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WATER FOR FIREFIGHTING IN SOL PLAATJE MUNICIPALITY, NORTHERN CAPE, SOUTH AFRICA.

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A research report submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, in partial fulfillment of the requirements for the degree of Master of Science in Engineering.

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ABSTRACT

In South Africa, SANS 10090 (SABS, 2018a) and the Red Book (DHS & CSIR, 2019) recommend that for firefighting municipal water distribution systems must have and maintain the capacity to provide water for firefighting purposes. van Zyl & Haarhoff (2007) state that the provision of water for firefighting is a dominant design consideration as it influences the sizing and outputs of critical components. Scheepers (2012) argues that fire flows acts 'as the most limiting demand condition' as when it required it is extracted in large quantities for a short period. The most commonly used fire flow values in the SANS 10090 have largely remained unchanged for several decades. In other words, these values have not been revised to take account of the evolution of municipal water consumption over more than 30 years. This suggests that the recommended water requirements for firefighting may no longer be fit for purpose.The literature review revealed that the fire flows in the Red book violates the same in the SANS 10090 - this is illegal as the SANS 10090 specifies enforceable absolute limits. Furthermore, the Red book and SANS 10090 provide different fire risk classifications and values for the different parameters and as such, inconsistent and lack uniformity.

It is important for design engineers to have accurate input data when planning and designing for fire flow requirements as any deficiency in basic design information could lead to an insufficient capacity to fight fires or an over-design of water supply infrastructure. A question arose from these observations, which provided inspiration for this study: Are fire flows in the SANS 10090 and Red book appropriate for current firefighting efforts? In answering this question, the first step of this study was to identify participating municipalities that were willing to release their datasets on firefighting for this study. Sol Plaatje municipality was one of the willing municipalities. This study thereafter categorised and analysed information contained in the 3236 fire incident reports that occurred within Sol Plaatje Municipality during the period 21 July 2017 to 21 August 2020, and compared actual fire flow volumes and flow rate data against the SANS 10090, Red book and previous South African studies. In order to provide context and aid better understanding of the datasets, structured interviews were conducted with municipal officials responsible for firefighting operations at Sol Plaatje municipality.

Key highlights of this study indicated: ~ 93.3% of fires in Sol Plaatje municipality were extinguished using 7 Kℓ or less of water. This result is similar to previous studies- In a 2014 study more than 90% of fires in 5 Western Cape Towns were extinguished using less than 10 Kℓ of water; In a 2019 study, 75% of fires in the City of Johannesburg were extinguished using less than 6.60 Kℓ of water; and In a 2022 study, 87% of fires in the City of Johannesburg were extinguished using 10 Kℓ or less of water. Overall, 75%-93% of fires were extinguished in the various study areas using 10 Kℓ or less of water. For large fires in Sol Plaatje municipality, the average water volume used to extinguish 85 large Category 2 fires was 8.56 Kℓ or less of water. This finding is similar to that of the Western Cape 2014 study and the 2022 City of Johannesburg study that found that 8.6 Kℓ and 9.63 Kℓ or less of water extinguished 77 and 89 large category 2 fires, respectively. What is evident from the results is that the volumes of water used in Sol Plaatje and previous studies are significantly less that the specified values in SANS 10090 and the Red book. An adverse consequence of higher values is that it leads to an over-design of water supply infrastructure as it increases the volume of municipal storage required for firefighting and consequently, increases the total capacity of municipal storage. Increased storage capacity increases resources that are expended, as well as water retention times, which negatively affects water quality. This study validates the recommendations of previous studies that the fire flows in the SANS 10090 and Red book need to be revised to enable the efficient conservation of scarce water resources and optimal design of water systems.

Keywords: water for firefighting; SANS 10090 and the Red book

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LIST OF ABBREVIATIONS AND ACRONYMS

AADD	-	Annual Average Daily Demand
AWWA	-	American Water Works Association
CBD	-	Central Business District
COJ	-	City of Johannesburg
CSIR	-	Council for Scientific and Industrial Research
DVGW	-	Deutscher Verein des Gas- und Wasserfaches (DVGW) (the technical and scientific association for gas, water regulations and standards in Germany
GPS	-	Global Positioning System
FPASA	-	Fire Protection Association of South Africa
FPASA Category 2 fires	-	Fires the Fire Protection Association of South Africa classifies in the 'Formal Structural' and 'Industry'
GB 50974-2014	-	Technical code for fire protection water supply and hydrant systems of the Peoples Republic of China
IDP	-	Integrated Development Plan
MOHURD	-	Ministry of Housing and Urban-Rural Development of the Peoples Republic of China
NZSC	-	New Zealand Standards Council
OBC	-	Ontario Building Code
ISO	-	Insurance Service Office
IWA	-	International Water Association
RSA	-	Republic of South Africa
SABS	-	South African Bureau of Standards
SANS 10090	-	South African National Standard: Community Protection against Fires
SANS 10252-1	-	South African National Standard: Water supply and drainage for buildings Part 1: Water supply installations for buildings
SANS 10400-T	-	South African National Standard: National Building Regulations – Part T: Fire Protection
SNZ PAS 4509	-	New Zealand Fire Service Firefighting Water Supplies Code of Practice
SPM	-	Sol Plaatje municipality

RED BOOK	-	The Neighbourhood Planning and Design Guide: Creating Sustainable Human Settlements
UNESCO-IHP	-	United Nations Educational, Scientific and Cultural Organization - Intergovernmental Hydrological Programme
WDS	-	Water distribution system
WSDP	-	Water Services Development Plan
WRG	-	Water Research Group

LIST OF SYMBOLS

A_f	-	Fire area (m²)
c	-	Capita
d	-	Day
F_T	-	Initial total tanker volume (firefighting vehicle)
F_F	-	Fire flow volume as per fire record
F_{UF}	-	View Factor
$F_{u,total}$	-	sum of the view factors for the four exposing building faces
h	-	Hour
Kℓ	-	Kilo Litre
Km	-	Kilometre
ℓ	-	Litre
m	-	Meter
m²	-	Square meter
m³	-	Cubic meter
min	-	Minute
MJ	-	Megajoule
Mℓ	-	Mega Litre
mm	-	Millimetre
mpa	-	Megapascal
n_o	-	Cooling efficiency of water for offensive operations
n_d	-	Cooling efficiency of water for defensive operations
Ø	-	Diameter
s	-	Second
w^n	-	Fire load density (MJ/m²)

CHAPTER 1 INTRODUCTION

1.1 BACKGROUND OF THE STUDY

In South Africa, potable water is consumed beyond sustainable levels amidst growing water shortage conditions. Mc Kenzie et al (2012) estimated South Africa's total urban water consumption in 2012 to be about 4 292 million m³/annum. According to Ngobeni & Breitenbach (2021) the average per capita domestic water consumption in South Africa is around 237 ℓ/c/d and this exceeds the world average of about 173 ℓ/c/d. This is a clear indication of what is termed 'a growing water crisis' by UNESCO-IHP (2008).

The 2030 Water Research Group (WRG, 2009) projected South Africa's water demand for 2030 to be 17 000 million m³ per annum against an estimated yield of 15 000 million m³ per annum. In other words, water demand is expected to exceed available water resources by 12% in the next 10 years. These statistics provide a compelling case to re-evaluate the way in which water is utilised in South Africa. One way of achieving this is to disaggregate municipal water supply components and make each component more efficient.

Water for firefighting is one of the components of municipal water supply. According to Scheepers (2012) fire flows acts 'as the most limiting demand condition' as when it required it is extracted in large quantities for a short period. Van Zyl & Haarhoff (2007) state that the provision of water for firefighting is a dominant design consideration as it influences the sizing and outputs of critical components in municipal water distribution systems. The SANS 10090 (SABS, 2018a) and Red book (DHS & CSIR, 2019) recommend that for firefighting municipal water distribution systems must have and maintain the capacity to provide water for firefighting purposes. It is evident that the provision of water for firefighting purposes is not only of high importance within municipal water distribution systems, but must be catered for.

The most commonly used fire flow values in the SANS 10090 (SABS, 2018a) have largely remained unchanged for several decades. In other words, these values have not been revised to take account of the evolution of municipal water consumption over more than 30 years. As such, the specified water requirements for firefighting may no longer be fit for purpose.

It is important for design engineers to have accurate input data when planning and designing for fire flow requirements as any deficiency in basic design information could lead to an insufficient capacity to fight fires or an over-design of water supply infrastructure. An adverse consequence of an over-design is that it increases the volume of municipal storage required for firefighting and consequently, increases the total capacity of municipal storage. Increased storage capacity increases resources that are expended, as well as water retention times, which negatively affects water quality.

A question arises from these observations, which provided inspiration for this study:

Are fire flows in the SANS 10090 (SABS, 2018a) and Red book (DHS & CSIR, 2019) appropriate for current firefighting efforts?

In answering this question, the first step of the study was to identify participating municipalities that were willing to release their datasets on firefighting for this study. Sol Plaatje Municipality was one of the willing municipalities. By understanding water requirements for firefighting purposes, with case specific datasets within Sol Plaatje Municipality, a more proactive approach to water demand management within the municipality may be facilitated.

1.2 PROBLEM STATEMENT

In South Africa, the water requirements for firefighting purposes within municipal water distribution systems is obtained either from the SANS 10090 (SABS, 2018a) or the Red book (DHS & CSIR, 2019). The SANS 10090 and Red book provide for design parameters such as fire flows, fire risk classification, fire duration and residual water pressures. Design engineers employ these parameters when determining water requirements for firefighting in any municipal area and the subsequent design of water supply networks.

Several studies have been conducted in South Africa particularly by van Zyl & Haarhoff (1997); Myburgh & Jacobs (2014); Mac Bean & Ilemobade (2019) and Essack & Ilemobade (2022). van Zyl & Haarhoff (1997) investigated design parameters such as fire flow, fire duration, fire storage volume, residual fire pressure and cost sensitivity relating to fire water supply and benchmarked them against international and South African standard. The study found that in the high risk categories, the values in the South African standard were much higher than that used internationally. This inevitably impacted the cost implications of implementing municipal water distribution systems. Myburgh & Jacobs (2014) investigated the extent to which the municipal water distribution system was used for extinguishing fires. The study found that 91.4% of fires were extinguished with non-reticulated water supplies. Mac Bean & Ilemobade (2019) observed that the fire flows in the Red book (DHS & CSIR, 2019) violates same in the SANS 10090 (SABS, 2018a) - this is illegal as the SANS 10090 specifies the enforceable absolute limits, and should not without reasonable grounds be violated. Also, the Red book and SANS 10090 provide different fire risk classifications and values for the different parameters and were inconsistent and lacked uniformity.

The above limitations and contradictions emanating from previous studies would have consequently resulted in increased sizes for storage, pipes and pumps (van Zyl & Haarhoff, 2007). This translates into increased infrastructure costs, longer retention times that may affect water quality negatively, higher physical leakages, higher non-revenue water volumes and generally a larger water demand base.

In light of the above, fire flows in the SANS 10090 (SABS, 2018a) and Red book (DHS & CSIR, 2019) need revision and this revision can only be realised after extensive

analysis of empirical firefighting data from different sources. This study seeks to contribute to this revision by analysing Sol Plaatje Municipality firefighting equipment and fire incident reports and comparing actual fire flows against the SANS 10090 (SABS, 2018a), Red book (DHS and CSIR, 2019) and previous South African studies (van Zyl & Haarhoff, 1997; Myburgh & Jacobs (2014); Mac Bean & Ilemobade (2019) and Essack & Ilemobade, 2022).

1.3 RESEARCH OBJECTIVES

This study seeks to address the main research question: *Are fire flows in the SANS 10090 (SABS, 2018a) and Red book (DHS & CSIR, 2019) appropriate for current firefighting efforts?* The response to this question will be achieved through the following research objectives:

- To conduct a detailed literature review on firefighting within municipal water distribution systems;
- To categorise and analyse fire flows, based on actual fire flow volumes and flow rate data during fire incidents in Sol Plaatje Municipality;
- To compare the SANS 10090 and Red book fire flow requirements against analysed firefighting operations in Sol Plaatje Municipality and previous South African studies (van Zyl & Haarhoff, 1997; Myburgh & Jacobs, 2014; Mac Bean & Ilemobade, 2019 and Essack & Ilemobade, 2022);
- To investigate large fires at Sol Plaatje municipality;
- To make recommendations to guide future revisions to the South African SANS 10090 (SABS, 2018a) and Red book (DHS and CSIR, 2019) for the provision of water for firefighting.

1.4 RESEARCH QUESTIONS

The research objectives of this study were achieved through seeking answers to the following questions as indicated in Table 1-1.

Table 1-1 Research objectives and research questions

No	Research Objectives	Research Questions
1	To conduct a detailed literature review on firefighting within municipal water distribution systems.	• What studies in the literature relate to the objectives of this study?
2	To categorise and analyse fire flows, based on actual fire flow volumes and flow rate data during fire incidents in Sol Plaatje Municipality;	• Where are the databases containing firefighting infrastructure and records for Sol Plaatje municipality located? • In what format (hardcopy and/or softcopy) are the databases and what are the contents of the databases? • What are the processes and equipment employed by the fire services department from the minute a fire event is reported to when the fire has been extinguished? • Which risk categories do fire in Sol Plaatje municipality mostly fall into and what are the range of fire flows and water volume?
3	To compare the SANS 10090 and Red book fire flow requirements against analysed firefighting operations in Sol Plaatje Municipality and previous South African studies (van Zyl & Haarhoff, 1997; Myburgh & Jacobs, 2014; Mac Bean & Ilemobade, 2019 and Essack & Ilemobade, 2022);	• What is the state of firefighting in Sol Plaatje Municipality? • How do the results of this study compare with the research findings of previous studies or initial predictions made in the literature review process?
4	To investigate large fires at Sol Plaatje municipality	• Are the minimum fire flows stipulated in the SANS 10090 and Red book adequate for extinguishing large fires at Sol Plaatje Municipality?
5	To make recommendations to guide future revisions to the SANS 10090 (SABS, 2018a) and Red book (DHS and CSIR,	• What are the conclusions and recommendations of this study against the

No	Research Objectives	Research Questions
	2019) for the provision of water for firefighting.	SANS 10090, Red book and previous studies on water for firefighting?

1.5 SCOPE AND LIMITATIONS OF THE STUDY

The scope of the study was to investigate water employed for firefighting purposes within municipal water distribution systems. To avoid bias in sampling, informal discussions were held with municipal officials from nine municipalities that are located across four districts within the Northern Cape province. This was done to ascertain whether datasets on firefighting were available and whether the municipality was willing to provide such datasets for this research project. Sol Plaatje Local municipality indicated that they had datasets on firefighting and these data sets were provided for this study.

Raw firefighting data were obtained from fire incident reports recorded between 21 July 2017 to 27 August 2020 from Sol Plaatje municipality. The fire incident reports contained the following records: fire incident number, date, physical address, time period (i.e. time received, time out, time of arrival at the scene and time of return to the station), duration of incident, number of personnel, vehicles deployed, probable cause of incident, fire risk categories and volume of water used. This study subsequently collected, filtered and analysed the dataset of Sol Plaatje Municipality and compared it against the values stipulated in the SANS 10090 (SABS, 2018a), Red book (DHS and CSIR, 2019) and the results of previous studies (van Zyl & Haarhoff, 1997; Myburgh & Jacobs, 2014; Mac Bean & Ilemobade, 2019 and Essack & Ilemobade, 2022).

The results of this study will be limited to the existing standard operating procedures employed by Sol Plaatje municipality on fire incident reporting, the associated firefighting strategies, the vehicles and equipment deployed during firefighting events. The study is also limited by the fact that it relies on firefighting data obtained from the Sol Plaatje Municipality that is deemed to be correctly captured and recorded.

In addition, the study is limited to water sourced from municipal water distribution systems as a fire extinguishing agent and does not take cognisance of other

firefighting systems or agents. This delineation is not an anomaly in South Africa, as various studies (van Zyl & Haarhoff, 1997; Myburgh & Jacobs, 2014; Mac Bean and Ilemobade, 2019; Essack and Ilemobade, 2022) indicate that that the majority of fires fought by public fire services in South Africa uses water sourced from municipal water distribution system as the most commonly used agent for firefighting purposes.

A questionnaire was developed as a research instrument to facilitate a better understanding of the obtained firefighting data. The questionnaire formed second layer of data collection. The reviewed literature was used to develop the questionnaire. The following topics were addressed in the questionnaire:

- The procedure for fire incidents reporting;
- Firefighting strategies and resource allocations;
- Infrastructure (including fleet specifications);
- Fire hydrants and the water distribution system;
- Other factors influencing firefighting processes.

The questionnaire was administered to three officials who were responsible for firefighting at Sol Plaatje municipality (i.e., Acting Senior Manager: Emergency Services, a Logistics Officer and a Firefighter). The selection criteria for the officials was based on their roles and responsibilities at the Fire Station. The structured interviews required that the officials be asked the same questions in the same way.

1.6 METHODOLOGY EMPLOYED TO ACHIEVE RESEARCH OBJECTIVES

Table 1.2 was adopted from Saunders et al (2012) and modified; it shows the methodologies employed to achieve each research objective.

Table 1.2 Methodologies employed to achieve research objectives (Saunders et al., 2016).

No	Research Objectives	Research Questions	Methodologies Employed
1	To conduct a detailed literature review on firefighting within municipal water distribution systems.	• What studies in the literature relate to the objectives of this study?	• In conducting the literature review, articles were sourced from ASCE Journals, Science Direct, Springer Collection, Sabinet Legal, Research gate, Taylor & Francis, Municipal Demarcation Board, Statistics South Africa, Water Research Commission, American Water Works Association and International Water Association; • These terms were used during the literature search: 'water demand', 'water conservation / water demand management', 'water use efficiency', 'water security', 'bulk water distribution systems', 'firefighting', 'fire flow', 'water in firefighting', 'fire statistics', 'fire prevention elements', 'fire suppression elements', 'fire flow methodologies', 'fire water guidelines in South Africa", 'SABS provisions on firefighting';
2	To categorise and analyse fire flows, based on actual fire flow volumes and flow rate data during fire incidents in Sol	• Where are the databases containing firefighting infrastructure and records for Sol Plaatje municipality located? • In what format (hardcopy and/or softcopy) are the databases and what are	• Discussions were held with municipal officials from nine municipalities that are located across four districts within the Northern Cape, to identify whether they had relevant datasets on firefighting and was willing to release them for this study. Sol Plaatje Municipality was one of the willing municipalities; • The dataset acquired consisted of **3236** fire incident reports from Emergency Services of Sol Plaatje Municipality that occurred between **21 July 2017 to 27 August 2020;** • The 3236 incident reports was manually transferred from hard copies and organised into 18 headings in an MS Excel spreadsheet as shown in Figure 5-1. Afterwards, the transferred data

No	Research Objectives	Research Questions	Methodologies Employed
	Plaatje Municipality;	the contents of the databases? • What are the processes and equipment employed by the fire services department from the minute a fire event is reported to when the fire has been extinguished? • Which risk categories do fire in Sol Plaatje municipality mostly fall into and what are the range of fire flows and water volume?	was subjected to an extensive data cleaning process for "data capturing irregularities such as spelling mistakes and missing data", "sequencing of incidents from the first incident to the last", "duplicates of incidents", "no services rendered" and "missing incident forms from the file"; • At the end of the data cleaning process 1186 incidents were deleted. The filtered dataset that remained for data analysis were **2060** records from the period **21 July 2017 to 27 August 2020**; • A combination of descriptive and inferential statistics was used to categorise and analyse the data into themes employed in the SANS 10090 (SABS, 2018a) and Red book (DHS & CSIR, 2019) and previous studies (i.e. van Zyl & Haarhoff, 1997; Myburgh & Jacobs, 2014; Mac Bean & Ilemobade, 2019 and Essack & Ilemobade, 2022).
3	To compare the SANS 10090 and Red book fire flow requirements against analysed firefighting operations in Sol Plaatje	• What is the state of firefighting in Sol Plaatje Municipality? • How do the results of this study compare with the requirements in the SANS 10090, Red book and the	The comparison between the SANS 10090, Red book, previous studies and filtered dataset of 2060 records of Sol Plaatje Municipality spanning from 21 July 2017 to 27 August 2020 was conducted in the following manner: • Scatter plots was constructed to present the magnitude and temporal distribution of fire flows and water volumes of the filtered dataset of 2060 records of Sol Plaatje Municipality against superimposed values of the SANS 10090 and Red book. In this way, the relationship between the values in the SANS 10090 and Red book was interchangeably assessed against the findings of Sol Plaatje Municipality and previous studies;

No	Research Objectives	Research Questions	Methodologies Employed
	Municipality and previous South African studies (van Zyl & Haarhoff, 1997; Myburgh & Jacobs, 2014; Mac Bean & Ilemobade, 2019 and Essack & Ilemobade, 2022);	findings of previous studies?	• Histograms were constructed for the filtered dataset of 2060 records of Sol Plaatje Municipality to visually display the categorisation of fire types, the average number of incidents and the frequency distribution of fire duration. This allowed for a comparative assessment to be conducted between the SANS 10090, Red book, previous studies and filtered dataset of 2060 records of Sol Plaatje Municipality; • A contingency table was compiled between the variables fire types, average fire flows and water volumes used of Sol Plaatje municipality and previous studies. This allowed for the patterns between the variables to be assessed; • A cumulative probabilty plot was constructed to provide a graphical representation of the cumulative percentage distribution against the water volumes used of Sol Plaatje Municipality and previous studies.
4	To investigate large fires at Sol Plaatje municipality	• Are the stipulated requirements in the SANS 10090 and Red book adequate for extinguishing large fires at Sol Plaatje Municipality?	Large fires – fires that used more than 5 Kℓ of water (van Zyl & Haarhoff, 1997) at Sol Plaatje Municipality were investigated as follows: • Firstly, the dataset of 2060 incidents was filtered for all FPASA Category 2 incidents. FPSA Category 2 incidents are fires that the Fire Protection Association of South Africa categorises as 'Formal Structural' and 'Industry' (FPASA, 2011), which are the only categories that aligns with the descriptions of fire risk categories in the SANS 10090 (SABS, 2018a) and more likely to occur in a reticulated area with hydrants. At the end of the filtering, 603 incidents remained; • Scatter plots were constructed to present the magnitude and temporal distribution of fire flows and water volumes for the filtered dataset of 603 records for Sol Plaatje municipality against superimposed values from the SANS 10090 and Red book;

No	Research Objectives	Research Questions	Methodologies Employed
			• Histograms were constructed for filtered dataset of 603 records of Sol Plaatje municipality to visual display the frequency distribution of fire duration and water volumes used; • The frequency distribution of water volumes indicated that out of 603 incidents, 516 incidents used between 0 and 5 Kℓ of water to extinguish. As a result the 516 incidents were omitted from further analysis as they did not fit the definition of large fires; • Only 87 fires used more than 5 Kℓ. Two outliers was identified and removed as they had a significantly higher water usage from the rest of the incidents; • At the end 85 incidents remained for further analysis. This dataset is comparable to that of Myburgh & Jacobs (2014) and Essack & Ilemobade who found 77 FPASA Category 2 in their dataset of 554 incidents and 89 FPASA Category 2 fires in their filtered datasets of 477 incidents, respectively; • Similar analyses was conducted for the 85 fires by constructing scatter plots for the presentation of the magnitude and temporal distribution of fire flows and water volumes, histograms for the frequency distribution of fire duration and cumulative probability plot water volumes used visualisation of magnitude and temporal distribution of fire flows and water volumes, Multimodal distribution of the 85 fires was conducted using histograms, cumulative probability plot cumulative percentage distribution against the water volumes used, and were compared against the values in the SANS 10090, Red book and obtained results from previous studies applicable to large fires. In this way, patterns between variables such as water used and fire duration could be observed and reported.
5	To make recommendations to guide future revisions to the	• What are the conclusions and recommendations of this study against the SANS 10090, Red book	The recommendations of this study were mainly drawn from the results and observations made on parameters such as: • Operations and organisation of the fire services at Sol Plaatje municipality compared against same recommendations in the SANS 10090 (i.e. pumping units and personnel when responding to

No	Research Objectives	Research Questions	Methodologies Employed
	SANS 10090 (SABS, 2018a) and Red book (DHS and CSIR, 2019) for the provision of water for firefighting.	and previous studies on water for firefighting?	callouts; average call receipt time, average turnout time, average travel time, average attendance times; emergency telephone lines and the useful life of vehicles and equipment); • Fire flows and water volumes employed at Sol Plaatje municipality were compared against recommendations in the SANS 10090, Red book and previous studies; • Fire risk classifications used at Sol Plaatje municipality were compared against recommendations in the SANS 10090 and Red book; • Fire duration and storage volumes used at Sol Plaatje municipality compared against recommendations in the SANS 10090, Red book and previous studies.

1.7 VALIDITY AND RELIABILITY

The concepts of validity and reliability are two indispensable features that ensured integrity and enhanced the quality of the results in this study. Validity was mainly concerned with whether the inferences made about the findings are meaningful and serve the intended purpose of addressing the research objectives. In other words, validity determined the extent or degree to which "what was intended to be measured was measured" (Field, 2005).

On the other hand, reliability was concerned with the stability and consistency of the results (Taherdoost, 2017). The objective of reliability was to evaluate the extent to which the obtained datasets were appropriate and were able to produce consistent results when compared to previous studies. Reliability determined whether the results of the study can be trusted. In other words, if similar findings were achieved by using the same procedures as described in previous studies, the findings are considered reliable.

As an illustration, the literature review demonstrated the knowledge and understanding of the type of data that was required by defining the logical relationships that exists between the theoretical concepts. As discussed under sections 5.3 & 5.4, the datasets were acquired, the variables were defined and linked to the applicable statistical tools to be employed during analysis. Thereafter, the primary data was digitized, filtered and datasets with irregularities were removed.

The cleaned datasets that remained were collated and analyzed using descriptive and inferential statistics and criteria's that had been employed in SANS10090, the Red Book, the Fire Protection Association of South Africa's (FPASA) 2011 South African National Statistics report, and previous studies. In this way, by conducting a comparative analysis with previous studies and obtaining similar results, the accuracy of the results of this study was factually reliable and validated. In addition, interviews were carried out with officials responsible for firefighting, to validate the data in the cleaned datasets and to clarify information contained in some datasets. Thus, as a process from collecting and analyzing the data, validity and reliability was achieved.

1.8 CHAPTER OUTLINE

This study comprises nine chapters. The first chapter is an introduction that includes the background of the study, the problem statement, the research objectives and questions and the methodologies employed to achieve the research objectives of the study. The second chapter presents a literature review that deals with fire science, firefighting and water, peak demand patterns and fire flows, International and South African standards on water for firefighting, previous studies conducted on water for firefighting and legal and policy considerations. The third chapter provides a detailed description of the study area. The fourth chapter summarises the unresolved issues in the literature. The fifth chapter details the data collection methods that were utilised. In chapter six the structured interviews that were conducted and organisation of fire services at Sol Plaatje municipality are presented and discussed. In chapter seven and eight the results of fire flows used, water volumes used and large fires at Sol Plaatje municipality are compared and analysed against same in the SANS 10090, Red book and previous studies. Chapter nine concludes the research project by providing recommendations based on the obtained results of the study.

CHAPTER 2 LITERATURE REVIEW

2.1 INTRODUCTION TO LITERATURE REVIEW

This chapter addresses research objective I (i.e. to conduct a detailed literature review on firefighting within municipal water distribution systems). In that way, this segment of the literature review provides context and explanations to the research question that is linked to research objective I: *What studies in the literature relate to the objectives of this study?* An extensive and focused review of the literature was conducted in an attempt to outline what is known and what is not yet known as a theoretical foundation to respond to the research question.

The organisation of the literature review starts by addressing the broad topic of fire science with particular reference to combustion chemistry. The approach to extinguishing fires is outlined along with selecting water as an appropriate extinguishing agent, this provides an explanation on why water is preferred over other extinguishing agents. Peak demand patterns are presented to highlight the temporal variation in water consumption activities within municipal water distribution systems and to ascertain whether the probability of the biggest fire incident occurring at the same time as peak demand is catered for, this is an important design consideration as it reflects an overall system pattern.

A thorough review is provided on standards and guidelines used internationally and in South Africa to define and interpret design parameters such as fire flows, fire risk classification, fire duration and residual water pressures. A review of legal and policy considerations was conducted to present the applicable legal framework. Previous studies was reviewed to demonstrate an in-depth understanding of existing knowledge, thereby setting up the importance and need for this study. To be more concise, the previous studies identified the gaps in the body of knowledge that led to the discovery of unresolved issues in the literature.

For the sake of brevity on the literature review process, Figure 2.1 shows the interface of reviewed literature topics. It should be noted that a more detailed review on the study area and unresolved issues in the literature are discussed in chapters 3 and 4, respectively.

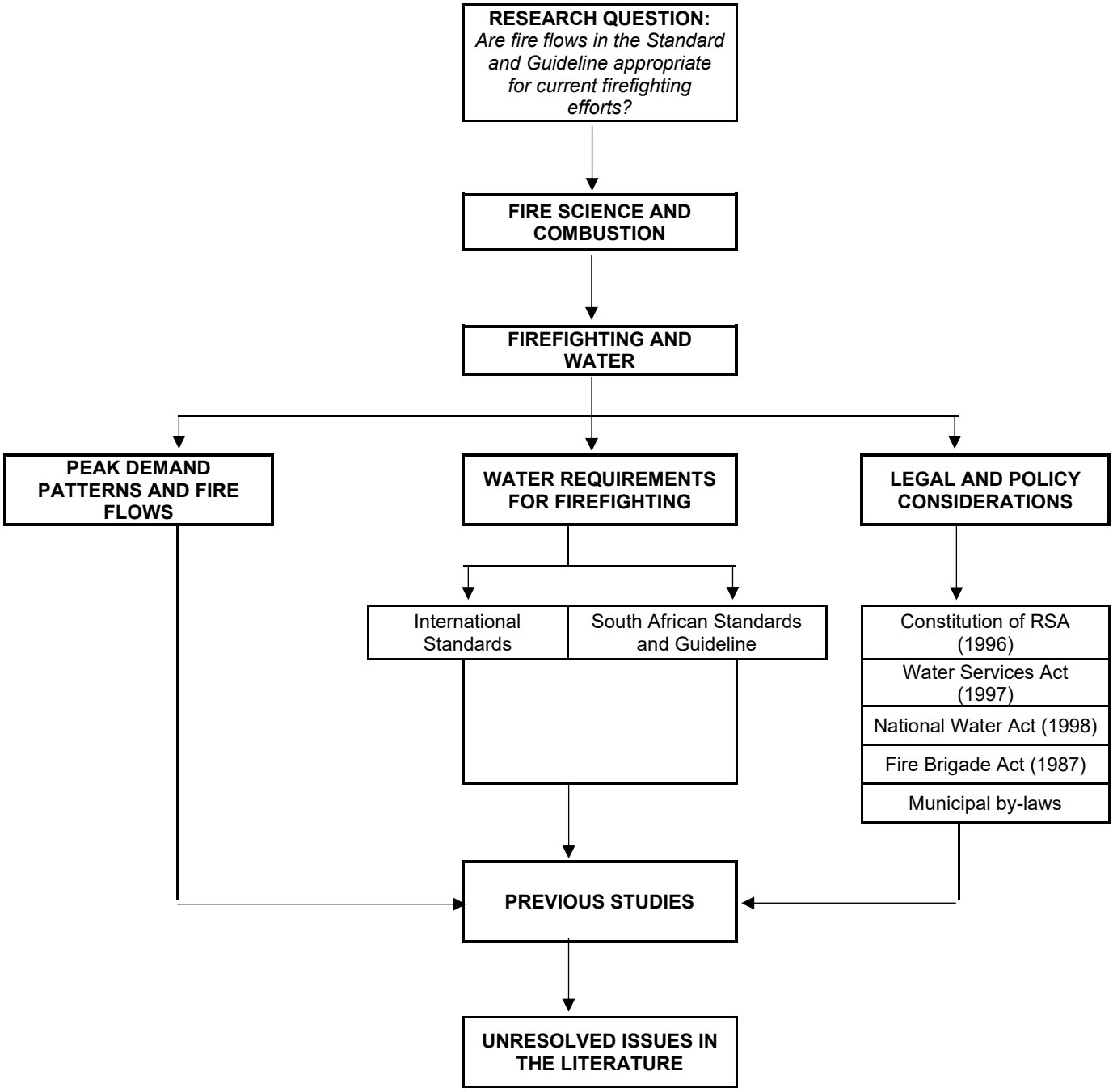

Figure 2-1 Interface of reviewed literature topics

2.2 FIRE SCIENCE AND COMBUSTION

Fire is a rapid exothermic chemical reaction that gives off energy in the form of heat and light in varying intensities and frequencies. The rapid exothermic chemical reaction is also known as combustion. Berger (2017) state that combustion occurs when fuel or other material reacts rapidly with oxygen, giving off light, heat, and flame. A flame is produced during the ignition point in the combustion reaction and is the visible, gaseous part of a fire.

According to Voelkert (2015) and Myburgh (2012), for a fire to occur it requires four basic elements i.e. heat, fuel, oxygen and a chemical chain reaction, that maintains the fire. These four elements are called a fire tetrahedron as shown in Figure 2-1. The purpose of the fire tetrahedron is to provide a simple geometric representation of the combustion process. The fire tetrahedron provides a good analogy of how to theoretically suppress a fire, by creating a buffer between the four elements.

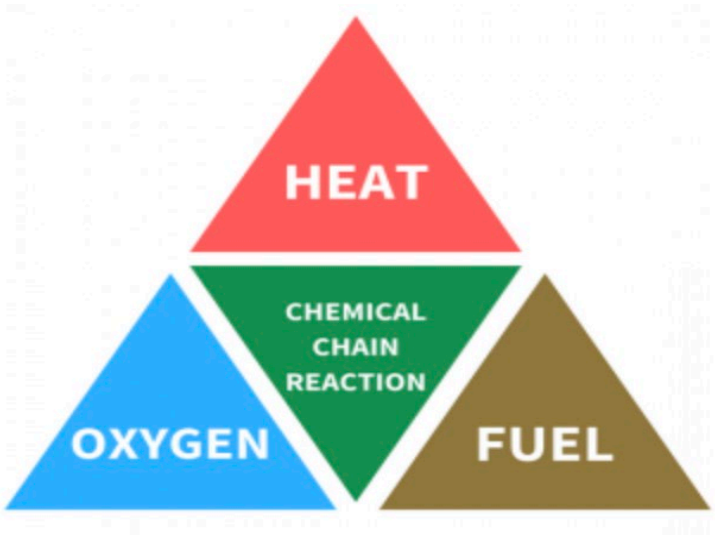

Figure 2-2 Fire tetrahedron (Voelkert, 2015)

Once the fire tetrahedron elements are present, fire will continue to propagate based on the heat transfer mechanism. The heat transfer mechanisms are relatively simple and are vital to the understanding of the fire itself. The heat transfer mechanisms simply indicates how heat may be transferred from one object to another or one material to another. Voelkert (2015) describes the three heat transfer mechanisms as:

- **Conductive heat** - the transfer of heat through a solid by direct contact;

- **Convective heat** - transfer of heat through a circulating fluid or gas (such as air); and
- **Radiant heat** - transfer of heat without direct contact or heating a fluid or air between the objects. Heat is transferred via electromagnetic waves transferred from one object to the other.

The physical shape and state of the fuel, the available oxygen, and the transmission of heat, all play vital roles in fire development. While each fire is different, all fires follow certain predictable patterns. In fire science, the development of fire can be divided into five different stages; incipient, flame growth, flashover, fully developed and decay as shown in Figure 2-2.

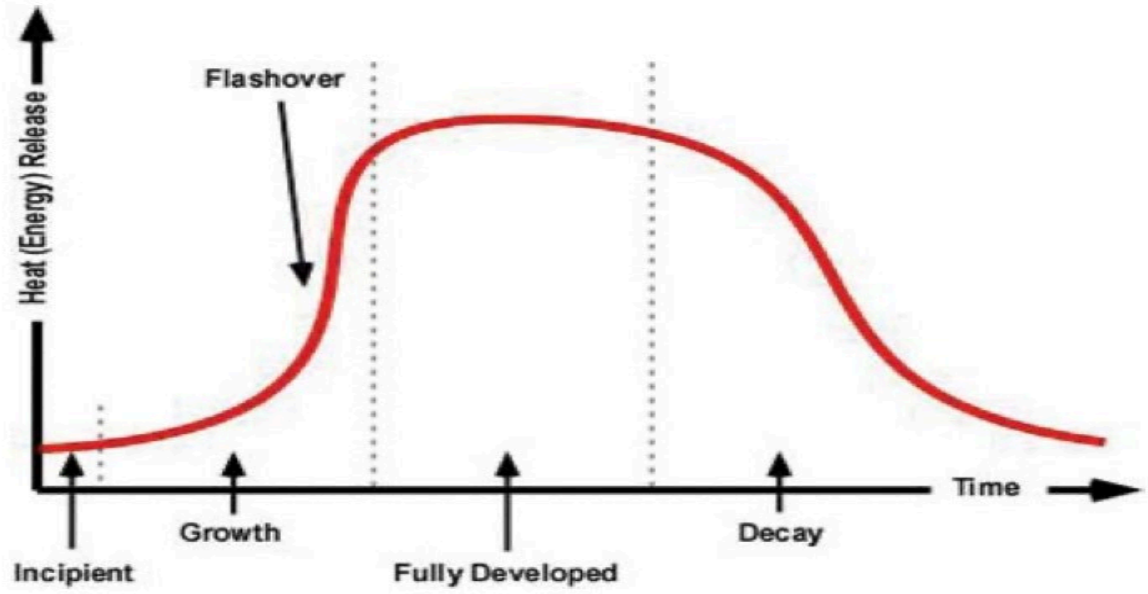

Figure 2-3 Development of fire (Berger, 2017)

In Figure 2-2 the development of fire at the incipient stage is dependent on the characteristics and configuration of the fuel involved. If there is enough oxygen, additional fuel will become involved and the heat release rate from the fire will increase; this is considered the growth stage. The flashover point is the sudden transition from a growth stage to fully developed fire. The transition from growth stage to full developed stage is rapid, this means the energy released is at its peak but is limited by ventilation. When the available fuel is consumed or there is limited oxygen, the fire is then considered in decay stage (Hartin 2008). During the decay stage, the rate of burning slows down as less fuel is available.

2.3 FIREFIGHTING AND WATER

2.3.1 Extinguishing Fires

The basic approach to fire extinguishment is to select the appropriate fire extinguishing agent based on the fire class and categories of the combustible elements. In other words, an assessment should be carried out on what is burning (e.g. wood, paper, cloth, diesel fuel, electrical equipment and combustible metals such as sodium, magnesium, and titanium) and then afterwards determine the appropriate fire extinguishing agent. In practice, the assessment of the combustible elements is often restricted by the fact that a fire incident is an emergency and wholly reactive in nature.

Voelkert (2015) and Gonzales (2020) state that a fire can be extinguished by eliminating any one or combination of the four elements in the fire tetrahedron. However, this ideology is too simple to explain how fires are extinguished. It is better suited when it describes the ingredients needed for combustion, but not for outlining the mechanisms by which fires are extinguished. According to Särdqvist (2002) a fire is eliminated when the extinguishing agent produces a chemical effect that reduces the chemical reaction's velocity below the minimum level needed to sustain the combustion process. As such, it is essential to select the appropriate extinguishing agent to effectively eliminate fires.

Epralima (2008) and Mac Bean (2019) state that upon selecting the appropriate extinguishing agent, there are four key methods that can be utilised to extinguish or control a fire:

- **Cooling** - It is the most common method and consists in lowering the temperature of the combustible element and the environment, below its ignition point.
- **Smothering** - It is the method which consists in isolating the combustible element and oxygen, or reduces their concentration within the environment.
- **Dilution or Elimination of combustible element** - It is the method which consists of separating the combustible element from the heat source or the environment of the fire.
- **Control of flames or Interruption of the chain reaction** - This method modifies the chemical reaction, altering the release of free radicals produced in the combustion and therefore delaying its development.

Mac Bean (2019) state that the majority of fires fought by public fire services in South Africa uses the method of cooling. As a result, water is the most commonly used fire extinguishing agent. Water is also commonly used because it is available in large quantities and it is easy to transport.

Various studies (van Zyl & Haarhoff, 1997; Hadjisophocleous & Richardson, 2005; Kanta and Brumbelow, 2013; Yadav & Patel, 2014; Myburgh & Jacobs, 2014; and Mac Bean & Ilemobade, 2019) indicate that water sourced from municipal water distribution system is the most commonly used agent for firefighting purposes. Särdqvist (2002) and Myburgh (2012), take this observation further by stating that the quality of water makes it an attractive fire extinguishing agent, as the physical properties of water such as the freezing and boiling point which may occur in a solid, liquid and gaseous forms mean that it is an effective combatant of heat, fuel, oxygen.

This means, if water is sprayed onto a burning surface, the surface temperature will fall and the production of pyrolysis gases will be reduced. The fuel concentration in the fire will decrease and less heat will be generated. At the same time, the oxygen concentration will decrease due to the steam produced. Thus, using water has an impact on all three sides of the fire tetrahedron.

It follows then that the municipal water distribution systems must have and maintain adequate capacity to meet the water requirements for firefighting purposes. The engineering aspects involved in achieving this objective include selecting the appropriate materials, sizing of pipes, pumps, valves, storage facilities and water demand management (DHS & CSIR, 2019; Yazdani and Jeffrey, 2012).

In hydraulic design terms, this means supplying adequate volumes of water at reasonable pressure and velocities for firefighting purposes. This is achieved by applying accurate input data for fire flow rates, fire risk categories, fire duration and residual pressures. In this way, sound engineering principles and technical justifications are observed when planning and designing for fire flow requirements in municipal water distribution systems.

2.4 PEAK DEMAND PATTERNS AND FIRE FLOWS

A water distribution system is in a ‘peak demand’ state, when the pressure is at minimum acceptable levels and the flow rates and head losses in the network are at maximum acceptable levels (Jacobs & Strijdom, 2009). Mc Kenzie (2014) states that the peak demand state occurs at a particular time of the day and during specific months of the year. This simply means water demand changes its form on an hourly, daily, weekly, monthly and seasonal basis. This time-related change is alternatively known as ‘temporal variation in water demand’ within various literature sources (Umapathi et al., 2012; Beal & Stewart, 2014; Bergel et al., 2017 & Pretorius et al., 2019).

The repeated occurrence of the water consumption activities such as domestic and non-domestic activities creates measurable demand patterns. In other words, when one or a combination of these activities occurs, the demand patterns becomes more predictable as consumers tend to use water the same way at specific time periods (Trifunović, 2016). This is an important consideration when planning a water distribution system, as it reflects an overall system pattern.

For example, the daily peak demand is more prominent in the morning (between 06:30am – 08:30 am) and late afternoon (between 17:00 pm – 20:30 pm) for both the summer and winter seasons, respectively (Heinrich, 2007). As indicated in Figure 2-3, the major difference is in the volume of water consumed, which averages at 288ℓ/h in the morning and 151ℓ/h in the afternoon for the summer season; and winter season, it averages 330 ℓ/h in the morning and 110ℓ/h in the afternoon.

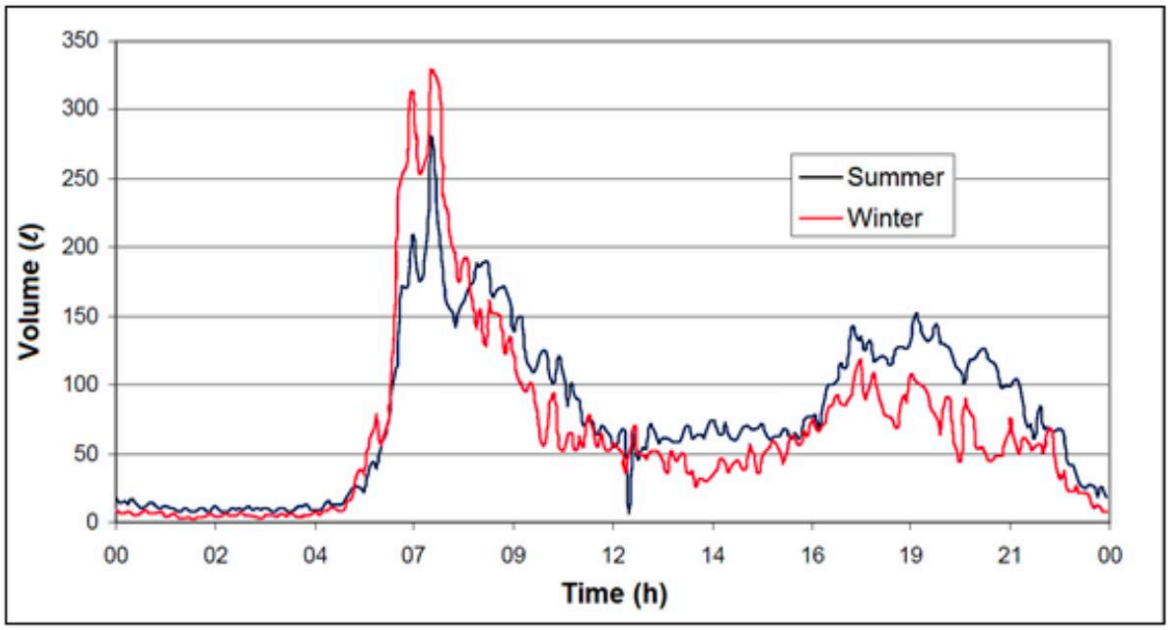

Figure 2 -4 Typical hourly, daily and seasonal water consumption pattern (Heinrich, 2007)

The characteristics of water distribution systems and the daily, weekly, monthly and seasonal water use patterns are likely to influence the design considerations for fire flows (Lucas et al., 2010). In North America, this probability is deemed too small to be considered in the design of water distribution systems (Jacobs & Strijdom, 2009). However, South African guidelines stipulate that fire flow water requirements should be added to the peak demand in a network; thus, the probability of fire incidents occurring at the same time as peak demand is always catered for.

2.5 WATER REQUIREMENTS FOR FIREFIGHTING

The following sections reviews the guidelines and standards used internationally and in South Africa to determine the water requirements for firefighting purposes.

2.5.1 International standards

2.5.1.1 Australia

In Australia, it is the responsibility of local water utilities to supply adequate volumes of water at reasonable pressures for firefighting (Hunter Water Australia, 2011). As a result, there is a general expectation from the public and private sectors that the water distribution systems provided by the local water utilities will be able to suppress fires at any time and at a reasonable rate.

The basic design approach adopted by a local water utility is to add the fire water demand to the base water demand of water distribution systems and ensure that other design considerations (such as network layouts, pipe sizes, pipe materials and spacing of hydrants) are capable of providing responsive firefighting capacity. Table 2-1 provides a summary of the Australian design criteria for water requirements for firefighting in reticulation systems (Hunter Water Australia, 2011)

Table 2-1 Australian design criteria for water requirements for firefighting in reticulation systems (Hunter Water Australia, 2011)

Description	Flow l/s
Fire Flow Provision	
Residential Buildings (3 Storeys or less)	600 ℓ /min
High Rise Residential	1200 ℓ /min
Commercial Area	1200 ℓ /min
Industrial Area	1200 ℓ /min
Residual Pressure	
Desirable Pressure in the main at the hydrant	150 kpa
Minimum pressure in the main at the hydrant	Must be positive
Reservoir Capacity	
Minimum reserve capacity in reservoir for firefighting	4 hours of 95th percentile demand and fire flow
Minimum Pipe Diameters	
Low Rise Residential (3 Storeys or less)	100 mm
High Rise Residential	150 mm
Commercial Area	150 mm
Industrial Area	150 mm
Hydrant Spacing	
Urban	Maximum 70 m
Rural Residential	Maximum 120 m
Rural	Not normally provided

The Council of Standards Australia lists other standards which are used inside buildings to determine requirements of fire flow performance at fire hose reels, fire hydrants and fire sprinkler systems. The standards are listed as follows:

- AS 2441: 2005 Installation of Fire Hose Reels (Standards Australia, 2005)
- AS 2419.1: 2017 Fire Hydrant Installations (Standards Australia, 2017a)

- AS 2118.1: 2017 Automatic Fire Sprinkler Systems Installations (Standards Australia, 2017b)

2.5.1.2 China

In China, the *GB* series of documents are alternatively referred to as the National Standards of the Peoples Republic of China. The *Technical code for fire protection water supply and hydrant systems GB 50974-2014* provides guidance on the design flow rates for fire water and fire hydrant systems. The Ministry of Housing and Urban-Rural Development (MOHURD) (2014), define fire water as water for firefighting facilities for vehicles or hand-carried and other mobile fire pumps, fixed fire pumps, municipal water supply, fire reservoir, gravity fire reservoir and natural water sources.

The technical code *GB 50974-2014* is managed simultaneously at multiple government departments in China. For example, the MOHURD publishes the code and is responsible for the interpretation of compulsory provisions. The compulsory provisions are marked in bold in the document and are enforceable**.** The Ministry of Public Safety is responsible for the daily management of the code, whilst the China IPPR International Engineering Corporation is responsible for interpreting case specific technical contents (MOHURD, 2014).

Common practice in the Peoples Republic of China requires the design engineer to consider fire flow capacity when determining the size of pipes, pumps, storage tanks and other appurtenances (Xiao et al., 2014). Thus, the *GB 50974-2014* standard controls the design by prescribing the design fire flow rates for municipal fire protection water supply, outdoor fire hydrants, outdoor structures, indoor hydrants, fire reservoirs and fire pumps, amongst others, “to ensure construction quality, standardise inspection, maintenance management, reduce fire hazards, protect personal and property safety” (MOHURD, 2014).

Table 2-2 shows the prescribed design fire flow rates for town areas. The code further state that the design fire flows for town should be determined according to “local fire statistics, firefighting water demand statistics, fire water demand guarantee rate, building composition, municipal water supply network rationality and other factors based on comprehensive analysis” (MOHURD, 2014).

Table 2-2 Design fire flows for town areas in the Peoples Republic of China (MOHURD, 2014).

Population (ten thousand)	Number of fires at the same time	Design flow rates for extinguishing a fire (ℓ/s)
N ≤ 1	1	15
1 < N ≤ 2.5		20
2.5 < N ≤ 5	2	30
5 < N ≤ 10		35
10 < N ≤ 20		45
20 < N ≤ 30		60
30 < N ≤ 40		75
40 < N ≤ 50	3	
50 < N ≤ 70		90
N > 70		100

Table 2-3 shows the prescribed design fire flow rates for outdoor hydrant for building. The code state that the design fire flows for outdoor hydrant for building should be determined according to the “building function, volume, fire rating, fire risk and other factors” (MOHURD, 2014).

Table 2-3 Design fire flows for outdoor hydrant for building in the Peoples Republic of China (MOHURD, 2014).

Fire Rating	Building Name and Type			Building Volume (m^3)					
				V ≤ 1500	1500 < V ≤ 3000	3000 < V ≤ 5000	5000 < V ≤ 20000	20000 < V ≤ 50000	V > 50000
Grade I and II	Industrial Building	Plant	A, B	15		20	25	30	35
			C	15		20	25	30	40
			D,E	15					20
		Warehouse	A, B	15		25		-	
			C	15		25		35	45
			D,E	15					20
	Civil Building	Residence		15					
		Public Building	Civil Building	15			25	30	40
			Civil Building	-			25	30	40
	Underground construction (including subway), peacetime and wartime air defence projects			15			20	25	30
Grade III	Industrial Building	B,C		15	20	30	10	45	-
		B,C		15			20	25	35
	Single Storey and multi-storey civil building			15		20	25	30	-
Grade IV	Industrial building of type D,E			15		20	25	-	
	Single Storey and multi-storey civil building			15		20	25	-	

2.5.1.3 Germany

In Germany, it is the responsibility of local government to provide adequate water for firefighting operations (DVGW, 2022). The determination of water for fighting using public water supply networks is guided by the Arbeitsblatt W 405. The Arbeitsblatt W 405 is a document published by the Deutscher Verein des Gas- und Wasserfaches (DVGW) which is the technical and scientific association for gas, water regulations and standards in Germany.

The DVGW (2022) recommend that the local authority is responsible for supplying only basic level of fire protection, this is called ‘base protection’. The DVGW (2022) also state that where the base protection is not enough, it is the responsibility of the building owner to ensure that his/her building has enough fire water, this is called ‘object protection’. In a case where the water distribution system requires an upgrade in order to cater adequately for the ‘object protection’ requirements, the local authority must

consider the health risk of longer retention times of water in the water distribution system.

The fire flow rates and corresponding pressures prescribed for fire hydrants are shown in table 2-4.

Table 2-4 Fire flow rates and corresponding pressures for fire hydrants in Germany (KSB Aktiengesellschaft, 2013)

<table>
<tr><th colspan="6">Required flow rates and pressure at outlet valves</th></tr>
<tr><th>Category</th><th>Flow rate</th><th>Simultaneous use</th><th>Minimum flow pressure</th><th>Max. flow pressure</th><th>Max. static pressure</th></tr>
<tr><td>Wall Hydrant Type S (for use by building occupants)</td><td>24 ℓ/min</td><td>2</td><td>0.20 Mpa</td><td rowspan="7">0.8 Mpa</td><td rowspan="7">1.2 Mpa</td></tr>
<tr><td rowspan="2">Wall Hydrant Type F (for use by firefighters)</td><td>100 ℓ/min</td><td>3</td><td></td></tr>
<tr><td>200 ℓ/min</td><td>3</td><td>0.30 Mpa</td></tr>
<tr><td>Surface hydrant DN 80</td><td>800 ℓ/min</td><td rowspan="3">As per fire protection plan</td><td>0.45 Mpa</td></tr>
<tr><td>Surface hydrant DN 100</td><td>1600 ℓ/min</td><td rowspan="2">0.15 Mpa</td></tr>
<tr><td>Underground hydrant DN 80</td><td>800 ℓ/min</td></tr>
</table>

2.5.1.4 New Zealand

The provision of water for firefighting in urban areas in New Zealand is guided by the *New Zealand Fire Service Firefighting Water Supplies Code of Practice 4509: 2008 (also referred to as SNZ PAS 4509: 2008)*. This document is the latest edition of the series (preceded by *SNZ PAS 4509: 2003)* and it is publicly available at no cost to the public. The main purpose of this standard is to outline the minimum standards for pressure and volume of water requirements for firefighting purposes in urban areas (NZSC, 2008).

The standard clearly states the differentiating parameters between urban and rural areas, whereby an urban area is categorised as having a fully reticulated water distribution system. A rural area as an area that has water distribution systems that are supplied through stand-alone tanks; this translates to insufficient firefighting capacity. These parameters should be accepted and viewed within the localised setting of New Zealand as the standard does not provide any other measurements to augment the definition of urban and rural areas.

It is important to note that although the SNZ PAS 4509 is referred to as a code; compliance to the document by local or district water utilities is non-mandatory (NZSC, 2008). Thus, in making decisions relating to the provision of water for firefighting the authorities must consider the requirements of all relevant legislation. The main legislative framework are the Local Government Act of 1974, the Building Act of 2004 and Resource Management Act of 1991.

The SNZ PAS 4509 presents two tables for determining the fire flow requirements for buildings. The first table (Table 2-5) details the fire flow requirements for municipal reticulation and non-reticulated supply in buildings.

Table 2-5 Table for reticulation and non-reticulated supply in buildings (NZSC, 2008)

	Reticulated Water Supply			**Non - Reticulated Water Supply**	
Fire Water Classification	**Required water flow within a distance of 135m**	**Additional water flow within a distance of 270m**	**Maximum number of fire hydrants to provide flow**	**Minimum water storage within a distance of 90m**	
				Time (Fire Fighting) (min)	**Volume** (m^3)
FW1	450 ℓ /min	-	1	15	7
FW2	750 ℓ /min	750 ℓ /min	2	30	45
FW3	1500 ℓ /min	1500 ℓ /min	3	60	180
FW4	3000 ℓ /min	3000 ℓ /min	4	90	540
FW5	4500 ℓ /min	4500 ℓ /min	6	120	1080
FW6	6000 ℓ /min	6000 ℓ /min	8	180	2160
FW7	FW7 is for either special or isolated hazards or where the fire hazard due to the size of the largest fire cell and its fire hazard category make specific fire engineering assessment necessary.				

The second table (Table 2.6) details the water supply classification based on the type of the building (i.e. single-family homes), sprinkler protection systems installed, the fire hazard category (i.e. occupancy) and the largest fire cell of the building. A fire cell is any space (including a group of contiguous spaces on the same or different levels) within a building, which is enclosed by any combination of fire separations, external walls, roofs, and floors (New Zealand Building Code, 1992).

Table 2-6 Table for water supply classification based on the type of the building (NZSC, 2008)

Sprinklered Structures															
Category	Water supply classification (see table 2)														
Single family homes with a sprinkler system installed to an approved standard	FW 1														
All other structures (apart from single family homes) with a sprinkler system installed to an approved standard	FW 2														
Non Sprinklered Structures															
Category	Water supply classification (see table 2)														
House; includes single family dwellings, multi-unit dwellings, but excludes multi-storey apartment blocks	FW 2														
All other structures (characterised by fire hazard category(1)), examples of which are given below	Water supply classification (see table 2)														
	Floor Area of Largest fire cell of the building (m²)														
	0 - 199(10)	200 - 399	400 - 599	600 - 799	800 - 999	1000 - 1199	1200 - 1399	1400 - 1599	1600 - 1799	1800 - 1999	2000 - 2199	2200 - 2399	2400 - 2599	2600 - 2799	> 2800
FHC 1(2)	FW 3	FW 3	FW 3	FW 4	FW 4	FW 4	FW 5	FW 5	FW 5	FW 5	FW 5	FW 5	FW 5	FW 5	FW 6
FHC 2(3)	FW 3	FW 3	FW 4	FW 5	FW 5	FW 5	FW 5	FW 6	FW 6	FW 7	FW 7	FW 7	FW 7	FW 7	FW 7
FHC 3(4)	FW 3	FW 4	FW 5	FW 5	FW 6	FW 6	FW 7	FW 7	FW 7	FW 7	FW 7	FW 7	FW 7	FW 7	FW 7
FHC 4(5)	FW 4	FW 6	FW 6	FW 6	FW 6	FW 7	FW 7	FW 7	FW 7	FW 7	FW 7	FW 7	FW 7	FW 7	FW 7
For special or isolated hazards not covered in above categories(9)	FW 7														

Note-

(1) Fire hazard category as defined in the compliance documents for the New Zealand Building Code, Acceptable Solution C/AS1.

(2) FHC 1 is sleeping activities including care facilities, motels, hotels, hostels; crowd activities of <100 people including cinemas, art galleries, community halls, lecture halls, churches; working/business/storage activities processing non-combustible materials such as wineries, cattle yards, horticultural products; multistorey apartment blocks.

(3) FHC 2 is crowd activities of >100 people, libraries, book storage, night clubs, restaurants; working/business/storage activities with low fire load such as hairdressers, banks, medical consulting rooms, offices.

(4) FHC 3 is working/business/storage activities with medium fire load such as manufacturing, processing, bulk storage up to 3 meters.

(5) FHC 4 is working/business/storage activities with high fire load such as chemical manufacturing, feed mills, plastics manufacturing, supermarkets or other stores with bulk display over 3 meters.

(6) For special or isolated fire hazards in an area with a lower water supply classification, an assessment should be carried out to determine measures to mitigate the hazard or increase the water supply.

(7) The values in the table were determined by heat release rate modelling for fully developed fires.

(8) All non-sprinkler protected structures, except houses, have an entry level of FW3.

(9) Examples of special or isolated hazards may include bulk fuel installations, timber yards, tyre dumps, wood chip stock piles, recycle depots, and marinas.

(10) For non-sprinkler protected fire hazard category 1 structures less than 50 m2 in floor area, the FW3 requirement may be reduced by up to 50% with the agreement of the Fire Region Manager. Examples of the sorts of structures intended to be covered by this comment are predominantly garages, sheds, and outbuildings.

2.5.1.5 Uganda

In Uganda, the Water Supply Design Manual (2013) is the main reference document that provides guidance and recommendations to design engineers responsible for water supply infrastructure in the country. The Water Supply Design Manual is in its second edition, the first edition was published in the year 2000. The Ministry of Water and Environment publishes and manages the contents of the manual. The main purpose of the manual is to ensure that the planning and design of water supplies is formalized and follows set procedures during implementation (Water Supply Design Manual, 2013).

The manual is divided into 13 chapters and 6 appendices. The main contents include introduction, water demand, water sources, water intakes, water quality, water treatment, water transmission and distribution, water pumping, treated water storage, environmental and social impact assessment, cost estimates, financial and economic analysis and design reports. Within the water demand section of the manual, the recommendations for water demand for firefighting are addressed.

Interestingly, the Ugandan Water Supply Design Manual (2013) references the *United Kingdom National Guidance Document on Provision of Water for Firefighting* (Local Government Association and Water UK, 2007), to the extent that the categories, descriptions and fire flow values are the same. Table 2-7 provides the water requirements for fighting in the water supply design manual.

Table 2-7 Water requirements for firefighting in Uganda (Water Supply Design Manual, 2013)

Category	Description		Flow in ℓ /s
Housing	Housing developments with units of detached or semidetached houses of not more than two floors should have a water supply capable of delivering a minimum through any single hydrant of:		480
	Multi occupied housing developments with units of more than two floors should have a water supply capable of delivering a minimum through any single hydrant on the development of:		1200 - 2100
Transportation	Lorry/coach parks, multi-storey car parks and service stations	All of these amenities should have a water supply capable of delivering a minimum through any single hydrant on the development or within a vehicular distance of 90metres from the complex of:	1500
Industry	In order that an adequate supply of water is available for use by the Fire Authority in case of fire it is recommended that water supply infrastructure to industrial estate follows with the mains network on site being normally not less than DN150	Up to one hectare	1200
		One to two hectares	2100
		Two to three hectares	3000
		Over three hectares	4500
Shops, Offices, Recreation Tourism	Commercial developments of this type should have a water supply capable of delivering a minimum flow to the development site of between:		1200 - 4500
Education, Health And Community Facilities	Village and small community halls	Should have a water supply capable of delivering a minimum flow through any single hydrant on the development or within a vehicular distance of 100m from the complex.	900
	Primary schools and single storey health centres	Should have water supply capable of delivering a minimum flow of through any single hydrant on the development or within a vehicular distance of 70m from the complex.	1200

Category	Description		Flow in ℓ /s
	Secondary schools, colleges, health and community facilities	Should have water supply capable of delivering a minimum flow through any single hydrant on the development or within a vehicular distance of 70m from the complex.	2100

There are clear differences between the *United Kingdom National Guidance Document on Provision of Water for Firefighting and the Ugandan Water Supply Design Manual* in some instances. By way of example, the *United Kingdom National Guidance Document* states that the local water utility has a duty to maintain a supply and pressure that will ensure that a fire authority has adequate firefighting water capacity during fire events (Local Government Association and Water UK, 2007). On the other hand, the Ugandan manual details an extensive framework on the calculation of water requirements for firefighting, to an extent that some of the *United Kingdom National Guidance Document* omissions such as design flow, pressure requirements and spacing of fire hydrants are addressed in the Ugandan manual. However, at the end the Ugandan manual resolves that water requirements for firefighting within water distribution systems may be completely ignored (Water Supply Design Manual, 2013). In other words, a local water utility in Uganda has no obligation to provide water for firefighting purposes, whilst in the United Kingdom it is a standard requirement to maintain adequate firefighting capacity. Furthermore, the Ugandan manual states that water for firefighting is considered as part of Non-Revenue Water and therefore forms part of the unbilled authorized consumption. In the United Kingdom, water utilities provide the service to their customers at a cost.

2.5.2 South African Guidelines and Standards

In South Africa, there are three documents that provide guidance on water requirements for firefighting. The three documents are:

- The Red book, titled: The Neighbourhood Planning and Design Guide: Creating Sustainable Human Settlements (DHS & CSIR, 2019);
- The South African National Standard SANS 10090: 2018 Edition 3.1, titled: Community Protection against Fires (SABS, 2018a);
- The South African National Standard SANS 10252-1: 2018 Edition 3.2, titled: Water supply and drainage for buildings Part 1: Water supply installations for buildings. (SABS, 2018b).

A clear difference exists between the above-mentioned documents. The Neighbourhood Planning and Design Guide: Creating Sustainable Human Settlements is a guideline, whilst the SANS 10090: edition 3.1 and SANS 10252-1: edition 3.2 are national standards (also known as *'Codes'*). According to Schlotfeldt (1995) as cited in CSIR (2005), guidelines are intended to assist engineers with decision making, whereas national standards are enforceable absolute limits.

2.5.2.1 The Red book (DHS & CSIR, 2019)

The Red Book (DHS & CSIR, 2019) was published in 2019 and is the successor of the Guidelines for Human Settlement Planning and Design (CSIR, 2005) which was published in 2005. The Red Book (DHS & CSIR, 2019) is the latest of a series of guideline documents that have been published over the past 37 years. This guideline aim to improve the quality of planning and designing of engineering services in South Africa. Accordingly, the CSIR (2005), refers to the Red Book is an updated 'living document' that is mandated to continuously reflect South Africa's societal changes at any given time.

As per tradition, the Red Book has a dedicated section for water supply, and within it, there is a sub-section for the provision of water for firefighting. In the Red Book, there is a notable change in the design criteria for fire flows. By way of example, in the predecessor Red book (CSIR, 2005) the fire risk category for high and moderate risk recommends minimum fire flows of 12 000 ℓ/min and 6000l ℓ/min respectively, whereas in the latest Red book, the high and moderate risk categories are capped at 6000 ℓ/min

and 3000 ℓ/min respectively. This is a significant change as it has a direct effect on the reduction of water demand for firefighting within water distribution systems. Table 2-8 presents a summary of the water requirements for firefighting in The Red Book (DHS & CSIR, 2019).

Table 2-8 Summary of water requirements for firefighting (DHS & CSIR, 2019)

Fire Risk Classification	Maximum Hydrant Spacing	Duration of Design fire flow (h)	Total Fire Flow		Minimum Flow at one hydrant (ℓ/s)	
			(ℓ/s)	(ℓ/min)	(ℓ/s)	(ℓ/min)
	J.58, Section (iv)	Table J.18	Table J.17			
High Risk: CBD and High-risk industrial	200m (or deemed necessary by the local fire department)	6	100	6000	25	1500
Moderate Risk 1: Industrial, Business, High rise flats ≥ four storeys		4	50	3000	25	1500
Moderate Risk 2: Cluster & Low-Income housing, high rise flats ≤ three storeys		2	25	1500	25	1500
Low Risk: Single Residential Housing		1	15	900	15	900

2.5.2.2 The SANS 10090: edition 3.1 (SABS, 2018a)

The SANS 10090: edition 3.1 (SABS, 2018a) standard is the latest edition of its predecessor the SANS 10090: edition 3 (SABS, 2003). The SANS 10090: edition 3.1 (SABS, 2018a) outlines a mechanism that can be used to determine the requirements for operational and fire safety functions of fire services provided to communities. The SANS 10090: edition 3.1(SABS, 2018a) was compiled from the following international and national standards:

- NFPA 291: Fire Flow Testing and Marking of Hydrants (NFPA, 2016a).
- NFPA 1201: Standard for providing Fire and Emergency Services to the Public (NFPA, 2015).
- NFPA 1500: Standard on Fire Department Occupational Safety, Health, and Wellness Program (NFPA, 2013).
- NFPA 1561: Standard on Emergency Services Incident Management System and Command Safety (NFPA, 2014).

- NFPA 1710: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments (NFPA, 2016b).
- NFPA 1901: Standard for Automotive Fire Apparatus (NFPA, 2016c).
- SANS 10400-A: The Application of the National Building Regulations – Part A: General Principles and Requirements (SABS, 2010)
- SANS 10400-T: The Application of the National Building Regulations – Part T: Fire Protection (SABS, 2011).

Ideally, there are two essential components that a firefighting service must implement and maintain i.e. an efficient and effective firefighting service and adequate water supply. The SANS 10090 provides recommendations on the performance of each aspect of fire service such as fire risk categories, fire brigade classifications, weight and speed of response to fires, communication protocols, vehicle and equipment management, incident management services, occupational health and safety, amongst others. It also outlines a system of determining the water requirements for firefighting (SABS, 2018a). The water requirements for firefighting in the latest edition of the SANS 10090 are summarised in Table 2-9 (SABS, 2018a).

Table 2-9 SANS 10090: 2018 Water demand requirements for firefighting (SABS, 2018a)

		Weight of Response at Fires			Minimum Fire Flow		Fire Hydrants		
Fire Risk Category	**Descriptions: Fire Risk Category**	**Minimum Number of Pumping Units**	**Minimum Manning Level per Appliance**	**Minimum Pumping Capacity of Each Unit (ℓ /min)**	**Possible Fire Sizes**	**Flow In (ℓ /min)**	**Minimum hydrant flow (ℓ /min)**	**Max. Distance Between Hydrants (m)**	**Maintenance Intervals**
A	Central business districts and extensive commercial and industrial areas normally found in cities and large towns (areas where the risk to life and property due to fire occurrence and spread is likely to be high).	2	5	3850	Non-residential buildings with divisions not greater than 5000 m².	13000	2000	85	Annually
B	Limited central business districts, smaller commercial or industrial areas normally associated with small towns and decentralized areas of cities and large towns (areas where the risk to life and property due to fire occurrence and spread is likely to be moderate).	2	4	3850	Non-residential buildings having division's not greater than 2 500 m².	9000	2000	120	Biennially
C	Residential areas of conventional construction.	1	4	2250	Non-residential premises not greater than 1 250 m²	6000	2000	200	Triennially
D1	Rural areas of limited buildings and remote from urban areas. D1 - Houses > 30 m apart D2 - Houses 10,1 m to 30 m apart D3 - Houses 3 m – 10 m apart D4 - Houses < 3 m apart	1	4	2250	Houses > 30 m apart	1900	1200	300	Triennially
D2					Houses 10,1 m to 30 m apart	2850	1200	200	
D3					Houses 3 m – 10 m apart	3800	1400	200	
D4					Houses < 3 m apart	5700	2000	200	
E	Special risk areas. Individual areas requiring a pre-determined attendance over and above the predominant risk category in an area. Includes large shopping/entertainment centres, informal settlements, harbours, hospitals, prisons, large airport buildings and petrochemical plants	Determined by Individual Risk Assessment							Annually

2.5.2.3 SANS 10252-1: edition 3.2 (SABS, 2018b)

The SANS 10252-1: edition 3.2 (SABS, 2018b) is another standard that provides recommendations for design pressures and flows for fire installations. The primary purpose of the SANS 10252-1: 2018 edition 3.2 standard is to provide advice for water supply installations in buildings, of which fire installations are a subsidiary.

The SANS 10252-1 (SABS, 2018b) standard also recommends water storage capacities for firefighting purposes in buildings. A volume of at least 25 m³ of water as well as a pumping system must be available at all times from public or private storages for buildings higher than 25 m (SABS, 2018b). Table 2-7 summarises the storage capacities required for firefighting purposes in buildings.

Table 2-10 Minimum water storage capacities required for buildings (SABS, 2018b).

Category of Premises	Minimum Storage Required
Boarding schools, children's homes or residential nurseries	4 h to 8 h demand
Commercial premises, including offices and shops	4 h to 8 h demand based on gross floor area
Educational institutions	4 h to 8 h demand for the design population of the building
Hotels, boarding houses, motels and nurses homes	4 h to 8 h demand per bed space
Hospitals, clinics, nursing homes	24 h demand for every bed the building is designed to accommodate
All other buildings where continuous water supply is required, i.e. hairdressers	4 h demand per day
Multiple storeys that exceed 25 m in height above the lowest ground level abutting on such building	8 h demand per dwelling unit
Old-age homes	8 h demand per capita

2.6 PREVIOUS STUDIES ON WATER REQUIREMENTS FOR FIREFIGHTING

2.6.1 van Zyl & Haarhoff (1997)

The main objective of the van Zyl and Haarhoff (1997) study was to investigate the South African design guidelines for the provision of water for firefighting on a technical level, with specific focus on the cost sensitivity of existing water reticulation networks against different fire water design parameters such as fire flow rates, fire duration, storage volumes, residual fire pressure and hydrant spacing. The water reticulation networks of Johannesburg CBD (high fire risk area) in Gauteng province and a residential area in Kriel (low fire risk area) in Mpumalanga province were assessed on the cost implications of the different fire water design parameters.

The study adopted an explanatory research methodology. Saunders et al., (2012) states that the aim of an explanatory study is to establish the causal relationships between variables in order to gain an illustrative response to a situation or a problem. A causal based relationship is measurable to a certain degree of precision and explicitly applies where the action of the independent variable (the cause) influences the outcome of the dependant variable (the effect).

van zyl & Haarhoff (1997) first differentiate between two separate loading conditions occurring at the same time within water reticulation networks i.e. public demand and fire water demand. Public demand (also referred to as *normal public peak demand*) is defined as the design peak flow conditions at the most critical point within water reticulation network. Fire water demand (also referred to as *fire public peak demand*) is the public demand occurring simultaneously with a major fire event in a supply area plus the water required to extinguish such a fire at the most critical point within water reticulation network. The study then shows the differences of fire water demands (independent variable) used in South Africa, the USA, Germany and the Netherlands (see Table 2-11).

Table 2-11 Fire water demands used internationally and in South Africa (van Zyl & Haarhoff, 1997)

No	Country	Firewater demand used	Approximate factor of *'instantaneous public peak demand'*
1	South Africa	Instantaneous public peak demand	1.00
2	USA	Daily Peak Demand	0.35
3	Germany	Hourly Peak Demand of a day with average water use	0.45
4	The Netherlands	Hourly Peak Demand	0.63

As indicated in Table 2-11, the South African fire water demand is higher than the other countries mentioned. This observation then formed the basis for determining the cost sensitivity analysis (dependant variable) of the water reticulation network against the design parameter of fire water demand. The results of the cost sensitivity analysis indicated that a small but significant network cost saving can be achieved if a lower fire water demand is used. In addition, the results also state that when the fire water demand of the German standard was used, there was cost savings of 3% and 2.5% in the high and low-risk water reticulation networks respectively.

Another finding was in the application of fire flow rates against the network cost in low and high-risk areas. The results of the analysis indicate that high-risk areas can have a reasonable effect on the network cost. For example, in the Johannesburg CBD, the cost increase to supply the South African standard of 12000 ℓ/min results in a cost increase of 48% in the water reticulation network. The high cost implication of the high-risk fire flow makes it imperative that a realistic standard be set to balance the level of fire protection against the cost of providing the service.

The study also provides an analysis for the other design parameters such as fire duration, storage volumes, residual fire pressure and hydrant spacing. It is important to note that the data sources for the analysis of the other design parameters are from earlier studies (van Zyl & Haarhoff, 1993 and van Zyl & Haarhoff, 1994) conducted by the same researchers.

Fire duration is defined as the period for which the required fire flow for a specific fire risk category should be maintained. The South African standard requires a fire

duration of six hours for high-risk areas and two hours for low risk areas. The appropriate fire flows for high and low-risk areas are multiplied by the respective fire durations (i.e. 12000 ℓ/min X 6h = 4320 Kℓ and 900 ℓ/min X 2h = 108 Kℓ) to determine the storage volume for fire water. These volumes are added to the reservoir storage requirements to obtain the required minimum storage capacity. However, the results of van Zyl & Haarhoff (1994) indicate that 90% of the major fires in high-risk areas were extinguished within two hours or less using 3100 ℓ/min or less of water. The fire flows used of 3100 ℓ/min or less were significantly lower than what the South African standard prescribes for the high-risk areas.

To put the fire storage volume picture into perspective, a cost sensitivity analysis for reservoir storage capacity of 3 Mℓ, 6 Mℓ and 9 Mℓ were determined as shown in figure 2-4. The results indicate that the high-risk fire storage of 4320 Kℓ has a significant impact on the cost of water storage, especially for smaller reservoir capacities. In other words, a 2 Mℓ base reservoir in a high-risk area, will have a greater cost increase when a 4.32 Mℓ is added for fire water storage.

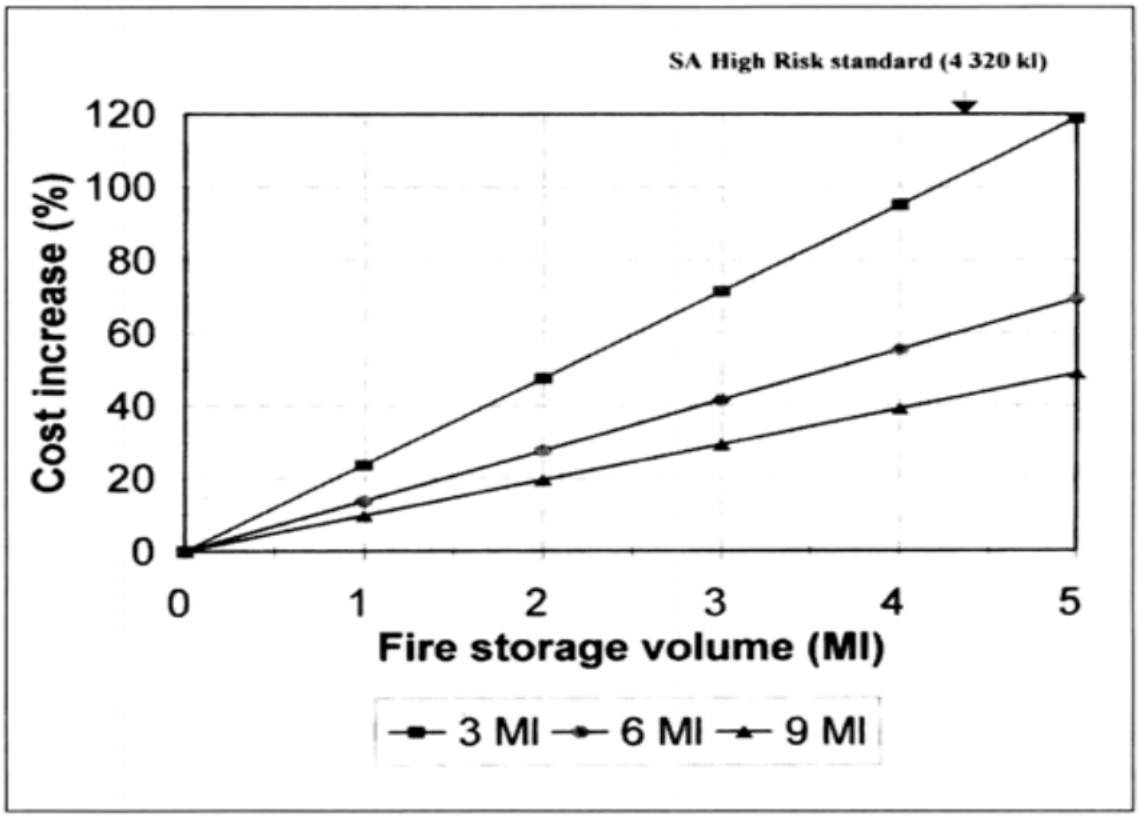

Figure 2-5 Cost sensitivity of 3 Mℓ, 6 Mℓ and 9 Mℓ reservoir storage capacity (van Zyl & Haarhoff, 1997)

The study concludes by determining the cost sensitivity analysis for residual fire pressure and hydrant spacing. The results state that the cost sensitivity of residual fire pressure and hydrant spacing are significant but are not as high when compared to fire flows. The South African standard specifies residual fire pressure of 7 m and 15 m for low and high-risk areas and hydrant spacing of 120m in high risk and 240m in low risk areas. van Zyl & Haarhoff (1993) found the South African standard specifications for residual fire pressure and hydrant spacing are acceptable.

2.6.2 Grayman et al (2004)

The study by Grayman et al (2004) assessed the adequacy of a water distribution system in terms of its capacity to provide for fire flows and to meet normal water demand conditions. The water distribution system was modelled to meet the maximum peak demand conditions with fire flow requirements superimposed. The main objective of the study was to evaluate the quantitative effects of providing fire flow on (1) the physical requirements of the water distribution system such as sizing of pipes and reservoirs; and (2) the resulting water quality of the water distribution systems.

In this study, the core characteristics of the case study contained 71 km length of pipeline varying in diameter from 150 mm to 360 mm. The average annual daily demand was 3.785 million litres per day. There were two reservoirs in the system with a total volume of 5185 m³. The system was supplied from a single source. The water distribution system was then hypothetically simulated under four different design conditions:

(i) Existing pipe and storage sizes;
(ii) Modified (downsized) pipes and storage that will still meet the full fire flow requirements;
(iii) Modified pipes and storage to meet a reduced fire flow requirement associated with having sprinkler systems in all structures and;
(iv) Modified pipe and storage with no fire flow requirements.

The analysis included the steady-state assessment and an extended period assessment that tested the ability of the water distribution system to deliver the flow over a typical fire duration (usually 3 hours). Additional modelling was performed to determine the cost of the resulting networks and to determine the water quality

consequences of the reduced pipe diameters and storage requirements. Water age was used as a surrogate measure for water quality.

The results indicate that the pipes in the original design of the network are oversized relative to meeting the fire flow requirements. Similarly, as fire flow requirements were reduced, the volume required for storage also reduced. Based on the cost modelling, the cost savings associated with the lower fire flow requirements (and resulting smaller pipe diameters) were relatively small. The most significant result was the large reductions in water age associated with reduced fire flows. This suggests a very significant potential improvement in water quality with the smaller pipes and tanks.

2.6.3 Hadjisophocleous & Richardson (2005)

The study by Hadjisophocleous & Richardson (2005)developed a method for calculating fire flows for offensive operations (extinguishing the source of the fire) and defensive operations (exposure protection against possible fires). The differentiation of offensive and defensive operations is critical in understanding the objectives of the study.

The literature review of Hadjisophocleous & Richardson (2005) identified the following existing methods for calculating fire flows:

- *Water For Fire Firefighting – Rate of Flow Formula* (Royer & Nelson, 1959)
- *Water Supply Requirements for Fire Protection* (Linder,1981)
- *Fire Suppression Rating Schedule Handbook* (Hickey, 1993)
- *Water Supply for Public Fire Protection* (IBC, 1999)
- *Standard on Water Supplies for Suburban and Rural Fire Fighting* (NFPA 1142, 1999)
- *Fire Engineering Design Guide* (Buchanan, 1994)
- Fire Protection Water Supply Guideline for Part 3 in the Ontario Building Code (OFM-TG, 1999)
- Estimating Water Requirements for Firefighting Operations using FIERA system (Torvi, 2001)

From the literature review, the authors developed the following framework as a way to subjectively evaluate existing methods used for determining water demand for firefighting:

- The existing method needs to provide for fire flows that will enable both fire suppression and the protection of exposures from fire.
- The existing method needs to provide for fire flows that are appropriate for the hazards presented, thus optimizing underground pipe sizes and creating a more cost-efficient distribution system.
- The existing method has a basis in the physics of fire suppression within the field of fire safety engineering.
- The existing method is amenable to incorporation in Codes
- The existing method acknowledges the different needs for fire flows for sprinklered and non-sprinklered buildings.
- The existing method addresses most building types and sizes. Other methodologies may be needed for determining fire flows for special hazards, such as fuel storage depots or very large buildings.
- The existing method is simple to use

Hadjisophocleous & Richardson (2005) deduce that none of the methods in the above-mentioned publications satisfies the framework of their study. For example, methods by Royer & Nelson (1959), Linder (1981) and Buchanan (1994) do not calculate the water requirements for defensive operations, while the remaining methods are not based on the physics of fire suppression. The only exception is the method by Torvi (2001); however, this method is not extensive enough as it relies on a computer model for calculating the heat release rate of the fire and does not calculate the water requirements for offensive operations.

The study then developed a New Method that considers both the fire flows for offensive and defensive operations in its application. Fire flows for offensive operations considers the fire load densities for building occupancies as shown in Table 2-12, the area of the fire, time taken to extinguish the fire and the cooling efficiency of water. Fire flows for defensive operations use the heat release rate and considers the view factor of exterior walls coupled with unprotected openings as shown in Table 2-13. The total fire flow is the sum of the flows for offensive and defensive operations.

Ideally, this method is designed to take into account the main building characteristics that govern the amount of energy produced during a fire in a building.

Table 2-12 Fire load densities (Hadjisophocleous & Richardson, 2005)

Occupancy	Sub Group	Example	Fire Load Densities (megajoule (MJ)/m²)
Assembly	High Fire Load	Libraries	2550
	Low Fire Load	Schools	410
Institutional		Hospitals	440
		Prisons	440
Residential		Dwellings	920
		Hotel Bedrooms	460
Business		Offices	670
Mercantile	High Fire Load	Toy Store	1100
	Low Fire Load	Hardware Store	600
Industrial	High Fire Load	Manufacturing / Storage (3m to 6m)	2240
	Intermediate Fire Load	Manufacturing / Storage (up to 3m)	1180
	Low Fire Load	Manufacturing	590

The values shown in Table 2-12 are based on the statistical data of fire load densities in buildings of various occupancies, which was obtained from a survey conducted by AWWA (2001). The values are mainly from the 90th percentile in the surveys.

Table 2-13 View Factor, F_{UF} as a function of the distance to the L ratio (Hadjisophocleous & Richardson, 2005)

d / L	0.0	0.25	0.5	1.0	2.0	3.0	4.0	5.0
F_U	1.0	0.83	0.55	0.24	0.07	0.03	0.02	0.01

The new methodology is best represented by the following equation:

$$Fire\ Flow_{total} = Fire\ Flow_{off} + Fire\ Flow_{def}$$

or,

$$Fire\ Flow_{total} = \left(\frac{0.058}{n_o} + \frac{0.005\ F_{u,total}}{n_d}\right) w^n \sqrt{A_f}$$

where,

n_o = cooling efficiency of water for offensive operations

n_d = cooling efficiency of water for defensive operations

$F_{u,total}$ = sum of the view factors for the four exposing building faces

w^n = fire load density (MJ/m²)

A_f = fire area (m²)

The study used four case studies to test the new methodology. The case studies were carried out using various building types, sizes and heights. These case studies are considered to be representative of what a municipality will face when determining any methodology for determining fire flows. The results of the methodology are summarised in Table 2-14 and are compared to the Ontario Building Code (OBC) and the Insurance Service Office (ISO) for illustration purposes.

Table 2-14 Results of case study comparisons

Case Study	Occupancy	OBC fire flow (ℓ/min)	ISO fire flow (ℓ/min)	New method (ℓ/min)
1	Townhouses	5400	15700	2800
2	Industrial	9000	18800	14600
3	School	2700	11750	4100
4	Retail / Office	9000	11100	10100

The results in Table 2-14 also indicate a significant reduction in total fire flows when the three methods were comparatively assessed. One exception is the occupancy of schools, where the OBC method is less than the ISO and New Method. A highlight of the New Method is that it satisfies all the set frameworks of the study. This is significant, as it proves that the New Method is flexible for most generalised conditions.

2.6.4 Myburgh & Jacobs (2014)

Myburgh & Jacobs (2014) evaluates water requirements for firefighting within water distribution systems in five towns located in three municipalities in proximity to Stellenbosch, South Africa. The study is anchored on the general responsiveness of water distribution systems to fire water demand. It investigates the extent to which water distribution systems are used for extinguishing fires and whether the level of fire flows required within water distribution systems are sufficient and realistic.

The objectives of the study were to:

- Review international standards and published research
- Identify a study area, obtain firefighting records and analyse data

- Evaluate the techniques used for firefighting and the water requirement for extinguishing fires
- Compare the actual fire flows to the current criteria and formerly published values

The research methodology required a 'practical approach', i.e. collecting fire incident reports of firefighting events from the respective municipalities. An email was sent to eight municipalities requesting fire incident reports - three municipalities responded positively. The researchers conducted follow-up interviews to verify and discuss the obtained fire incident reports. The obtained fire incident reports were not uniform in terms of format and database fields; however, most of the reports contained the following useful information:

- Date and time of each fire event
- Estimated volume of water used during fire event
- Time required to extinguish a fire
- The method and/or equipment that was used to extinguish a fire and in some cases, the location of the fire event.

Table 2-15 provides an overview of the obtained data. The data was provided electronically (Municipalities A and B) and in hard copy format (Municipality C). The data for the three municipalities were imported to MS Excel and evaluated using the following criteria: (i) Type of Fire, (ii) Fire volume, (iii) Average fire flow rate and (iv) whether a water distribution system was used during a fire event. The filtered data sets contained 556 and 546 incidents where fire volume and fire flow rate could be derived respectively.

Table 2-15 Overview of obtained fire incident (Myburgh & Jacobs, 2014)

Municipality	Date Range	Number of Fire Incidents				
		Total	Fire Type Indicated	Fire Volume could be derived	Fire Flow Rate could be derived	Sufficient data to test whether water distribution system was used
A	1/01/2010 – 31/12/2010	1745	78	78	71	78
B	1/01/2010 – 30/12/2010	705	330	330	330	327
C	1/01/2010 – 30/12/2010	156[1]	146	146	145	139
Total		2450	554	554	546	544

[1] *The total was not counted; only those records with near-complete information were captured from hard-copy documents.*

The selected fire incident reports included sufficient information to enable a classification of each fire by type. Table 2 -16 provides a summary of the total number of fires in five categories i.e. (i) structural fires, (ii) informal settlement fires, (iii) vegetation, grass, veld and refuse fires, (iv) automobile accidents with fires and (v) special serves

Table 2-16 Overview of fire incidents per fire-type (Myburgh & Jacobs, 2014)

Municipality	Number of fires within urban area			Number of fires beyond urban edge or unrelated		
	Automobile accidents	Informal settlements	Structural fires	Veld, Grass and Refuse	Special Services	Total
A	6	22	34	16	0	78
B	37	40	35	195	23	330
C	18	18	8	84	18	146
Sub-Total	61	80	77	295	41	554
Total	218			336		
Contributions (% of total)	11	14.4	13.9	53.2	7.4	100

As shown in Table 2-16, the “veld, grass and refuse” and “informal settlements” fire types are the highest contributors with 53.2% and 14.4%, respectively. These fire types typically occurred in areas where a water distribution system could not be used directly as these are mainly non-reticulated areas. To derive knowledge on whether a water distribution system was used, the authors followed a logical sequence. The fire reports indicated the number of vehicles that responded to each fire with corresponding water tank capacity for each vehicle. It was confirmed that the vehicles

were always dispatched to a firefighting event with full water tanks. It was thus possible to derive the total volume of water dispatched to a fire scene, F_T, for each fire incident. As a result, the values for F_F and F_T could be compared. If $F_F \leq F_T$, the assumption is that the water distribution system was not used during the firefighting event, this would imply that the dispatched vehicles contained more water than was needed to extinguish the fire. If $F_F > F_T$, more water would be needed than was dispatched by road, and an additional water volume F_N would be extracted from the WDS during the period of fighting the fire. The volumes were expressed as $F_F \leq F_T + F_{N'}$. The results are presented in Table 2-17 and are summarised as follows:

- The total number of filtered records included all fire incident reports with sufficient information to establish whether the WDS was used or not.
- For some records, F_T was not recorded, but the incident report indicated instead that either a fire hydrant attached to the WDS (Column A) or a manual method (Column B) was used to extinguish the fire.
- The number of records with ($F_F \leq F_T$) and also ($F_F > F_T$) were respectively listed as Column (C) and Column (D).
- Water would not have been needed from the WDS during an actual fire event for all fires with $F_F > F_T$, because some of these were flagged as type category 'Special Service' as recorded in Column (E). These were excluded when calculating the number of fires simply because they did not represent actual emergencies.
- The number of fires with $F_F > F_T$ that were noted to be beyond the urban edge were listed in Column (F). Discussion with fire department staff indicated that water would have been abstracted from the WDS for such fires, since the tanker vehicles would shuttle from the fire to the closest hydrant at the urban edge for refilling during the firefighting process.
- Column (G) shows the number of fires where use of the WDS was considered likely.

Table 2-17 Results indicating the role of water distribution systems in extinguishing fires (Myburgh & Jacobs, 2014)

Municipality	Number of relevant fire incidents								WDS used[1] (%)
	Total Filtered	(A) Flagged as Hydrant	(B) Flagged as Manual	(C) $F_F \leq F_T$	(D) $F_F > F_T$	(E) of type Special Services	(F) on farmland beyond urban edge	WDS used: (G)= (A) + (D) – (E)	
A	78	8	4	55	11	0	2	19	24.4
B	327	0	0	312	15	5	5	10	3.1
C	139	0	0	118	21	14	14	18	12.9
Total	544	8	0	485	47	21	21	47	8.6

As shown in Table 2-17, only 47 fires (8.6% of the total) that suggest the use of the water distribution system during firefighting. Fires beyond the urban edge were listed in column (F), and were 21 (45%) in total. The results showed that 24%, 3% and 13% of the fires were extinguished using the water distribution system in the three municipalities A, B and C, respectively. Municipality A had the largest percentage and represented the largest town in the study area.

The average and maximum fire flow volume and flow rate for each fire category was also established as indicated in Table 2-18.

Table 2-18 Summary of fire volume and flow rate (Myburgh & Jacobs, 2014)

Type category	Automobile Accidents	Informal Settlements	Structural Fires	Veld, Grass and Refuse	Special Services
Average Flow Volume (Kℓ)	2.5	4.4	8.6	4.1	8.6
Maximum flow volume (Kℓ)	10	50	120	100	100
Average flow rate (ℓ/min)	69	91	110	74	93
Maximum flow rate (ℓ/min)	167	417	1200	246	300

2.6.5 Mac Bean & Ilemobade (2019)

The study by Mac Bean & Ilemobade (2019) evaluates the South African standards and guidelines pertaining to the water requirements for firefighting purposes. This study is built on the recommendations of van Zyl & Haarhoff (1997) that the provision and requirements for fire flows should be amended to reflect the prevailing conditions and technologies. The authors formulated the research question as: Is the South

African standard and guideline pertaining to fire flow provision appropriate for firefighting and do these ensure the most efficient balance between providing sufficient fire protection and promoting sustainable water use?

In responding to the research question, the first step was the review of national and international design standards and guideline applicable for fire flows. The second step captured and analysed 10 years (from 1 January 2006 to 30 September 2017) of billable fire incident reports representing 3859 fire events within the City of Johannesburg and made recommendations to guide future revisions of the primary South African design standard and guideline for the provision of water for firefighting.

The source of primary data was collected from 'billable fire incident reports' obtained from the City of Johannesburg fire department. The definition of 'billable fire incident reports' was derived from sections 10(1) and 10(2) of the Fire Brigade Services Act No. 99 (RSA, 1987). Sections 10(1) and 10(2) of the Fire Brigade Services Act No. 99 (RSA, 1987) provides that a fire department may charge for the service rendered under these conditions:

"10(1) A controlling authority may, subject to any condition contemplated in section 11(2)(a), determine the fees payable by a person on whose behalf the service of the controlling authority is applied-
(a) for the attendance of the service;
(b) for the use of the service and equipment; or
(c) for any material consumed.

10(2) A person on whose behalf, in the opinion of the chief fire officer concerned, a service of a controlling authority has been employed, may in writing be assessed by that chief fire officer for the payment of the fees referred to in subsection (1) or any portion thereof. "

In summary, the details captured on the 'billable fire incident reports' included the duration of the call out, the quantity of water used and the equipment used during a fire event.

The results of the Mac Bean & Ilemobade (2019) study indicate the following:

- Over the 10-year period, not a single fire incident in the City of Johannesburg recorded an average flow rate greater than 6 000 ℓ/min. This implies that over the 10-year period, no incident can be classified as a SANS 10090 Category A, B or C and The Red Book 'high risk' category fire. Figure 2-5 shows average fire flows for the City of Johannesburg from 1 January 2006 to 30 September 2017 with the SANS 10090 (SABS, 2018a) and Red book (DHS & CSIR, 2019) values superimposed.

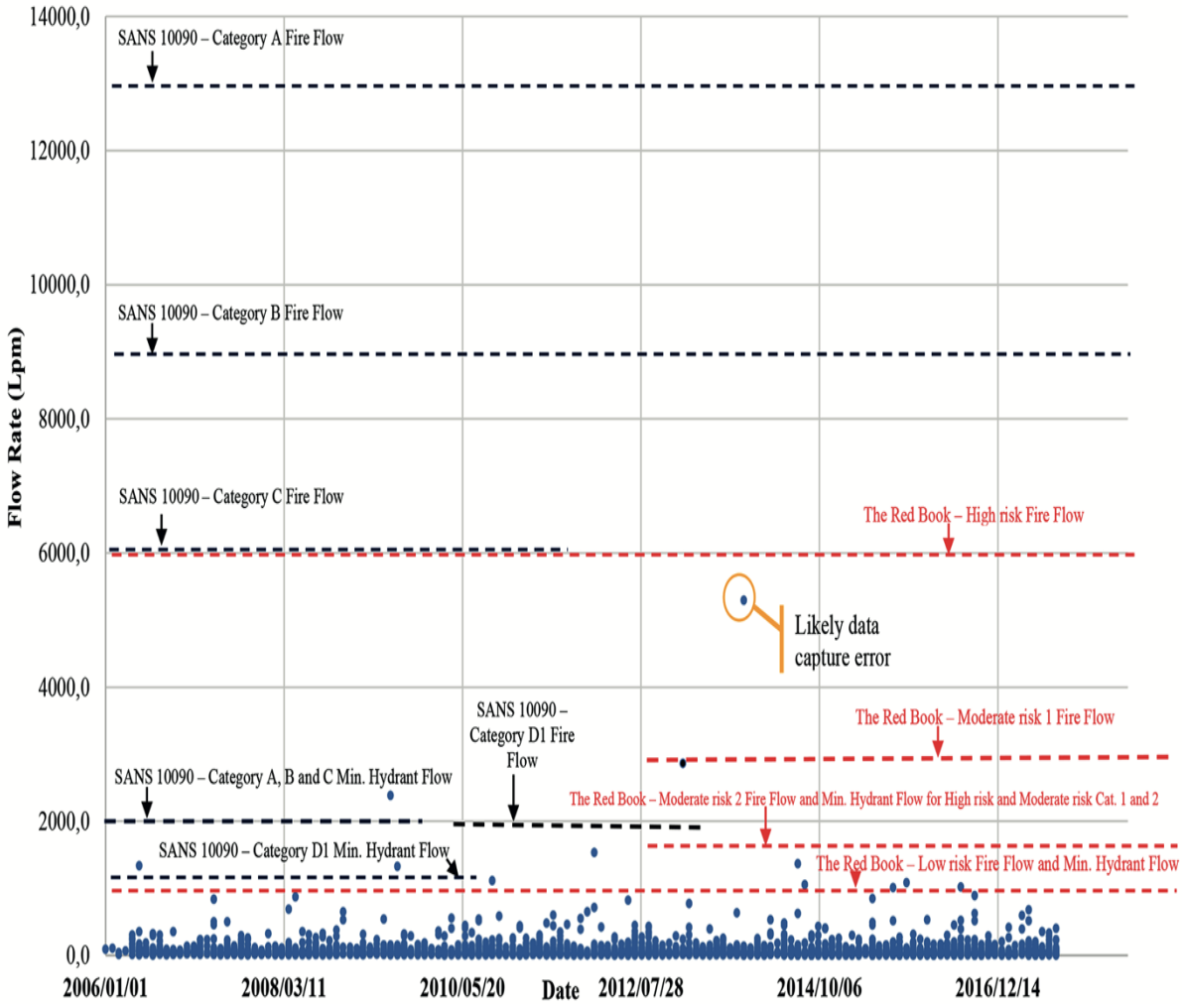

Figure 2-6 Average fire flows from 1 January 2006 to 30 September 2017 Mac Bean & Ilemobade2019)

- During the 10-year period, only 2 incidents recorded average flow rates greater than 2000 ℓ/min. Three incidents recorded average flow rates greater than 1500 ℓ/min. The vast majority of average flow rates fell below both the SANS 10090

Minimum Hydrant Flow for Categories A, B, C and D and The Red Book Minimum Hydrant Flow for 'high risk' and 'moderate risk' categories.

- Figure 2-6 indicated that 75% of fire incidents were extinguished using less than 6.6 Kℓ of water –this volume is less than the capacity (6.9 Kℓ) of a conventional pumping tanker within the City of Johannesburg's fleet purchased in 2003. This means that over the study's 10-year period, 75% of fire incidents in the City of Johannesburg could have been extinguished without the use of municipal fire hydrants if a pumping tanker with a full tank of water was dispatched.

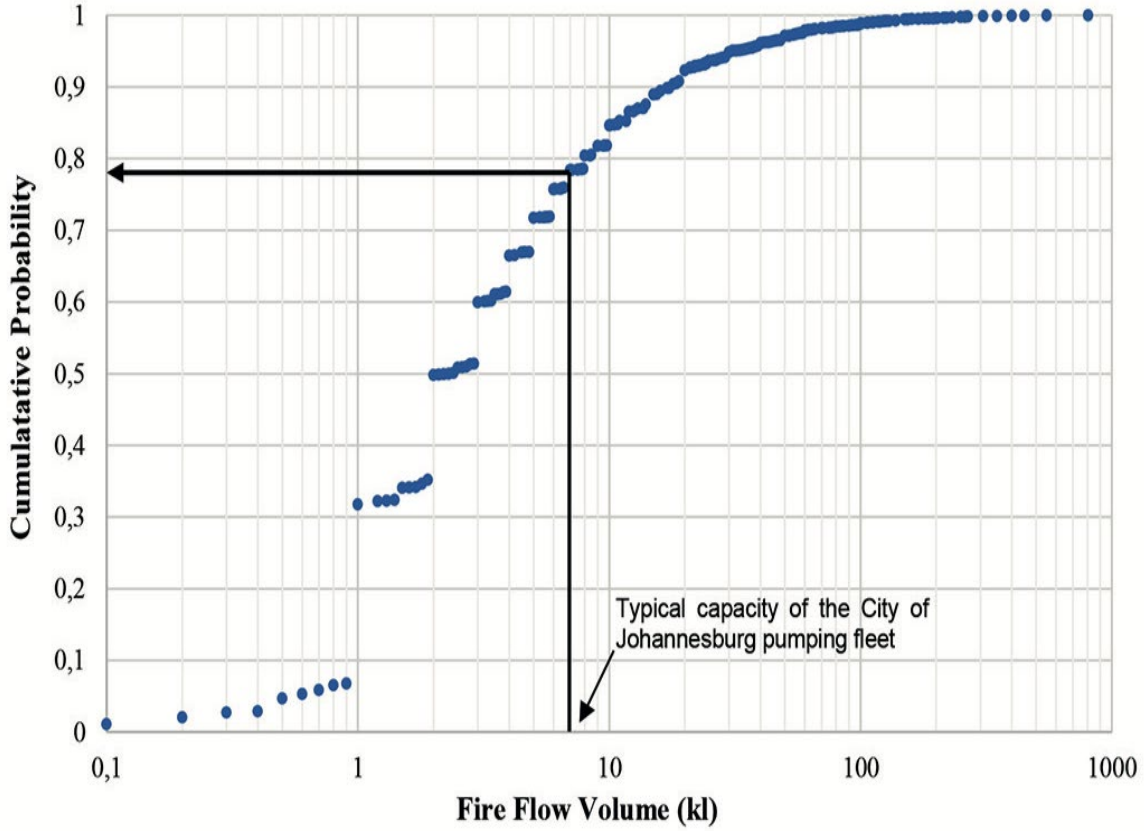

Figure 2-7 Cumulative probability plot for all fire flow volumes 2017 (Mac Bean & Ilemobade, 2019)

- Figure 2-7 presents the cumulative probability plot of average flow rates, with the SANS 10090 and The Red Book values superimposed. The figure shows that 99.9% of all fire incidents within the City during the designated period resulted in an average fire flow rate less than 1200 ℓ/min, which equals the lowest of the Minimum Hydrant Flow rates for SANS 10090 (i.e. Category D). Likewise, 99.7% of all fire incidents resulted in an average fire flow rate less than 900 ℓ/min, which equals the Minimum Hydrant Flow rate for The Red Book's lowest fire risk category (i.e. low risk). These findings suggest that there is scope

to reduce the current minimum fire flows especially in low risk categories whilst maintaining adequate levels of safety.

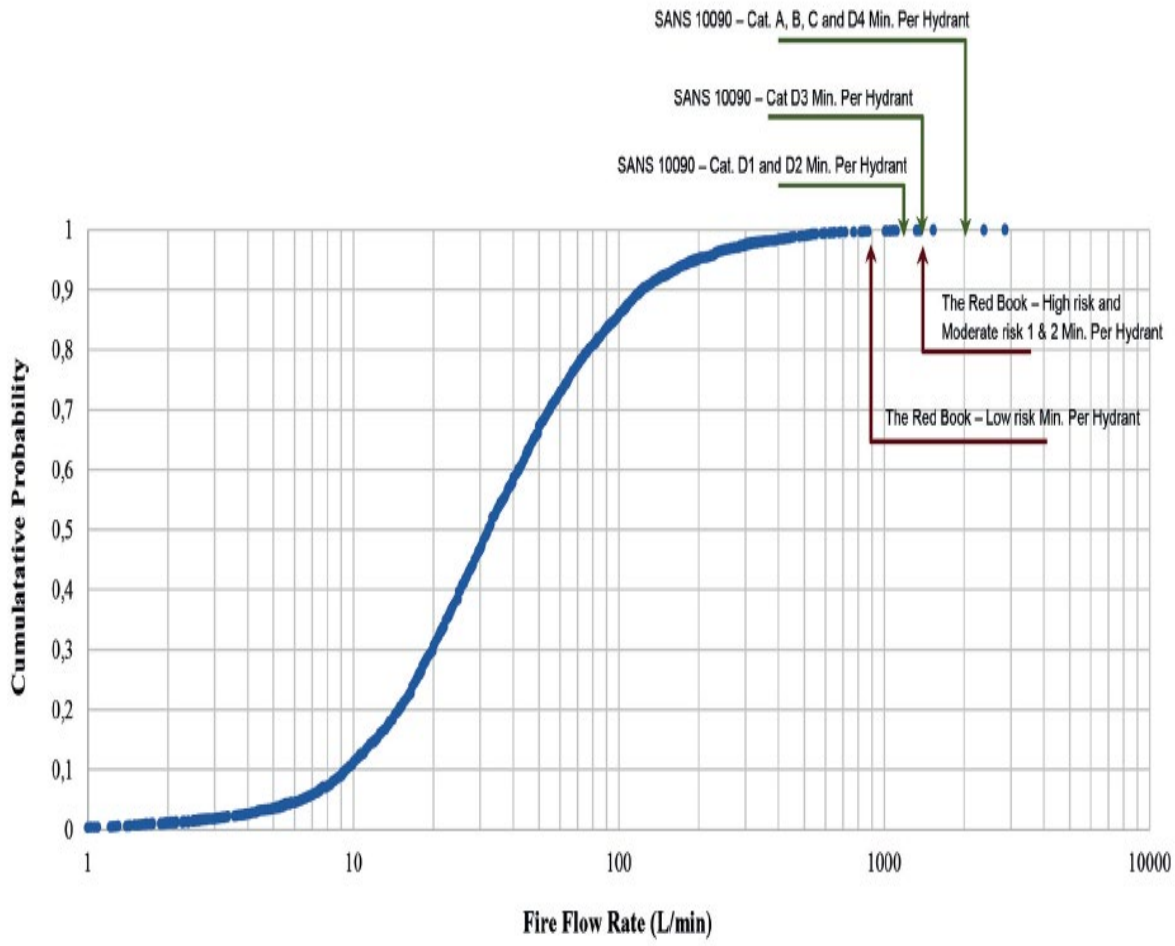

Figure 2-8 Cumulative probability plot for extracted fire flow rates within the City of Johannesburg between 1 January 2006 to 30 September 2017 2017 (Mac Bean & Ilemobade, 2019)

- In Figure 2-8, the green bar chart shows the average number of fire incidents occurring each month while the blue bar chart shows the average fire flow volume per incident for each month over the period 1 January 2006 to 30 September 2017. An expected seasonal trend is observed with regard to frequency of fire occurrence, with a notable rise in incidents from June to October, which are typically dry and low-rainfall months in Johannesburg. While average fire flow volumes range between 7 to 12 Kℓ per incident, there is no observable seasonal trend. These trends imply that, while the frequency of fire

occurrence is strongly related to climatic conditions, the volume of water used to quench fires, and by implication, the size of the fires, is not a function of climatic conditions within the City of Johannesburg. As a consequence, seasonal peak factors for fire flows may not be necessary when incorporating the provision for water for firefighting in the design of municipal water distribution systems within the City of Johannesburg or other metropolitan municipalities with similar fire flow and climatic conditions.

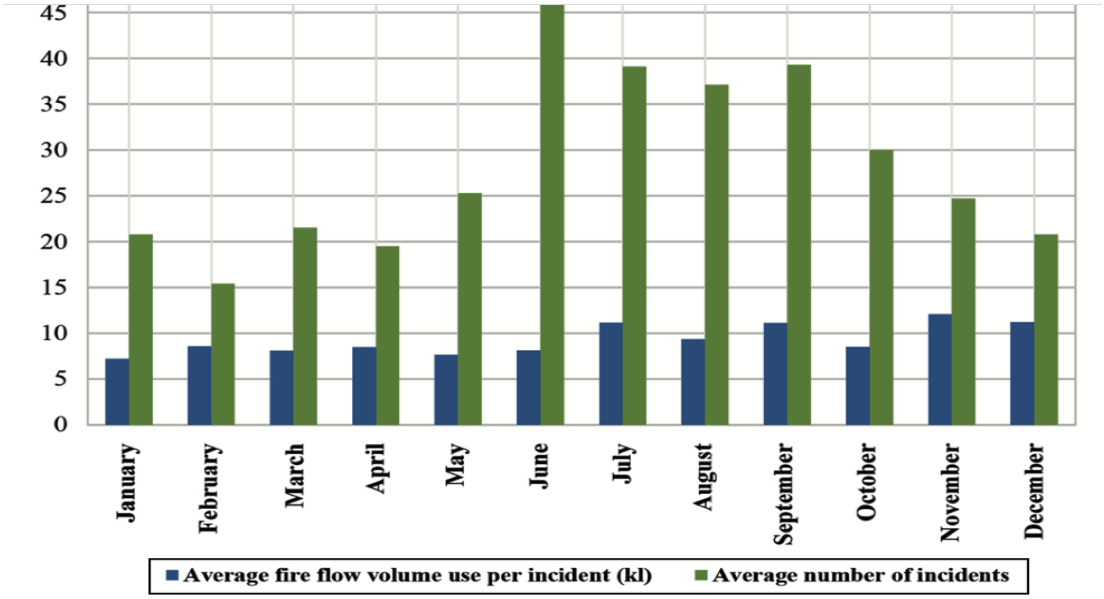

Figure 2-9 Average fire flow volume and number of incidents per month between 1 January 2006 and 30 September 2017 (Mac Bean & Ilemobade, 2019)

- Figure 2-9 displays the occurrence of incidents throughout the course of a day, averaged over the period 1 January 2006 to 30 September 2017. The green graph shows the percentage distribution of fire incident start times. In Fig. 8, three peaks (at 01:00, 15:00 and 20:00) are observed. The highest of the three was at 01:00 – this represents 230 (5.9%) fire incidents. The blue graph shows a typical diurnal residential water use pattern published by Van Zyl (1996) (cited in Scheepers, 2012). The water use pattern shows the primary peak residential demand occurring at 06:00 while the secondary peak demand occurs between 16:00 and 17:00. When compared to the start times of fires within the City of Johannesburg, it is observed that the start times of peak fires do not correspond with peak residential water demand periods. The inverse was the case – the lowest observed start times of fires were during peak demand periods. This

finding may therefore provide motivation to further investigate the recommendation to cater for both instantaneous peak demand and fire demand during WDS design as recommended by The Red Book (DHS and CSIR, 2019: J.3.2.2) i.e.: 'Conveyance infrastructure should have sufficient capacity for peak demand conditions and fire-flow requirements, in accordance with the design guidelines in this document' and (CSIR, 2005: volume 2, Chapter 9, page 27): 'The nominal capacity of the duty pump should be equivalent to the sum of the instantaneous peak demand and the fire demand (obtained from the section on provision of water for firefighting), or the instantaneous peak demand plus an allowance of 20%, whichever is the greater.'

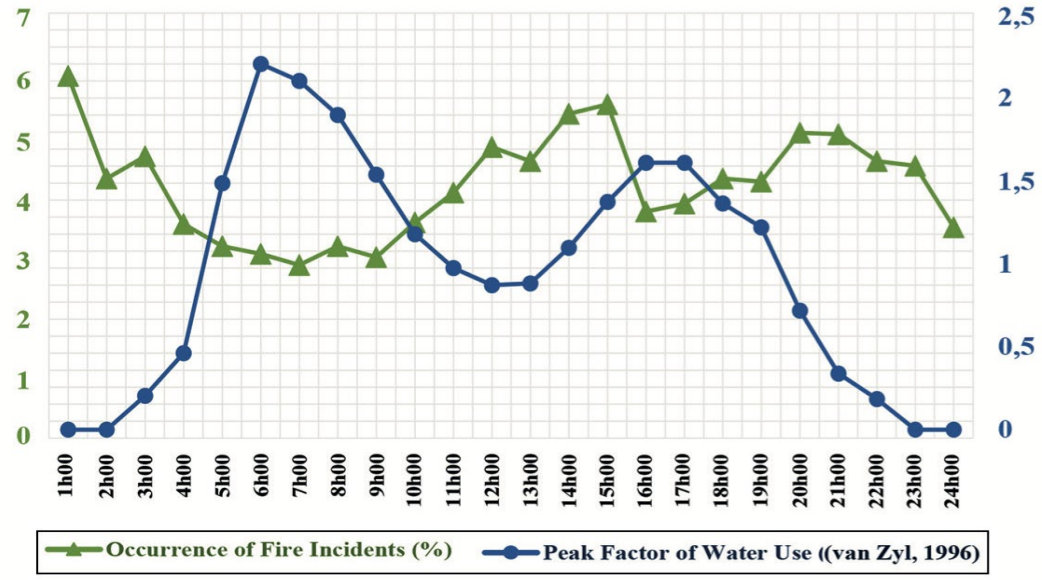

Figure 2-10 Occurrence of fires versus a typical residential peak water demand pattern 2017 (Mac Bean & Ilemobade, 2019)

2.6.6 Essack & Ilemobade (2022)

The main objective of the Essack & Ilemobade (2022) study was to determine if the minimum fire flows recommended in the SANS 10090 (SABS, 2018a) and Guideline (DHS & CSIR, 2019) are acceptable for fighting large structural and industrial fires in South Africa. The concept of large fires is derived from previous studies, van Zyl and Haarhoff (1997) found that it required 5 Kℓ or more of water to extinguish large fires. Similarly, Myburgh & Jacobs (2014) found that it took average water volume of 8,6 Kℓ to extinguish a structural fire, due to the average demand of 8,6 Kℓ being more than than 5 Kℓ, these structural fires will also be referred to as large fires.

More recently, Mac Bean & Ilemobade (2019) found that 75% of small and large fires within the City of Johannesburg were extinguished with 6,6 Kℓ of water. On this basis, the study of Essack & Ilemobade (2022) is overtly built on the recommendations of Mac Bean & Ilemobade (2019) study. Essack & Ilemobade (2022) re-analysed the initial datasets used by Mac Bean & Ilemobade (2019) and incorporated additional information derived from engagements held with the City of Johannesburg firefighting personnel.

In this way, the concept of large and industrial fires was narrowed down through intensive data management, filtering, analysis and seeking further clarity from the City of Johannesburg firefighting personnel to better understand the initial datasets. The results of the re-analysed data sets were then compared with the minimum fire flows of the SANS 10090 (SABS, 2018a), Guideline (DHS & CSIR, 2019) and previous studies (van Zyl and Haarhoff, 1997; Myburgh & Jacobs, 2014 and Mac Bean & Ilemobade, 2019).

The initial datasets of Mac Bean & Ilemobade (2019) that consisted of 4 643 fire incident that occurred over a 10 year period (1 January 2006 to 30 September 2017) was collated and filtered in 3 phases, by Essack & Ilemobade (2022) and are summarised as follows;

Phase 1

- For Phase 1, out of the 4 643 fire incidents, only 4 479 fire incidents spanning 24 February 2006 to 26 September 2017 remained. In this dataset, an average of 32 incidents occurred per 30 day month over 12 month cycle.
- The dataset indicated that in the South African cold months of May to September the highest number fire incidents were recorded. Mac Bean & Ilemobade (2019) also found a similar finding.
- The dataset further indicated that 99% of the 4 479 fire incidents were extinguished using less than 100 Kℓ or less of water while 87% were extinguished using 10 Kℓ or less.
- Furthermore, the fire flows for 99.90% and 99.60% of the fire incidents were less than the minimum fire flow of the lowest SANS 10090 fire risk category (i.e.

Category D1; 1 900 *ℓ/min*) and The Red Book (i.e. Low Risk Category; 900 ℓ/min) respectively

Phase 2

- For Phase 2, the criteria for filtering the 4 479 dataset was set as follows:
  - Only FPASA category 2 (i.e. 'Formal structural' and 'Industry') fires were considered
  - Only data of 13 City of Johannesburg fire stations (Berea, Brixton, Central, Fairview, Huntershill, Lonehill, Malvern, Midrand, Randburg, Rooseveldt Park, Rosebank, Sandton and Turffontein) were retained. Discussions with the City of Johannesburg firefighting personnel indicated that the 13 fire stations relatively kept accurate data of fire events.
  - Records where more than one fire station responded to the same fire incident, were excluded from the dataset.
  - Fire incidents that recorded 0 Kℓ of water, were excluded from the dataset.
- At the end of Phase 2, only 477 FPASA category 2 (i.e. 'Formal structural' and 'Industry') fires remained. The dataset indicated that less than 5 Kℓ of water was used to extinguish 386 (81%) of the FPASA category 2. As such only 91 fires fits the definition of large fires.

Phase 3

- For Phase 3, the data filtering focused on the 91 fires that required more than 5 Kℓ of water to be extinguished. There were 2 outliers found whereby the volumes of water recorded were notably larger than the rest of the fire incidents and it could not be verified whether these values were actual or data capture errors.
- At the end of Phase 3, only 89 large fires remained. This dataset is comparable to that of Myburgh & Jacobs, 2014 who investigated 77 larges category 2 fires.
- The dataset indicated that out of the 89 large fire, 54 of the large fires were extinguished between 30 and 120 minutes. van Zyl and Haarhoff (1997) also found a comparable finding, where large fires in Johannesburg between 1980 and 1981 were extinguished between 30 and 90 minutes.

- The dataset indicates that the average water volume used to extinguish the 89 large category 2 fires was 9,63 Kℓ. This is 12% higher than the 8,60 Kℓ average water volume obtained by Myburgh and Jacobs (2014).
- Additionally, 40 of the 89 large category 2 fires (45%) required less than 6.60 Kℓ of water to extinguish. This validates Mac Bean and Ilemobade's (2019) finding that 75% of small and large fires within the City of Johannesburg were extinguished using less than 6.60 Kℓ of water.

An important highlight of this study is that it validates many of the findings in previous studies (van Zyl and Haarhoff, 1997; Myburgh & Jacobs, 2014 and Mac Bean & Ilemobade, 2019). It clearly shows that the SANS 10090 (SABS, 2018a) and Red book (DHS & CSIR, 2019) are conservative.

2.7 LEGAL AND POLICY CONSIDERATIONS

2.7.1 The Constitution of the Republic of South Africa (1996)

The Constitution of South Africa (RSA, 1996) is the supreme law of the country. It sets out the legal rights of citizens, explains the obligations of government and how they must use their powers. The Constitution (RSA, 1996) under the Bill of Rights, Section 24, states that everyone has the right to an environment that is not harmful to their health or well-being and Section 27(1)(b) states that it is a basic human right to have access to water services. The Constitution under Section 27(2) makes it an obligation for government to take practical legislative and other measures, within its available resources, to achieve the progressive realization of this right.

Another constitutional provision is in Section 151(1), wherein it is outlined that the executive and legislative authority of a municipality is vested in the municipal council. Section 156(2) states that "a municipality may make and administer by-laws for the effective administration of the matters which it has the right to administer". In other words, municipal councils have the jurisdiction to publish their own by-laws for the services it renders to the community.

An explicit injunction is given to municipalities in the constitution (under Chapter 7-Local Government, Section 156(1)(a) and Schedule 4, Part b) of its executive authority and right to administer firefighting services and water service, amongst other listed

services. In this way, the provision of firefighting services and water services is a constitutional mandate. A water service is defined as water supply services and sanitation services in the Waters Services Act (RSA, 1997), whilst a firefighting service is defined as a service that prevent fires and protects life and property should a fire occur (SABS, 2018a).

2.7.2 The Waters Services Act (1997)

The Water Services Act, Act 108 of 1997 (RSA, 1997) was enacted to provide legislative frameworks for the realisation of the constitutional mandate of government in providing water services to all citizens. The Water Services Act (RSA, 1997) is an important legislative tool that provides a more detailed framework in respect of managing water services in government. Section 12 of the Water Services Act (RSA, 1997) places a duty on the Water Service Authority to develop a Water Services Development Plan as part of the process of preparing an Integrated Development Plan (IDP).

This effectively places water services at the pinnacle of a Water Service Authority's strategic planning and ensures that the communities are consulted- the IDP process requires an intensive community participation program. In this way, a water service authority ensures an economical and sustainable access to water services that promote social and economic development.

2.7.3 The National Water Act (1998)

The National Water Act, Act No 36 of 1998 (RSA, 1998) centralises sustainability and equity as the guiding principles in the protection, use, development, conservation, management and control of water resources. These guiding principles seeks to integrate water resources within the broader socio-economic and political framework. Claassen (2013) states that the integrative aspect is multidimensional as it bridges the gap between different perspectives that includes the need to promote social and economic development and the need to protect water resources and sustenance of human life. Accordingly, the National Water Act under Section 4(1) allows for the use of water in or from water resources for purposes of firefighting. The act under Section 20 also lists firefighting as an emergency incident.

2.7.4 Fire Brigade Services Act (1987)

The main purpose of the Fire Brigade Services Act (RSA, 1987) is to “establish, maintain, employ, coordinate and standardize fire services; and matters connected therewith” (RSA, 1987). A Fire Service is defined in the act (RSA, 1987) as a service that is intended to be employed for (a) preventing outbreak or spread of fire; (b) fighting or extinguishing a fire; (c) the protection of life or property against a fire or other danger; (d) the rescue of life or property from a fire or other danger; (e) subject to the provision of any other law, the rendering of an ambulance service as an integral part of the fire brigade service; or (f) the performance of any other function connected with any of the matters referred to in (a) to (e).

The texture of the Act (RSA, 1987) is to define the administrative aspects of a Fire Brigade Service. The only explicit reference to the role of water is in the definitions where the word ‘material’ is defined as ‘water or other substance consumed by a Fire Brigade Service in fighting or extinguishing a fire’. Generally, the Act is silent on the water requirements for firefighting purposes.

It is also interesting to note that at the time of publishing and enactment of the Act, the standard called ‘Community protection against fire’ (SABS 090) which was first published in 1966 and revised in 1972 and the guideline called ‘Guidelines for the provision of engineering services for residential townships’ - The Bluebook (Department of Community Development, 1983) was already in place; however the act does not make any reference to these documents. The omission is significant, as various authors (van Zyl & Haarhoff, 1997; Myburgh and Jacobs, 2014 and Mac Bean and Ilemobade, 2019) have widely established a credible symbiotic relationship between a firefighting service and water supply service. Generally, the expectation is that a sector specific legislation such as the Fire Brigade Services Act must express authoritative declarations on water requirements for firefighting purposes.

2.7.5 Municipal By-Laws

Municipal by-laws are laws that are adopted by a municipal council to regulate and administer the services a municipality provides to its constituency. Municipal by-laws provide order and certainty in provision of services in areas of their jurisdiction as they bind both the municipality and community. The Constitution of the Republic of South Africa (RSA, 1996), under Section 156 (2) and Section 13(a) of the Local Government:

Municipal Systems Act 2000 (RSA, 2000), affirms the power of municipal councils to adopt their own by-laws. As such, a municipal council derives its powers and functions to adopt a by-law from the Constitution of the Republic of South Africa (RSA, 1996) and Local Government: Municipal Systems Act 2000 (RSA, 2000).

Mac Bean & Ilemobade (2019) reviewed the by-laws of the eight metropolitan municipalities in South Africa and further sampled local and district municipalities with each province having representation. It was found that there are significant differences in how fire is legislated within the different municipalities. Mac Bean & Ilemobade (2019) also states that municipalities must use modern firefighting datasets to update their legislation on present day firefighting water requirements to facilitate the planning and design of water distribution systems to handle the high water draw offs that happen when extinguishing a fire. The reality is that municipalities require case specific data sets in firefighting services in order to fulfil their constitutional mandate.

CHAPTER 3 THE CASE OF SOL PLAATJE MUNICIPALITY

This chapter is linked to research objective I (i.e. to conduct a detailed literature review on firefighting within municipal water distribution systems). Previous studies revealed that there are limited investigations on water requirements for firefighting in other geographical areas in South Africa. More limitations were also highlighted in the application of area based parameters such as population size, climatic conditions, vegetation and geographical location (i.e. inland and coastal) that impact the occurrence of fires. From these revelations, this chapter reviewed the literature within the specific context of the geographical location and related variables, water balance and municipal by-laws of Sol Plaatje municipality. This provided an in-depth understanding of the geographical area and area based parameters applicable in Sol Plaatje municipality.

3.1 GEOGRAPHICAL LOCATION AND RELATED VARIABLES

In South Africa, there are limited investigations on water requirements for firefighting purposes in different geographical locations. Published studies in this respect were conducted in three provinces, namely the Gauteng, Mpumalanga and Western Cape provinces. In the Gauteng province, the studies conducted were in the City of Johannesburg (van Zyl & Haarhoff, 1997; Mac Bean & Ilemobade, 2019 and Essack & Ilemobade, 2022). In the Mpumalanga province, van Zyl & Haarhoff (1997) conducted their study in a residential area in Kriel and in the Western Cape province, Myburgh & Jacobs (2014) conducted their investigation in five urban towns within a 150 km radius from Stellenbosch.

The previous studies indicate that there are a number of area based parameters such as population size, climatic conditions, vegetation and geographical location (i.e. inland and coastal) that impact the occurrence of fires. For example, Myburgh (2012) states that limited vegetation could result in a significant reduction in the occurrence of fires in small rural towns (low risk and low population density areas), and the subsequent fire flows required to extinguish the fires. Also, van Zyl & Haarhoff (1997) found that 90% of major fires in Johannesburg (high risk and high population density areas) were extinguished using fire flows lower than 900 ℓ/min. This finding was validated by Essack & Ilemobade (2022), who indicated that 89 major structural fires

in Johannesburg were extinguished using fire flows lower than the minimum fire flows in the SANS 10090 and the Red Book.

Myburgh (2012) recommends that similar studies must be conducted in other South African provinces, such as the Northern Cape province due to its floristic characterization and classification of vegetation. According to Low & Rebelo (1996), the Northern Cape is located within five biomes i.e. Savanna, Nama Karoo, Succulent Karoo, Grassland and Fynbos Biomes. Figure 3-1 shows the mapping of the biomes located in South Africa.

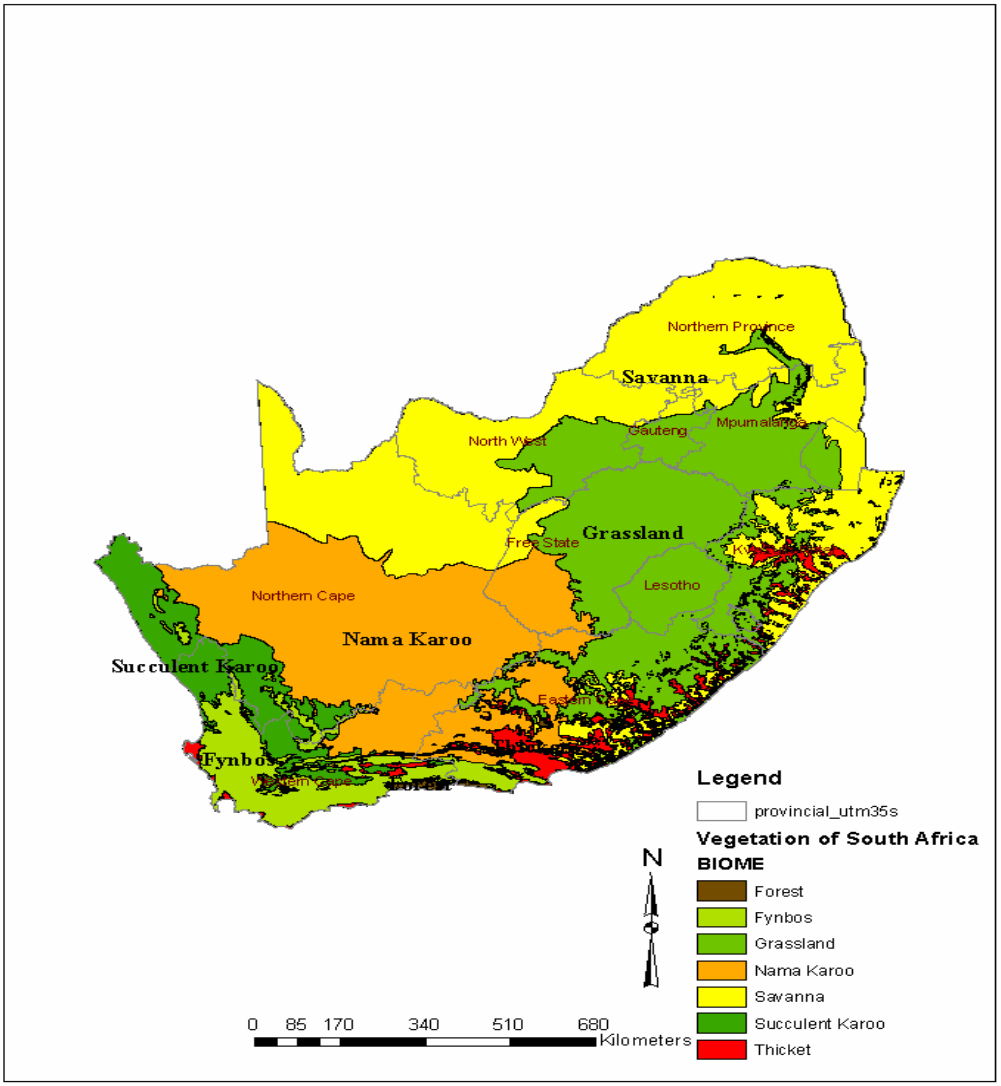

Figure 3-1 The mapping of the biomes located in South Africa (Low & Rebelo, 1996)

Out of the five biomes located in the Northern Cape, it is only the Savanna, Grassland and Fynbos biomes that are prone to fires. Fire is important in the management practice of the vegetation and maintaining high levels of diversity in the biomes (Wilgen et al, 1985; Trollipe, 1982 and Neary and Leonard, 2020). van Wilgen (2013) further states that fire is the main driving force in the ecological dynamics of the fynbos ecosystems i.e. for fynbos plants, such as proteas, fires are necessary for the plants to be able to release seeds and germinate.

The Northern Cape Province is sparsely populated and when compared to other provinces in South Africa it records the lowest population statistics in the country. In 2021, the Northern Cape Province (as shown in Figure 3-2) had a population of 1 145 861. The Northern Cape Province is divided into five districts, namely Frances Baard, ZF Mgwacu, John Taole Gaetsiwe, Namakwa and Pixley Ka Seme. The Frances Baard district is the smallest district in terms of geographical area and had an overall population of 469 290 in 2021 that resides in four local municipalities namely Sol Plaatje, Dikgatlong, Magareng and Phokwane.



Figure 3-2 Locality map of Northern Cape (municipalities, 2021)

The largest proportion of the population of the Northern Cape province resides in Sol Plaatje municipality with 248 041 persons residing in 60 297 households (Statistics South Africa, 2021). As a result, Sol Plaatje municipality houses 21% of the population of the province thereby making it the largest urban formation in the Northern Cape Province (SPLM IDP, 2020).

Sol Plaatje municipality is geographically located in the city of Kimberley. Kimberley is the capital city of the Northern Cape province. According to Mucina & Rutherford (2006), Kimberley is located in Savanna biome as shown in Figure 3-1 and the vegetation type is classified as the Kimberly Thornveld (SVK4). Low & Rebelo (1996) state that the Savanna biome is the largest biome in Southern Africa, occupying 46% of the area and one third the area of South Africa. The Savanna biome is a veld that is characterised by grassy ground layer and an upper layer of woody plants in the field layer (Trollipe, 1982). A major delimiting factor of the Savanna biome, is that fires help to maintain the grassy ground layer (Bond, 2019). Consequently, the importance of fires in maintaining the composition and structure of the vegetation in the savanna biome is thus well recognised (Archibald et al., 2017).

3.2 WATER BALANCE

One of the most useful tools developed to analyse the components of water distribution system input volume is the IWA standard water balance (Lambert & Mc Kenzie, 2002). The water balance indicates what happens to the water once it enters the water distribution system. The IWA standard water balance as shown in Table 3-1, is a volumetric tool that inculcates uniformity in the presentation of performance data linked to water distribution systems.

Table 3-1 Standard water balance (Lambert & Mc Kenzie, 2002)

<table>
<tr><td rowspan="8">System Input Volume</td><td rowspan="3">Authorised Consumption</td><td rowspan="2">Billed Authorised Consumption</td><td>Billed Metered Consumption</td><td rowspan="2">Revenue Water</td></tr>
<tr><td>Billed Unmetered Consumption</td></tr>
<tr><td rowspan="2">Unbilled Authorised Consumption</td><td>Unbilled Metered Consumption</td><td rowspan="6">Non-Revenue Water</td></tr>
<tr><td>Unbilled Unmetered Consumption</td></tr>
<tr><td rowspan="5">Water Losses</td><td rowspan="2">Apparent Losses</td><td>Unauthorised Consumption</td></tr>
<tr><td>Metering Inaccuracies</td></tr>
<tr><td rowspan="3">Physical leakages</td><td>Leakage on Transmission and/or Distribution Mains</td></tr>
<tr><td>Leakage and Overflows at utility Storage Tank</td></tr>
<tr><td>Leakage on Service Connections up to point of Customer Metering</td></tr>
</table>

The water balance of Sol Plaatje municipality was summarised in the SPM Water and Sanitation Masterplan (2018) and SPM IDP (2018). These documents indicated that in 2018, the total system input volume was approximately at 76 000 Kℓ/d, Non-Revenue Water was estimated at 44% and water losses (physical and commercial) were estimated at 41%. Forecasted water demand for the year 2037 (with 2017 as the base year) was estimated to be 120 160 Kℓ/d.

In aggregated terms, in the year 2018, ~33 440 Kℓ/d was Non-Revenue Water and of that amount, water losses contributed ~31 160 Kℓ/d. Similarly, if the Non-Revenue Water and water losses percentages of the year 2018 are applied to the projected 2037 water demand, indications are that ~52 870 Kℓ/d will be Non-Revenue Water and of that amount, water losses will contribute ~49 266 Kℓ/d. These are quantities of purified water that are not generating any income for the municipality.

The SPM IDP (2018), notes two primary challenges, which best represents the difficulties faced by the municipality in the water supply service. Firstly, it is the high water losses. According to a study conducted by the World Bank (2006), the American Water Works Association (AWWA) recommends that water losses be maintained at 10% or less. Secondly, the current water demand exceeds the raw water licence conditions by 20%. It is important to note that in South Africa, raw water use is

regulated by section 21, 22, 23, 24, 25 & 26 of the National Water Act (RSA, 1998). Section 22 of the National Water Act sets out conditions for a water licence by any entity. Section 23 of the National Water Act delegates the Minister to determine the quantities of water that may be allocated to an entity. Section 23 (4) states that the entity "must comply to a determination made" in terms of quantities of water allocated to it. In this way municipalities are subjected to an authorisation process for raw water licence issuance and must comply to "any condition relevant to the authorisation" that is "subject to any limitations, restrictions or prohibitions". This means, abstracting water above what the water licence conditions has permitted is an illegal practice in South Africa.

The reliability and efficacy of the water distribution system depends on the age of the infrastructure and its orderly functioning is indispensable to ensure sustainable water supply service (Van Zyl, 2014). As such it is important to note that the Sol Plaatje municipality operates and maintains a water distribution system which is over 50 years old, of which 75% consists of 992 km steel and AC pipes (SPM IDP, 2018).

The Sol Plaatje municipality is a Water Service Provider and Water Service Authority as per the provisions of the Water Services Act 108 of 1997 (RSA, 1997). Accordingly, Sol Plaatje municipality is responsible for raw water abstraction from the Vaal River, raw water conveyance to the Riverton Water Treatment Works, water treatment and distribution of potable water to households in the city of Kimberley.

The Kimberley water distribution system is supplied from the Riverton water treatment works which has a design capacity of 162 Mℓ/d. The Riverton water treatment works is located on the bank of the Vaal River. Raw water is abstracted from the Vaal River and treated at the Riverton water treatment works. After the water treatment processes, the potable water is pumped through a 20 km bulk pipeline to the Newtown reservoirs.

The route of the bulk water pipeline starts at the Riverton water treatment works with 636 mm Ø and 890 mm Ø pipelines that are parallel to each other up to the mid-station point. From the mid-station point the two pipelines continue along two different routes to the Newton reservoirs. Route 1 has two 636 mm Ø pipelines that runs parallel to each other up to the Newton reservoirs precinct. Route 2 has one 941 mm Ø pipeline

that further divides along the route into two pipelines i.e. 636 and 738 mm Ø pipelines continuing until the Newton reservoirs precinct. The Newtown reservoirs are located at the highest point in Kimberley, have a capacity of 261.5 Mℓ with an average top water level of ± 1244 m above mean sea level (SPM, 2018).

3.3 RELATED MUNICIPAL BY-LAWS OF SOL PLAATJE MUNICIPALTY

In this section, the relevant municipal by-laws of Sol Plaatje municipality related to the provision of water for firefighting purposes are evaluated. In this way, a contextual overview is provided on how the Sol Plaatje municipality deals and/or manages the water requirements for firefighting purposes.

3.3.1 Building Control By-law

The objective of the Building Control by-law is *"to provide for the control of building erected on land in the Sol Plaatje municipality; and for matters connected therewith"* (SPM, 2006a). The by-law is 3 pages long and is subdivided into 6 subheadings i.e. (1) Definitions; (2) Buildings on land to be erected on plans; (3) Application for and issue statement; (4) Failure by the municipality to act within a certain period; (5) Delegation of powers and (6) Short title. The main textual setting of the by-law is to set out the processes and procedures for the approval of building plans within the municipality's jurisdiction.

The by-law makes no explicit reference to fire installations within buildings and water requirements for firefighting purposes. It also does not reference any to the Standards (SABS, 2018a, SABS 2018b & SABS, 2020) and/or Red book (DHS & CSIR, 2019). However, in the definitions, wherein the term *'building'* is defined, Section 1(e) state that a building includes "*any facilities or system, or part or portion thereof, within or outside but incidental to a building, for the provision of a water supply, drainage, sewerage, stormwater disposal, electricity supply or other similar service in respect of the building"*. This tacitly implies that Sol Plaatje municipality has the power to take decisions on the fire systems that are designed in the building plans that they approve.

This was validated by Sephiri (2021), who stated that building plans are submitted to the fire department for assessments prior to approval being granted by the building control officer. The fire department then applies the Standards (SABS, 2018a, SABS 2018b & SABS, 2020) and/or the Red book (DHS & CSIR, 2019). With complicated

designs, the developer at their own cost, provides a design report from a registered professional engineer for any other fire installations related to the building. This process of involving the fire department and engineer design report in the assessment of fire installations within buildings is not defined and/or outlined in the by-law.

3.3.2 Fire Brigade By-law

The objective of the Fire Brigade by-law is *"to provide for a fire brigade service in Sol Plaatje municipality and for matters connected therewith*". The by-law outlines various provisions in line with the fire brigade service such as the definition of a fire brigade service, composition of service, procedure on the outbreak of fire or other emergency situation and wearing of uniforms amongst others. Interestingly, throughout the by-law the chief fire officer is identified as the main decision maker in all operational provisions.

The by-law defines the chief fire officer as the person appointed in terms of section 5(1) of the Fire Brigade Services Act (SPM, 2006b). The Fire Brigade Services Act states that municipalities must appoint a chief fire officer with the qualifications and experience to be in charge of a fire service (RSA, 1987). In other words, the competency of the chief fire officer duly authorises him/her to determine the fire service response for fighting or extinguishing fires. There is no provision made for water for fighting purposes. There is also no reference made any to the Standards (SABS, 2018a & SABS 2018b) and/or Red book (DHS & CSIR, 2019).

3.3.3 Water Services By-law

The Water Services by-law includes provisions for the sanitation services. The objective of the by-law is *"to provide for water services for the Sol Plaatje municipality and for matters connected therewith"* (SPM, 2006c). In the Water Services by-law (SPM, 2006c), reference is made to the Standards SABS 0252- 1 (SABS 2018b) and SANS 10400 (SABS, 2020), however it is not for specifications on the water requirements for firefighting. For example, it refers to the definition of a 'connection pipe' as similar to the definition of 'communication pipe' in SANS 10252- 1 (SABS, 2018b). Similarly, the by-law references SANS 10400 (SABS, 2020) on the written approval required for fire installation work done "in terms of SANS 10400", there is no additional information on building occupancy, type of fire system and risk categories, amongst

CHAPTER 4 UNRESOLVED ISSUES IN THE LITERATURE

This chapter is also linked to research objective I (i.e. to conduct a detailed literature review on firefighting within municipal water distribution systems). This chapter summarises the unresolved issues in the literature review into main five topics i.e. South African design codes, area based parameters, fire flows, fire duration and storage volumes and residual pressure during firefighting. The five topics then forms the core theoretical foundation that guides the analysis of the preceding research objectives (i.e. research objective II: to categorise and analyse fire flows, based on actual fire flow volumes and flow rate data; research objective III: to compare the SANS 10090 and Red book fire flow requirements against analysed firefighting operations in Sol Plaatje Municipality and previous South African studies; research objective IV: to investigate large fires at Sol Plaatje municipality; and research objective V: to make recommendations to guide future revisions to the SANS 10090 and Red book for the provision of water for firefighting).

4.1 SOUTH AFRICAN DESIGN CODES

Studies conducted over the past 20 years have recommended that the current South African design codes (DHS & CSIR, 2019 and SABS, 2018a) should be amended to levels that are more appropriate. The following three points summarises some of the main arguments from previous studies in relation to the application of the current South African design codes:

- According to van zyl & Haarhoff (1997) a water reticulation network design is normally evaluated under two separate loading conditions i.e. normal public peak demand and fire water demand. Normal public peak demand is defined as the design peak flow conditions occurring at the most critical point within water reticulation network, whereas fire water demand as the normal public peak demand plus the fire flows required to extinguish a major fire event.

  The application of fire water demand in a water reticulation network design provides for a scenario where the pressure is at acceptable levels, the flow rates and head losses in the network are at maximum levels and the biggest fire is taking place at the same time, without any reduction in the normal public peak demand. van zyl & Haarhoff (1997) found the probability of this occurring

remote. Similarly, Mac Bean & Ilemobade (2019) observed that the start times of peak fires do not correspond with peak residential water demand periods – the inverse was the case as the lowest observed start times of fires were during peak demand periods.

- van zyl & Haarhoff (1997) highlights the importance of having the type and use of building linked to the fire risk category of the building in the South African design codes. This would allow for a low fire risk application like a scrap yard located in a high fire risk area to be only considered for basic level of fire protection in the design of the water reticulation network in that supply area. For a high fire risk application located in a low fire risk area, the building owner must ensure that his/her building has adequate supply of fire water.
- Mac Bean & Ilemobade (2019) observed that the fire flows in the Red book (DHS & CSIR, 2019) violates same in the SANS 10090 (SABS, 2018a) - this is illegal as the SANS 10090 specifies the enforceable absolute limits. Also, the Red book and SANS 10090 provide different fire risk classifications and values for the different parameters and as such where inconsistent and lacked uniformity.

4.2 AREA BASED PARAMETERS

It has been widely established both internationally and locally (Grayman et al., 2004; Hadjisophocleous and Richardson, 2005; van Zyl & Haarhoff, 1997; Myburgh, 2012; Myburgh and Jacobs, 2014 and Mac Bean and Ilemobade, 2019) that area based parameters such as population size, climatic conditions, vegetation and geographical location impact the occurrence of fires. Myburgh (2012) state that limited vegetation could result in a significant reduction in the occurrence of fires in small rural towns (low risk and low population density areas), and the subsequent fire flows required to extinguish the fires.

Also, in the study of Mac Bean & Ilemobade (2019) conducted in the City of Johannesburg a rise in fire incidents was observed between June and October months, which are typically winter season months and low rainfall months. The average fire flow volume ranges between 7 to 12 Kℓ per incident. The implication was that, while the frequency of fire occurrence is strongly related to climatic conditions,

the volume of water used to extinguish fires, and by association, the size of the fires, is not a function of climatic conditions.

Another interesting observation from the previous studies is that investigations have only been conducted in three provinces i.e. the Gauteng, Mpumalanga and Western Cape provinces. In the Gauteng province, the studies conducted were in the City of Johannesburg (van Zyl & Haarhoff, 1997; Mac Bean & Ilemobade, 2019 and Essack & Ilemobade, 2022). In the Mpumalanga province, van Zyl & Haarhoff (1997) conducted their study in a residential area in Kriel and in the Western Cape province, Myburgh & Jacobs (2014) conducted their investigation in five urban towns. Although, this limitation is an important observation when analysing the knowledge gaps, it must be noted the Gauteng, Mpumalanga and Western Cape provinces have distinct characteristics in terms of their population size, climatic conditions, vegetation and geographical locations (inland and coastal). As such studies conducted in those areas have contributed immensely to the overall body of knowledge.

By conducting similar studies in other geographical locations in South Africa and comparing their results with the South African design codes and previous studies will broaden the knowledge gap. Moreover, when area based parameters are factored in the analysis of results. In this way, the Northern Cape province provides a compelling case for conducting similar studies relating to water requirements for firefighting purposes as it has distinct characteristics in terms of their population size, climatic conditions, vegetation and geographical location in South Africa (which has both inland and coastal).

4.3 FIRE FLOWS

The South African design codes (DHS & CSIR, 2019 and SABS, 2018a) are inconsistent and lacks uniformity as they provide different fire flows and fire risk categories. As noted by Mac Bean & Ilemobade (2019) the Red book (DHS & CSIR, 2019) gives out a single set of fire risk categories to which all its various recommendations are related. In contrast, the SANS 10090 (SABS, 2018a) presents two fire risk categories. The first is titled, ‘Fire Risk Category’, whereas the second is titled, ‘Possible Fire Sizes’. The ‘Possible Fire Sizes’ category is used to determine the ‘Minimum Fire Flow’. The implications of having two categories in the SANS 10090 is

that the minimum fire flow and the minimum hydrant flow are determined from different fire risk categories, despite the fact that both are within the same table and are linked. For example, an affluent residential area (Category C) where houses are spaced more than 30 m apart (Category D1) would have the SANS 10090 recommend two minimum hydrant flows of 2000 ℓ/min (Category C) and 1200 ℓ/min (Category D1) and two minimum fire flows of 6 000 ℓ/min (Category C) and 1 900 ℓ/min (Category D1).

Furthermore, previous studies (van Zyl & Haarhoff, 1997; Mac Bean & Ilemobade, 2019 and Essack & Ilemobade, 2022) have found the fire flows to be crude and conservative. Mac Bean & Ilemobade (2019) found that the fire flows for 99.90% and 99.60% of the fire incidents in the City of Johannesburg were less than the minimum fire flow of the lowest SANS 10090 fire risk category (i.e. Category D1; 1 900 ℓ/min) and The Red Book (i.e. Low Risk Category; 900 ℓ/min) respectively. van Zyl & Haarhoff (1997) had a similar finding i.e. 90% of the large fires in the City of Johannesburg used less than 3100 ℓ/min.

In addition, van Zyl and Haarhoff (1997) found that it required 5 Kℓ or more of water to extinguish large fires. Similarly, Myburgh & Jacobs (2014) found that it took average water volume of 8,6 Kℓ to extinguish a large fire. The Essack & Ilemobade (2022) study found that 40 of the 89 large category 2 fires (45%) required less than 6.60 Kℓ of water to extinguish. This validates Mac Bean and Ilemobade's (2019) finding that 75% of small and large fires within the City of Johannesburg were extinguished using less than 6.60 Kℓ of water.

4.4 FIRE DURATION AND STORAGE VOLUMES

Fire duration is defined as the period for which the required fire flow for a specific fire risk category should be maintained. The SANS 10090 require a fire duration of six hours for high risk areas and two hours for low risk areas. However, the results of van Zyl & Haarhoff (1994) indicate that 90% of the major fires in high risk areas were extinguished within two hours or less using 3100 ℓ/min or less of water. More recently, the data sets of Essack & Ilemobade (2022) indicated that out of the 89 large fire, 54 of the large fires were extinguished between 30 and 120 minutes.

By way of example, in the study of van Zyl & Haarhoff (1994) when the Red book stipulations was used to determine minimum storage capacity for high risk areas, the

calculation was applied as: 12000 ℓ/min X 6h = 4320 Kℓ, when same was used for van Zyl & Haarhoff (1994) findings the calculation was applied as: 3100 ℓ/min X 2h = 372 Kℓ. In other words, there was a 91,4% reduction in reservoir storage requirements for high risk areas when the findings of van Zyl & Haarhoff (1994) are compared against the recommendations of the then Red book.

4.5 RESIDUAL PRESSURE DURING FIREFIGHTING

Residual pressure during firefighting events refers to the recorded pressure head (H), measured in metres, when water is discharged from a point (device, element or fixture) into the atmospheric pressure during active firefighting events. Generally, the hydraulic design of fire engines and water distribution systems requires a specific residual pressure to be available and maintained to adequately extinguish fires. A ‘too low’ pressure head would be deemed inadequate and ‘too high’ would result in a wastage of water.

Incidentally, from previous studies (van Zyl & Haarhoff, 1997; Mac Bean & Ilemobade, 2019 and Essack & Ilemobade, 2022) there is no analysis of the residual pressure during firefighting events. This omission is significant as it could mean fire departments are inadequately prepared when they fight fires and that they assume that their instruments and subsequently the water distribution systems are fit for purpose as per the design recommendations of the South African design codes.

CHAPTER 5 DATA COLLECTION

This chapter responds to research objective II (i.e. to categorise and analyse fire flows, based on actual fire flow volumes and flow rate data during fire incidents in Sol Plaatje municipality). This chapter provides answers to the following research questions: Where are the databases containing firefighting infrastructure and records for Sol Plaatje municipality located?; In what format (hardcopy and/or softcopy) are the databases and what are the contents of the databases?; What are the processes and equipment employed by the fire services department from the minute a fire event is reported to when the fire has been extinguished? Which risk categories do fire in Sol Plaatje municipality mostly fall into and what are the range of fire flows and water volume?

5.1 IDENTIFYING A PARTICIPATING MUNICIPALITY

The first step that was undertaken in the data collection process was to identify a participating municipality that had relevant datasets on firefighting. A practical approach was adopted by initiating discussions with municipal officials from nine municipalities that are located across four districts within the Northern Cape province. This was done to primarily ascertain whether datasets on firefighting were available and whether the municipality was willing to provide such datasets for this research project.

From the discussions, Sol Plaatje Local municipality indicated that they had datasets on firefighting and these data sets were provided for this study. A copy of a fire incident report is shown in **Appendix A**.

5.2 OBTAINING PERMISSIONS

A questionnaire was developed as part of the application documents for ethics clearance. Ethics clearance approval (with protocol number **CEECC-1491265-2021**) was granted on the 02 August 2021 **(see Appendix B)**. A letter of request was submitted to Sol Plaatje municipality to access their datasets on firefighting and conduct structured interviews for the purpose of this study. Permission was granted by Sol Plaatje municipality as shown in **Appendix C**.

5.3 DEFINING AND UNDERSTANDING THE VARIABLES IN THE DATA SETS

The main source of data was obtained from fire incident reports of Sol Plaatje municipality. Fire incident reports are defined as a physical document that is filled out and submitted to the Fire and Emergency Services after every fire incident that is responded to by the fire brigade (Mac Bean, 2019). The details captured in the fire incident reports of Sol Plaatje municipality are summarised in Figure 5-1 and contains the following data, which is relevant to the objectives of this study:

- The call out number of each fire incident;
- The time and date of each call out;
- The duration of each call out;
- The location of fire incident;
- The manpower used during call out;
- The probable cause of the fire;
- The equipment used by the fire brigade and;
- The estimated volume of water that was used to extinguish the fire.

It is clear that the datasets categorised above consists of both quantitative and qualitative attributes. Firstly, the quantitative variable (also known as numerical variable) is classified in terms of quantity, units of measurements, range and scale of values (Levine et al., 2016) and its operational definition is affected by whether the variable is discrete or continuous. Discrete variables arises from a counting process such as ‘number of fire incidents’ or ‘number of personnel used during call-outs’. Continuous variables arises from a measuring process such as ‘time since last fire incident’ or ‘total duration of fire incidents’.

Secondly, they have an ‘open-endedness, naturalistic and emergent approach’ (Creswell, 2012). The intent of this approach is to provide an explanation for the quantitative outcomes. This is a great benefit as the researcher is able to pinpoint the data that is relevant to the research project (Almalki, 2016). For example, in a study conducted by Mac Bean (2019), open – ended questions were compiled around specific themes (i.e. connection between fire hydrant & the WDS, external factors affecting firefighting processes and efficiency, amongst others) to assists in clarifying the quantitative data analyses. The qualitative stage is connected to and depends on

the quantitative outcomes (Creswell & Plano Clark, 2017). Furthermore, the researcher needs to operate in a natural context in order to establish trust, participation, access to meanings and in-depth understanding (Saunders et al., 2012). The transformation of the datasets follows this logical sequence.

As such, a combination of descriptive and inferential statistics are the main branches of statistical tools that assisted in achieving the objectives of this study. Descriptive statistics gives a detailed account of the relationship between variables in a sample or population, whilst inferential statistics uses a random sample of data collected from a population to predict the whole population (Ali & Bhaskar, 2016). Accordingly descriptive and inferential statistics are used together to provide a powerful tool for both description and prediction of the collected data.

The possible results of an experiment is called a sample space, denoted by *S*. A random variable is a rule or function that allocates a value to each result in the sample space (Guo & Wang, 2014). In other words, it is described a random variable because it may take any given range of values that cannot be exactly predicted but can be described in terms of their probability. Generally a random variable is denoted as capital letter *X* and its specific values are the corresponding lowercase *x*. There are two types of random variables, namely discrete and continuous variables.

According to Keller (2012), a discrete random variable can take on a countable (finite) number of values. For an example, if *X* defined as the number of fire incidents, then the possible values of *X* are 0,1,2,3,4…..1000. Keller, (2012), also states that a continuous random variable are a set of values that are uncountable. For an example, if *X* defined as the flow rate reading on a device during a fire event, then the possible values of *X* are 0l/s and 15l/s, in other words the sample space contains an infinite number of possibilities equal to the number of points on a line segment (Walpole et al., 2012).

In this study, the following parameters were identified as being discrete random variables:

- Number of fire incidents
- Time of day an activity occurs
- Frequency of fire event per day
- Risk Category of Fires

- Personnel

The following parameters were identified as being continuous random variables:

- Volume of water
- Flow Rate

5.4 ADMINISTERING THE DATASETS

The data was received in hard copies as shown in Appendix A. The hard copies were filed in lever arch files with the spine of the files labeled according to the South African municipal annual financial year cycles (i.e July to June of each year). The data acquired consisted of 3236 incident reports that occurred between 21 July 2017 to 27 August 2020.

The raw data was extracted manually from the hardcopies into an MS Excel spreadsheet according to the municipal annual financial year cycles. In this case there was a separate MS Excel worksheet from July 2017 to June 2018, July 2018 to June 2019, July 2019 to June 2020 and July 2020 to August 2020. Table 5-1 provides a summary of the years and fire incidents that occurred.

Table 5-1 Summary of the years and fire incidents

No	Years	No of Incidents
1	July 2017 to June 2018	1049
2	July 2018 to June 2019	1003
3	July 2019 to June 2020	900
4	July 2020 to August 2020	284
	Total	**3236**

The processes that followed was to transform the raw data into a logical sequence. The raw data was then manually transfered and organised into the following 18 headings (per financial year), as shown in Figure 5-1.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CALL NO	CALL DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	PERSONEL	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER
1	21-06-2017	12:19	12:22	12:34	12:50	00:28	00:03	00:31	C	1	2	Other	Open Flames	Grass	Yes	WT1	0

Figure 5-1 Headings of raw data transfer into excel worksheet

It is important to note that photocopies of the incident reports and working offsite with the incident reports was not allowed by the municipality as some incidents reports had confidential information such as ID numbers and residential adresses. As such all data transferal work was done at the municipal offices under the supervision of the administrative section of the fire department during working hours on week days only – the administrative section of the fire department does not work after hours and on weekends. However, this had an added advantage, as various aspects and errors of the data was verifed and corrected as the data transfer was happening. Once the data transfer into the MS Excel worksheets was completed. The worksheets were combined into one workbook to create a chronological year-to-year timeline.

Another extensive data cleaning process was conducted, where fire incidents that had "data capturing irregularities such as spelling mistakes", "sequencing of incidents from the first incident to the last", "duplicates of incidents", "no services rendered", "missing incident forms from the file" and "data capturing errors and missing data" were individually assessed for usefulness and appropriateness. After the assessment, the fire incidents were filtered down and the deleted fire incidents are summarised as indicated in Table 5-2.

Table 5-2 Summary of deleted fire incidents

No	Description	Key Reasons	No of deleted fire Incidents
1	No Services Rendered	• False Calls • The team arrived on site after the fire extinguished itself out	986
2	Missing incident forms from the files	• These are fire incident forms that were missing in the file	149
3	Data capturing errors and missing data	• Call Numbers, Dates and Times incorrectly recorded • Key data not filled in (such as dates, times, worktime and water volume)	22
4	Duplicates of Incidents	• Double entries of data • Two or three forms of the same incident	19
		Total	**1176**

The filtered data set that remained for data analysis were **2060** records from the period **21 July 2017 to 27 August 2020**. From the "cleaned" data of **2060** records, additional metrics such as flow rate were added as the 19th column. For the worktime calculation

in MS Excel, time was converted to minutes by multipying by 1440 (24 X 60). As such, the flow rate formula was computed as:

$$Flow\ Rate\ (\frac{l}{min}) = \left(\frac{Water\ Volume\ X\ 1000}{Worktime\ X\ 1440}\right)$$

5.5 ORGANISING AND PRESENTING THE DATASETS

Generally, data that has been collected in its original format normally does not present any useful information. The data needs to be organised and presented in a way that is comprehensible. Organising and presenting the data provides useful summaries that jumpstarts the analyses of the data. An appropriate way of organising and presenting the collected data sets is by constructing a histogram**,** frequency distribution, cumulative distribution, pie chart and scatter plot.

The last step in the data collection process was to organise and present the filtered data set of 2060 records against defined criteria and themes sourced from previous studies (i.e. Van Zyl & Haarhoff, 1997; Myburgh & Jacobs, 2014; Mac Bean & Ilemobade, 2019 and Essack & Ilemobade, 2022), the SANS 10090 (SABS, 2018a) and Red book (DHS & CSIR, 2019). For example, the cumulative probability plot for fire flow volumes of the filtered data set was compared against the same cumulative probability plot of Mac Bean & Ilemobade (2019). Similarly the classification of fires according to FPSA of the filtered data set was compared against the same of Essack & Ilemobade (2022). A detailed analyses is provided in Chapter 6, 7 & 8.

CHAPTER 6 STRUCTURED INTERVIEWS AND ORGANISATION OF FIRE SERVICES AT SOL PLAATJE MUNICIPALITY

This chapter responds to research objective III (i.e. to compare the SANS 10090 and Red book fire flow requirements against analysed firefighting operations in Sol Plaatje Municipality and previous South African studies). This chapter provides answers to the following research question: What is the state of firefighting in Sol Plaatje Municipality?

6.1 INTERVIEW PROCESS

The role of structured interviews in this study, was to seek clarity to some of the data inputs that was captured on the obtained fire incident reports from Sol Plaatje municipality. The structured interviews are a second strata of data collection “to provide additional or different knowledge, interpretations or conclusions” (Bulmer et al., 2009).

The structured interviews were conducted with three officials responsible for firefighting at Sol Plaatje municipality i.e. Acting Senior Manager: Emergency Services, Logistic Officer and Firefighter. The selection criteria for the officials was based on their roles and responsibilities at the Fire Station and it was also focused on candidates that will provide credible information in relation to the objectives of this study. For example, the Station Chief (Acting Senior Manager) is the highest decision maker in accordance with the Fire Services Act (RSA, 1997); the Logistics Officer is the only official who has detailed records and knowledge of all vehicles and equipment related to firefighting at the station and the firefighter is responsible for extinguishing of fires and providing context to the data.

The structured interviews required that the officials be asked the same questions in the same way. In this way, the interview process managed to solicit their knowledge and experience in relation to the existing firefighting operations at the Sol Plaatje municipality. In addition, the information gathered provided important views on the firefighting operations of Sol Plaatje municipality and highlighted the challenges relating to water for firefighting.

It is important to note that prior to full access being granted to the data sets, the municipality required a letter from the University of the Witwatersrand that detailed the

objectives of the study and the type of information that was required. This requirement then prompted an application for ethics clearance approval for non-medical students from the School of Civil and Environmental Engineering of the University of the Witwatersrand (Appendix B).

Permission was granted by Sol Plaatje municipality as shown in Appendix C. The implementation of the interviews process was disagrregated into three stages namely, (i) Introductions and explanation of the objectives of the study as shown in the participant information sheet in Appendix D; (ii) Participant consent was requested as shown in Appendix E and (iii) the interview questions as shown in Appendix F.

The final stage in the interview process was to interpret the data that was gathered during the interview process. This stage allowed for the narrative responses to be compiled into groups of information, also referred to as codes and themes by Creswell & Plano Clark (2017). The following sections details the narrative responses of the participants.

6.2 PROCEDURE ON INCIDENT REPORTING

Sol Plaatje municipality has one central call centre system which is located at the main fire station in town. The municipality also has two satellite stations located in the townships of Galeshewe and Ritchie. The municipality is in the process of completing the third satellite station that will be located in the suburb of Homevale. When an incident is been reported, the call centre agent simultaneously writes out a call slip which has basic information such as call centre agent name, name of the caller, date and time, call number and message (which includes address of incident and type of incident).

The call slip is then given the Station Officer on duty. The Station Officer writes out a call information sheet which has information such as date, time, name of reporter, telephone number, address of incident, dispatch vehicles, fire station in the area of incident, Safety Officer for the incident and staff on duty. The SANS 10090 (SABS, 2018a) recommends that these administrative processes must happen within 3 minutes from receipt of the call and dispatching of vehicles from the fire station.

Amongst the three interviewed officials there was no uniform viewpoint on the exact time the fire incident reports were to be filled out. The contrasting views is a significant

remiss, as some entries on the incident report (such as travel time to incident, duration of incident and water used) should be captured immediately after the fire occurrence. Another observation during the interviews was that the interviewees continuously referred to the SANS 10090 (SABS, 2018a) as the reference document for decisions made.

It was also interesting to observe that there is no defined criteria in the SANS 10090 (SABS, 2018a) about the procedure that must be followed when reporting fire incidents. The SANS 10090 provides guidance on a number of protocols such as the weight and speed of response, station area coverage, emergency lines and water supply. Municipalities are obligated to develop their own working systems that meet the recommendations of SANS 10090 imperatives. When comparison is made between fire incident reports from the City of Johannesburg and the Sol Plaatje municipality some consistencies are observed as a result.

6.3 FIREFIGHTING STRATEGY AND RESOURCE ALLOCATIONS

This segment of the interviews addressed clarity seeking questions on the following aspects in the fire incident reports:

- Deployment of personnel to fire incidents
- Fire risk categories
- Water requirements for firefighting
- Additional support during active fire incident
- Modern technologies and equipment used

The firefighting strategy is the sole responsibility of the Station Officer and the Safety Officer. Accordingly, the Fire Brigade Act (RSA, 1987) stipulates that these persons must be adequately qualified and have the relevant experience. The Station Officer on duty is responsible for the allocation of resources for the fire incident callout. After the station officer has compiled the call information sheet the first response team which includes firefighters and safety officer is dispatched immediately. It should be noted that due to COVID-19, the municipality has diverted from normal protocols of having three of the first response team travelling in one vehicle. The team is split up in

numbers of three people travel in a ten seater minibus and three people travel in the fire engine.

There is a baseline number of firefighters and vehicles that are deployed as the first response to fire incidents. This is based on the probable causes of the fire that was reported by the caller. However, there is continuous radio communication between the first response team, the station officer and the safety officer. In this way, an assessment of the efficacy of the team is constantly evaluated and if additional support is required, additional support is requested.

The officials indicated that the fire risk categories in the incident reports are the same as those referred to in the SANS 10090 (SABS, 2018a). The fire incident reports of Sol Plaatje municipality shows a single set of categories (i.e. A, B, C, D & E) as shown in Table 6-1. On the other hand, the SANS 10090 has two sets of categories: the first is 'Fire Risk Categories' and the second is 'Possible Fires' as shown in Table 2-9. The provision of two sets of categories by the SANS 10090 is causing confusion and could lead to the wrong classification of fire incidents especially in Category D.

Table 6-1 Descriptions of fire risk categories of Sol Plaatje municipality

Category	Description
A	Central business districts and extensive commercial and industrial areas normally found in cities and large towns (areas where the risk to life and property due to fire occurrence and spread is likely to be high).
B	Limited central business districts, smaller commercial or industrial areas normally associated with small towns and decentralized areas of cities and large towns (areas where the risk to life and property due to fire occurrence and spread is likely to be moderate).
C	Residential areas of conventional construction.
D	Rural areas of limited buildings and remote from urban areas.
E	Special risk areas. Individual areas requiring a pre-determined attendance over and above the predominant risk category in an area. Includes large Shopping/entertainment centres, informal settlements, harbours, hospitals, prisons, large airport buildings and petrochemical plants.

Interviewees confirmed that the fire engines or water tankers always departs from the fire station with a full load of water. It is the responsibility of the driver of the vehicles

to ensure that the vehicles are at full capacity and relevant equipment are in the vehicle. Interviewees also mentioned that in the last 15 years, the municipality has not procured new fire engines. This implies that the existing fleet is old and must be replaced as per the recommendations of SANS 10090 (SABS, 2018a).

6.4 FIRE HYDRANTS AND WATER DISTRIBUTION SYSTEM

There are two primary challenges, which best represents, the current status quo and are identified as playing a significant role in the useability, accessibility and reliability of fire hydrants i.e. (i) vandalism of components of fire hydrants and (ii) lack of maintenance of fire hydrants and immediate surroundings. The interviewees also indicated that components that include metal are stolen or broken on a regular basis and in many instances the locations of hydrants are not maintained. This results in shrubs, bushes and grass surrounding hydrants.

Although the Red book (DHS and CSIR, 2019) makes recommendations on certain aspects such as flowrates, pressure, sizing and positioning, marking and symbols of fire hydrants; it is relatively silent on the maintenance of fire hydrants. Figure 6-1 shows the recommendations of the Redbook on fire hydrants (DHS and CSIR, 2019).

Risk classification	Total fire flow (L/s)	Minimum flow at one hydrant (L/s)	Minimum pressure at fire node (m)	Minimum pressure at rest of system (m)
High risk: CBD and high-risk industrial	100	25	15	5
Moderate risk 1: Industrial, business, high-rise flats ≥ four storeys	50	25	15	5
Moderate risk 2: Cluster & low-income housing, high rise flats ≤ three storeys	25	25	10	5
Low risk: Single residential housing	15	15	10	5

(iv) Sizing and positioning of fire hydrants

When providing fire hydrants, the following should be considered:

- Hydrants should not be provided off mains smaller than 75 mm diameter.
- Hydrants should be located in vehicular thoroughfares and opposite stand boundary pegs, and at a maximum spacing of 200 m (or as otherwise required by the local fire department).
- 75 mm diameter sluice-valve hydrants should be used for the high-risk and moderate-risk categories. For the low-risk category, the hydrant may be the screw-down type.
- The location of hydrants should be indicated by using permanent marker posts on the verge opposite the fitting or painted symbols on road or kerb surfaces. Symbols on markers should be durable.
- The hydrants' flow rate should be serviced and checked for conformity with Table J.17 at intervals not exceeding one year.
- Where possible, fire hydrants should be positioned to also serve as a scour valve.

Figure 6-1 Recommendations of the Red book on fire hydrants

It is only the SANS 10090 (SABS, 2018) that makes detailed recommendations on the maintenance and serviceability of fire hydrants. Figure 6-2 shows the SANS 10090 hydrants maintenance and serviceability requirements

11.5.2 Authority having jurisdiction shall ensure that hydrants are serviced (and the flow measured for conformity with table 8) at intervals as given in table 10 and shall include the following:

a) hydrant markings in accordance with NFPA 291;

b) positions as indicated on water reticulation drawings;

c) hydrant serviceability including condition, access and operation;

d) individual flow and pressure tests; and

e) availability of suitable accurate records.

11.5.3 The location of hydrants should be adequately indicated.

Table 10 — Hydrant maintenance intervals

1	2
Risk category	**Interval**
A & E	Annually
B	Biennially
C & D	Triennially

Figure 6-2 SANS 10090 Recommendation on hydrants maintenance and serviceability requirements.

The interviewed officials also indicated that the challenges experienced with fire hydrants has made them to discard using the fire hydrants on a reactive basis. The logistics manager also keeps records of fire hydrants that are in good working condition within the boundaries of Sol Plaatje municipality. These fire hydrants are constantly tested for flow and pressure. Thus, in instances of large fires a second vehicle is dispatched to act as a fill-up alternative and the records of the useable fire hydrants are used to determine the nearest fire hydrant in the areas of the fire incident.

6.5 THE USE OF MODERN TECHNOLOGIES AND EQUIPMENT

The interviewed officials were aware of technologies and equipment that are available in the market that could assist them. Some of which are GPS system in the vehicles (this would provide clear directions to the location of fire incidents) and flow meters (to accurately measure the flowrates and pressure of discharge appliances). The officials

indicated that the municipality had limited financial resources and this was an impediment to the efficiency of the municipality's fire services.

6.6 ORGANISATION OF THE FIRE SERVICES

6.6.1 Weight of response per fire risk category

Table 6-2 summarises the weight of response per fire risk category at Sol Plaatje municipality. The weight of response refers to the fire service using sufficient appliances with adequate personnel to provide efficient and effective fire protection services to the community (SABS, 2018a). Table 6-2 indicates that Sol Plaatje municipality does not respond adequately when attending to call outs, when compared to the recommendations of SANS 10090 (SABS, 2018a).

Table 6-2 Weight of response per fire risk category of Sol Plaatje municipality

Risk Category	Number of incidents	SANS 10090: Minimum number of pumping units	Sol Plaatje: Average number of pumping units deployed per Incident	SANS 10090: Minimum manning per appliance	Sol Plaatje: Average Manning per Appliance
A	105	2	1,19	5	3
B	183	2	1,33	4	3
C	1320	1	1,26	4	3
D	242	1	1,38	4	3
E	210	As determined by individual risk assessment	1,23	As determined by individual risk assessment	3

6.6.2 Speed of response per fire risk category

Table 6-3 indicates the speed of response per fire risk category of Sol Plaatje municipality. The efficiency of a fire service speed of response is largely based on the attendance time that the fire brigade is capable of achieving when responding to call outs. As a result attendance times should not exceed the SANS 10090 recommendations on speed of response (SABS, 2018a).

Table 6-3 indicates that the Sol Plaatje municipality exceeds the minimum prescribed times to attend to fire incidents. In other words, on average the municipality takes longer to leave the fire station after receiving a call out; the travel time and maximum attendance time is also longer. These delays could be attributed to the age of appliances (see Table 6-5).

Table 6-3 Speed of response per fire risk category of Sol Plaatje municipality

Risk Category	Number of Incidents	SANS 10090: Maximum call receipt and turn-out time (min:sec)	Sol Plaatje: Average call receipt and turn-out time (min:sec)	SANS 10090: Maximum appliance travel time (min:sec)	Sol Plaatje: Average appliance travel time (min:sec)	SANS 10090: Maximum attendance time (h:min:sec)	Sol Plaatje: Average maximum attendance time (h:min:sec)
A	105	03:00	03:14	05:00	07:02	00:08:00	00:53:14
B	183	03:00	05:03	07:00	11:10	00:10:00	01:13:16
C	1320	03:00	04:27	10:00	12:44	00:13:00	01:11:02
D	242	01:00	05:37	20:00	16:44	00:23:00	01:52:52
E	210	Within requirement of appropriate risk category	04:17	Within requirement of appropriate risk category	12:06	Within requirement of appropriate risk category	01:10:09

6.6.3 Emergency telephone lines

Sol Plaatje Municipality has a population of 248 041, residing in 60 297 households (Statistics South Africa, 2021). According to SANS 10090 (SABS, 2018a), a municipality with a population size between 125 001 to 300 00 must have three (3) dedicated emergency lines. However, Sol Plaatje Municipality has only one (1) emergency line.

6.6.4 Fleet information

Table 6-4 summarises the information on the fleet of Sol Plaatje firefighting. Table 6-4 shows the type of vehicle, the carrying capacity of vehicles, status of vehicles, number of fire incidents each vehicle attended to during the period June 2017 to August 2020, the average water volume and average flow rate employed. For example, Pump 1 (P1) with carrying capacity of 7 500ℓ has attended to 57,72% (1189) of the 2060 fire incidents in the data set and recorded a total volume of 2 590 300ℓ.

Table 6-4 Fleet information

No	Vehicles	Carrying capacity of vehicles	Status	No of incidents	%	Average water volume (Kℓ)	Average flow rate (ℓ/min)
1	D1	Light Duty Vehicles (Bakkies) with trailer	Good Condition	1	0.05%	4	63.49
2	D2		Good Condition	44	2.14%	48.8	1315.32
3	D3		Good Condition	1	0.05%	0	0
4	D4		Good Condition	3	0.15%	11	248.78
5	D6		Good Condition	31	1.50%	31.3	1433.38
6	D7		Good Condition	13	0.63%	10	314.3
7	P1	7500 ℓ	Good Condition	1189	57.72%	2590.3	97752.83
8	P2	3700 ℓ	Decommissioned	83	4.03%	189	6157.83
9	P3	2500 ℓ	Good Condition	126	6.12%	214.5	10126.89
10	P5	2500 ℓ	Good Condition	158	7.67%	357	15313.36
11	SNK	Hydraulic Platform	Good Condition	1	0.05%	3	66.67
12	TRACTOR	N/A	Good Condition	1	0.05%	0	0
13	WT 1	10 000 ℓ	Good Condition	162	7.86%	757	10713.91
14	WT 2	10 000 ℓ	Good Condition	247	11.99%	919.3	20208.04
	Total			2060	100.00%	5135.2	163714.8

6.6.5 Reserve fleet

Sol Plaatje municipality does not use reserve fleet as per recommendations of the SANS 10090 (SABS, 2018a). The SANS 10090 recommends that one vehicle must be used as a reserve where the fleet consists of 5 or less pumping units and that the reserve vehicle must not be older than five years beyond the prescribed maximum useful life. The interviewed officials indicated that the existing fire engine called P1 is the main frontline vehicle due the fact that it is relatively ‘newer’ than other vehicles. The other fire engines (i.e. P2 & P5 – which are more than 20 years old) are used as reserves to P1.

The water tankers (i.e. WT1 and WT2) are also used as backup vehicles subject to approval of the Station Officer and Safety Officer. In most cases the water tankers are used as fill up vehicles to P1, P3 & P5. The water tankers are conventional water trucks that were converted into fire engines. The water tankers have some firefighting capabilities and are only used as first respond vehicles when P1 is engaged in an incident somewhere else or undergoing maintenance and repairs.

6.6.6 Useful life of vehicles and equipment

Table 6-5 summarises the useful life of firefighting vehicles and equipment that was used during the period June 2017 to August 2020. A fire service must strike a balance between newer and older vehicles to avoid having ageing emergency vehicles in service (SABS, 2018a). Table 6-5 shows that all the firefighting vehicles and equipment of Sol Plaatje Municipality have exceeded their useful life.

Table 6-5 Useful life of vehicles and equipment

No	Vehicle / Equipment Name	Vehicle Type	SANS 10090: Service Period (Years)	Sol Plaatje: Actual Service Period (Years)
1	D1	Light Vehicles	8	More than 8 years old
2	D2		8	More than 8 years old
3	D3		8	More than 8 years old
4	D4		8	More than 8 years old
5	D6		8	More than 8 years old
6	D7		8	More than 8 years old
7	P1	Pumping Appliances	15	More than 15 years old
8	P2		15	More than 20 years old
9	P3		15	More than 20 years old
10	P5		15	More than 20 years old
11	WT 1		15	More than 15 years old
12	WT 2		15	More than 15 years old
13	SNK	Hydraulic Platform	8	More than 8 years old
14	TRACTOR	Tractor	10	More than 10 years old

CHAPTER 7 EVALUATION OF FIRE FLOWS AND VOLUMES AT SOL PLAATJE MUNICIPALITY

This chapter addresses research objectives II and III (i.e. to categorise and analyse fire flows, based on actual fire flow volumes and flow rate data during incidents in Sol Plaatje Municipality and to compare the SANS 10090 and Red book fire flow requirements against analysed firefighting operations in Sol Plaatje Municipality and previous South African studies). This chapter provides answers to the following research questions: Which risk categories do fire in Sol Plaatje municipality mostly fall into and what are the range of fire flows and water volume? How do the results of this study compare with the research findings of previous studies or initial predictions made in the literature review process?

7.1 MAGNITUDE AND DISTRIBUTION

The scatter plot shown in Figure 7-1 indicates the magnitude and temporal distribution of the water volumes used to extinguish the 2060 fire events in the data set spanning from June 2017 to August 2020. The scatter plot shows that 99.9% and 96.9% of fire incidents required 60 Kℓ or less and 10 Kℓ or less of water to extinguish, respectively. Myburgh & Jacobs (2014) also reported of that more than 90% of the fires were extinguished with less than 10 Kℓ of water in 5 Western Cape Towns. In the study of Mac Bean & Ilemobade (2019) and Essack & Ilemobade (2022) for the City of Johannesburg, 99% of incidents required less than 100 Kℓ of water to extinguish, with 87% requiring 10 Kℓ or less.

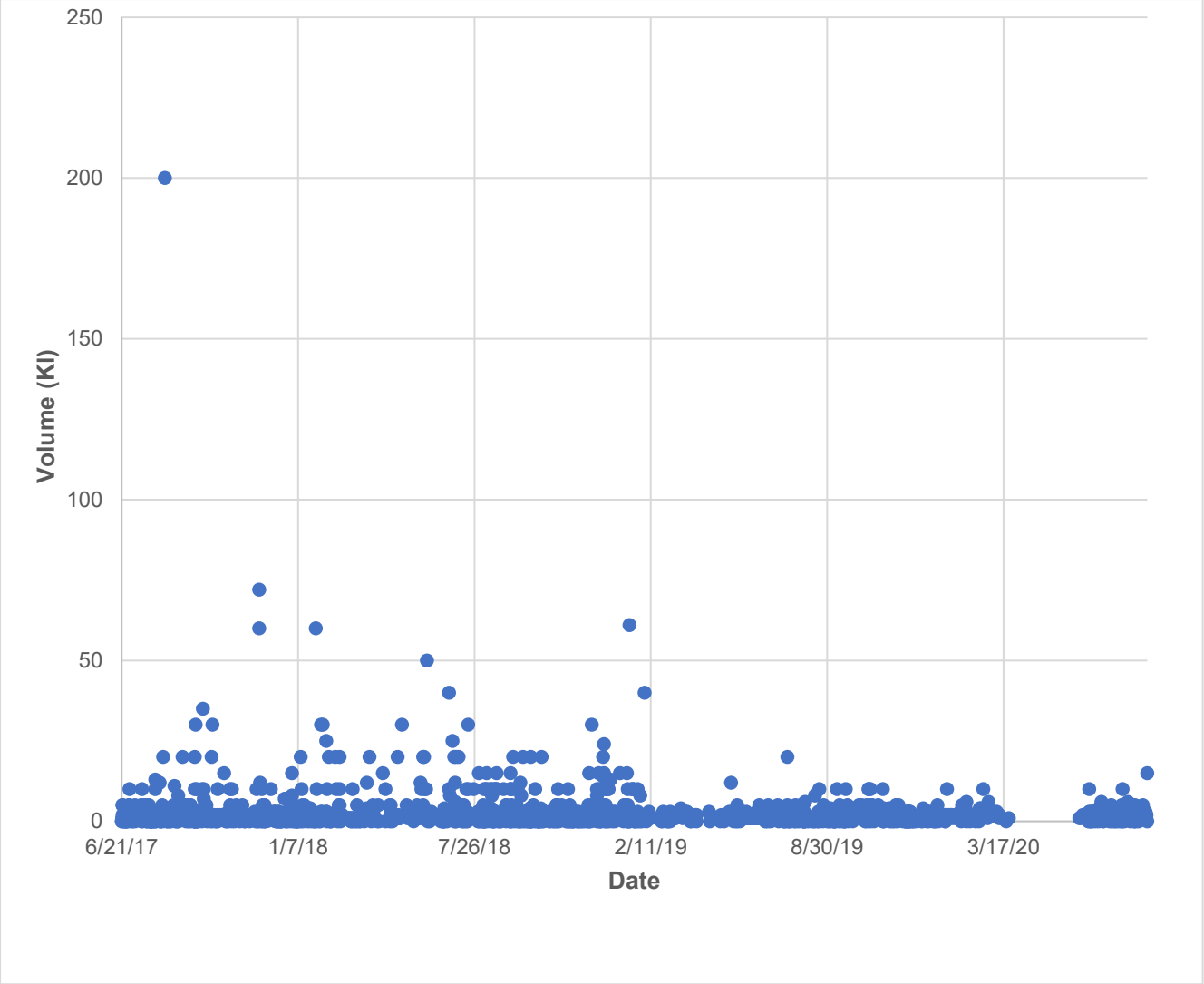

Figure 7-1 Magnitude and temporal distribution of water volumes used to extinguish 2060 records that occurred from June 2017 to August 2020.

Figure 7-2 presents the scatter plot of the magnitude and distribution of the fire flow rates used to extinguish the 2060 fire events during the period June 2017 to August 2020 with SANS 10090 (SABS, 2018a) & Red book (DHS & CSIR, 2019) minimum flow superimposed. On the left hand side are the SANS 10090 fire flow rates in categories D1, D2, D3, D4, C, B & A, and on the right hand are the Red book fire flow rates shown in categories low risk, moderate risk 2, moderate risk 1 & high risk.

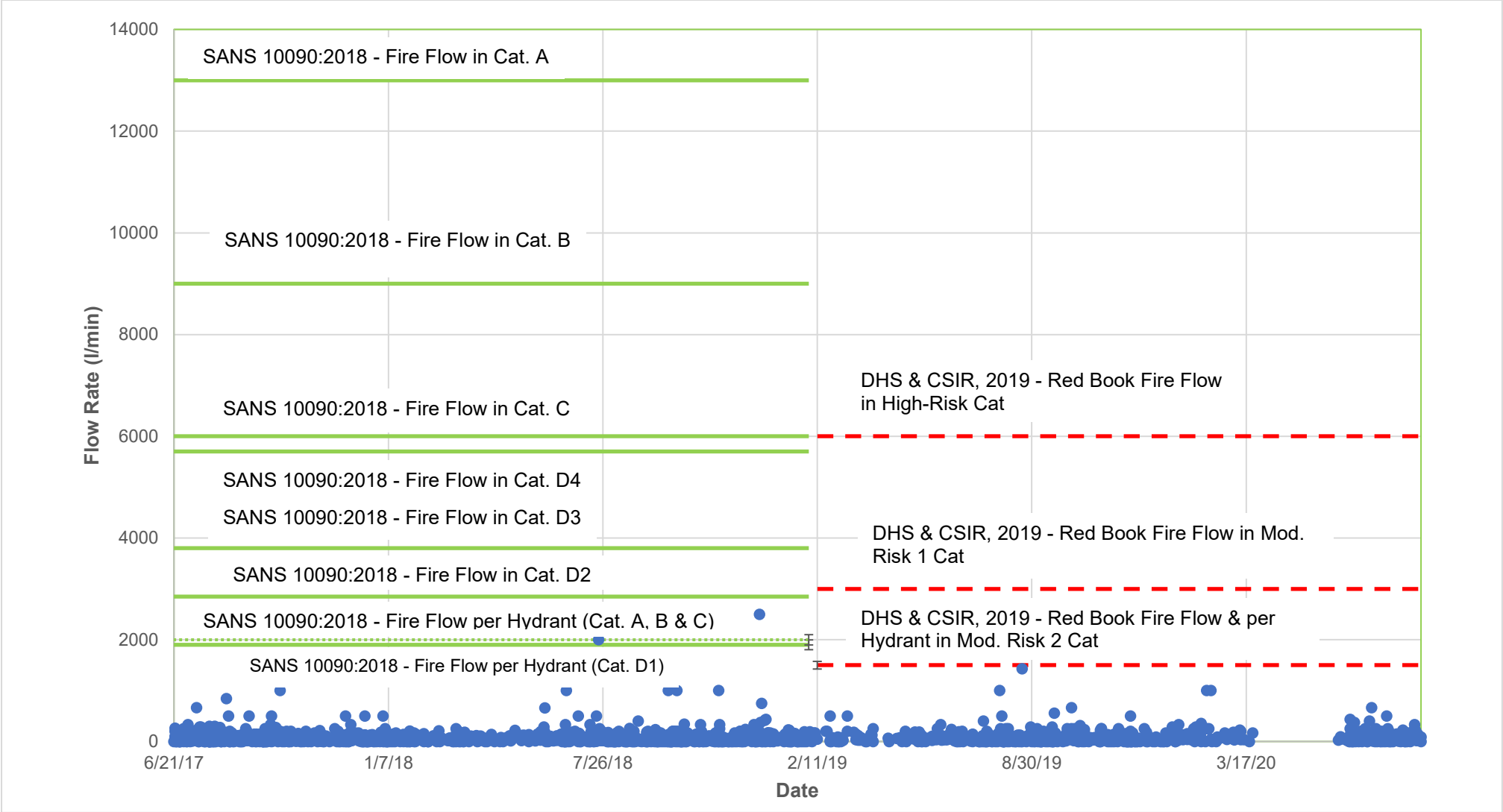

Figure 7-2 Magnitude and distribution of the fire flow rates 2060 incidents with SANS 10090 (SABS, 2018a) & Red book (DHS & CSIR, 2019) minimum flow superimposed.

The scatter plot shows that 99.9% of fire incidents that occurred during the period 21 July 2017 to 21 August 2020, used less than 1900ℓ/min, which is the minimum fire flow for category D1 fires in the SANS 10090. Only two incidents within the municipality during this period employed fire flows larger than 1900ℓ/min. A similar comparison with the Red book shows that 99.5% of incidents employed less than 900ℓ/min, which is the fire flow specified in the Red book for Low Risk: single residential housing. These findings are similar to Mac Bean & Ilemobade (2019) and Essack & Ilemobade (2022) who determined that 99.9% and 99.6% of the fire incidents in the City of Johannesburg used less than the minimum fire flows in the SANS 10090 and Red book, respectively. This means there has been not a single incident that recorded the fire flows recommended in category A, B, C, D4, D3 & D2 of SANS 10090 and high risk & moderate risk 1 of the Redbook.

7.2 CATEGORISATION OF FIRE TYPES

The dataset of 2060 fire incidents indicates that fire types were classified and recorded into the following main categories: Residential, Institutional, Public Assembly, Commercial, Storage, Industry, Transport, Other and Other Services. From each main category, there were two other lower level subcategories that provided more information. A similar observation was made on the information newsletter released by the Fire Protection Association South Africa (FPASA, 2011) about the South African National Fire Statistics of 2011, wherein the fire types was also classified under the same main and subcategories as Sol Plaatje municipality except for the category of Other Services. This indicates that Sol Plaatje municipality method of classifying and recording fire types is aligned with that of Fire Protection Association South Africa. In this way, an evaluation into the categorisation of fire types will not solely depend on the main category description as there is additional information provided for consideration.

The main categories of the 2060 fire incidents and the additional information recorded on the two lower level subcategories enabled for this dataset to be condensed into the six categories that were used by Essack & Ilemobade (2022). Figure 7-3 shows the six fire type categories used in the study of Essack & Ilemobade (2022) compared with the 2060 fire incidents of Sol Plaatje municipality. Figure 7-3 also indicates that for

the study of Essack & Ilemobade (2022) conducted in the City of Johannesburg, the highest percentage of incidents occurred in the category of Formal Structural (78.01%), whereas In Sol Plaatje municipality (887;43,06%) of incidents occurred in Bush category (which includes grass fires) and the second highest number (560; 27.18%) were Formal Structural fires (which includes informal settlements, amongst others). What is evident in Figure 7-3 is that the distribution is related to the predominant land covers within the SPM i.e. Open veld is the predominant land cover at 93 % while the built environment is 4 % (SPM, 2020).

To better interpret the results in Figure 7-3, it is necessary to incorporate into the analysis an area based parameter such as urban vegetation of Sol Plaatje municipality and the City of Johannesburg. Sol Plaatje municipality is classified as a minor municipality, semi-urbanised with a population of less than 500 000 people. On the other hand, the City of Johannesburg is the largest city in South Africa in terms of population and wealth economics - this largely contributes towards the rapid urbanisation and densification of the city. A study by Verma et al., (2016) found that the impervious surface of the City of Johannesburg had increased by 57.03% from 2000 to 2016, which directly resulted in the loss of vegetation (grass and trees cover) and significant increase in build-up areas. This implies, a fire in the City of Johannesburg is more likely to occur in built-up areas that has no vegetation, whereas in Sol Plaatje municipality a fire is more likely to occur in build-up areas that have vegetation. This also explains the notable percentage differences of incidents between the categories of Formal Structural in the study of Essack & Ilemobade (2022) and Bush (which includes grass fires) in Sol Plaatje municipality.

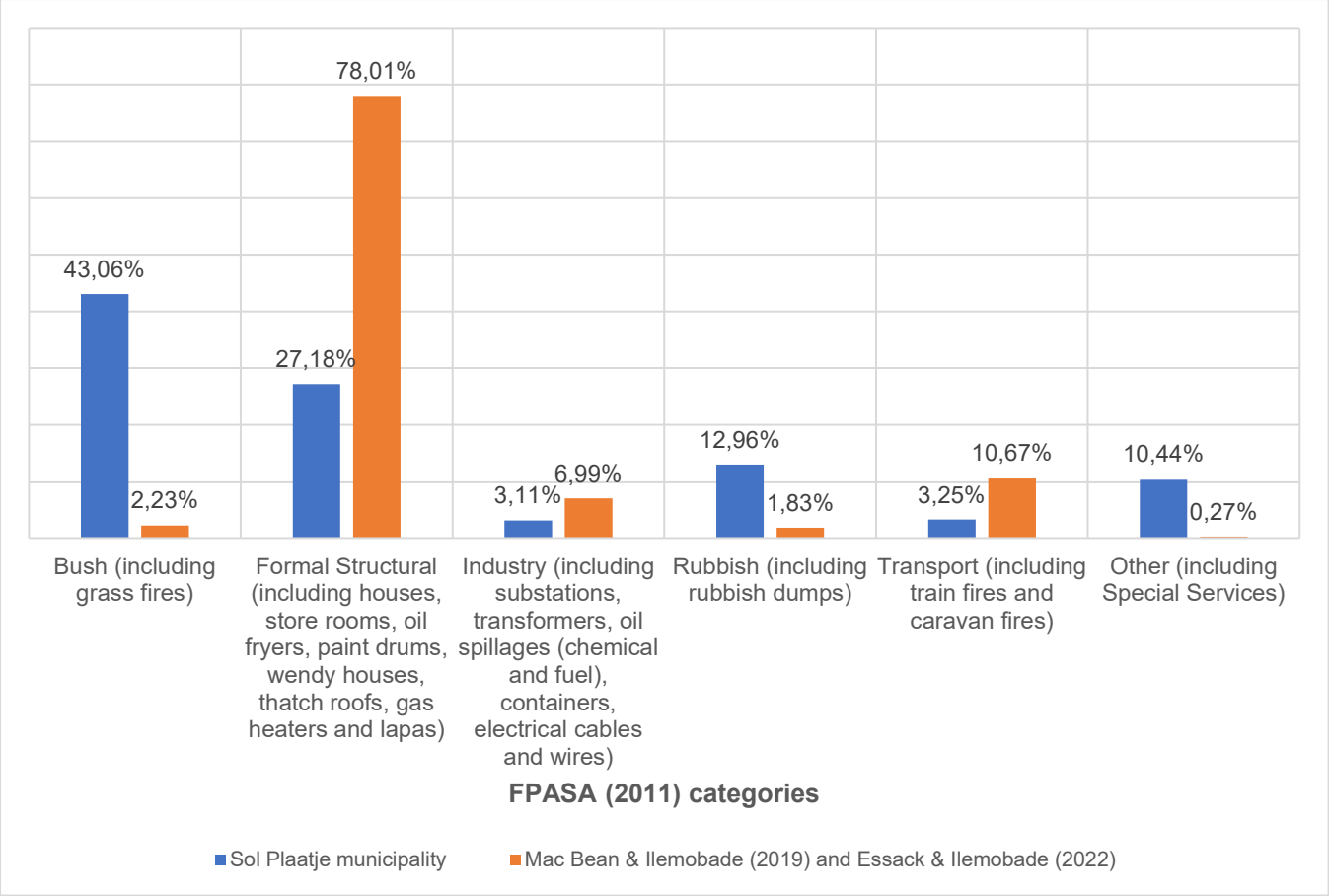

Figure 7-3 Categorisation of 2060 fire incidents of Sol Plaatje municipality compared with Mac Bean & Ilemobade (2019) and Essack & Ilemobade (2022)

Table 7-1 shows that Sol Plaatje municipality used lower volumes of water for three categories (i.e. Bush, ~3.78 Kℓ; Formal, ~4.21 Kℓ; and Other Services ~2,47 Kℓ) when compared to same in the studies of Myburgh & Jacobs (2014), Mac Bean & Ilemobade (2019), Essack & Ilemobade (2022). Sol Plaatje municipality only used higher volume of water in the category of Transport more than the City of Johannesburg and the 3 municipalities. Sol Plaatje municipality has notably used lower volume of water and fire flow rates when compared to the values specified in the SANS 10090 (SABS, 2018a) and Red book (DHS & CSIR, 2019).

A second observation is that Sol Plaatje municipality used higher flow rates in three categories Bush (~84.11 ℓ/min), Formal (~78,32 ℓ/min) and Transport (~77.9 ℓ/min), it only used lower flow rates in the category of Other Services (~20.16 ℓ/min) when compared to same in Essack & Ilemobade (2022). The Myburgh & Jacobs (2014) study had higher flow rates in Formal (~110 ℓ/min), Transport (~93 ℓ/min)and Other

Services(~69 ℓ/min) and lower flow rates in Bush (~74 ℓ/min) when compared to Sol Plaatje municipality.

A third observation relates to the durations specified in the Red book for each fire risk category. An adverse consequence of specifying longer fire durations is that it increases the volume of municipal storage required for firefighting and consequently, increases the total capacity of municipal storage. Increased storage capacity increases resources that are expended, as well as water retention times, which negatively affects water quality. For each fire category, the average duration of fires is significantly less than specified in the Red book.

Overall, notable differences was observed between the values of Sol Plaatje municipality and the reported values of Myburgh & Jacobs (2014) and Essack & Ilemobade (2022) for the estimated average fire flow rates. Essack & Ilemobade (2022) states that the reasons for the significant differences can be attributed to: (a) the time between vehicles arriving and exiting a fire event were likely recorded differently; (b) the water volumes to extinguish fires may generally be less between the municipalities; (c) the municipalities may employ other extinguishing agents (e.g. foam and saw dust) in addition to water; and (d) water extracted from all water sources may not be recorded.

This study agrees with the aforementioned reasons. Firstly, in the fire incident reports of Sol Plaatje municipality (see Appendix A) there is specific space to record the “worktime”, whereas in the studies Myburgh & Jacobs (2014) and Essack & Ilemobade (2022) the “worktime” is an outcome of a calculation “vehicle release time – vehicle arrival time”. In addition, during the structured interviews with Sol Plaatje municipality officials, “worktime” was explained as “vehicle arrival time on site -vehicle departure time from site”. This indicates that worktime was recorded differently.

Secondly, out of the three municipalities, Table 7-1 shows that Sol Plaatje municipality recorded the lowest water volume to extinguish fires in three categories. Thirdly, the structured interviews with Sol Plaatje municipality officials also revealed that firefighting strategy which includes deployment of personnel, determination of water requirements and the use of foam as extinguishing agent, amongst others is the sole responsibility of the Station Officer and the Safety Officer. In this way, the strength of

the firefighting strategy is constantly evaluated, thus if other extinguishing agents and additional water sources are required, they will immediately be utilised.

Table 7-1 Comparison of the estimated average fire flows, average water volumes and average fire durations at the Sol Plaatje Municipalty compared to Myburgh & Jacobs (2014), Mac Bean & Ilemobade (2019) Essack & Ilemobade (2022) and those specified SANS 10090 (SABS, 2018a) and Red book (DHS & CSIR, 2019)

	Average flow rate used (ℓ/min)			**Average water volume used (Kℓ)**					
FPASA (2011) fire categories	**Sol Plaatje Municipality**	**City of Johannesburg (Mac Bean & Ilemobade, 2019 and Essack & Ilemobade, 2022)**	**3 SA municipalities (Myburgh & Jacobs, 2014)**	**Sol Plaatje Municipality**	**City of Johannesburg (Mac Bean & Ilemobade, 2019 and Essack & Ilemobade, 2022)**	**3 SA municipalities (Myburgh & Jacobs, 2014)**	**Average duration (minutes) of fires at Sol Plaatje Municipality**	**The SANS 10090 minimum fire flow (ℓ/min) from Category D1 to Category B**	**The Red Book total fire flow (ℓ/min) from Low-Risk to Moderate-Risk 1 Categories**
Bush	84,11	40,89	74,00	1,7	3,78	4,1	20,21	1 900 (equates to a volume of 114 Kℓ over The Red Book specified 1 hour duration of fire flow) to 9 000 (equates to a volume of 2 160 Kℓ over The Red Book specified 4 hour duration of fire flow)	900 (equates to a volume of 54 Kℓ over The Red Book specified 1 hour duration of fire flow) to 3 000 (equates to a volume of 720 Kℓ over The Red Book specified 4 hour duration of fire flow)
Rubbish									
Formal structural	78,32	29,48	110,00	3,03	4,21	8,6	38,69		
Industry									
Transport	77,9	20,69	93,00	6	3,94	2,5	77,02		
Other (Special services)	20,16	30,56	69,00	0,43	2,47	8,6	21,33		

7.3 AVERAGE FIRE INCIDENTS PER MONTH

Figure 7-4 presents the average number of incidents per each calendar month for the data set of 2060 incidents over the duration of June 2017 to August 2020. On average, 6 incidents occurred per month. Figure 7-4 shows that the average number of fire incidents in Sol Plaatje municipality peaked during the months of July & August (winter) and September (spring). On the other hand, Mac Bean & Ilemobade (2019) and Essack & Ilemobade (2022) showed that the average number of fire incidents peaked between May and September in the City of Johannesburg. These months experience the least rain and the highest energy usage (electricity, wood, paraffin) for heating and cooking use.

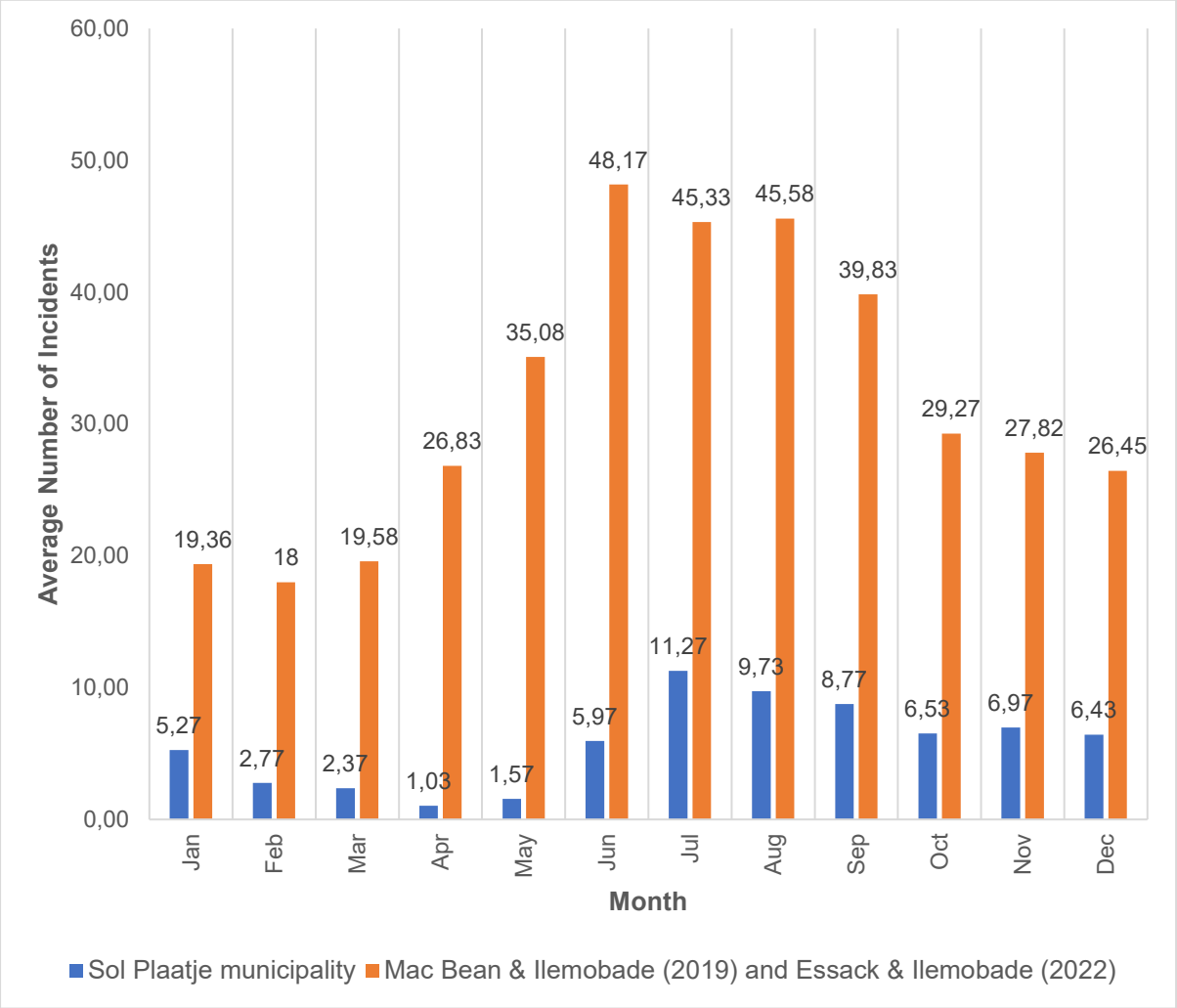

Figure 7-4 Average number of fire incidents per month compared to Mac Bean & Ilemobade (2019) and Essack & Ilemobade (2022).

7.4 CUMULATIVE PROBABILITY PLOT

Figure 7-5 shows the cumulative probability plots for the dataset of 2060 incidents over the duration of June 2017 to August 2020. The cumulative probability plot in Figure 7-5 indicates that about 93.3% of fires in Sol Plaatje municipality were extinguished using 7 Kℓ or less of water. In comparison with previous studies: Myburgh & Jacobs (2014) determined that more than 90% of fires in 5 Western Cape Towns were extinguished using less than 10 Kℓ of water; Mac Bean & Ilemobade (2019) and Essack & Ilemobade (2022) determined that 87% of fires in the City of Johannesburg were extinguished using 10 Kℓ or less of water. Overall, between 75%-93% of fires were extinguished in the various study areas using 10 Kℓ or less of water.

Figure 7-5 also indicates the probability that if Pump 1 with capacity of 7500 Kℓ was dispatched as a first response vehicle it had the ability to extinguish 93.3% of fire incidents in Sol Plaatje municipality without the use of fire hydrants. However, it is important to note that the fighting strategy (which includes risk assessments, deployment of personnel, determination of water requirements and the use of other extinguishing agents, amongst others) is the sole responsibility of the station officer and safety officer on duty.

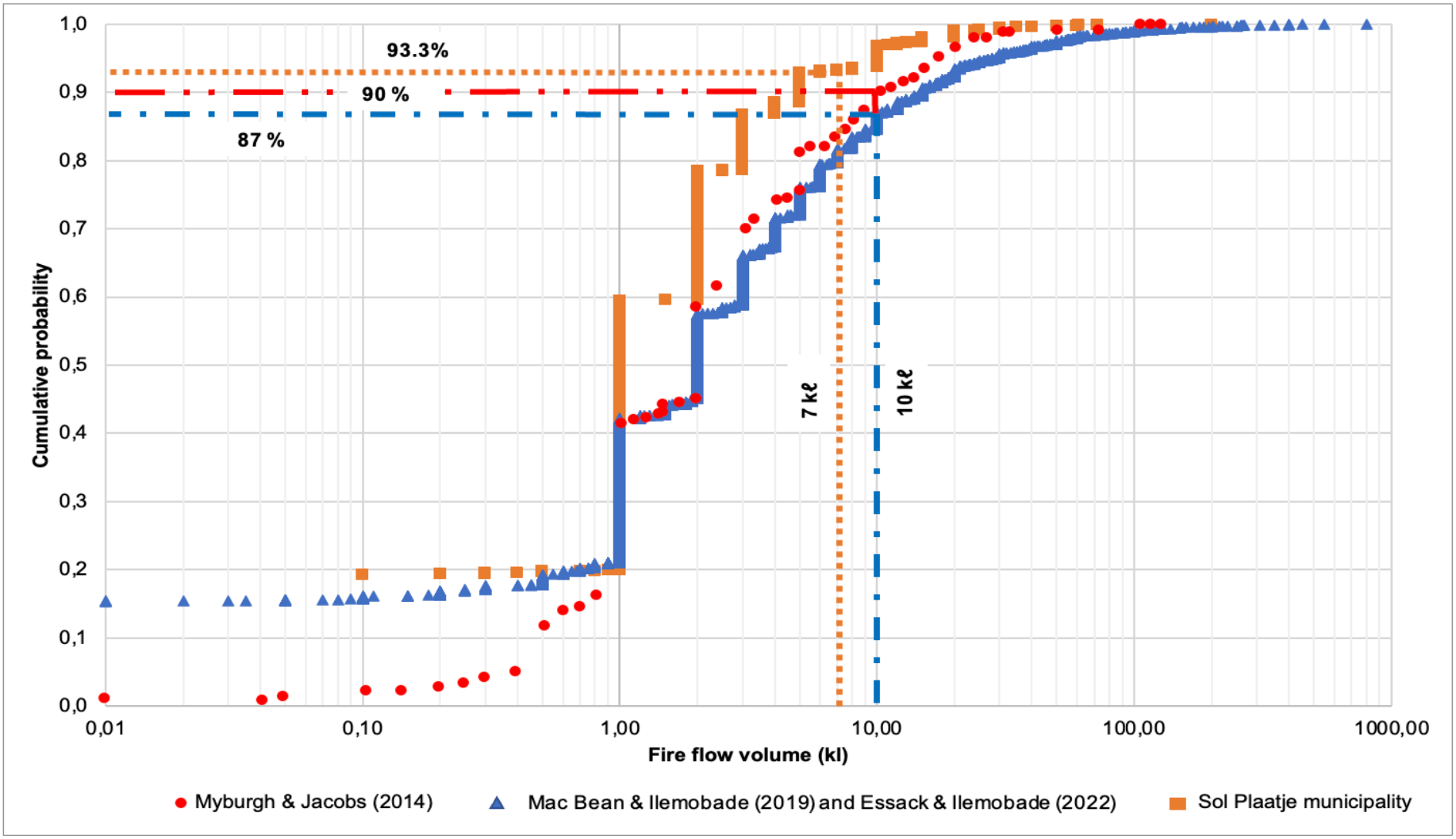

Figure 7-5 Cumulative probability plot for all fire flow volumes compared to Myburgh & Jacobs (2014), Mac Bean & Ilemobade (2019) and Essack & Ilemobade (2022).

7.5 FIRE DURATION

The frequency distribution in Figure 7-6 shows the time taken to extinguish the dataset of 2060 incidents over the duration of June 2017 to August 2020. Figure 7-6 indicates that 93.65% (1929) of fire incidents were extinguished between 0 minutes and 135 minutes.

To add perspective to Figure 7-6, the fire durations of the 93.65% of fires in Sol Plaatje municipality is incorporated in the calculation of the reservoir storage (i.e. 200 ℓ/min X 2.25h = 27 Kℓ) and compare it with same for high risk areas as per criterion set in the Red book (i.e. 6000 ℓ/min X 6h = 2160 Kℓ), there is a 98.75% reduction in reservoir storage requirements if the flow rate and fire duration of 1929 incidents is applied.

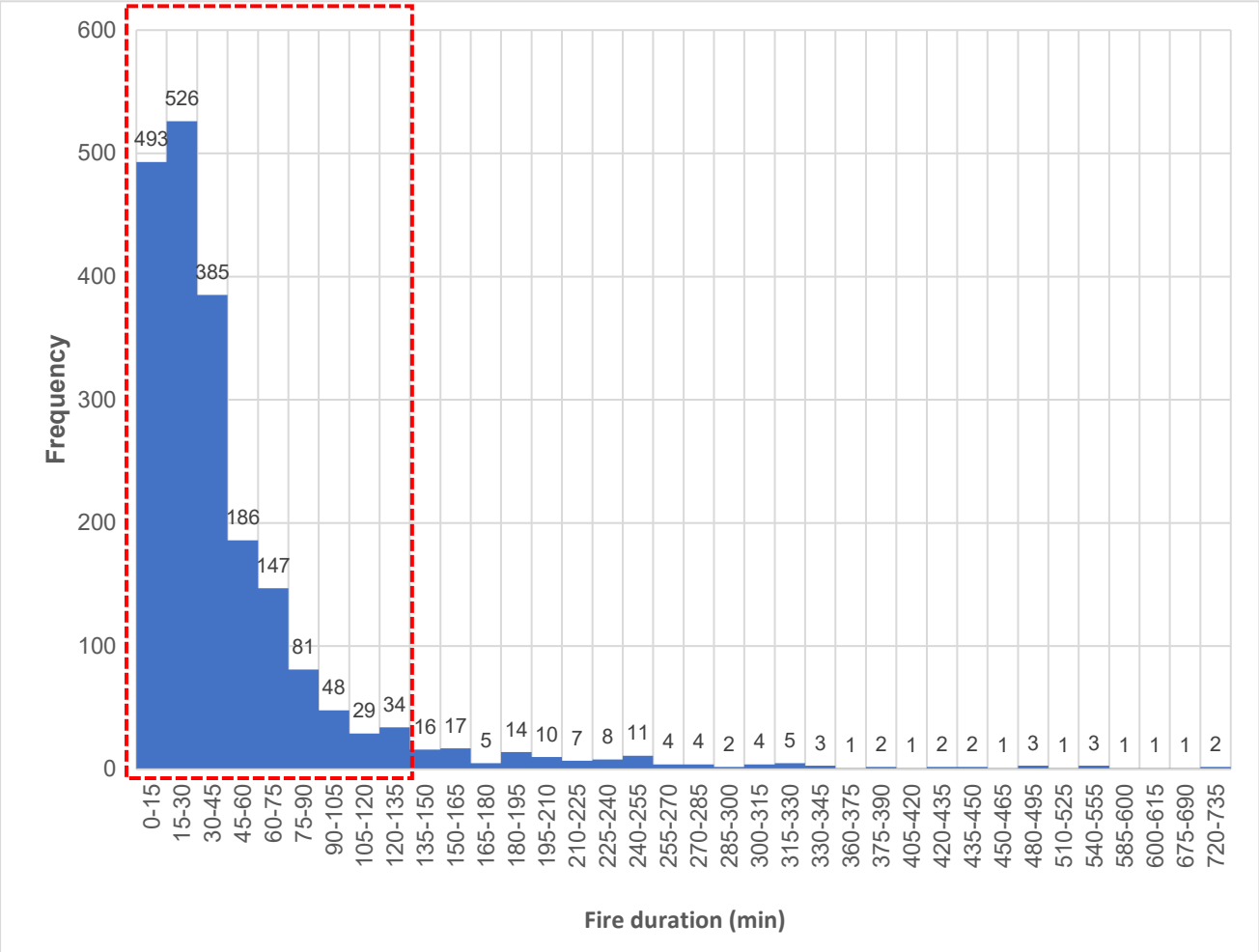

Figure 7-6 Frequency distribution of fire duration for 2060 records that occurred from June 2017 to August 2020 in Sol Plaatje municipality

7.6 FIRE OCCURRENCE AND RESIDENTIAL PEAK WATER USAGE

Figure 7-7 shows the occurrence of fires (dashed lines) and residential peak water usage (solid line) throughout the day for the data set of 2060 incidents over the duration of June 2017 to August 2020. The peak factor line was first established by van Zyl (1996) and adapted by Scheepers (2012) at a later stage. The peak factor line indicates two peak periods during the day i.e. between 05h00am and 07h00 and between 16:00pm and 17h00pm.

Figure 7-7 shows that over the three year period of the dataset there were more than 100 fires reported per hour time slot that typically occurred between 11h00 hours and 20h00 hours in Sol Plaatje municipality. The highest peak during the course of a typical day was observed at 15h00 hours (161 fire incidents, over the three year period of the dataset). In addition, while the occurrence of fires and the residential peak water usage do not coincide in the morning, this is not the case in the afternoon as the largest number of fires (161) occurred at 15h00 hours, with peak demand experienced shortly afterwards. This means that over the 3 year duration of the data, peak fires occurred within proximity of the second peak residential water demand at Sol Plaatje municipality. As shown in Figure 7-7, this finding is similar to that of Mac Bean & Ilemobade (2019) and Essack & Ilemobade (2022) conducted in the City of Johannesburg, which also observed a peak at 15h00 during the course of a typical day with 212 (5.49%) incidents, albeit its amongst the three peaks observed, the largest number of fire occurs at 00h00 hours with 230 (5.96%) incidents and the last peak observed at 20h00 hours with 212 (5.49%) incidents over period of about 10 years.

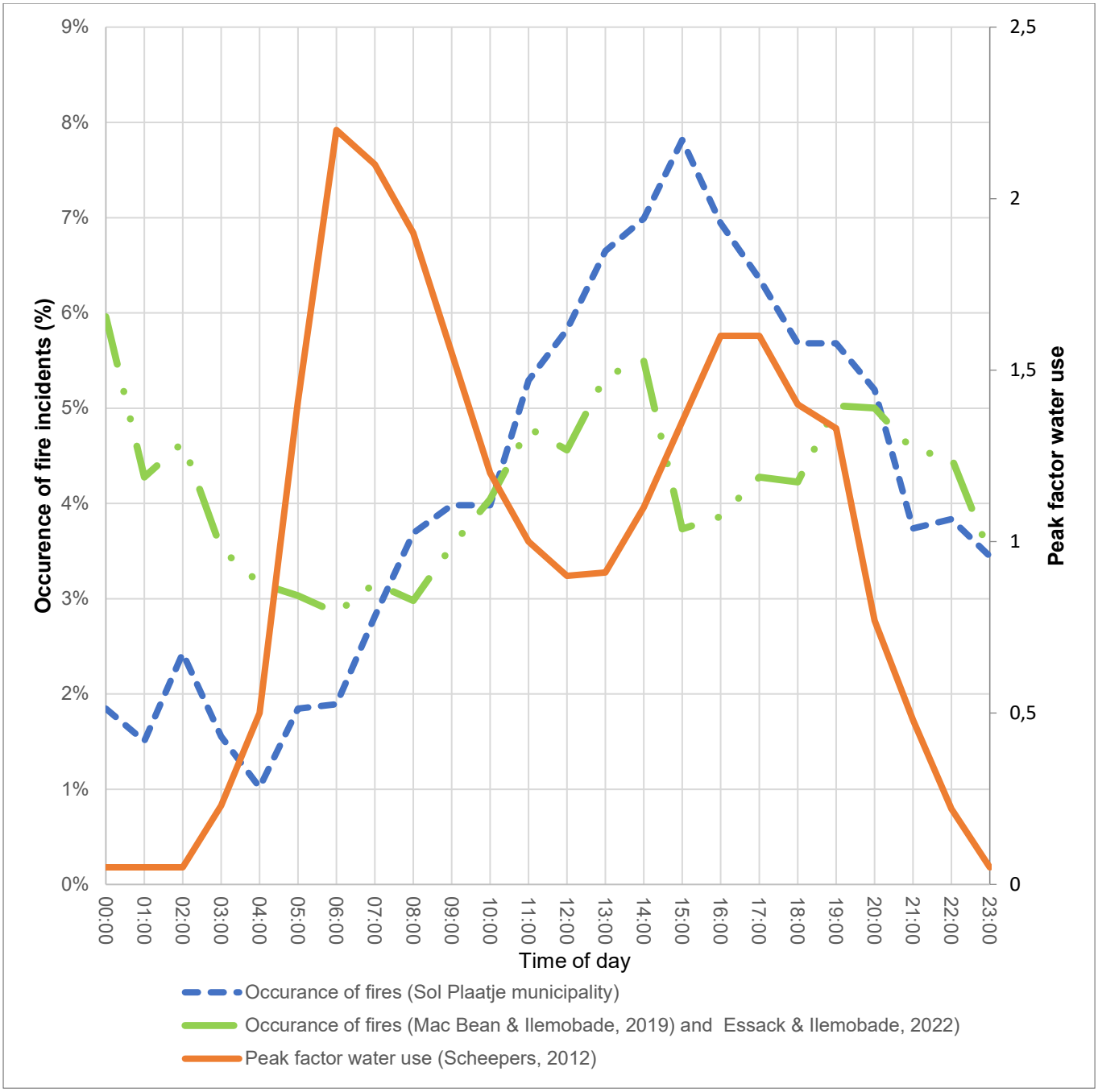

Figure 7-7 Fires occurrence and residential peak water usage in Sol Plaatje municipality compared to Mac Bean & Ilemobade (2019) and Essack & Ilemobade (2022).

CHAPTER 8 EVALUATION OF LARGE FIRES AT SOL PLAATJE MUNICIPALITY

This chapter addresses research objective VI (i.e. to investigate large fires at Sol Plaatje municipality). This chapter provides answers to the following research questions: Are the stipulated requirements in the SANS 10090 and Red book adequate for extinguishing large fires at Sol Plaatje Municipality?

8.1 INTRODUCTION

The evaluation of large fires is mainly based on the methodology that was adopted in previous studies (van Zyl & Haaroff, 1997; Myburgh & Jacobs, 2014 and Essack & Ilemobade, 2022). van Zyl and Haarhoff (1997) found that it required 5 Kℓ or more of water to extinguish large fires. Similarly, Myburgh & Jacobs (2014) found that it took average water volume of 8,6 Kℓ to extinguish a large fire. More recently, Essack & Ilemobade (2022) analysed and filtered about 10 years (from 1 January 2006 to 30 September 2017) of 4479 fire incident reports and found that the average water volume used to extinguish large fires was 9,63 Kℓ.

A notable observation from previous studies is that large fires were extracted from the datasets through a defined logical sequence. For example, in Myburgh & Jacobs (2014) the dataset contained 554 incidents, the datasets were categorised into 5 classes: Veld, Grass and Refuse; Structural fires; Automobile accidents; Special Services; and Informal Settlement - at the end of the data filtering, only 77 incidents were large fires. Similarly, for Essack & Ilemobade (2022) out of datasets of 4479 incidents, only 89 large fires were extracted through an intensive data filtering . This shows that the methods applied for extraction of large fires was amenable to a defined criteria.

In light of the above, the first step of the extraction process for large fires was to filter the dataset of 2060 records of Sol Plaatje municipality in a sequence. Essack & Ilemobade (2022) state that FPSA Category 2 (i.e. 'Formal Structural' and 'Industry') fires are area based categories (i.e. residential and non-residential), which are the only categories that aligns with the descriptions of fire risk categories in the SANS 10090 (SABS, 2018a) and are more likely to occur in a reticulated area with hydrants. As

such, by using the Essack & Ilemobade (2022) defined criteria, only 603 fire incidents remained for further analysis.

The last step in the filtering process to extract large fires from datasets was to: (1) to filter dataset for all Category 2 incidents requiring more than 5 Kℓ of water to extinguish; (2) to compare the multimodal distribution of these fires against obtained results from previous studies and; (3) to evaluate the duration taken to extinguish these fires.

8.2 MAGNITUDE AND DISTRIBUTION OF WATER VOLUMES FOR FILTERED DATA SET

Figure 8-1 shows the magnitude and temporal distribution of the water volumes used to extinguish the 603 fire events in the data set spanning from 22 June 2017 to 27 August 2020. The scatter plot shows that 94.5% of the 603 fire incidents required 8 Kℓ or less of water to extinguish. This finding is comparable to the obtained results of Essack & Ilemobade (2022) who determined that 94.8% of the 477 fire incidents required 10 Kℓ or less of water to extinguish.

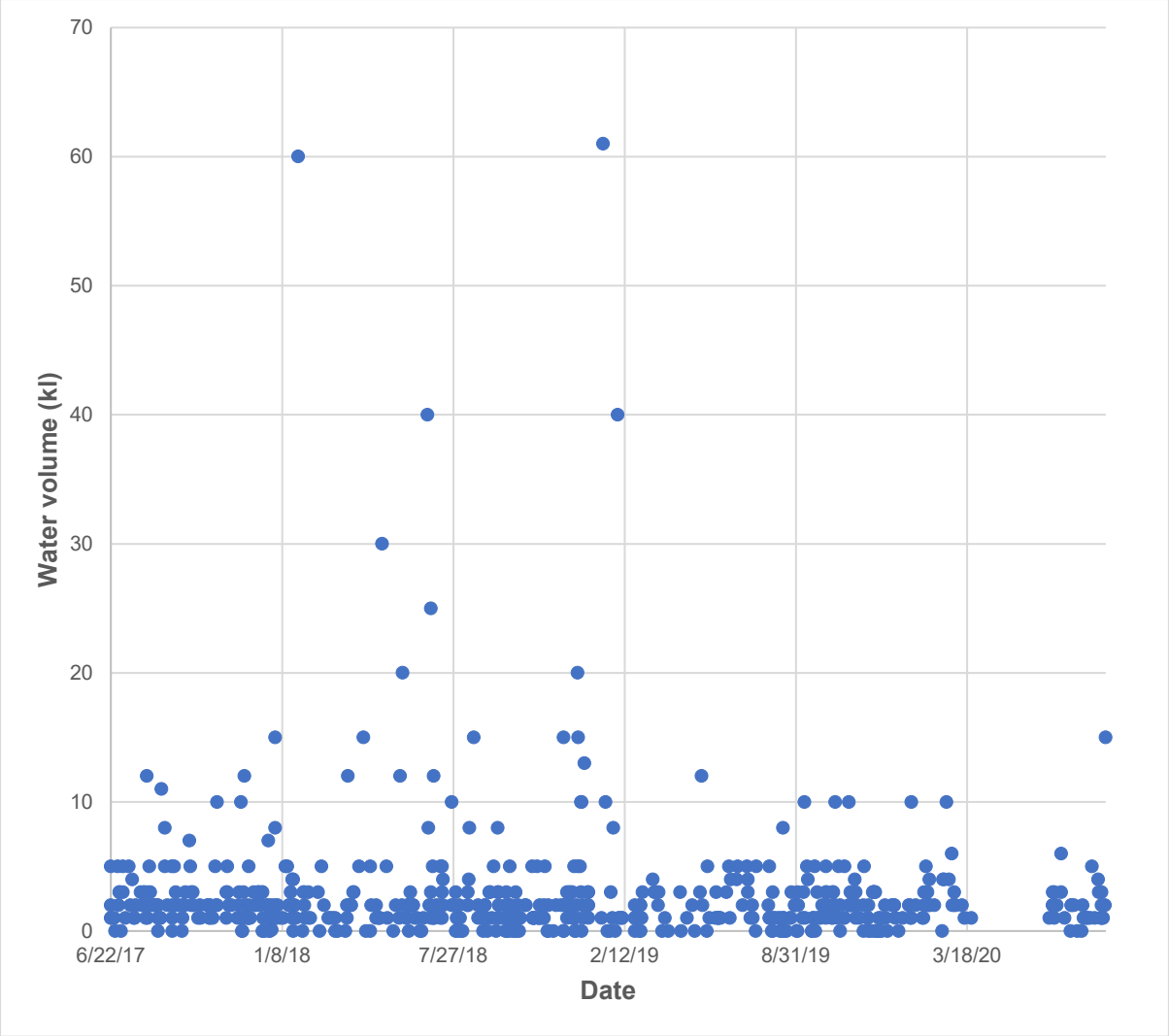

Figure 8-1 Magnitude and temporal distribution of water volumes used to extinguish 603 records in Sol Plaatje municipality that occurred from 22 June 2017 to 27 August 2020

Figure 8-2 presents the scatter plot of the magnitude and distribution of the fire flow rates used to extinguish the 603 fire events during the period 22 June 2017 to 27 August 2020 with SANS 10090 (SABS, 2018a) & Red book (DHS & CSIR, 2019) minimum flow superimposed. Figure 8-2 shows that 99.8% of the 603 fire incidents used less than 1200ℓ/min, which is the minimum fire flow per hydrant for category D1 fires in the SANS 10090. A similar comparison with the Red book shows that 99.7% of incidents employed less than 900ℓ/min, which is the minimum fire flow for low risk category in the Red book. Only one incident within the municipality during this period employed fire flows of 2500ℓ/min.

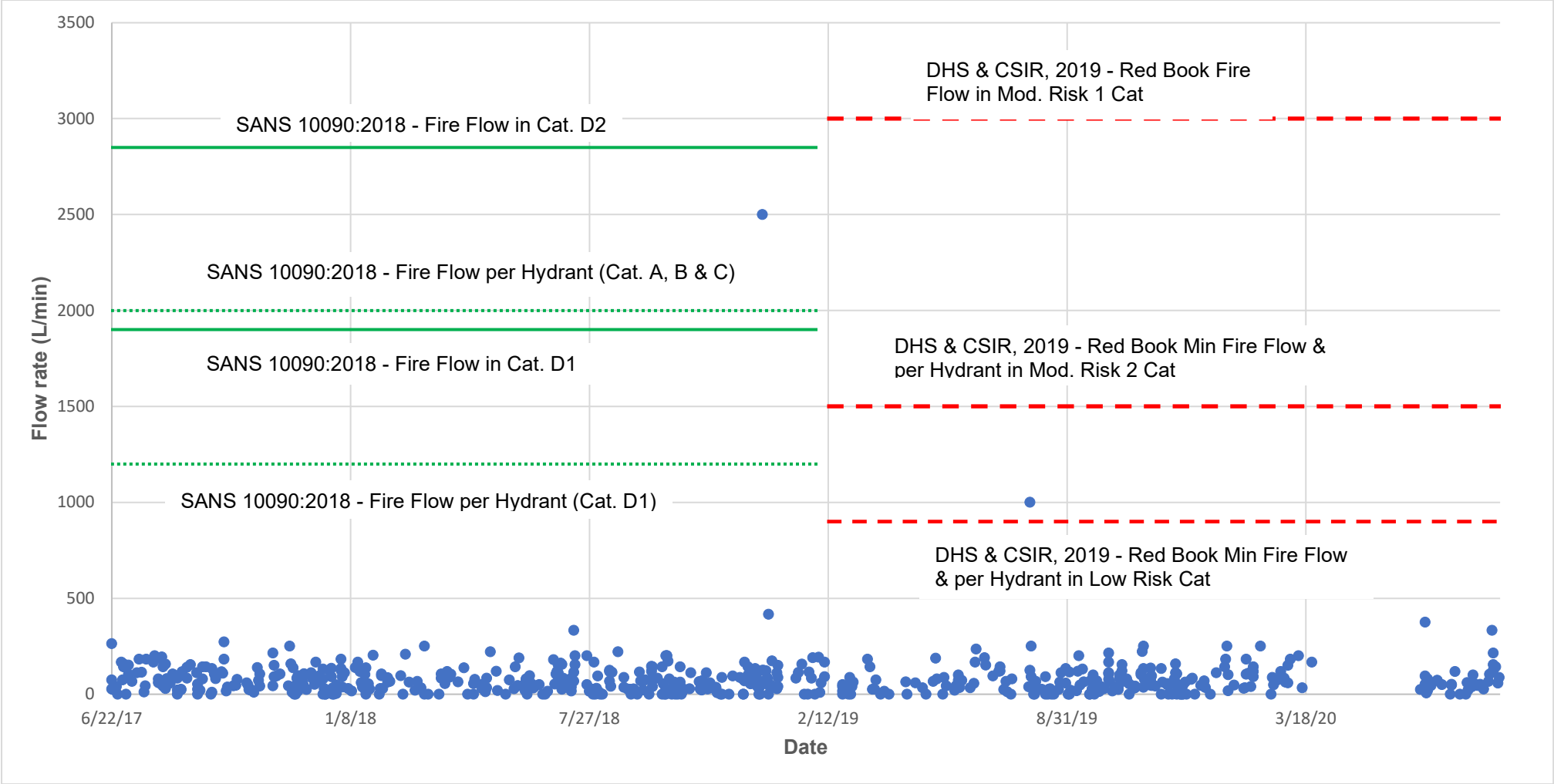

Figure 8-2 Magnitude and distribution of fire flow rates for filtered data set of 603 incidents in Sol Plaatje municipality with SANS 10090 (SABS, 2018a) & Red book (DHS & CSIR, 2019) minimum flow superimposed

8.3 FREQUENCY DISTRIBUTION OF WATER VOLUMES FOR FILTERED DATA SET

Figure 8-3 shows the distribution of water volumes used per incident for the dataset of 603 incidents. The distribution indicates that 516 (86%) incidents used less 5 Kℓ of water to extinguish. This finding is similar to Essack & Ilemobade (2022) who reported that 81% of fire incidents used less than 5 Kℓ of water to extinguish.

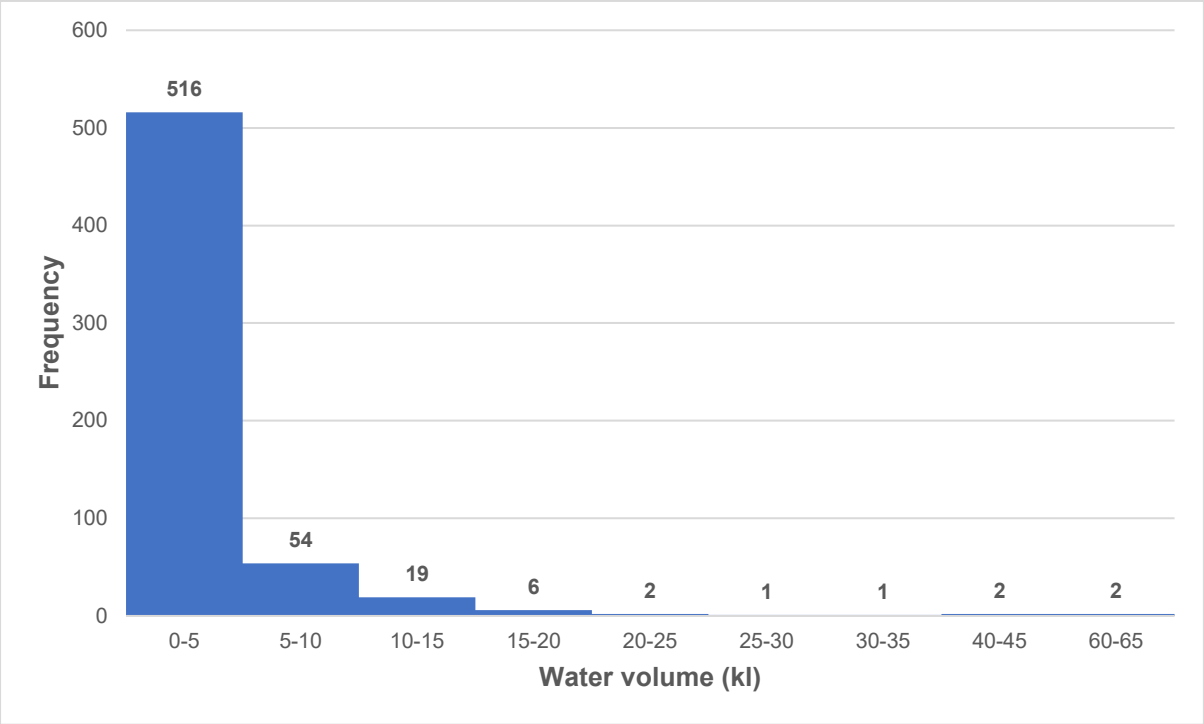

Figure 8-3 Frequency distribution of water volumes for filtered data set of 603 incidents in Sol Plaatje municipality

8.4 FREQUENCY DISTRIBUTION OF FIRE DURATION FOR FILTERED DATA SET

Figure 8-4 shows the frequency distribution of the fire duration per incident for the 603 records of Sol Plaatje municipality compared with Essack & Ilemobade (2022) . Figure 8-4 shows that 87.9% of the fire incidents in Sol Plaatje municipality were extinguished between 0 minutes and 75 minutes (marked in red). A similar trend is observed in the Essack & Ilemobade (2022) study where 75% of the fire incidents required between 30 minutes and 2 hours to extinguish (marked in green).

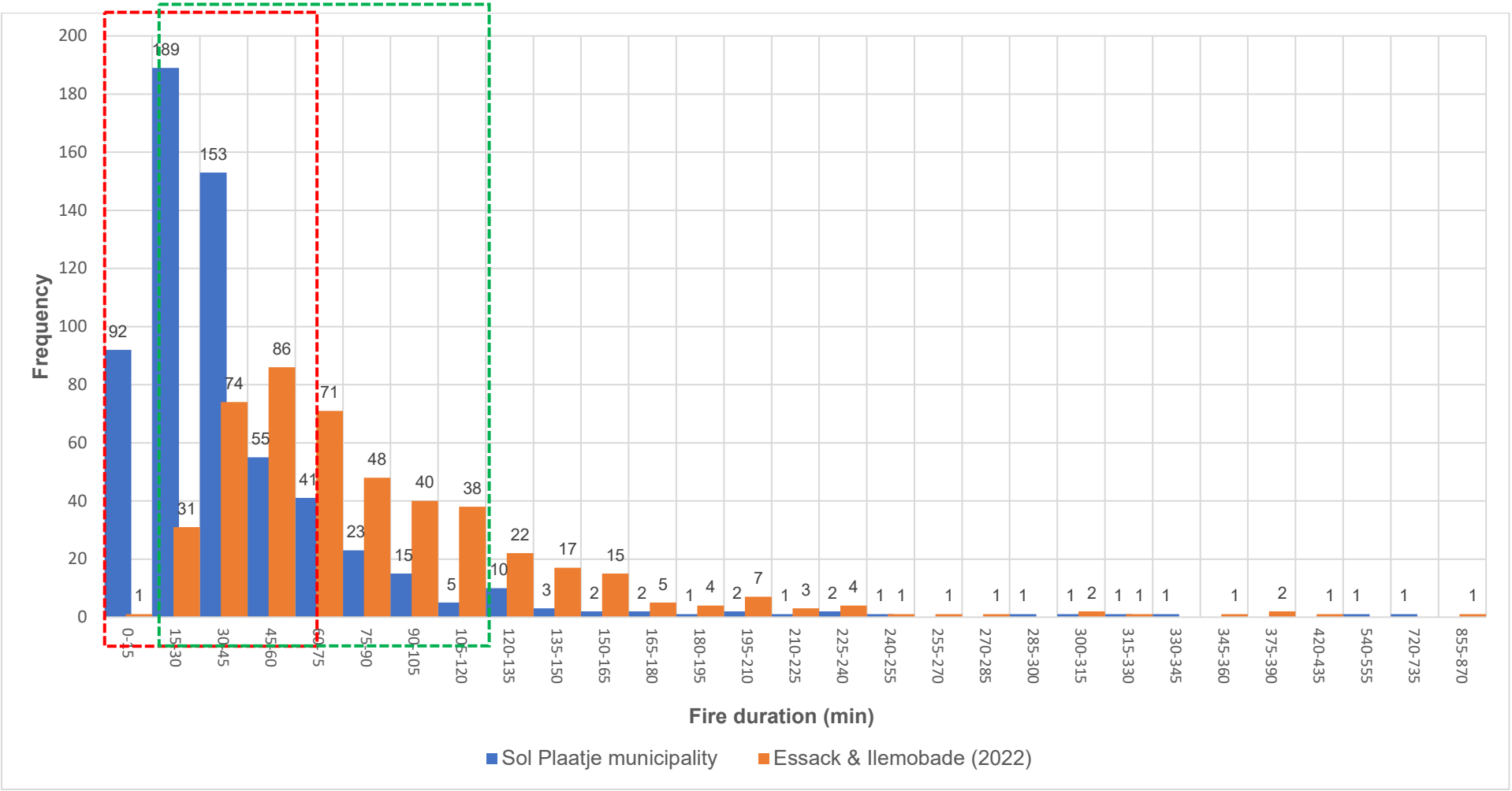

Figure 8-4 Frequency distribution of fire duration for filtered data set of 603 incidents in Sol Plaatje municipality compared with Essack & Ilemobade (2022).

8.5 LARGE FIRE INCIDENTS

Figure 8-3 shows that only 87 large fires used more than 5 Kℓ of water to extinguish. Two outliers were identified and were not considered further analysis as they had a significantly higher water usage from the rest of the incidents. Thus, only 85 large fires were considered for further analysis. This is comparable to Myburgh & Jacobs (2014) who found 77 large fire in their dataset of 554 incidents. Similarly, Essack & Ilemobade (2022) found 89 large fires in their filtered datasets of 477 incidents.

Figure 8-5 presents the magnitude and distribution of average water volumes for 85 large incidents with Essack & Ilemobade (2022) and Myburgh & Jacobs (2014) superimposed. The average water volume used to extinguish the 85 large fires was 8.56 Kℓ or less of water. In comparison with previous studies: Myburgh & Jacobs (2014) determined that 77 large fires in 5 Western Cape Towns were extinguished with an average water volume 8.6 Kℓ and Essack & Ilemobade (2022) determined that 89 large fires in the City of Johannesburg were extinguished with an average water volume 9.63 Kℓ or less of water. This means Sol Plaatje municipality was 0.46% lower than the 8,60 Kℓ average water volume obtained by Myburgh and Jacobs (2014) and 11.39% lower than the 9.63 Kℓ average water volume obtained Essack & Ilemobade (2022).

Figure 8-6 presents the scatter plot of the magnitude and distribution of fire flow rates of 85 large incidents with SANS 10090 (SABS, 2018a) & Red book (DHS & CSIR, 2019) minimum flow superimposed. Figure 8-6 indicates that 100% of the 85 large fires in Sol Plaatje municipality were extinguished with 416,67 ℓ/min or less of water. The fire flows used of 416,67 ℓ/min or less were significantly lower than what the SANS 10090 and Red book prescribes for the low risk areas.

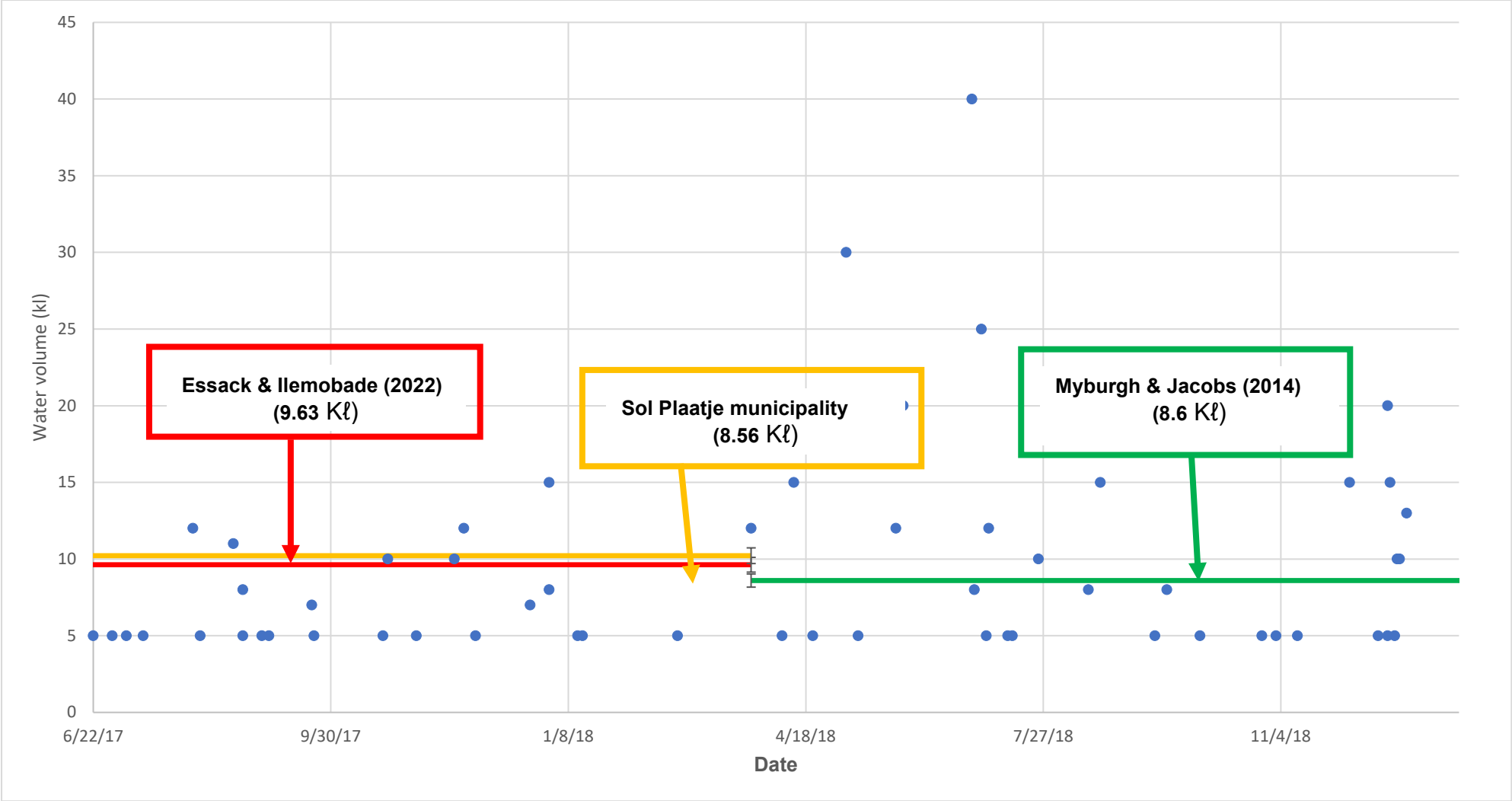

Figure 8-5 Magnitude and distribution of average water volumes for 85 large incidents in Sol Plaatje municipality with Essack & Ilemobade (2022) and Myburgh & Jacobs (2014) superimposed.

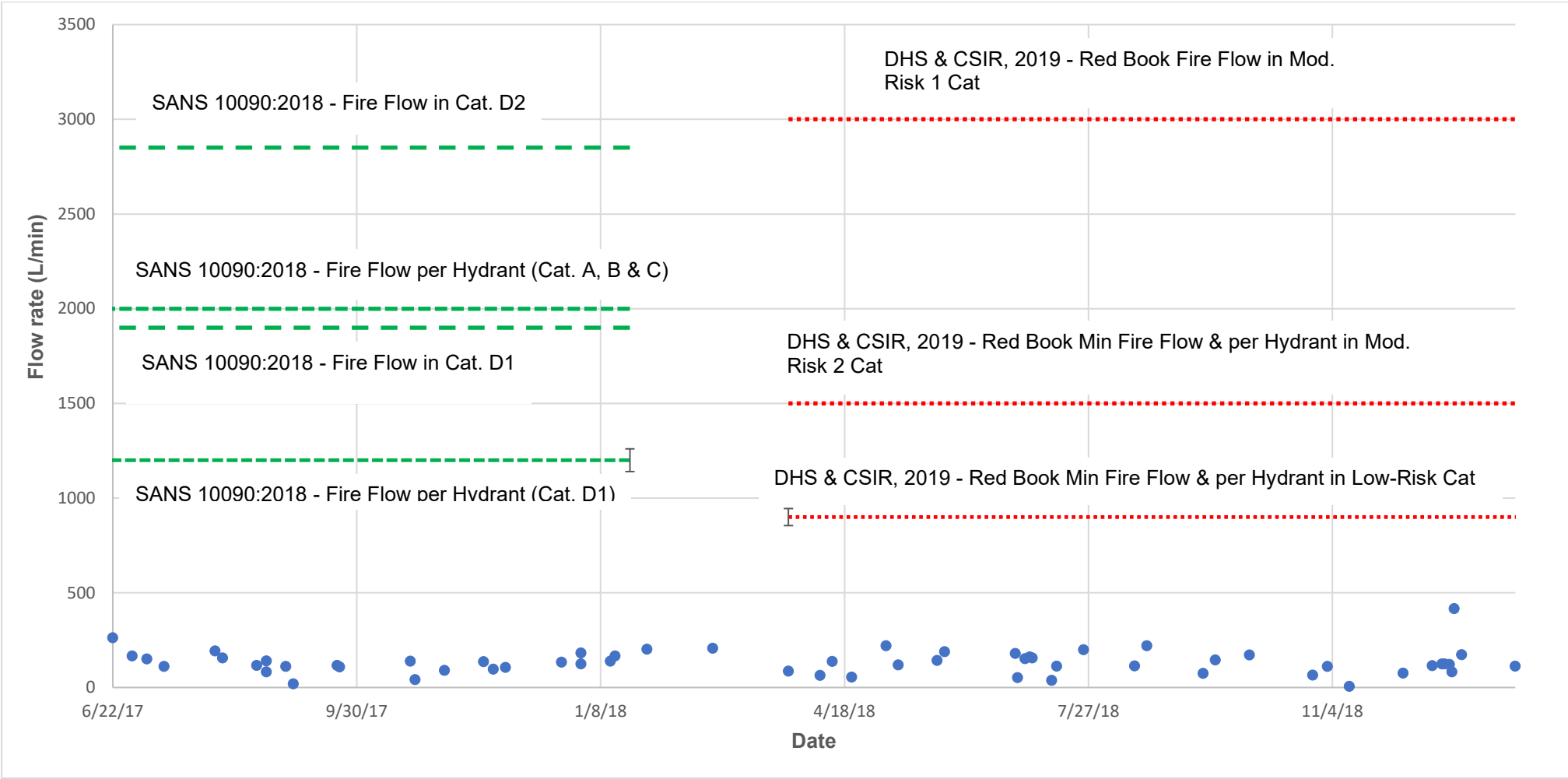

Figure 8-6 Magnitude and distribution of fire flow rates of 85 large incidents in Sol Plaatje municipality with SANS 10090 (SABS, 2018a) & Red book (DHS & CSIR, 2019) minimum flow superimposed

Figure 8-7 shows the probability that 55% of the 85 large fires can be managed with less than 7 Kℓ of water, which is less than the capacity of the most commonly used vehicle known as Pump 1 (P1) which has a capacity of 7 500ℓ. In probability statistics, this may be interpreted that 55% (47 out of 85) of the large fires in Sol Plaatje municipality can be extinguished without the use of fire hydrants if Pump 1 is dispatched as a first response vehicle. However, Table 8-1 shows that Pump 1 was used in the extinguishing of 57 (67.1%) of the 85 large fires. Overall, this suggests municipal water was used to supplement the full load of water carried by Pump 1.

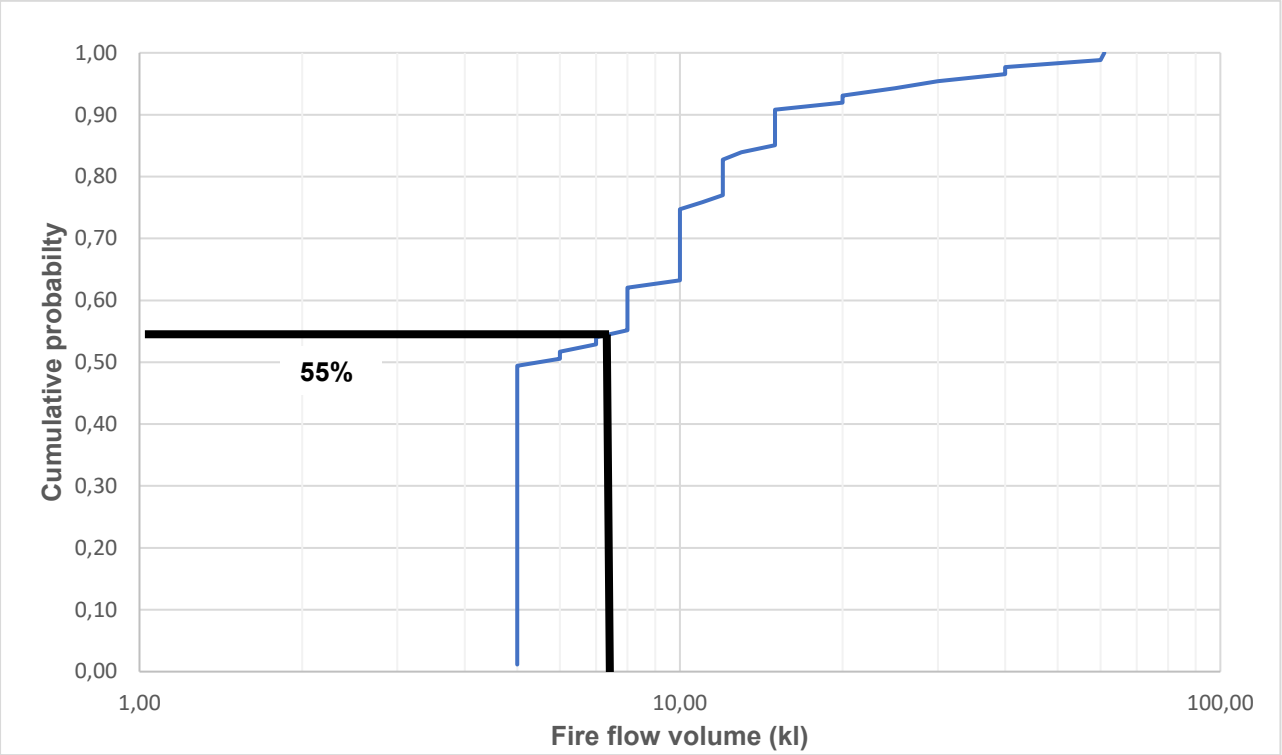

Figure 8-7 Cumulative probability plot for the water volumes of the 85 incidents in Sol Plaatje municipality

Table 8-1 Vehicles employed to extinguish the 85 large fire incidents in Sol Plaatje municipality

No	Vehicles	Carrying Capacity of Vehicles	Status	No of Incidents
1	P1	7500 ℓ	Good Condition	57
2	P2	3700 ℓ	Decommissioned	4
3	P3	2500 ℓ	Good Condition	6
4	P5	2500 ℓ	Good Condition	5
5	WT 1	10 000 ℓ	Good Condition	4
6	WT 2	10 000 ℓ	Good Condition	6

The duration taken to extinguish the 85 Category 2 large fires is shown in the frequency distribution in Figure 8-8 and compared with Essack & Ilemobade (2022). Figure 8-8 shows that 64.04% (57) of the large fires were extinguished between 30 minutes and 90 minutes. This finding is similar to van Zyl and Haarhoff (1997) study, which reported that large fires in the City of Johannesburg between 1980 and 1991 were extinguished between 30 and 90 minutes using less than 3100 ℓ/min of water. Similarly, Essack & Ilemobade (2022) also reported that 60% (54) of the large fires in the City of Johannesburg were extinguished between 30 and 120 minutes.

The Red book requires a fire duration of six hours for high risk areas and one hour for low risk areas. By applying the fire durations for large fires in Sol Plaatje municipality (i.e. 416,67 ℓ/min X 1.5h = 37.5 Kℓ) and compare it with same for high risk areas as per criterion set in the Red book, there is a 98.26% reduction in reservoir storage requirements for large fires in high risk areas..

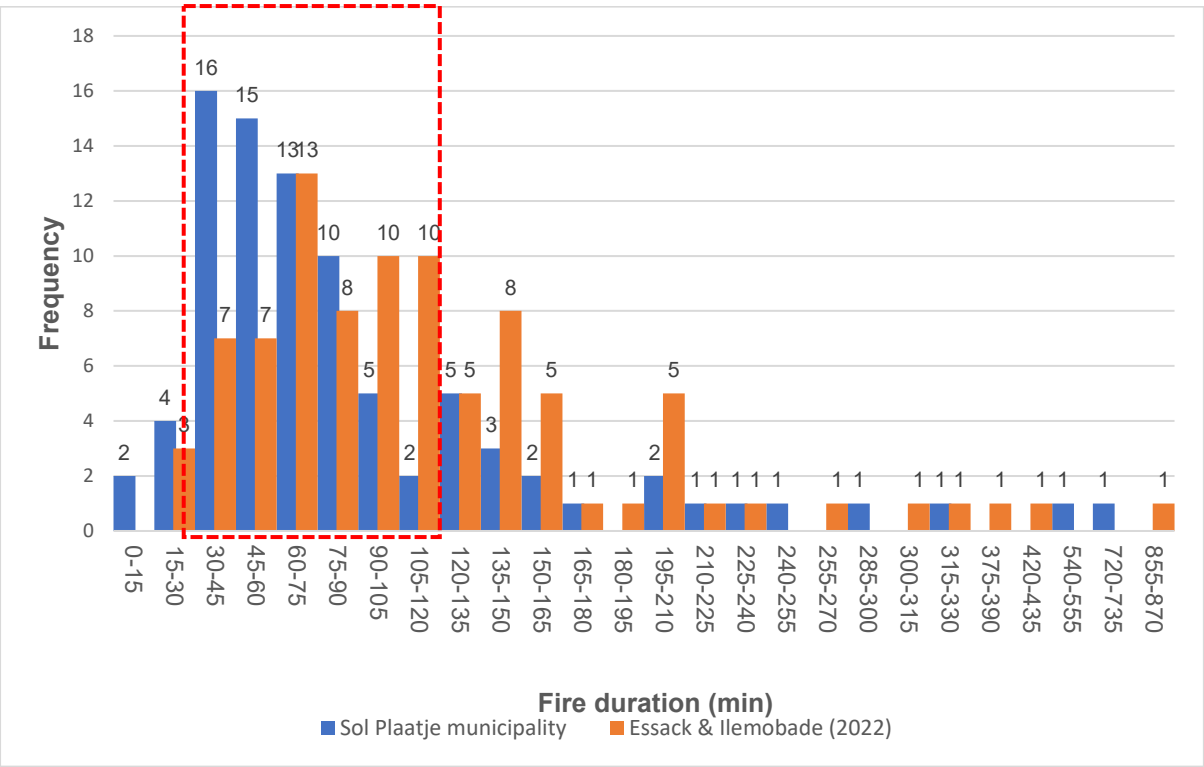

Figure 8-8 Frequency distribution of fire duration for 85 large fire incidents compared with Essack & Ilemobade (2022).

CHAPTER 9 CONCLUSIONS AND RECOMENDATIONS

This chapter addresses research objective V (i.e. to make recommendations to guide future revisions to the SANS 10090 and Red book for the provision of water for firefighting). This chapter provides answers to the following research question: What are the conclusions and recommendations of this study against the SANS 10090, Red book and previous studies on water for firefighting?

The literature review conducted in Chapter 2 and the analysis of data in Chapter 5, 6, 7 & 8 indicated that some of the information specified in the SANS 10090 and Red book for fire flows, fire risk classifications, fire duration and storage volumes need to be revised to enable the efficient conservation of scarce water resources and optimal design of water systems. In addition, the study identified challenges in the operations and organisation of the fire services at Sol Plaatje municipality when compared to recommendations in the SANS 10090. This chapter summarises and concludes by making recommendations based on the results and observations made throughout the study.

9.1 CONCLUSIONS AND RECOMMENDATIONS

9.1.1 Fire services at Sol Plaatje municipality

9.1.1.1 Modern technology and equipment

The SANS 10090 (SABS, 2018a) provides guidance on a number of protocols such as the weight and speed of response and water supply, amongst others. Municipalities then develops their own working systems that monitors their performance against these recommendations. It was interesting to observe that there is no defined criteria in the SANS 10090 about the procedure that municipalities must follow when capturing information on fire incident reports. There is also no standardised template in the SANS 10090 of a fire incident report. From the interviewed officials of Sol Plaatje municipality there was no uniform viewpoint on the exact time the fire incident reports were required to be filled out. These contrasting views are significant, as some entries on the incident report (such as travel time to incident, duration of incident and water used) requires a specific level of accuracy when captured.

It is recommended that Sol Plaatje municipality must incorporate modern technologies and equipment into their firefighting strategies. For example, by installing a GPS system in the fire engines and other response vehicles the possible routes to an incident will be calculated instantly and can be collectively monitored and managed by the call centre, safety officer and the station officer on duty. Similarly, by installing flow measuring devices, the water used, flow rates and residual pressure can be measured in real-time. All these data can be centralised to a multivariate software that has capabilities to produce a consolidated fire incident report.

9.1.1.2 Fire risk categories

The interviewed officials at Sol Plaatje municipality indicated that the fire risk categories in the incident reports are the same as those referred to in the SANS 10090. The fire incident reports of Sol Plaatje municipality shows a single set of categories (i.e. A, B, C, D & E). However, the SANS 10090 has two sets of categories: the first is 'Fire Risk Categories' and the second is 'Possible Fires'. This creates a contradiction between the classification of fire incidents in the SANS 10090 and how Sol Plaatje municipality applies them.

It is recommended that Sol Plaatje municipality uses the two sets of categories: the first is 'Fire Risk Categories' and the second is 'Possible Fires' in their fire incident reports as it is a legal requirement. It is recommended that the officers be trained or informed on the two sets of categories in the SANS 10090 to enable them to classify fire incidents in line with the SANS 10090.

9.1.1.3 Weight and speed of response

Sol Plaatje municipality deployed less pumping units and personnel when responding to callouts. The municipality's average call receipt time, average turnout time, average travel time, average attendance time were longer than the minimum prescribed in the SANS 10090.

It is recommended that Sol Plaatje municipality must employ more firefighting officers and procure additional fire engines to enhance their firefighting efficiency.

9.1.1.4 Emergency phone lines

The Sol Plaatje municipality had only one emergency phone line for population of 248 041, residing in 60 297 households. The SANS 10090 recommends that a municipality with a population size between 125 001 to 300 00 must have three (3) dedicated emergency lines. It is recommended that Sol Plaatje municipality increases their emergency lines to align with the SANS 10090.

9.1.1.5 Vehicles and Equipment

Table 6.5 indicates that Sol Plaatje municipality have vehicles and equipment that exceeds their service periods when compared to the recommendations of the SANS 10090. It is recommended that Sol Plaatje municipality must source new vehicles and equipment as the age of the existing vehicles and equipment could summarily be amongst the reasons for the challenges experienced in the provision of fire services. The existing fleet may serve as reserve fleet to augment the frontline vehicles and equipment as per the recommendations of clause 5.3.4 of the SANS 10090.

9.1.1.6 Fire Brigade By-law

The Fire Brigade By-law of Sol Plaatje municipality was enacted in 2006. The objective of the Fire Brigade by-law is *"to provide for a fire brigade service in Sol Plaatje municipality and for matters connected therewith*". Within the By-law there is no provision made for water for firefighting purposes and there is no reference made to the SANS 10090 (SABS, 2018a), SANS10252-1 (SABS, 2018b), SANS 10400-T (SABS, 2020) and the Redbook (DHS & CSIR, 2019).

Based on Figure 7-2, 99.9% of fire incidents that occurred during the period 21 July 2017 to 21 August 2020, used less than 1900ℓ/min, which is the minimum fire flow for category D1 fires in the SANS 10090 . A similar comparison with the Redbook shows that 99.5% of incidents used less than 900ℓ/min, which is the fire flow specified in the Red book for Low Risk: single residential housing.

In addition the SANS 10400-T (SABS, 2020) states that "any industrial park, permanent amusement park or exhibition ground, shopping centre or group housing, cluster housing, or townhouse complex" fire hydrants must be installed at a distance greater than 90 m from any hydrant. In other words, the SANS 10400-T recommends

for medium to low risk areas the spacing between hydrants should be limited to 90m intervals.

It is recommended that Sol Plaatje municipality amends the Fire Brigade By-law and the water requirements for firefighting be adopted as shown in Table 9-1.

Table 9-1 Proposed water requirements for firefighting at Sol Plaatje municipality

	Minimum Fire Flow		Fire Hydrants	
Fire Risk Category	**Possible Fire Sizes**	**Flow In (ℓ /min)**	**Minimum hydrant flow (ℓ /min)**	**Max. Distance Between Hydrants (m)**
A	Non-residential buildings with divisions not greater than 5000 m².	9000	2000	90
B	Non-residential buildings having division's not greater than 2 500 m².	6000	2000	120
C	Non- residential premises not greater than 1 250 m²	3600	1200	180
D1	Houses > 30 m apart	900	900	270
D2	Houses 10,1 m to 30 m apart	1200	1200	
D3	Houses 3 m – 10 m apart	1200	1200	
D4	Houses < 3 m apart	1200	1200	
E	Determined by Individual Risk Assessment			

In summary, Table 9-1 indicates that at least 99.5% of all incidents that occurred in Sol Plaatje municipality over the dataset spanning 3 years would be catered for. For category B & C, provision is made for three hydrants to discharge simultaneously at their minimum flow rates. It is only in category A that more than three hydrants to discharge simultaneously at their minimum flow rate.

9.1.2 Fire risk classification: SANS 10090

The SANS 10090 presents two sets of fire risk classifications: the first is 'Fire Risk Categories' and the second is 'Possible Fires'. As Mac Bean (2018) observed this could lead to inaccurate classification of fire incidents (especially in Category D) and further result in the minimum fire flows and minimum hydrant flow being determined from different risk categories. This study agrees with the observation of Mac Bean (2018) and recommends that the future revisions of the SANS 10090 must adopt a single set of fire risk categories.

9.1.3 Fire flows and water volumes: SANS 10090 AND REDBOOK

Currently, the SANS 10090 and Red book specifies the fire classifications (and therefore, fire flow requirements) that are based on the type of area and/or building typologies (e.g. Central Business District (CBD), residential areas, rural and urban, high rise and low rise buildings). This means that the fire flows in the SANS 10090 and Red book are applied to all municipal water distribution systems in the same way. There is no differentiation that takes cognisance of other parameters such as population size, climatic conditions, land cover (vegetation, build-up areas, etc), rural and urban areas and geographical location (inland and coastal), which impact the occurrence of fires as identified in the literature review in Chapter 2.

The results shown in Figure 7-1 indicated that there was not a single incident that recorded the minimum fire flows stipulated in categories A, B, C, D4, D3 & D2 of the SANS 10090, and High Risk & Moderate Risk 1 of the Red book in the Sol Plaatje municipality. Similarly, Table 7-1 shows that Sol Plaatje municipality used lower water volumes in three categories (i.e. Bush, Formal and Other Services) when compared to same categories in the City of Johannesburg (Essack & Ilemobade, 2022) and 5 towns in the Western Cape province (Myburgh & Jacobs, 2014). It is only in the Transport category that Sol Plaatje municipality used higher volumes of water in relation to the studies above.

Table 7-1 also shows that the average volume of water and fire flow employed at the Sol Plaatje municipality to extinguish each category of fire is notably lower than the volume and fire flow specified in the SANS 10090 and Red book. In fact, only 2 fire

incidents in the Sol Plaatje municipality, over the 3 year period of the dataset, employed fire flows larger than 1900 ℓ/min, which is the minimum fire flow for the lowest category (Category D1) in The SANS 10090. This highlight is similar to Essack and Ilemobade (2022) who reported that 99.90% and 99.60% of the fire incidents in the City of Johannesburg employed less than the minimum and total fire flows in the SANS 10090 and Red book respectively.

Another observation worth mentioning is that the average volume of water employed to extinguish all categories of fires in the Sol Plaatje municipality was 6 Kℓ or less. In fact, a scatter chart of the 2 060 fire incidents at the SPM showed that 93.3 % of fires were extinguished using 7 Kℓ of water or less. This result is not surprising as it is similar to results reported by Myburgh and Jacobs (2014), Mac Bean and Ilemobade (2019) and Essack and Ilemobade (2022).

To add perspective to the obtained results and also considering the significant differences as discussed in section 7.1 and 7.2, it is necessary to incorporate area based parameters into the discussion. Sol Plaatje municipality is classified as a rural municipality with a population of less than 500 000 people. On the other hand, the City of Johannesburg is the largest city in South Africa with a population of 6 000 000 people.

A study by Verma et al., (2016) found that the impervious surface of the City of Johannesburg increased by 57.03% from 2000 to 2016, and this directly resulted in the loss of vegetation (grass and tree cover) and significant increase in built-up areas. SPM (2020) indicates that the predominant land cover within Sol Plaatje municipality is open veld at 93% while built environment is only 4%. This implies, a fire in the City of Johannesburg is more likely to occur in build-up areas with a large number of high rise building and industrial areas, whereas in Sol Plaatje municipality in less build-up areas. This is also observed in Figure 7-3, as the highest fire incidents were in the category of bush in Sol Plaatje municipality and in the category of formal structures in City of Johannesburg at 43.06% and 78.01%, respectively.

Considering the above, it is the recommendation of this study that the fire flows must be revised to appropriate levels. Buildings (such as hospital, scrapyard, schools,

amongst others) and area based parameters (such as population size, land cover (vegetation, build-up areas, etc), rural and urban areas, geographical location (inland and coastal) and climatic conditions) must be included in the descriptions for fire risk classifications. In this way, the determination of fire flow requirements could be aggregated based on the uses of buildings and applicable area based parameters in a supply area.

9.1.4 Fire duration and storage volumes: REDBOOK

The analysis of fire durations conducted in sections 7.5 (dataset of 2060 fire incidents), 8.4 (dataset of 603 FPSA category 2 incidents) and 8.5 (data set of 85 large fire incidents) indicates that the average fire durations of the Sol Plaatje municipality datasets were significantly lower than the recommendations of the Red book. An adverse consequence of having longer fire duration periods is that it increases the reservoir storage capacity as the obtained volumes are added to the reservoir storage requirements to obtain the required minimum storage capacity and further leads to longer retention times which negatively affects the water quality.

For example, when the Red book recommendations are used to determine minimum storage capacity for high risk areas, the calculation is applied as: 6000 ℓ/min X 6h = 2160 Kℓ. For dataset of 2060 fire incidents, 1929 fire incidents (93.65%) used 200 ℓ/min and were extinguished between 0 minutes and 135 minutes, and therefore the calculation is applied as: 200 ℓ/min X 2.25h = 27 Kℓ, there is a 98.75% reduction in reservoir storage requirements when compared to the Red book recommendations for high risk areas. Similarly, for the dataset of 603 FPSA category 2 incidents, 573 fire incidents (95.2%) used 200 ℓ/min and were extinguished between 0 minutes and 75 minutes, and therefore the calculation is applied as: 200 ℓ/min X 1.25h = 15 Kℓ. There is a 99.30% reduction in reservoir storage requirements. Lastly, for the data set of 85 large fire incidents, the calculation is applied as: 416,67 ℓ/min X 1.5h = 37.5 Kℓ and this results in a 98.26% reduction in reservoir storage requirements for large fires in high risk areas.

The results as presented in sections 7.5, 8.4 and 8.5 provide a compelling case for the revision of the Red book, as this subsequently results in the over design of municipal

water distribution systems and leads to a decrease in water quality due to the long retention periods of potable water

9.2 RECOMMEDATIONS FOR FURTHER STUDIES

South Africa has experienced the worst form of electricity loadshedding during the course of this study. The practical implication is that municipal water distribution systems that has mechanical and electrical components (such as pumps, telemetry systems and other water production processing units, amongst others) that uses electricity from the ESKOM grid may experience complete redundancy or reduced reliability when electricity loadshedding occurs along with a large fire. For example, a water distribution system that has mechanical and electrical components located in a small rural town where the whole town gets switched off during loadshedding may not be able to meet the water requirements of a large fire that takes 6 hours or more hours to extinguish during stage 6 or higher stages of loadshedding. Thus, the impact of electricity loadshedding on water consumption activities such as water for firefighting needs to be investigated.

In addition, it is recommended that future work must include developing a robust methodology on how to capture and record high quality firefighting data. The methodology must use digitalization and automation techniques to capture and record crucial data such as location of incidents, date and time, speed of response, water volumes, flow rates and pressures used. This will provide immense value in understanding firefighting data and their impact on water distribution systems.

CHAPTER 10 REFERENCES

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APPENDIX A - EXAMPLE OF FIRE INCIDENT REPORT

SOL PLAATJE EMERGENCY SERVICES
P O BOX 1532, KIMBERLEY 8300
INCIDENT REPORT

SERVICES RENDERED: YES ✓ NO ☐ CATEGORY: A B C D E SANRAL STAT'S ☐

COMMENTS:

INCIDENT ADDRESS: [redacted]

INCIDENT NUMBER 44
INCIDENT DATE 01/07/18
KILOMETRES 30km
WITHIN MUN AREA
OUTSIDE MUN AREA

ACCOUNT RENDERED: YES ☐ NO ✓ For office use only

PARTICULARS OF PERSON TO RECEIVE ACCOUNT [redacted]
CONTACT PERSON UNDER INVESTIGATION
STREET ADDRESS
STREET AND NUMBER
SUBURB [redacted]
CITY & CODE
POSTAL ADDRESS
POSTAL ADDRESS [redacted]
CITY & CODE
TELEPHONE NUMBER (w) (h) (Cell)
IDENTIFICATION NUMBER
NAME & ADDRESS EMPLOYER
VEHICLE REGISTRATION NO

METHOD OF RECEIVING
TELEPHONE ALARM RADIO ✓ ORAL
TIME RECEIVED 04:17 TIME STOPPED 07:23 TIME COMPLETED 08:00

VEHICLE	OFFICER	CREW	TURNOUT TIME	TIME ARRIVED	TIME BACK	TIME OUT	WORK TIME
Pump 1	Maitri	3	04:20	04:29	08:00	220 MIN	164 MIN
WT2	Phobvo	—	04:28	04:38	08:00	220 MIN	164 MIN

	ADULTS (CIVILIAN)	CHILDREN (CIVILIAN)	FIREMEN	TOTAL
DEATHS	✓	✓	✓	✓
INJURIES				

INSURANCE: YES ✓ NO

METHOD OF EXTINGUISHING: AUTO HAND ✓

INCIDENT: (FIRES)

MAIN CATEGORY	SUB CATEGORY
RESIDENTIAL	HOUSE
INSTITUTIONAL	
PUBLIC ASSEMBLY	
COMMERCIAL	✓ ABANDONED
INDUSTRY	
STORAGE	
TRANSPORT	
OTHER	

PROBABLE CAUSES: (FIRES)	
SMOKING	
ELECTRICAL FAULTS	
OPEN FLAMES	
COOKING	
HEATING	
WELDING/CUTTING	
LIGHTNING	
ARSON	
UNDETERMINED	✓
OTHER	

OTHER SERVICES:
SPECIAL SERVICE
HAZMAT
RESCUES

FALSE ALARMS:
GOOD INTENT
MALICIOUS

ESTIMATIONS:	VALUE (FIRES)	DAMAGE (FIRES)	STATUS OF OWNER
BUILDING	R3,5 MIL	R1,2 MIL	MARRIED
CONTENTS	R50 000.00	R50 000.00	DIVORCED
VEHICLE 1			WIDOW
VEHICLE 2			WIDOWER
TOTAL	~~R4 MIL~~ R3,55 MIL	R1,25 MIL	PENSIONER

EQUIPMENT USED:			
WATER (per Kiloliter)		25kl	JAWS OF LIFE
FOAM (per liter)			OTHER EQUIPMENT USED: (SPECIFY)
DRY CHEMICAL POWDER (per KG			MAST LIGHT + GENERATOR X1
H.P HOSES			
FIRE HOSES (NOZZLES)	2X LINES 45mm		PIKE POLE X1
PORTABLE PUMPS			
BREATHING APPARATUS			
LADDERS	HOOK LADDER X1		

DESCRIPTION OF INCIDENT: (TO BE COMPLETED BY THE INCIDENT COMMANDER)

~~FARM HOUSE~~ AND LAPA WELL ALIGHT. ROOF ALREADY COLLAPSED. LAPA DESTROYED AND COLLAPSED ON ARRIVAL. USED 25 kl H_2O TO EXTINGUISH THE FIRE

NAMES OF CREW MEMBERS: (EXCLUDE THE INCIDENT COMMANDER MENTIONED AT THE VEHICLES)

[redacted] STAFF & SAFETY OFFICER

STAFF

SAFETY [redacted]

FIRE INVESTIGATION: (TO BE COMPLETED BY THE PERSON WHO DONE THE INVESTIGATION)

UNDER INVESTIGATION

SIGNATURE (PERSON COMPLETING THE REPORT) [redacted]

APPENDIX B - ETHICS CLEARANCE APPROVAL

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING ETHICS COMMITTEE
CONSTITUTED UNDER THE UNIVERSITY HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)

CLEARANCE CERTIFICATE **PROTOCOL NUMBER: CEECC-1491265-2021**

PROJECT TITLE WATER FOR FIREFIGHTING IN SOL PLAATJE MUNICIPALITY, NORTHERN CAPE, SOUTH AFRICA.

INVESTIGATOR Tumelo Thage

SCHOOL/DEPARTMENT OF INVESTIGATOR CIVIL AND ENVIRONMENTAL ENGINNERING

DATE CONSIDERED 02 August 2021

DECISION OF THE COMMITTEE Approved unconditionally

RISK LEVEL MINIMAL RISK

EXPIRY DATE Date of submission of the project Research Report

ISSUE DATE OF CERTIFICATE

02 August 2021

CHAIRPERSON

(Professor John Ndiritu)

cc: Supervisor: Prof. A. Ilemobade

DECLARATION OF INVESTIGATOR

To be completed in duplicate and **ONE COPY** returned to the Chairperson of the School/Department ethics committee.

I fully understand the conditions under which I am are authorized to carry out the abovementioned research and I guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee.

Signature **Date** 07 / 08 / 2021

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

APPENDIX C - PERMISSION LETTER FROM SOL PLAATJE MUNICIPALITY

SOL PLAATJE MUNICIPALITY

OFFICE OF THE MUNICIPAL MANAGER
KANTORO YA MOTSAMAISI WA MASEPALA
KANTOOR VAN DIE MUNISIPALE BESTUURDER

Private Bag X5030,
Kimberley 8300
Tel: (053) 830 6911
Fax: (053) 833 1005
www.solplaatje.org.za

Ref. No./Verw:

Enquiries / Navrae: [redacted]

20 July 2021

Mr Tumelo Thage
Principal Investigator
University of Witswatersrand
JOHANNESBURG

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH ON WATER FOR FIREFIGHTING AT SOL PLAATJE MUNICIPALITY

Dear Mr. Thage

Permission is granted to Mr. Tumelo Thage, an Msc in Civil Engineering student at the University of Witwatersrand (WITS) to conduct research at Sol Plaatje Municipality.

It is noted that the objectives of the study are as follows:

- To conduct a detailed literature review on fire protection within municipal water distribution systems;
- To categorize and analyze fire flows, based on actual fire flow volumes and flow rate data during fire incidents in Sol Plaatje Municipality;
- To compile a status quo report that assesses firefighting equipment currently used by Sol Plaatje Municipality;
- To make recommendations to guide future revisions to the South African Standards (SANS 10090:2018) and Guideline (DHS and CSIR, 2019) for the provision of water for firefighting.

Relevant information required for the purpose of the research study will be made available as per applicable laws and regulations. Sol Plaatje Municipality further notes that all ethical aspects of the research will be covered within the provisions of the WITS Research Ethics Policy. Upon completion of the research study, it would be appreciated that the findings and/or results be made available to the management of Sol Plaatje Municipality.

Yours Sincerely

[redacted]

ACTING MUNICIPAL MANAGER

The City that Sparkles

APPENDIX D - PARTICIPANT INFORMATION SHEET

	**School of Civil and Environmental Engineering** **University of the Witwatersrand, Johannesburg**
	Investigator : Tumelo Thage, Msc Civil Engineering Research Student **Email** : 1491265@students.wits.ac.za **Supervisor** : Prof. Adesola Ilemobade **Investigating** : Water for Firefighting
Research Title:	Water for Firefighting in Sol Plaatje Municipality, Northern Cape, South Africa

Participant Information Sheet

Dear Participant

My name is Tumelo Thage and I am a Masters student in Civil Engineering at the University of the Witwatersrand, Johannesburg. As part of my studies, I have to undertake a research project, and I am investigating Water for Firefighting in Sol Plaatje Municipality, Northern Cape, South Africa under the supervision of Prof. Adesola Ilemobade. The aim of this research project is to analyse the Sol Plaatje Municipality firefighting equipment and fire incident reports and comparing actual fire flows against the South African standard and design guideline. This study may produce results that can contribute to the future revision of the South African standard and design guideline.

As part of this project, I would like to invite you to take part in a face-to-face interview session. This activity will involve you answering questions about your experience as a firefighter in Sol Plaatje Municipality and will take around 30 - 45 minutes. This will be arranged for a time, date and location of your convenience between 23/08/2021 – 27/08/2021. With your permission, I would also like to audio record the interview using a digital device.

There will be no personal costs to you if you participate in this project, you will not receive any direct benefits from participation but there are no disadvantages or penalties if you do not choose to participate or if you withdraw from the study. You may withdraw at any time or not answer any question if you do not want to. The interview will be completely confidential and anonymous as I will not be asking for your

name or any identifying information, and the information you give to me will be held securely and not disclosed to anyone else. I will be using a pseudonym (false name) to represent your participation in my final research report. If you experience any distress or discomfort at any point in this process, we will stop the interview or resume another time.

If you have any questions during or afterwards about this research, feel free to contact me on the details listed below. This study will be written up as a research report which will be available online through the university library website.. The data collected from this research project will be stored in encrypted folder and will be kept for 5 years. With your permission the data collected from this research project may be used by other researchers. If you have any concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0)11 717 1408, email hrec-medical.researchoffice@wits.ac.za

Yours sincerely,
Tumelo Thage

Researcher:
Tumelo Thage, 1491265@students.wits.ac.za, 0718905036

Supervisor:
Prof. Adesola Ilemobade, adesola.ilemobade@wits.ac.za, +27(0)11 717 7153

APPENDIX E - PARTICIPANT CONSENT FORM

	School of Civil and Environmental Engineering **University of the Witwatersrand, Johannesburg**
	Investigator : Tumelo Thage, Msc Civil Engineering Research Student **Email** : 1491265@students.wits.ac.za **Supervisor** : Prof. Adesola Ilemobade **Investigating** : Water for Firefighting
Research Title:	Water for Firefighting in Sol Plaatje Municipality, Northern Cape, South Africa

Participant Consent Form

I, .., ., agree to participate in this research project. The research has been explained to me and I understand what my participation will involve. I agree to the following:

(Please circle the relevant options below).

I agree that my participation will remain anonymous	(YES)	NO
I agree that the researcher may use anonymous quotes in his / her research report	(YES)	NO
I agree that the interview may be audio recorded	(YES)	NO
I agree that the information I provide may be used anonymously after this project has ended, for academic purposes by other researchers, subject to their own ethics clearance being obtained.	(YES)	NO

Name of Participant:..	Signature:..	Date: 17/09/2021
Name of Interviewer: Tumelo Thage	Signature:.....	Date: 17/09/2021

	School of Civil and Environmental Engineering **University of the Witwatersrand, Johannesburg**
	Investigator : Tumelo Thage, Msc Civil Engineering Research Student **Email** : 1491265@students.wits.ac.za **Supervisor** : Prof. Adesola Ilemobade **Investigating** : Water for Firefighting
Research Title:	Water for Firefighting in Sol Plaatje Municipality, Northern Cape, South Africa

Participant Consent Form

I, [redacted] agree to participate in this research project. The research has been explained to me and I understand what my participation will involve. I agree to the following:

(Please circle the relevant options below).

I agree that my participation will remain anonymous	(YES)	NO
I agree that the researcher may use anonymous quotes in his / her research report	(YES)	NO
I agree that the interview may be audio recorded	(YES)	NO
I agree that the information I provide may be used anonymously after this project has ended, for academic purposes by other researchers, subject to their own ethics clearance being obtained.	(YES)	NO

Name of Participant: [redacted]	Signature: [redacted]	Date: 19/01/2022
Name of Interviewer: Tumelo Thage	Signature:	Date: 19/01/2022

[redacted]
LOGISTIC OFFICER
19 -01- 2022
TEL: [redacted] FAX: [redacted]
CELL: [redacted]
E-Mail: [redacted]

	School of Civil and Environmental Engineering **University of the Witwatersrand, Johannesburg**
	Investigator : Tumelo Thage, Msc Civil Engineering Research Student **Email** : 1491265@students.wits.ac.za **Supervisor** : Prof. Adesola Ilemobade **Investigating** : Water for Firefighting
Research Title:	Water for Firefighting in Sol Plaatje Municipality, Northern Cape, South Africa

Participant Consent Form

I, [redacted], agree to participate in this research project. The research has been explained to me and I understand what my participation will involve. I agree to the following:

(Please circle the relevant options below).

I agree that my participation will remain anonymous	(YES)	NO
I agree that the researcher may use anonymous quotes in his / her research report	(YES)	NO
I agree that the interview may be audio recorded	(YES)	NO
I agree that the information I provide may be used anonymously after this project has ended, for academic purposes by other researchers, subject to their own ethics clearance being obtained.	(YES)	NO

Name of Participant: [redacted]	Signature: [redacted]	Date: 19/01/2020
Name of Interviewer: Tumelo Thage	Signature:	Date: 19/01/2022

APPENDIX F - INTERVIEW QUESTIONS

	School of Civil and Environmental Engineering **University of the Witwatersrand, Johannesburg**
	Investigator : Tumelo Thage, Msc Civil Engineering Research Student **Email** : 1491265@students.wits.ac.za **Supervisor** : Prof. Adesola Ilemobade **Investigating** : Water for Firefighting
Research Title:	Water for Firefighting in Sol Plaatje Municipality, Northern Cape, South Africa

INTERVIEW QUESTIONS*

*If the participant allows, responses will be audio recorded. Alternatively, responses will be handwritten by the interviewer.

SECTION 1: PROCEDURE ON INCIDENT REPORTING

1.1 List the fire stations that are under the jurisdiction of the Sol Plaatje Municipality. For each fire station, indicate its' area of coverage.

……

……

……

……

1.2 Which stations from the above list produce reliable water for firefighting data on their fire incident reports based on access to functional measuring equipment?

……

……

……

……

1.3 Does the municipality have a centralized or decentralized incident call center?

……

……

……

……

1.4 What are the procedural steps that are followed after an incident has been reported?

……

……

……

……

1.5 When does the incident call-out start and close?

……

……

……
……

1.6 When is the incident report form filled out?

……
……
……
……

SECTION 2: FIREFIGHTING STRATEGY AND RESOURCE ALLOCATIONS

2.1 What is the minimum number of personnel expected to respond to a fire and what roles are each personnel in the team expected to perform?

……
……
……
……

2.2 What does the category in the incident report forms refer to?

……
……
……
……

2.3 How is the worktime in the incident report forms calculated?

……
……
……
……

2.4 How are the water requirements for firefighting determined?

……
……
……
……

2.5 How is additional support requested during active fire incidents?

……
……
……
……

2.6 What modern technologies / equipment have become available in the past decade and what value do they add?

……

……
……
……

SECTION 3: FIRE ENGINES AND WATER TANKERS

3.1 When are the fire engines and water tankers filled, to what extent and why?

……
……
……
……

3.2 Provide an estimate of how long fire engines and water tankers can be emptied when full?

……
……
……
……

3.3 What is the maximum discharge rate and pressure fire engines and water tankers can generate?

……
……
……
……

3.4 Can a fire engine or water tanker be refilled whilst at the same time being used to fight a fire?

……
……
……
……

SECTION 4: FIRE HYDRANTS AND WATER DISTRIBUTION SYSTEM (WDS)

4.1 What are the most common limitations experienced with fire hydrants?

……
……
……
……

4.2 When fire hydrants are not available, how are fires fought?

……
……
……
……

4.3 What equipment is used to connect to fire hydrant?

……
……
……
……

4.4 What are the typically experienced fire hydrant flow rates and pressures?

……
……
……
……

4.5 What are the lower and upper bounds of fire hydrant flow rates and pressures?

……
……
……
……

SECTION 5: OTHER FACTORS INFLUENCING FIREFIGHTING PROCESSES.

5.1 What are the different levels of skill, training and qualification for firefighting?

……
……
……
……

5.2 What effect do the following factors have on the efficacy of firefighting processes, please state reasons?

Size of Tanker……..
Size of Hoses……
Size of Tanker……
Number of Firemen……..
Type of Building……
Location of Fire…….
Water provision…….

5.3 Are you familiar with the following documents, do you agree with their recommendations and what changes / amendments would you recommend, please state reasons?

Red Book……
SANS 10090……
SANS 10252-1……
SANS 10400-T……
Sol Plaatje Municipality Building Control by-law……..……
Sol Plaatje Municipality Water Services by-law…….
Sol Plaatje Municipality Fire Brigade by-law……

SECTION 6: FLEET SPECIFICATION

6.1 Fleet specifications of the fire engines and water tankers

6.1.1 Please provide a brief description on each vehicle?

6.1.2 Request to take photo of each vehicle?

APPENDIX G – SUMMARY OF DATASET OF SOL PLAATJE MUNICIPALITY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1	2017/06/21	12:19:00	12:22:00	12:34:00	12:50:00	0:28	0:03	0:31	C	1	2	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
2	2017/06/22	03:25:00	03:25:00	03:34:00	03:52:00	0:27	0:00	0:27	C	2	6	Commercial	Arson	Offices	Yes	P1	2,0	74,07
3	2017/06/22	03:52:00	03:52:00	03:57:00	04:11:00	0:19	0:00	0:19	C	1	3	Commercial	Arson	Funeral Parlour	Yes	WT2	5,0	263,16
4	2017/06/22	03:52:00	03:57:00	04:02:00	04:50:00	0:38	0:05	0:58	C	2	5	Commercial	Arson	Funeral Parlour	Yes	P1	1,0	26,32
5	2017/06/22	16:35:00	16:35:00	16:47:00	17:02:00	0:05	0:00	0:27	C	2	2	Other	Open Flames	Rubbish	Yes	P1	1,0	200,00
6	2017/06/22	18:00:00	18:00:00	18:16:00	18:33:00	0:17	0:00	0:33	C	3	4	Other	Open Flames	Veldfire	Yes	P1	1,0	58,82
7	2017/06/22	08:39:00	08:43:00	14:06:00	15:00:00	0:10	0:04	6:21	B	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	100,00
8	2017/06/22	13:11:00	13:46:00	14:06:00	15:00:00	1:11	0:35	1:49	C	1	2	Other Services	Special Services	Water Supply	Yes	WT2	5,0	70,42
9	2017/06/23	14:18:00	14:20:00	14:31:00	15:06:00	0:22	0:02	0:48	D	1	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
10	2017/06/23	14:31:00	14:35:00	14:44:00	16:00:00	0:55	0:04	1:29	C	2	6	Other	Open Flames	Grass	Yes	P1	1,0	18,18
11	2017/06/23	19:06:00	19:09:00	19:20:00	22:05:00	1:45	0:03	2:59	D	2	6	Other Service	Rescues		Yes	P1	0,0	0,00
12	2017/06/23	23:31:00	23:35:00	23:40:00	00:12:00	0:41	0:04	0:41	C	2	5	Transport	Open Flames	Car	Yes	WT2	1,0	24,39
13	2017/06/24	11:32:00	11:33:00	11:39:00	12:11:00	0:05	0:01	0:39	D	2	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
14	2017/06/24	15:18:00	15:21:00	15:25:00	16:01:00	0:34	0:03	0:43	C	2	4	Other	Open Flames	Grass	Yes	P1	1,0	29,41
15	2017/06/24	17:47:00	17:48:00	17:56:00	18:10:00	0:09	0:01	0:23	C	2	5	Other	Open Flames	Grass	Yes	WT2	1,0	111,11
16	2017/06/24	19:25:00	19:30:00	19:41:00	20:10:00	0:18	0:05	0:45	C	2	3	Other	Open Flames		Yes	WT2	1,0	55,56
17	2017/06/25	13:54:00	13:55:00	14:06:00	15:00:00	0:37	0:01	1:06	D	2	6	Other	Open Flames	Grass	Yes	WT2	1,0	27,03
18	2017/06/26	10:03:00	10:05:00	10:16:00	11:11:00	0:23	0:02	1:08	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	43,48
19	2017/06/26	11:55:00	11:57:00	12:06:00	12:35:00	0:25	0:02	0:40	C	2	4	Residential	Open Flames	House	Yes	P1	1,0	40,00
20	2017/06/26	17:00:00	17:03:00	17:10:00	17:47:00	0:33	0:03	0:47	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
21	2017/06/26	18:02:00	18:06:00	18:26:00	19:02:00	0:38	0:04	1:00	D	1	2	Other	Open Flames	Grass	Yes	D3	0,0	0,00
22	2017/06/26	18:03:00	18:05:00	18:09:00	18:57:00	0:44	0:02	0:54	B	2	3	Other Service	Rescues	MVA	Yes	P1	0,0	0,00
23	2017/06/26	19:14:00	19:17:00	19:22:00	19:32:00	0:10	0:03	0:18	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	100,00
24	2017/06/26	21:24:00	21:24:00	21:29:00	22:44:00	0:51	0:00	1:20	C	1	3	Other	Open Flames	Grass	Yes	WT1	1,0	19,61
25	2017/06/26	21:47:00	21:47:00	21:59:00	22:24:00	0:15	0:00	0:37	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	66,67
26	2017/06/27	05:04:00	05:07:00	05:18:00	05:59:00	0:27	0:03	0:55	E	2	3	Residential	Open Flames	Formal	Yes	P1	0,0	0,00
27	2017/06/27	08:47:00	08:54:00	08:58:00	09:33:00	0:24	0:07	0:46	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
28	2017/06/27	11:44:00	11:47:00	11:51:00	12:46:00	0:12	0:03	1:02	C	1	3	Other	Open Flames	Grass	Yes	WT1	1,0	83,33
29	2017/06/28	18:05:00	18:08:00	18:25:00	19:16:00	0:32	0:03	1:11	C	1	3	Other	Open Flames	Tyres	Yes	P1	1,0	31,25
30	2017/06/29	12:38:00	12:39:00	12:47:00	14:13:00	1:06	0:01	1:35	C	1	2	Other	Open Flames	Grass	Yes	P1	5,0	75,76
31	2017/06/30	07:05:00	07:05:00	07:10:00	07:56:00	0:30	0:00	0:51	C	2	5	Residential	Open Flames	Informal	Yes	P3	5,0	166,67
32	2017/06/30	11:42:00	11:42:00	11:51:00	12:48:00	0:51	0:00	1:06	B	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
33	2017/06/30	13:26:00	13:27:00	13:45:00	14:18:00	0:04	0:01	0:52	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	250,00
34	2017/06/30	14:26:00	14:36:00	15:00:00	16:26:00	1:50	0:10	2:00	E	1	1	Other Services	Special Services	Water Supply	Yes	WT2	10,0	90,91
35	2017/07/01	14:28:00	14:31:00	14:42:00	15:06:00	0:27	0:03	0:38	E	2	3	Residential	Undetermined	Formal	Yes	P1	2,0	74,07
36	2017/07/01	23:47:00	23:48:00	23:55:00	00:17:00	0:08	0:01	0:30	C	1	3	Other	Open Flames	Grass	Yes	WT1	1,0	125,00
37	2017/07/02	05:00:00	05:02:00	05:10:00	05:45:00	0:19	0:02	0:45	C	2	3	Residential	Open Flames	Formal	Yes	P1	3,0	157,89
38	2017/07/02	22:11:00	22:14:00	22:24:00	23:08:00	0:21	0:03	0:57	C	2	3	Residential	Open Flames	Informal	Yes	P1	3,0	142,86
39	2017/07/03	08:59:00	09:04:00	09:12:00	10:00:00	0:20	0:05	1:01	C	2	2	Other	Open Flames	Grass	Yes	P3	0,0	0,00
40	2017/07/03	11:30:00	11:32:00	11:42:00	12:56:00	1:32	0:02	1:26	E	1	2	Other	Open Flames	Public Toilet	Yes	WT2	1,0	10,87
41	2017/07/03	16:35:00	16:38:00	16:51:00	17:45:00	0:59	0:03	1:10	C	3	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
42	2017/07/04	20:45:00	20:49:00	20:55:00	21:02:00	0:03	0:04	0:17	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	333,33
43	2017/07/05	10:35:00	10:39:00	10:48:00	12:35:00	1:08	0:04	2:00	C	3	4	Other	Open Flames	Grass	Yes	P1	1,0	14,71
44	2017/07/05	17:06:00	17:07:00	17:10:00	17:33:00	0:23	0:01	0:27	C	2	2	Other	Open Flames	Grass	Yes	P3	1,0	43,48
45	2017/07/06	11:24:00	11:26:00	11:38:00	12:35:00	0:41	0:02	1:11	C	3	4	Other	Open Flames	Grass	Yes	P1	3,0	73,17
46	2017/07/06	13:34:00	13:37:00	13:41:00	14:01:00	0:10	0:03	0:27	C	2	4	Other	Open Flames	Grass	Yes	P1	2,0	200,00
47	2017/07/06	21:06:00	21:07:00	21:13:00	22:37:00	0:33	0:01	1:31	E	2	4	Residential	Open Flames	Grass	Yes	P1	5,0	151,52
48	2017/07/06	22:29:00	22:30:00	22:41:00	23:34:00	0:29	0:01	1:05	C	3	5	Residential	Open Flames	Formal	Yes	P1	3,0	103,45
49	2017/07/06	22:34:00	23:16:00	23:25:00	00:17:00	0:09	0:42	1:43	C	1	0	Other	Open Flames	Grass	Yes	P1	1,0	111,11
50	2017/07/06	23:04:00	23:37:00	23:44:00	01:02:00	0:10	0:33	1:57	E	1	1	Other Services	Special Services	Water Supply	Yes	WT2	0,0	0,00
51	2017/07/08	09:58:00	10:02:00	10:10:00	12:30:00	2:20	0:04	2:32	B	2	3	Other	Open Flames	Grass	Yes	WT2	1,0	7,14
52	2017/07/08	12:30:00	12:30:00	12:35:00	14:15:00	1:17	0:00	1:45	C	2	3	Other	Open Flames	Grass	Yes	WT2	2,0	25,97
53	2017/07/08	14:21:00	14:26:00	14:29:00	14:51:00	0:13	0:05	0:30	C	2	3	Other	Open Flames	Rubbish	Yes	P1	1,0	76,92

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
54	2017/07/08	16:17:00	16:19:00	16:26:00	16:55:00	0:13	0:02	0:38	C	2	2	Other	Open Flames	Grass	Yes	P3	2,0	153,85
55	2017/07/08	17:01:00	17:02:00	17:14:00	18:30:00	0:39	0:01	1:29	C	2	4	Other	Open Flames	Grass	Yes	P3	3,0	76,92
56	2017/07/09	06:45:00	06:48:00	06:54:00	07:14:00	0:15	0:03	0:29	C	2	5	Storage	Heating	Store Room	Yes	P1	1,0	66,67
57	2017/07/09	10:20:00	10:22:00	10:39:00	11:09:00	0:14	0:02	0:49	B	2	4	Other	Open Flames	Grass	Yes	P3	1,0	71,43
58	2017/07/09	17:37:00	17:42:00	17:50:00	18:58:00	0:50	0:05	1:21	C	1	2	Other	Open Flames	Grass	Yes	P1	2,0	40,00
59	2017/07/09	18:18:00	18:19:00	18:24:00	18:35:00	0:10	0:01	0:17	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	100,00
60	2017/07/09	18:45:00	19:00:00	19:07:00	19:33:00	0:14	0:15	0:48	C	2	2	Other	Open Flames	Grass	Yes	P1	2,0	142,86
61	2017/07/10	16:30:00	16:31:00	16:44:00	17:28:00	0:26	0:01	0:58	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	38,46
62	2017/07/11	15:22:00	15:25:00	15:43:00	15:43:00	1:03	0:03	0:21	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	15,87
63	2017/07/11	16:30:00	16:31:00	16:44:00	17:28:00	0:50	0:01	0:58	C	1	3	Other	Open Flames	Grass	Yes	P3	1,0	20,00
64	2017/07/11	19:02:00	19:05:00	19:11:00	19:38:00	0:22	0:03	0:36	C	1	2	Other	Open Flames	Grass	Yes	P1	2,0	90,91
65	2017/07/12	08:30:00	08:39:00	08:45:00	09:06:00	0:18	0:09	0:36	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	55,56
66	2017/07/12	13:51:00	13:55:00	14:06:00	14:24:00	1:44	0:04	0:33	A	2	4	Other	Open Flames	Tree	Yes	P1	3,0	28,85
67	2017/07/12	13:51:00	13:55:00	14:06:00	14:24:00	0:18	0:04	0:33	C	2	5	Other	Open Flames	Grass	Yes	P1	4,0	222,22
68	2017/07/12	14:13:00	14:30:00	14:44:00	15:06:00	0:22	0:17	0:53	B	3	5	Other	Open Flames	Grass	Yes	P1	1,0	45,45
69	2017/07/12	15:04:00	15:06:00	15:22:00	16:49:00	1:05	0:02	1:45	B	3	5	Other	Open Flames	Grass	Yes	P1	1,0	15,38
70	2017/07/12	17:14:00	17:17:00	17:25:00	17:54:00	0:15	0:03	0:40	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	133,33
71	2017/07/12	19:06:00	19:09:00	19:18:00	19:44:00	0:17	0:03	0:38	E	2	4	Other	Open Flames	Grass	Yes	P1	3,0	176,47
72	2017/07/12	22:43:00	22:47:00	22:49:00	23:06:00	0:03	0:04	0:23	C	2	4	Other	Open Flames	Grass	Yes	P1	2,0	666,67
73	2017/07/13	16:32:00	16:35:00	16:45:00	18:02:00	1:05	0:03	1:30	C	2	4	Other	Open Flames	Grass	Yes	P1	2,0	30,77
74	2017/07/13	12:45:00	12:47:00	13:05:00	14:12:00	0:45	0:02	1:27	C	1	4	Residential	Electrical	Formal	Yes	P1	5,0	111,11
75	2017/07/14	12:24:00	12:24:00	12:38:00	13:39:00	0:54	0:00	1:15	C	2	3	Other	Open Flames	Rubbish	Yes	P1	10,0	185,19
76	2017/07/14	17:54:00	17:58:00	18:04:00	18:50:00	0:36	0:04	0:56	C	2	3	Other	Open Flames	Grass	Yes	P1	1,0	27,78
77	2017/07/14	18:05:00	18:07:00	18:12:00	18:57:00	0:20	0:02	0:52	D	1	1	Other	Open Flames	Grass	Yes	D2	1,0	50,00
78	2017/07/14	19:06:00	19:09:00	19:15:00	19:32:00	0:07	0:03	0:26	B	3	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
79	2017/07/14	19:45:00	19:46:00	19:55:00	20:18:00	0:05	0:01	0:33	C	1	3	Other Services	Special Services	Medical	Yes	WT1	0,0	0,00
80	2017/07/15	01:08:00	01:09:00	01:14:00	01:28:00	0:22	0:01	0:20	C	2	4	Other	Open Flames	Grass	Yes	P1	1,0	45,45
81	2017/07/15	01:44:00	01:47:00	01:55:00	02:48:00	0:43	0:03	1:04	C	2	4	Other	Open Flames	Grass	Yes	P1	3,0	69,77
82	2017/07/15	08:14:00	08:17:00	08:24:00	09:00:00	0:24	0:03	0:46	C	2	2	Other	Open Flames	Grass	Yes	P1	2,0	83,33
83	2017/07/15	12:15:00	12:17:00	12:39:00	13:50:00	0:52	0:02	1:35	B	3	4	Other	Open Flames	Rubbish	Yes	P1	5,0	96,15
84	2017/07/15	14:15:00	14:16:00	14:36:00	16:12:00	1:26	0:01	1:57	D	2	1	Other	Open Flames	Rubbish	Yes	WT2	2,0	23,26
85	2017/07/15	17:45:00	17:47:00	18:16:00	18:44:00	0:11	0:02	0:59	E	1	2	Residential	Arson	Formal	Yes	P1	2,0	181,82
86	2017/07/15	17:46:00	17:47:00	18:06:00	18:59:00	0:24	0:01	1:13	B	1	1	Other	Open Flames	Grass	Yes	WT2	1,0	41,67
87	2017/07/15	22:25:00	22:28:00	22:37:00	22:57:00	0:07	0:03	0:32	C	3	2	Other	Open Flames	Grass	Yes	P1	2,0	285,71
88	2017/07/16	12:45:00	12:47:00	12:56:00	13:18:00	0:07	0:02	0:33	D	1	2	Other	Open Flames	Grass	Yes	P1	2,0	285,71
89	2017/07/16	19:32:00	19:34:00	19:38:00	19:50:00	0:04	0:02	0:18	A	1	3	Other	Open Flames	Tyres	Yes	P1	1,0	250,00
90	2017/07/16	20:24:00	20:27:00	20:31:00	20:45:00	0:12	0:03	0:21	C	1	3	Other	Open Flames	Tyres	Yes	P1	2,0	166,67
91	2017/07/16	20:42:00	20:45:00	20:56:00	21:02:00	0:17	0:03	0:20	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	58,82
92	2017/07/17	05:29:00	05:32:00	05:45:00	06:42:00	0:35	0:03	1:13	C	1	2	Residential	Open Flames	Formal	Yes	P1	4,0	114,29
93	2017/07/17	12:26:00	12:29:00	12:45:00	13:46:00	1:07	0:03	1:20	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	14,93
94	2017/07/18	11:27:00	11:30:00	11:33:00	12:18:00	0:44	0:03	0:51	A	2	3	Other Services	Hazmat	Cleaned Chemical of the road	Yes	P1	1,0	22,73
95	2017/07/18	17:49:00	17:52:00	17:58:00	18:32:00	0:34	0:03	0:43	D	2	4	Other	Open Flames	Rubbish	Yes	P1	3,0	88,24
96	2017/07/18	21:03:00	21:06:00	21:26:00	22:05:00	0:57	0:03	1:02	C	2	4	Other	Open Flames	Grass	Yes	P1	2,0	35,09
97	2017/07/19	11:02:00	11:04:00	12:00:00	12:35:00	1:17	0:02	1:33	C	1	1	Other Services	Special Services	Water Supply	Yes	P3	1,0	12,99
98	2017/07/19	14:40:00	14:43:00	14:53:00	16:00:00	1:00	0:03	1:20	C	2	4	Other	Open Flames	Grass	Yes	P1	3,0	50,00
99	2017/07/19	15:49:00	15:51:00	15:55:00	16:48:00	0:23	0:02	0:59	C	2	4	Other	Undetermined	Caravan	Yes	P3	0,0	0,00
100	2017/07/19	19:38:00	19:41:00	19:46:00	20:48:00	0:37	0:03	1:10	C	1	3	Other	Open Flames	Grass	Yes	P1	5,0	135,14
101	2017/07/20	08:45:00	08:48:00	08:52:00	09:13:00	0:15	0:03	0:28	A	1	2	Other Services	Hazmat	Motorbike MVA	Yes	P1	0,0	0,00
102	2017/07/20	12:40:00	12:40:00	12:54:00	13:11:00	0:01	0:00	0:31	C	1	1	Other	Open Flames	Grass	Yes	D2	0,0	0,00
103	2017/07/20	13:42:00	13:45:00	13:54:00	14:42:00	0:25	0:03	1:00	C	1	2	Other	Open Flames	Rubbish	Yes	D2	1,0	40,00
104	2017/07/20	14:03:00	14:03:00	14:07:00	14:35:00	0:22	0:00	0:32	D	1	3	Other	Open Flames	Grass	Yes	WT1	2,0	90,91
105	2017/07/20	14:54:00	14:55:00	14:58:00	15:23:00	0:12	0:01	0:29	C	1	3	Other	Open Flames	Rubbish	Yes	P3	3,0	250,00

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
106	2017/07/20	16:23:00	16:26:00	16:40:00	17:42:00	0:23	0:03	1:19	E	3	5	Residential	Arson	Formal	Yes	P3	1,0	43,48
107	2017/07/20	17:43:00	17:46:00	17:53:00	18:37:00	0:18	0:03	0:54	A	1	2	Other	Open Flames	Grass	Yes	D2	1,0	55,56
108	2017/07/20	17:49:00	17:51:00	18:00:00	18:47:00	0:56	0:02	0:58	B	2	3	Other	Open Flames	Lucern	Yes	WT2	5,0	89,29
109	2017/07/20	18:47:00	18:50:00	19:08:00	20:04:00	0:41	0:03	1:17	D	1	2	Other	Open Flames	Grass	Yes	D2	2,0	48,78
110	2017/07/20	20:18:00	20:19:00	20:50:00	22:04:00	0:48	0:01	1:46	D	3	5	Other	Open Flames	Grass	Yes	P3	1,0	20,83
111	2017/07/21	03:47:00	03:50:00	04:01:00	04:33:00	0:11	0:03	0:46	C	2	3	Storage	Electric Faults	Corrugated	Yes	P3	2,0	181,82
112	2017/07/21	12:22:00	12:25:00	12:34:00	13:19:00	0:17	0:03	0:57	B	1	3	Other	Open Flames	Grass	Yes	P1	1,0	58,82
113	2017/07/21	13:45:00	13:48:00	14:09:00	15:24:00	0:30	0:03	1:39	C	2	6	Other	Open Flames	Grass	Yes	P1	1,0	33,33
114	2017/07/21	20:02:00	20:05:00	20:18:00	20:48:00	0:32	0:03	0:46	C	2	2	Other	Open Flames	Grass	Yes	P1	1,0	31,25
115	2017/07/22	16:51:00	16:54:00	17:02:00	18:56:00	1:22	0:03	2:05	C	3	5	Other	Open Flames	Grass	Yes	P1	5,0	60,98
116	2017/07/22	19:28:00	19:31:00	19:45:00	20:24:00	0:19	0:03	0:56	C	2	6	Other	Open Flames	Grass	Yes	P1	1,0	52,63
117	2017/07/23	11:30:00	11:33:00	11:41:00	12:29:00	0:49	0:03	0:59	D	2	6	Other	Open Flames	Grass	Yes	P1	2,0	40,82
118	2017/07/23	15:23:00	15:28:00	15:38:00	17:14:00	1:32	0:05	1:51	D	3	5	Other	Open Flames	Grass	Yes	P1	2,0	21,74
119	2017/07/23	20:18:00	20:21:00	20:26:00	21:00:00	0:21	0:03	0:42	C	2	6	Other Services	Rescue	MVA	Yes	P1	0,0	0,00
120	2017/07/24	14:39:00	14:39:00	14:53:00	19:14:00	4:35	0:00	4:35	A	4	5	Other Services	Hazmat	Oil	Yes	P1	0,0	0,00
121	2017/07/24	14:41:00	14:53:00	15:03:00	15:08:00	0:05	0:12	0:27	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
122	2017/07/24	15:02:00	15:22:00	15:41:00	15:51:00	0:10	0:20	0:49	B	1	2	Other	Open Flames	Grass	Yes	P1	3,0	300,00
123	2017/07/24	17:20:00	17:33:00	17:40:00	18:18:00	0:18	0:13	0:58	C	1	2	Other Services	Rescue	Child	Yes	P3	0,0	0,00
124	2017/07/24	20:17:00	20:23:00	20:32:00	20:44:00	0:05	0:06	0:27	D	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
125	2017/07/24	20:33:00	20:34:00	20:39:00	21:12:00	0:13	0:01	0:39	B	3	5	Other Services	Rescue	MVA	Yes	P1	0,0	0,00
126	2017/07/25	05:58:00	06:01:00	06:05:00	06:17:00	0:06	0:03	0:19	B	2	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
127	2017/07/25	14:11:00	14:13:00	14:30:00	15:28:00	0:44	0:02	1:17	C	2	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
128	2017/07/25	15:29:00	15:32:00	16:21:00	16:59:00	0:44	0:03	1:30	C	3	4	Other	Open Flames	Grass	Yes	P1	2,0	45,45
129	2017/07/25	20:40:00	20:43:00	20:50:00	21:29:00	0:27	0:03	0:49	E	2	4	Other	Open Flames	Grass	Yes	P1	2,0	74,07
130	2017/07/26	10:22:00	10:24:00	10:26:00	10:38:00	0:08	0:02	0:16	A	2	4	Other	Open Flames	Tyres	Yes	P1	2,0	250,00
131	2017/07/26	16:42:00	16:43:00	16:53:00	18:07:00	1:05	0:01	1:25	C	2	3	Other	Open Flames	Grass	Yes	P1	3,0	46,15
132	2017/07/26	16:59:00	17:20:00	17:25:00	17:53:00	0:19	0:21	0:54	C	1	2	Other	Open Flames	Rubbish	Yes	P3	2,0	105,26
133	2017/07/27	06:53:00	06:56:00	07:03:00	07:42:00	0:18	0:03	0:49	C	3	6	Residential	Open Flames	Formal	Yes	P1	3,0	166,67
134	2017/07/27	19:18:00	19:21:00	19:24:00	19:32:00	0:06	0:03	0:14	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
135	2017/07/27	20:03:00	20:06:00	20:11:00	20:21:00	0:06	0:03	0:18	D	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
136	2017/07/28	14:45:00	14:48:00	14:58:00	15:36:00	0:33	0:03	0:51	D	2	6	Other	Open Flames	Grass	Yes	P3	2,0	60,61
137	2017/07/28	15:36:00	15:36:00	15:45:00	16:08:00	0:23	0:00	0:32	E	1	3	Other Services	Special Services	Water Supply	Yes	WT2	3,0	130,43
138	2017/07/28	16:28:00	16:32:00	16:35:00	17:05:00	0:07	0:04	0:37	C	1	3	Other	Open Flames	Grass	Yes	P3	1,0	142,86
139	2017/07/28	16:39:00	16:39:00	16:39:00	17:25:00	0:29	0:00	0:46	C	1	3	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
140	2017/07/28	19:04:00	19:06:00	19:11:00	19:47:00	0:10	0:02	0:43	C	1	3	Residential	Undetermined	Informal	Yes	P3	2,0	200,00
141	2017/07/29	00:25:00	00:28:00	00:43:00	02:00:00	0:59	0:03	1:35	C	2	6	Other	Open Flames	Rubbish	Yes	WT2	13,0	220,34
142	2017/07/29	04:49:00	04:52:00	04:56:00	05:45:00	0:43	0:03	0:56	C	1	2	Other	Open Flames	Rubbish	Yes	WT2	10,0	232,56
143	2017/07/29	05:52:00	05:54:00	06:11:00	06:36:00	0:10	0:02	0:44	C	1	3	Other	Open Flames	Rubbish	Yes	P3	3,0	300,00
144	2017/07/29	16:14:00	16:19:00	16:23:00	16:40:00	0:08	0:05	0:26	C	1	3	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
145	2017/07/29	18:39:00	18:48:00	18:58:00	19:28:00	0:20	0:09	0:49	C	1	1	Other Services	Special Services	Water Supply	Yes	WT2	3,0	150,00
146	2017/07/29	22:38:00	22:40:00	22:46:00	23:20:00	0:28	0:02	0:42	A	1	3	Other	Open Flames	Rubbish	Yes	WT2	3,0	107,14
147	2017/07/30	06:16:00	06:19:00	06:33:00	06:52:00	0:15	0:03	0:36	C	1	2	Other	Open Flames	Rubbish	Yes	WT2	1,0	66,67
148	2017/07/30	12:06:00	12:07:00	12:19:00	12:57:00	0:30	0:01	0:51	C	2	4	Other	Open Flames	Rubbish	Yes	WT2	0,0	0,00
149	2017/07/30	18:10:00	18:11:00	18:20:00	18:32:00	0:12	0:01	0:22	C	1	4	Other	Open Flames	Grass	Yes	WT1	1,0	83,33
150	2017/07/31	01:26:00	01:26:00	01:29:00	02:55:00	0:16	0:00	1:29	C	2	6	Residential	Open Flames	Informal	Yes	P3	3,0	187,50
151	2017/07/31	12:00:00	12:03:00	12:19:00	13:10:00	0:39	0:03	1:10	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	51,28
152	2017/07/31	13:45:00	13:51:00	14:11:00	14:45:00	0:37	0:06	1:00	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	27,03
153	2017/07/31	16:19:00	16:22:00	16:31:00	17:24:00	0:38	0:03	1:05	B	1	3	Other	Open Flames	Grass	Yes	WT2	2,0	52,63
154	2017/07/31	16:23:00	16:26:00	16:40:00	17:41:00	0:33	0:03	1:18	C	1	3	Residential	Open Flames	Informal	Yes	P1	2,0	60,61
155	2017/07/31	18:39:00	18:42:00	18:56:00	19:47:00	0:38	0:03	1:08	E	1	3	Residential	Open Flames	Informal	Yes	P1	3,0	78,95
156	2017/08/01	16:15:00	16:16:00	16:28:00	17:21:00	0:48	0:01	1:06	C	2	2	Other	Open Flames	Rubbish	Yes	P1	2,0	41,67
157	2017/08/02	12:21:00	12:24:00	12:35:00	14:17:00	1:28	0:03	1:56	C	2	5	Other	Open Flames	Grass	Yes	P1	2,0	22,73
158	2017/08/02	18:07:00	18:08:00	18:10:00	18:34:00	0:18	0:01	0:27	C	1	2	Residential	Open Flames	Informal	Yes	WT1	1,0	55,56

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
159	2017/08/02	20:16:00	20:18:00	20:29:00	20:57:00	0:31	0:02	0:41	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	32,26
160	2017/08/03	08:02:00	08:02:00	08:11:00	09:23:00	1:02	0:00	1:21	C	2	5	Commercial	Open Flames	Train Station Building	Yes	P1	12,0	193,55
161	2017/08/03	10:36:00	10:37:00	10:43:00	10:58:00	0:11	0:01	0:22	A	1	2	Other	Open Flames	Rubbish	Yes	P1	3,0	272,73
162	2017/08/03	11:24:00	11:24:00	11:35:00	12:27:00	1:03	0:00	1:03	C	1	3	Other Services	Special Services	SAPS	Yes	WT1	3,0	47,62
163	2017/08/04	02:57:00	03:00:00	03:02:00	03:58:00	0:24	0:03	1:01	A	2	2	Public Assembly	Open Flames	Church Door	Yes	P1	1,0	41,67
164	2017/08/04	06:24:00	06:27:00	06:33:00	06:49:00	0:22	0:03	0:25	B	1	1	Other	Open Flames	Grass	Yes	P1	0,0	0,00
165	2017/08/04	11:08:00	11:11:00	11:19:00	11:48:00	0:20	0:03	0:40	C	1	3	Other	Open Flames	Rubbish	Yes	P1	0,0	0,00
166	2017/08/04	16:07:00	16:10:00	16:34:00	18:09:00	1:02	0:03	2:02	C	1	5	Other	Open Flames	Grass	Yes	WT2	1,0	16,13
167	2017/08/04	16:16:00	16:17:00	16:46:00	18:10:00	1:54	0:01	1:54	D	1	3	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
168	2017/08/04	19:04:00	19:05:00	19:12:00	20:04:00	0:21	0:01	1:00	E	1	3	Residential	Arson	Informal	Yes	P1	3,0	142,86
169	2017/08/04	21:28:00	21:31:00	21:41:00	23:52:00	1:49	0:03	2:24	D	3	7	Other Services	Rescues	MVA	Yes	P1	3,0	27,52
170	2017/08/05	22:22:00	22:25:00	22:31:00	23:15:00	0:43	0:03	0:53	D	1	3	Other	Open Flames	Grass	Yes	P1	1,0	23,26
171	2017/08/06	12:51:00	12:54:00	13:04:00	13:43:00	0:49	0:03	0:52	D	1	3	Other	Open Flames	Grass	Yes	P1	2,0	40,82
172	2017/08/06	14:42:00	14:45:00	14:53:00	15:45:00	0:32	0:03	1:03	C	1	3	Commercial	Open Flames	Supermarket	Yes	P1	5,0	156,25
173	2017/08/06	15:12:00	15:15:00	15:57:00	18:30:00	1:15	0:03	3:18	C	2	7	Other	Open Flames	Grass	Yes	P1	3,0	40,00
174	2017/08/06	16:08:00	16:08:00	16:17:00	18:11:00	1:45	0:00	2:03	C	2	2	Other	Open Flames	Grass	Yes	WT1	1,0	9,52
175	2017/08/06	22:44:00	22:45:00	22:55:00	00:11:00	1:09	0:01	1:27	C	1	3	Residential	Arson	Informal	Yes	WT2	2,0	28,99
176	2017/08/07	03:33:00	03:36:00	03:45:00	04:35:00	0:47	0:03	1:02	C	1	3	Other Services	Special Services	Medical	Yes	P1	0,0	0,00
177	2017/08/07	13:55:00	13:57:00	14:05:00	14:39:00	0:37	0:02	0:44	C	3	4	Residential	Electrical Faults	Formal	Yes	P1	3,0	81,08
178	2017/08/07	19:20:00	19:22:00	19:34:00	19:53:00	0:11	0:02	0:33	B	3	5	Other	Open Flames	Grass	Yes	P1	2,0	181,82
179	2017/08/07	08:58:00	09:01:00	09:10:00	09:44:00	0:21	0:03	0:46	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	47,62
180	2017/08/07	12:57:00	12:59:00	13:08:00	19:04:00	5:20	0:02	6:07	D	3	6	Other	Open Flames	Grass	Yes	P1	20,0	62,50
181	2017/08/09	08:53:00	08:53:00	09:00:00	12:49:00	3:57	0:00	3:56	A	2	3	Other Services	Special Services	Defrosting O2 Condensator	Yes	WT1	200,0	843,88
182	2017/08/09	13:14:00	13:18:00	13:33:00	13:47:00	0:11	0:04	0:33	C	2	5	Other	Open Flames	Grass	Yes	P1	1,0	90,91
183	2017/08/09	14:41:00	14:41:00	14:43:00	15:18:00	0:24	0:00	0:37	C	1	2	Other	Open Flames	Grass	Yes	WT1	1,0	41,67
184	2017/08/09	20:05:00	20:06:00	20:14:00	20:35:00	0:15	0:01	0:30	C	2	2	Other	Open Flames	Rubbish	Yes	P1	2,0	133,33
185	2017/08/10	05:35:00	05:36:00	05:40:00	06:19:00	0:35	0:01	0:44	C	2	2	Residential	Arson	Formal	Yes	P3	2,0	57,14
186	2017/08/10	14:59:00	15:02:00	15:13:00	16:58:00	1:54	0:03	1:59	C	4	6	Other	Open Flames	Grass	Yes	P1	3,0	26,32
187	2017/08/10	17:02:00	17:02:00	17:28:00	18:00:00	0:15	0:00	0:58	C	1	3	Other	Open Flames	Grass	Yes	WT1	1,0	66,67
188	2017/08/11	19:24:00	19:24:00	19:26:00	19:47:00	0:02	0:00	0:23	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	500,00
189	2017/08/11	22:39:00	22:30:00	22:36:00	23:36:00	0:39	3:00	0:57	C	2	3	Other	Open Flames	Grass	Yes	P1	1,0	25,64
190	2017/08/12	09:56:00	09:59:00	10:06:00	10:25:00	0:09	0:03	0:29	C	2	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
191	2017/08/12	11:14:00	11:18:00	11:21:00	11:51:00	0:12	0:04	0:37	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	83,33
192	2017/08/12	14:09:00	14:14:00	14:23:00	14:55:00	0:04	0:05	0:46	B	1	2	Other	Open Flames	Rubbish	Yes	P3	0,0	0,00
193	2017/08/12	14:12:00	14:13:00	14:19:00	14:31:00	0:05	0:01	0:19	C	1	1	Other	Open Flames	Rubbish	Yes	P1	1,0	200,00
194	2017/08/12	16:01:00	16:03:00	16:14:00	16:52:00	0:19	0:02	0:51	E	2	3	Residential	Arson	Formal	Yes	P1	2,0	105,26
195	2017/08/12	17:42:00	17:44:00	17:58:00	19:02:00	0:44	0:02	1:20	C	2	4	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
196	2017/08/13	16:13:00	16:16:00	16:24:00	16:57:00	0:22	0:03	0:44	B	2	2	Other	Open Flames	Grass	Yes	P1	1,0	45,45
197	2017/08/14	07:06:00	07:08:00	07:14:00	07:22:00	0:06	0:02	0:16	A	1	1	Other	Open Flames	Rubbish	Yes	P1	1,0	166,67
198	2017/08/14	16:46:00	16:48:00	16:58:00	17:30:00	0:14	0:02	0:44	D	2	2	Other	Open Flames	Grass	Yes	P1	1,0	71,43
199	2017/08/14	17:09:00	17:10:00	17:28:00	18:14:00	0:55	0:01	1:05	D	3	6	Other	Open Flames	Tree	Yes	P1	1,0	18,18
200	2017/08/15	10:15:00	10:17:00	10:25:00	11:33:00	0:21	0:02	1:18	E	1	3	Residential	Open Flames	Formal	Yes	P3	2,0	95,24
201	2017/08/15	10:35:00	10:36:00	10:48:00	12:22:00	1:15	0:01	1:47	C	3	2	Other	Open Flames	Grass	Yes	P1	3,0	40,00
202	2017/08/15	20:27:00	20:27:00	20:44:00	21:40:00	1:11	0:00	1:13	B	3	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
203	2017/08/16	09:24:00	09:26:00	09:34:00	10:11:00	0:47	0:02	0:47	E	2	5	Residential	Open Flames	Informal	Yes	P3	1,0	21,28
204	2017/08/16	13:00:00	13:02:00	13:06:00	13:46:00	0:39	0:02	0:46	A	2	4	Commercial	Open Flames	Supermarket	Yes	P1	0,0	0,00
205	2017/08/16	13:07:00	13:07:00	13:21:00	14:22:00	1:07	0:00	1:15	C	1	0	Other	Open Flames	Grass	Yes	D2	1,0	14,93
206	2017/08/16	13:55:00	13:56:00	14:08:00	16:12:00	2:02	0:01	2:17	C	1	5	Other	Open Flames	Grass	Yes	P3	2,0	16,39
207	2017/08/16	14:43:00	14:46:00	14:55:00	15:50:00	0:24	0:03	1:07	C	1	3	Residential	Arson	Informal	Yes	P1	2,0	83,33
208	2017/08/16	17:39:00	17:41:00	17:47:00	18:20:00	0:30	0:02	0:41	D	1	3	Other	Open Flames	Grass	Yes	P1	1,0	33,33
209	2017/08/18	13:38:00	13:38:00	13:50:00	14:54:00	0:32	0:00	1:16	C	1	2	Other Services	Special Services	Water Supply	Yes	P3	3,0	93,75
210	2017/08/18	17:01:00	17:04:00	17:11:00	18:11:00	1:03	0:03	1:10	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	31,75

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
211	2017/08/18	22:45:00	22:48:00	22:52:00	23:26:00	0:33	0:03	0:41	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	30,30
212	2017/08/19	15:50:00	15:53:00	16:38:00	16:43:00	1:16	0:03	0:53	C	1	2	Other	Open Flames	Grass	Yes	P1	5,0	65,79
213	2017/08/19	20:27:00	20:29:00	20:39:00	21:30:00	0:40	0:02	1:03	C	1	3	Residential	Electrical Faults	Formal	Yes	P1	1,0	25,00
214	2017/08/19	23:45:00	23:48:00	00:24:00	00:47:00	0:43	0:03	1:02	D	1	3	Other	Electrical Faults	Lamp Post	Yes	WT2	1,0	23,26
215	2017/08/20	09:01:00	09:04:00	09:18:00	11:09:00	1:34	0:03	2:08	D	2	5	Storage	Oher	Store Room	Yes	P1	11,0	117,02
216	2017/08/21	15:42:00	15:44:00	15:50:00	17:06:00	1:10	0:02	1:24	C	1	3	Other	Open Flames	Grass	Yes	P1	5,0	71,43
217	2017/08/21	02:56:00	02:58:00	03:18:00	03:37:00	0:30	0:02	0:41	C	1	2	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
218	2017/08/22	14:21:00	14:22:00	14:39:00	15:34:00	0:48	0:01	1:13	D	1	3	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
219	2017/08/22	17:17:00	17:17:00	17:23:00	18:07:00	0:44	0:00	0:50	C	1	4	Other	Open Flames	Grass	Yes	P3	2,0	45,45
220	2017/08/23	08:58:00	08:58:00	09:18:00	10:15:00	1:17	0:00	1:17	D	1	1	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
221	2017/08/24	05:29:00	05:29:00	05:33:00	08:00:00	2:11	0:00	2:31	D	1	1	Other Services	Hazmat	Explosives	Yes	WT1	0,0	0,00
222	2017/08/24	11:28:00	11:30:00	11:46:00	13:02:00	0:57	0:02	1:34	C	3	6	Commercial	Open Flames	Site Office	Yes	P3	8,0	140,35
223	2017/08/24	13:02:00	13:02:00	13:29:00	14:57:00	0:56	0:00	1:55	D	3	5	Other	Open Flames	Veld Fire	Yes	P3	2,0	35,71
224	2017/08/24	19:43:00	19:45:00	19:54:00	20:33:00	0:16	0:02	0:50	C	2	5	Other	Open Flames	Veld Fire	Yes	P1	1,0	62,50
225	2017/08/24	23:24:00	23:28:00	23:33:00	00:59:00	1:00	0:04	1:35	E	2	5	Residential	Arson	Informal	Yes	P3	5,0	83,33
226	2017/08/27	12:24:00	12:25:00	12:36:00	13:15:00	0:13	0:01	0:51	E	2	4	Residential	Open Flames	Formal	Yes	P3	2,0	153,85
227	2017/08/27	14:04:00	14:06:00	14:10:00	14:30:00	0:04	0:02	0:26	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	250,00
228	2017/08/28	15:04:00	15:10:00	15:50:00	17:22:00	1:05	0:06	2:18	D	1	1	Other	Open Flames	Veld Fire	Yes	D2	1,0	15,38
229	2017/08/28	15:25:00	15:28:00	15:32:00	15:44:00	0:05	0:03	0:19	C	1	4	Other	Open Flames	Veld Fire	Yes	P1	1,0	200,00
230	2017/08/29	07:11:00	07:12:00	07:25:00	08:03:00	0:37	0:01	0:52	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	27,03
231	2017/08/29	14:38:00	14:38:00	15:21:00	18:00:00	3:22	0:00	3:22	A	1	1	Other Services	Special Services	Water Supply	Yes	WT2	20,0	99,01
232	2017/08/30	07:21:00	07:24:00	07:35:00	07:52:00	0:02	0:03	0:31	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	500,00
233	2017/08/30	08:40:00	08:43:00	08:49:00	09:26:00	0:13	0:03	0:46	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	76,92
234	2017/08/30	17:26:00	17:49:00	18:03:00	18:20:00	0:22	0:23	0:54	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	45,45
235	2017/08/30	18:42:00	18:45:00	18:56:00	19:52:00	1:00	0:03	1:10	C	1	3	Other	Open Flames	Grass	Yes	P1	5,0	83,33
236	2017/08/31	13:52:00	13:55:00	14:11:00	15:08:00	0:45	0:03	1:16	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	22,22
237	2017/08/31	13:59:00	14:11:00	14:16:00	14:56:00	0:18	0:12	0:57	A	1	2	Other	Open Flames	Rubbish	Yes	P3	2,0	111,11
238	2017/08/31	14:56:00	14:56:00	15:09:00	15:55:00	0:27	0:00	0:59	C	1	2	Other Services	Special Services	Water Supply	Yes	P3	2,5	92,59
239	2017/08/31	19:04:00	19:08:00	19:15:00	19:48:00	0:22	0:04	0:44	C	2	3	Other	Open Flames	Grass	Yes	P3	1,0	45,45
240	2017/09/01	12:18:00	12:20:00	12:25:00	13:15:00	0:45	0:02	0:57	C	2	6	Residential	Arson	Formal	Yes	P1	5,0	111,11
241	2017/09/02	12:33:00	12:35:00	12:36:00	13:30:00	0:38	0:02	0:57	C	1	3	Residential	Open Flames	Informal	Yes	P1	2,0	52,63
242	2017/09/02	09:35:00	09:49:00	10:04:00	11:30:00	1:23	0:14	1:55	D	2	1	Other	Open Flames	Grass	Yes	WT1	1,0	12,05
243	2017/09/02	13:30:00	13:33:00	13:48:00	14:14:00	0:36	0:03	0:44	C	1	3	Other	Open Flames	Grass	Yes	WT1	2,0	55,56
244	2017/09/02	16:30:00	16:30:00	16:55:00	18:30:00	1:30	0:00	2:00	C	2	5	Other	Open Flames	Grass	Yes	WT2	1,0	11,11
245	2017/09/02	18:33:00	18:34:00	18:47:00	19:32:00	0:40	0:01	0:59	C	1	3	Residential	Arson	Informal	Yes	P1	1,0	25,00
246	2017/09/02	18:46:00	18:54:00	19:07:00	20:00:00	0:49	0:08	1:14	C	1	2	Other	Electrical Faults	Powerstation	Yes	WT2	0,0	0,00
247	2017/09/03	14:37:00	14:40:00	15:07:00	16:02:00	1:12	0:03	1:25	C	1	2	Other	Open Flames	Grass	Yes	P1	2,0	27,78
248	2017/09/03	19:50:00	19:51:00	20:06:00	20:25:00	0:32	0:01	0:35	C	1	3	Other	Open Flames	Grass	Yes	WT2	1,0	31,25
249	2017/09/04	14:57:00	14:58:00	15:18:00	19:25:00	4:07	0:01	4:28	D	1	2	Residential	Undetermined	Farm	Yes	WT1	5,0	20,24
250	2017/09/04	16:35:00	16:37:00	16:45:00	17:20:00	0:14	0:02	0:45	C	1	2	Other	Open Flames	Grass	Yes	P1	2,0	142,86
251	2017/09/05	17:51:00	17:54:00	18:14:00	18:45:00	0:38	0:03	0:54	C	1	2	Other Services	Special Services	Water Supply	Yes	WT2	3,0	78,95
252	2017/09/05	18:36:00	18:38:00	19:04:00	20:04:00	1:00	0:02	1:28	C	1	4	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
253	2017/09/05	20:47:00	20:50:00	20:58:00	23:00:00	1:45	0:03	2:13	B	3	5	Other	Open Flames	Grass	Yes	P1	1,0	9,52
254	2017/09/06	05:58:00	06:01:00	06:14:00	06:32:00	0:25	0:03	0:34	C	1	3	Residential	Undetermined	Informal	Yes	WT1	2,0	80,00
255	2017/09/06	13:17:00	13:19:00	13:28:00	13:59:00	0:21	0:02	0:42	E	1	3	Residential	Open Flames	Formal	Yes	P1	3,0	142,86
256	2017/09/06	17:49:00	17:52:00	17:55:00	18:22:00	0:24	0:03	0:33	A	1	2	Other Services	Hazmat	Diesel Spillage	Yes	P1	0,0	0,00
257	2017/09/06	18:25:00	18:28:00	18:35:00	19:15:00	0:25	0:03	0:50	D	2	2	Other	Open Flames	Grass	Yes	P3	3,0	120,00
258	2017/09/07	13:17:00	13:19:00	13:34:00	14:57:00	1:00	0:02	1:40	B	1	3	Other	Open Flames	Grass	Yes	P1	5,0	83,33
259	2017/09/07	16:21:00	16:24:00	16:45:00	19:05:00	2:06	0:03	2:44	C	3	8	Other	Open Flames	Grass	Yes	WT2	5,0	39,68
260	2017/09/08	10:04:00	10:06:00	10:21:00	11:35:00	0:42	0:02	1:31	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	47,62
261	2017/09/09	11:12:00	11:13:00	11:30:00	12:22:00	0:41	0:01	1:10	D	3	4	Other	Open Flames	Grass	Yes	P1	3,0	73,17
262	2017/09/09	14:26:00	14:27:00	14:31:00	14:57:00	0:01	0:01	0:31	D	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
263	2017/09/09	15:25:00	15:27:00	15:58:00	17:33:00	1:00	0:02	2:08	D	2	2	Other	Open Flames	Grass	Yes	P1	1,0	16,67

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
264	2017/09/09	22:37:00	22:39:00	22:56:00	23:40:00	0:14	0:02	1:03	E	1	2	Residential	Open Flames	Formal	Yes	P3	2,0	142,86
265	2017/09/10	10:43:00	10:46:00	10:48:00	11:05:00	0:11	0:03	0:22	C	2	2	Other	Open Flames	Grass	Yes	P3	1,0	90,91
266	2017/09/10	15:04:00	15:07:00	15:17:00	16:44:00	1:03	0:03	1:40	D	2	2	Other	Open Flames	Grass	Yes	P3	3,0	47,62
267	2017/09/10	23:23:00	23:26:00	23:39:00	00:15:00	0:21	0:03	0:58	D	1	3	Other	Open Flames	Grass	Yes	P3	2,0	95,24
268	2017/09/11	03:32:00	03:34:00	03:39:00	04:20:00	0:31	0:02	0:48	C	1	3	Other	Open Flames	Grass	Yes	P1	3,0	96,77
269	2017/09/11	14:50:00	14:51:00	15:04:00	16:20:00	1:00	0:01	1:30	D	1	3	Other	Open Flames	Grass	Yes	P1	2,0	33,33
270	2017/09/11	18:12:00	18:14:00	18:18:00	18:43:00	0:16	0:02	0:31	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	125,00
271	2017/09/11	18:43:00	18:43:00	18:44:00	19:17:00	0:34	0:00	0:34	C	1	2	Other	Open Flames	Grass	Yes	P1	2,0	58,82
272	2017/09/11	20:20:00	20:23:00	20:33:00	21:46:00	1:01	0:03	1:26	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	32,79
273	2017/09/12	05:00:00	05:03:00	05:27:00	06:30:00	0:46	0:03	1:30	D	2	4	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
274	2017/09/12	08:55:00	08:56:00	09:14:00	11:57:00	3:01	0:01	3:02	C	2	3	Other	Open Flames	Grass	Yes	P1	20,0	110,50
275	2017/09/12	11:51:00	12:00:00	12:13:00	17:07:00	5:01	0:09	5:16	D	4	6	Other	Open Flames	Grass	Yes	P1	10,0	33,22
276	2017/09/12	12:28:00	12:35:00	12:56:00	13:41:00	0:45	0:07	1:13	C	1	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
277	2017/09/12	14:01:00	14:02:00	14:05:00	14:49:00	0:44	0:01	0:48	C	1	3	Other	Open Flames	Grass	Yes	P1	3,0	68,18
278	2017/09/12	14:50:00	15:10:00	15:16:00	15:39:00	0:23	0:20	0:49	C	1	0	Other	Open Flames	Grass	Yes	D2	1,0	43,48
279	2017/09/12	17:57:00	18:01:00	18:06:00	18:35:00	0:29	0:04	0:38	C	1	1	Other	Open Flames	Grass	Yes	D2	1,0	34,48
280	2017/09/12	19:05:00	19:10:00	19:21:00	19:31:00	0:07	0:05	0:26	E	1	1	Other	Open Flames	Grass	Yes	D2	0,0	0,00
281	2017/09/12	22:22:00	22:26:00	22:36:00	23:01:00	0:20	0:04	0:39	B	2	3	Other Services	Rescues	-	Yes	D2	0,0	0,00
282	2017/09/13	09:28:00	09:31:00	09:40:00	10:50:00	1:18	0:03	1:22	C	2	3	Other	Open Flames	Grass	Yes	P1	3,0	38,46
283	2017/09/13	09:43:00	10:49:00	11:54:00	16:43:00	5:37	1:06	7:00	D	3	8	Other	Open Flames	Grass	Yes	P1	30,0	89,02
284	2017/09/13	10:52:00	10:53:00	11:15:00	11:40:00	0:37	0:01	0:48	B	2	3	Other	Open Flames	Grass	Yes	P1	2,0	54,05
285	2017/09/13	14:38:00	14:48:00	15:09:00	16:09:00	0:53	0:10	1:31	C	1	2	Other	Open Flames	Grass	Yes	P1	2,0	37,74
286	2017/09/13	15:40:00	17:19:00	18:00:00	20:53:00	3:00	1:39	5:13	D	1	0	Other	Open Flames	Grass	Yes	Tractor	0,0	0,00
287	2017/09/13	15:48:00	15:49:00	15:54:00	16:30:00	0:33	0:01	0:42	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	30,30
288	2017/09/13	19:06:00	19:08:00	19:14:00	19:48:00	0:26	0:02	0:42	C	1	2	Institutional	Arson	Room	Yes	P3	0,0	0,00
289	2017/09/14	08:59:00	09:02:00	09:10:00	09:52:00	0:15	0:03	0:53	C	2	5	Residential	Electrical Faults	Formal	Yes	P3	2,0	133,33
290	2017/09/14	09:34:00	09:36:00	09:47:00	13:42:00	4:06	0:02	4:08	C	2	3	Other	Open Flames	Grass	Yes	D2	2,0	8,13
291	2017/09/14	15:03:00	15:21:00	15:30:00	19:03:00	3:42	0:18	4:00	D	4	3	Other	Open Flames	Grass	Yes	D2	10,0	45,05
292	2017/09/14	15:12:00	15:16:00	15:27:00	16:22:00	1:06	0:04	1:10	B	1	0	Other	Open Flames	Grass	Yes	WT2	1,0	15,15
293	2017/09/14	15:23:00	15:26:00	15:31:00	16:24:00	0:33	0:03	1:01	C	1	3	Other	Open Flames	Grass	Yes	D2	1,0	30,30
294	2017/09/14	19:18:00	19:31:00	20:03:00	21:17:00	1:40	0:13	1:59	B	1	3	Industry	Welding	Acetelane Set	Yes	P3	1,0	10,00
295	2017/09/14	20:46:00	20:48:00	20:53:00	21:03:00	0:07	0:02	0:17	C	1	3	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
296	2017/09/14	22:22:00	22:26:00	22:32:00	22:43:00	0:04	0:04	0:21	D	1	3	Other	Open Flames	Grass	Yes	P3	1,0	250,00
297	2017/09/15	15:58:00	15:59:00	15:59:00	16:05:00	0:07	0:01	0:07	C	1	0	Other	Open Flames	Grass	Yes	P1	0,0	0,00
298	2017/09/15	19:19:00	19:23:00	19:35:00	20:23:00	0:25	0:04	1:04	D	1	3	Other	Open Flames	Grass	Yes	P3	0,0	0,00
299	2017/09/15	21:32:00	21:33:00	21:44:00	02:09:00	3:00	0:01	4:37	D	1	2	Other	Arson	Cotton Wool	Yes	WT1	1,0	5,56
300	2017/09/16	17:40:00	17:46:00	17:48:00	20:10:00	1:40	0:06	2:30	D	1	3	Other Services	Rescues		Yes	WT1	0,0	0,00
301	2017/09/16	23:10:00	23:13:00	23:20:00	23:59:00	0:19	0:03	0:49	C	1	3	Residential	Open Flames	Informal	Yes	P3	2,0	105,26
302	2017/09/17	06:47:00	06:50:00	06:57:00	07:52:00	0:37	0:03	1:05	D	3	6	Storage	Cooking	Feed Storage	Yes	P3	3,0	81,08
303	2017/09/17	20:07:00	20:10:00	20:20:00	20:57:00	0:20	0:03	0:50	C	2	4	Other	Open Flames	Grass	Yes	P3	2,0	100,00
304	2017/09/18	06:59:00	07:02:00	07:08:00	07:26:00	0:11	0:03	0:27	A	1	2	Other	Open Flames	Rubbish	Yes	P3	2,0	181,82
305	2017/09/18	11:30:00	11:32:00	11:36:00	11:49:00	0:06	0:02	0:19	A	1	3	Other	Open Flames	Rubbish	Yes	P3	1,0	166,67
306	2017/09/18	11:58:00	11:58:00	12:12:00	12:42:00	0:16	0:00	0:44	E	1	2	Other	Open Flames	Rubbish	Yes	P3	3,0	187,50
307	2017/09/19	07:05:00	07:09:00	07:13:00	07:26:00	0:06	0:04	0:21	A	1	3	Other	Open Flames	Rubbish	Yes	P3	2,0	333,33
308	2017/09/20	15:20:00	15:27:00	15:38:00	19:06:00	3:39	0:07	3:46	D	2	1	Other	Open Flames	Grass	Yes	P3	1,0	4,57
309	2017/09/20	17:26:00	17:29:00	17:35:00	17:44:00	0:04	0:03	0:18	A	1	3	Other	Open Flames	Rubbish	Yes	WT2	1,0	250,00
310	2017/09/20	18:40:00	19:57:00	20:15:00	21:03:00	0:20	1:17	2:23	E	1	2	Other Services	Special Services	Water Supply	Yes	WT2	10,0	500,00
311	2017/09/20	18:55:00	18:55:00	19:08:00	19:30:00	0:14	0:00	0:35	C	1	2	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
312	2017/09/21	08:22:00	08:38:00	08:47:00	09:10:00	0:19	0:16	0:48	A	1	3	Other	Open Flames	Rubbish	Yes	P3	1,0	52,63
313	2017/09/21	13:35:00	15:43:00	16:15:00	22:30:00	6:23	2:08	8:55	D	5	6	Other	Open Flames	Rubbish	Yes	WT1	35,0	91,38
314	2017/09/22	03:46:00	03:49:00	03:56:00	05:10:00	1:00	0:03	1:24	C	2	6	Residential	Arson	Formal	Yes	P3	7,0	116,67
315	2017/09/22	04:58:00	05:08:00	05:34:00	08:00:00	2:00	0:10	3:02	D	4	5	Other	Open Flames	Grass	Yes	D2	4,0	33,33
316	2017/09/22	13:38:00	13:40:00	13:53:00	16:24:00	2:13	0:02	2:46	D	3	3	Other	Open Flames	Grass	Yes	D2	10,0	75,19

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
317	2017/09/22	17:10:00	17:13:00	17:34:00	18:57:00	1:23	0:03	1:47	D	2	3	Other	Open Flames	Grass	Yes	WT1	1,0	12,05
318	2017/09/23	00:43:00	00:45:00	00:49:00	01:38:00	0:46	0:02	0:55	C	2	4	Residential	Open Flames	Formal	Yes	P2	5,0	108,70
319	2017/09/24	19:19:00	19:19:00	19:21:00	19:40:00	0:11	0:00	0:21	E	2	4	Residential	Open Flames	Formal	Yes	P3	3,0	272,73
320	2017/09/24	19:41:00	19:41:00	19:47:00	20:31:00	0:11	0:00	0:50	C	2	4	Commercial	Open Flames	Tuck Shop	Yes	P3	2,0	181,82
321	2017/09/25	05:49:00	05:53:00	06:00:00	06:22:00	0:08	0:04	0:33	C	1	3	Other	Open Flames	Grass	Yes	P2	1,0	125,00
322	2017/09/25	10:24:00	10:31:00	10:43:00	12:45:00	2:14	0:07	2:21	C	4	6	Other	Open Flames	Grass	Yes	P2	5,0	37,31
323	2017/09/25	13:35:00	13:37:00	13:45:00	14:49:00	0:55	0:02	1:14	C	1	4	Other Services	Special Services	Water Supply	Yes	P3	2,0	36,36
324	2017/09/26	18:44:00	18:48:00	18:53:00	19:19:00	0:25	0:04	0:35	C	1	2	Other	Open Flames	Grass	Yes	P2	2,0	80,00
325	2017/09/26	20:09:00	20:13:00	20:20:00	20:28:00	0:12	0:04	0:19	C	1	2	Other	Open Flames	Grass	Yes	P2	0,0	0,00
326	2017/09/26	21:44:00	21:48:00	22:15:00	02:00:00	2:56	0:04	4:16	D	1	2	Transport	Other	Truckfire	Yes	WT1	3,0	17,05
327	2017/09/27	07:20:00	07:25:00	07:34:00	08:33:00	0:41	0:05	1:13	B	2	2	Other	Open Flames	Tyres	Yes	D6	2,0	48,78
328	2017/09/27	07:40:00	07:43:00	07:55:00	08:09:00	0:10	0:03	0:29	B	1	1	Other	Open Flames	Tyres	Yes	P2	1,0	100,00
329	2017/09/27	08:29:00	08:32:00	08:41:00	09:56:00	0:42	0:03	1:27	C	1	1	Other	Open Flames	Tyres	Yes	P2	1,0	23,81
330	2017/09/27	09:36:00	09:39:00	10:00:00	10:45:00	1:09	0:03	1:09	C	1	1	Other	Open Flames	Rubbish	Yes	WT1	2,0	28,99
331	2017/09/27	12:35:00	12:38:00	12:45:00	14:06:00	0:10	0:03	1:31	C	2	2	Other	Open Flames	Grass	Yes	P3	1,0	100,00
332	2017/09/27	15:38:00	15:40:00	15:49:00	17:03:00	0:53	0:02	1:25	E	1	4	Residential	Undetermined	Informal	Yes	WT2	2,0	37,74
333	2017/09/27	06:20:00	06:23:00	06:45:00	07:18:00	0:31	0:03	0:58	B	1	2	Other	Open Flames	Tyres	Yes	P3	2,0	64,52
334	2017/09/28	08:03:00	08:05:00	08:25:00	08:31:00	0:01	0:02	0:28	D	1	1	Other	Open Flames	Grass	Yes	P2	1,0	1000,00
335	2017/09/28	10:15:00	10:17:00	10:33:00	10:53:00	0:05	0:02	0:38	C	1	2	Other	Open Flames	Grass	Yes	P2	1,0	200,00
336	2017/09/28	12:17:00	12:18:00	12:43:00	13:36:00	0:13	0:01	1:19	C	1	1	Other Services	Special Services	Water Supply	Yes	WT2	2,5	192,31
337	2017/09/30	16:07:00	16:56:00	17:23:00	17:55:00	0:45	0:49	1:48	C	1	2	Other Services	Special Services	Detached Roof	Yes	WT1	0,0	0,00
338	2017/10/01	16:23:00	16:26:00	17:02:00	21:53:00	5:16	0:03	5:30	C	2	4	Other Services	Special Services	Water Supply	Yes	WT2	20,0	63,29
339	2017/10/02	10:20:00	10:20:00	10:56:00	17:37:00	6:29	0:00	7:17	C	1	1	Other Services	Special Services	Water Supply	Yes	WT2	30,0	77,12
340	2017/10/02	19:31:00	19:33:00	19:38:00	20:23:00	0:23	0:02	0:52	E	2	4	Residential	Open Flames	Informal	Yes	P3	1,0	43,48
341	2017/10/02	19:46:00	19:49:00	20:17:00	21:24:00	4:41	0:03	1:38	D	2	4	Other Services	Rescues	MVA	Yes	P3	0,0	0,00
342	2017/10/04	02:29:00	02:32:00	02:48:00	03:30:00	0:43	0:03	1:01	C	2	6	Residential	Open Flames	Formal	Yes	P3	2,0	46,51
343	2017/10/04	12:00:00	12:03:00	12:15:00	12:58:00	0:05	0:03	0:58	C	1	2	Other	Lighting	Palm Tree	Yes	P3	1,0	200,00
344	2017/10/05	19:57:00	20:00:00	20:03:00	20:19:00	0:13	0:03	0:22	C	1	2	Other	Electrical Faults	Lamp Post	Yes	WT2	1,0	76,92
345	2017/10/06	09:25:00	09:28:00	09:38:00	09:43:00	0:07	0:03	0:18	A	1	2	Other	Open Flames	Rubbish	Yes	P3	1,0	142,86
346	2017/10/06	20:27:00	20:30:00	20:38:00	23:46:00	3:16	0:03	3:19	D	2	3	Other Services	Rescues	MVA	Yes	P2	0,0	0,00
347	2017/10/06	23:20:00	23:33:00	23:46:00	23:56:00	0:09	0:13	0:36	C	1	2	Other Services	Rescues	MVA	Yes	P3	0,0	0,00
348	2017/10/08	07:09:00	07:09:00	07:14:00	08:46:00	1:45	0:00	1:37	A	1	0	Other Services	Special Services	Water Supply	Yes	WT2	10,0	95,24
349	2017/10/08	07:14:00	07:14:00	07:34:00	08:04:00	0:10	0:00	0:50	E	1	0	Other Services	Special Services	Water Supply	Yes	WT2	2,0	200,00
350	2017/10/08	13:18:00	13:26:00	14:19:00	16:17:00	1:21	0:08	2:59	C	2	1	Other	Open Flames	Grass	Yes	P3	1,0	12,35
351	2017/10/08	17:34:00	17:35:00	17:49:00	18:38:00	0:49	0:01	1:04	C	2	5	Other Services	Special Services	Cutting Tree	Yes	P2	0,0	0,00
352	2017/10/11	11:02:00	11:02:00	11:09:00	11:58:00	0:41	0:00	0:56	C	1	2	Other Services	Special Services	Water Supply	Yes	P1	1,0	24,39
353	2017/10/11	15:04:00	15:54:00	16:32:00	19:12:00	1:40	0:50	4:08	D	1	2	Other Services	Special Services	Water Supply	Yes	P1	2,0	20,00
354	2017/10/12	23:22:00	23:26:00	23:32:00	23:49:00	0:11	0:04	0:27	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	90,91
355	2017/10/13	00:41:00	00:46:00	00:51:00	01:42:00	0:34	0:05	1:01	C	1	3	Residential	Open Flames	Formal	Yes	P2	2,0	58,82
356	2017/10/13	09:43:00	09:45:00	09:47:00	10:08:00	0:15	0:02	0:25	C	1	2	Other	Open Flames	Grass	Yes	P1	2,0	133,33
357	2017/10/13	14:06:00	14:06:00	14:26:00	17:40:00	3:39	0:00	3:34	D	2	4	Other	Open Flames	Grass	Yes	P2	1,0	4,57
358	2017/10/14	21:45:00	21:49:00	21:57:00	23:14:00	0:41	0:04	1:29	C	2	4	Residential	Electrical Faults	Formal	Yes	P2	2,0	48,78
359	2017/10/15	04:13:00	04:14:00	04:27:00	05:55:00	0:41	0:01	1:42	C	2	5	Residential	Arson	Formal	Yes	P2	1,0	24,39
360	2017/10/15	14:49:00	15:14:00	15:44:00	17:15:00	1:34	0:25	2:26	D	1	1	Other Services	Special Services	Water Supply	Yes	P1	15,0	159,57
361	2017/10/15	15:46:00	15:47:00	16:08:00	17:15:00	1:03	0:01	1:29	C	1	2	Other Services	Special Services	Water Supply	Yes	P2	2,0	31,75
362	2017/10/16	00:37:00	00:44:00	00:50:00	01:59:00	0:38	0:07	1:22	C	2	5	Residential	Open Flames	Informal	Yes	P1	1,0	26,32
363	2017/10/16	11:52:00	11:52:00	12:00:00	13:10:00	0:42	0:00	1:18	D	1	2	Other	Open Flames	Grass	Yes	WT1	1,0	23,81
364	2017/10/16	21:39:00	21:39:00	21:50:00	23:41:00	1:32	0:00	2:02	C	1	3	Residential	Smoking	Formal	Yes	WT1	2,0	21,74
365	2017/10/17	11:20:00	11:23:00	11:31:00	11:58:00	0:15	0:03	0:38	C	1	5	Other	Open Flames	Grass	Yes	P2	1,0	66,67
366	2017/10/17	17:03:00	17:06:00	17:16:00	18:51:00	1:08	0:03	1:48	C	1	5	Other Services	Rescues	Dog in Drain	Yes	P2	0,0	0,00
367	2017/10/18	14:49:00	14:49:00	15:00:00	18:43:00	3:54	0:00	3:54	C	1	2	Other Services	Rescues	Dog in Drain	Yes	P1	0,0	0,00
368	2017/10/18	21:42:00	21:43:00	21:48:00	22:11:00	0:12	0:01	0:29	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	83,33
369	2017/10/19	01:03:00	01:06:00	01:15:00	02:58:00	1:43	0:03	1:55	E	2	5	Residential	Open Flames	Informal	Yes	P2	1,0	9,71

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
370	2017/10/20	08:27:00	08:28:00	08:32:00	09:28:00	0:35	0:01	1:01	C	1	3	Other	Open Flames	Rubbish	Yes	P1	3,0	85,71
371	2017/10/20	11:32:00	11:34:00	11:42:00	12:57:00	1:09	0:02	1:25	A	1	2	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
372	2017/10/21	13:27:00	13:30:00	13:38:00	13:52:00	0:06	0:03	0:25	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	166,67
373	2017/10/21	21:07:00	21:10:00	21:19:00	21:44:00	0:08	0:03	0:37	C	1	4	Other	Open Flames	Rubbish	Yes	P1	1,0	125,00
374	2017/10/22	09:45:00	10:24:00	10:35:00	12:30:00	1:31	0:39	2:45	C	2	3	Other Services	Special Services	Water Supply	Yes	P1	10,0	109,89
375	2017/10/22	18:45:00	18:49:00	18:58:00	19:28:00	0:05	0:04	0:43	C	1	4	Other	Lighting	Palm Tree	Yes	P1	1,0	200,00
376	2017/10/22	19:40:00	19:42:00	19:54:00	20:50:00	0:36	0:02	1:10	C	2	5	Institutional	Arson	Creche	Yes	P1	5,0	138,89
377	2017/10/23	15:08:00	15:10:00	15:22:00	16:06:00	0:28	0:02	0:58	C	1	3	Institutional	Open Flames	Creche	Yes	P1	2,0	71,43
378	2017/10/24	02:31:00	02:34:00	02:45:00	03:14:00	0:19	0:03	0:43	C	1	3	Residential	Undetermined	Informal	Yes	P1	2,0	105,26
379	2017/10/24	14:46:00	14:50:00	14:53:00	15:14:00	0:28	0:04	0:28	A	1	2	Other	Open Flames	Rubbish	Yes	P1		0,00
380	2017/10/24	23:55:00	23:58:00	00:05:00	04:06:00	3:56	0:03	3:01	B	3	5	Institutional	Electrical Faults	Hospital	Yes	P1	10,0	42,37
381	2017/10/25	08:32:00	08:34:00	09:00:00	13:32:00	4:26	0:02	5:00	C	1	3	Other Services	Special Services	Water Supply	Yes	P1	4,0	15,04
382	2017/10/27	17:55:00	17:57:00	17:59:00	18:47:00	0:45	0:02	0:52	C	2	2	Other	Open Flames	Grass	Yes	D2	0,0	0,00
383	2017/10/28	09:07:00	09:07:00	09:20:00	10:22:00	1:03	0:00	1:15	D	1	1	Other Services	Special Services	Water Supply	Yes	D1	4,0	63,49
384	2017/10/28	10:24:00	10:24:00	10:40:00	11:40:00	0:56	0:00	1:16	C	1	2	Other Services	Special Services	Water Supply	Yes	P1	2,0	35,71
385	2017/10/28	17:42:00	17:56:00	18:14:00	18:53:00	0:44	0:14	1:11	C	1	2	Other Services	Special Services	Water Supply	Yes	P1	2,0	45,45
386	2017/10/28	22:28:00	22:33:00	22:50:00	23:11:00	0:41	0:05	0:43	D	1	2	Other	Open Flames	Grass	Yes	P1	2,0	48,78
387	2017/10/29	08:01:00	08:10:00	08:20:00	10:34:00	2:21	0:09	2:33	C	3	2	Other Services	Special Services	Water Supply	Yes	P1	5,0	35,46
388	2017/10/30	10:13:00	10:15:00	10:28:00	10:48:00	0:12	0:02	0:35	C	1	3	Other	Open Flames	Rubbish	Yes	P1	2,0	166,67
389	2017/10/31	13:40:00	13:41:00	13:52:00	14:32:00	0:35	0:01	0:52	D	1	2	Other	Open Flames	Grass	Yes	WT1	3,0	85,71
390	2017/11/02	11:46:00	11:49:00	12:05:00	15:03:00	2:00	0:03	3:17	D	1	3	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
391	2017/11/02	15:56:00	15:59:00	16:15:00	17:51:00	0:31	0:03	1:55	C	1	3	Other Services	Special Services	Water Supply	Yes	P1	2,0	64,52
392	2017/11/02	17:45:00	17:47:00	18:01:00	18:43:00	0:39	0:02	0:58	C	1	1	Other	Open Flames	Grass	Yes	D2	1,0	25,64
393	2017/11/04	05:44:00	05:46:00	05:54:00	06:16:00	0:14	0:02	0:32	D	1	3	Transport	Open Flames	Car Fire	Yes	P1	3,0	214,29
394	2017/11/04	13:49:00	13:50:00	14:02:00	14:40:00	0:23	0:01	0:51	E	1	3	Residential	Open Flames	Formal	Yes	P1	1,0	43,48
395	2017/11/04	18:56:00	18:58:00	19:10:00	19:46:00	0:22	0:02	0:50	B	1	1	Other	Open Flames	Grass	Yes	D2	1,0	45,45
396	2017/11/05	02:44:00	02:47:00	03:00:00	03:43:00	0:20	0:03	0:59	E	1	3	Residential	Arson	Formal	Yes	P1	3,0	150,00
397	2017/11/05	12:29:00	12:38:00	13:09:00	14:55:00	3:17	0:09	2:26	D	1	1	Other	Open Flames	Grass	Yes	D2	1,0	5,08
398	2017/11/05	20:15:00	20:17:00	20:25:00	21:39:00	0:55	0:02	1:24	C	2	4	Residential	Electrical Faults	Formal	Yes	P1	5,0	90,91
399	2017/11/06	11:10:00	11:12:00	11:20:00	12:31:00	0:17	0:02	1:21	D	1	4	Other	Open Flames	Grass	Yes	P1	1,0	58,82
400	2017/11/07	12:08:00	12:12:00	12:17:00	13:07:00	0:08	0:04	0:59	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
401	2017/11/07	19:28:00	19:30:00	19:42:00	21:29:00	1:59	0:02	2:01	B	2	3	Other	Open Flames	Grass	Yes	P1	1,0	8,40
402	2017/11/07	19:49:00	19:54:00	20:04:00	20:25:00	0:21	0:05	0:36	E	1	2	Residential	Open Flames	Informal	Yes	P1	2,0	95,24
403	2017/11/08	03:35:00	03:42:00	03:47:00	03:57:00	0:08	0:07	0:22	C	1	2	Other	Other	Fallen Tree	Yes	P1	0,0	0,00
404	2017/11/08	19:29:00	19:32:00	19:35:00	19:51:00	0:09	0:03	0:22	A	2	5	Other	Open Flames	Rubbish	Yes	P1	1,0	111,11
405	2017/11/10	07:20:00	07:21:00	07:25:00	08:20:00	0:19	0:01	1:00	C	1	3	Residential	Open Flames	Informal	Yes	P1	2,0	105,26
406	2017/11/11	14:14:00	14:16:00	14:35:00	15:27:00	0:40	0:02	1:13	C	2	4	Other	Open Flames	Rubbish	Yes	P1	2,0	50,00
407	2017/11/12	09:53:00	09:57:00	10:15:00	11:59:00	0:43	0:04	2:06	C	1	3	Other Services	Special Services	Water Supply	Yes	P1	2,0	46,51
408	2017/11/13	12:01:00	12:01:00	12:05:00	12:42:00	0:22	0:00	0:41	C	1	3	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
409	2017/11/14	11:40:00	11:43:00	12:29:00	14:29:00	2:15	0:03	2:49	C	1	3	Other Services	Special Services	Water Supply	Yes	P1	2,0	14,81
410	2017/11/17	14:06:00	14:09:00	14:16:00	14:53:00	0:23	0:03	0:47	E	2	3	Residential	Open Flames	Informal	Yes	P1	1,0	43,48
411	2017/11/18	21:17:00	21:17:00	21:32:00	22:06:00	0:08	0:00	0:49	E	1	2	Residential	Open Flames	Informal	Yes	P1	2,0	250,00
412	2017/11/19	08:59:00	09:03:00	09:06:00	09:44:00	0:19	0:04	0:45	C	1	2	Residential	Open Flames	Formal	Yes	P1	3,0	157,89
413	2017/11/20	13:37:00	13:40:00	14:00:00	15:30:00	1:35	0:03	1:53	D	1	2	Other	Electrical Faults	Lamp Post	Yes	P1	1,0	10,53
414	2017/11/20	14:03:00	14:05:00	14:20:00	15:00:00	0:20	0:02	0:57	C	1	2	Other Services	Special Services	MVA	Yes	P1	0,0	0,00
415	2017/11/20	15:26:00	15:28:00	15:40:00	16:30:00	0:40	0:02	1:04	C	1	2	Other Services	Special Services	Water Supply	Yes	P1	2,0	50,00
416	2017/11/21	13:07:00	13:09:00	13:17:00	15:12:00	1:13	0:02	2:05	E	2	5	Residential	Open Flames	Informal	Yes	P1	10,0	136,99
417	2017/11/21	19:48:00	19:51:00	20:05:00	20:21:00	0:05	0:03	0:33	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	200,00
418	2017/11/22	07:04:00	07:05:00	07:12:00	07:44:00	0:20	0:01	0:40	C	1	2	Other	Electrical Faults	Power Box	Yes	P1	0,0	0,00
419	2017/11/22	18:02:00	18:03:00	18:08:00	19:15:00	0:56	0:01	1:13	C	1	2	Other	Other	Tyres	Yes	P1	2,0	35,71
420	2017/11/23	10:37:00	10:37:00	10:53:00	11:33:00	0:22	0:00	0:56	E	2	2	Residential	Open Flames	Informal	Yes	P1	1,0	45,45
421	2017/11/23	11:38:00	11:39:00	11:43:00	12:29:00	0:24	0:01	0:51	E	1	1	Residential	Arson	Formal	Yes	P1	0,0	0,00
422	2017/11/23	14:33:00	14:33:00	14:40:00	16:20:00	1:12	0:00	1:47	B	1	1	Other Services	Special Services	Water Supply	Yes	P1	1,5	20,83

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
423	2017/11/23	16:18:00	16:20:00	16:30:00	16:37:00	0:07	0:02	0:19	B	1	1	Other	Open Flames	Rubbish	Yes	P1	1,0	142,86
424	2017/11/24	08:41:00	08:43:00	09:30:00	20:20:00	11:26	0:02	11:39	C	2	4	Other Services	Special Services	Water Supply	Yes	P1	72,0	104,96
425	2017/11/24	10:21:00	10:23:00	10:36:00	20:23:00	10:00	0:02	10:02	C	2	3	Other Services	Special Services	Water Supply	Yes	P1	60,0	100,00
426	2017/11/24	22:23:00	22:24:00	23:32:00	23:42:00	0:36	0:01	1:19	C	2	4	Residential	Electrical Faults	Formal	Yes	P1	3,0	83,33
427	2017/11/25	02:43:00	02:45:00	03:02:00	05:24:00	2:04	0:02	2:41	C	3	3	Commercial	Arson	Medical Surgery	Yes	P1	12,0	96,77
428	2017/11/25	06:47:00	06:50:00	07:06:00	07:59:00	0:59	0:03	1:12	C	1	2	Other	Electrical Faults	Electrical Wiring	Yes	P1	1,0	16,95
429	2017/11/26	01:32:00	01:56:00	02:14:00	03:10:00	0:58	0:24	1:38	C	2	3	Commercial	Arson	Medical Surgery	Yes	P1	2,0	34,48
430	2017/11/26	04:21:00	04:24:00	04:46:00	05:21:00	0:41	0:03	1:00	D	2	5	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
431	2017/11/27	18:03:00	18:05:00	18:20:00	19:47:00	1:20	0:02	1:44	B	1	0	Other Services	Special Services	Water Supply	Yes	WT1	10,0	125,00
432	2017/11/28	08:29:00	08:35:00	09:43:00	09:56:00	0:16	0:06	1:27	C	1	4	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
433	2017/11/28	14:26:00	14:32:00	14:37:00	14:47:00	0:02	0:06	0:21	C	3	3	Other	Open Flames	Grass	Yes	D2	1,0	500,00
434	2017/11/28	14:50:00	14:51:00	15:05:00	15:47:00	0:40	0:01	0:57	C	1	1	Other Services	Special Services	Water Supply	Yes	P1	5,0	125,00
435	2017/11/29	01:05:00	01:09:00	01:23:00	02:03:00	0:16	0:04	0:58	C	3	3	Residential	Open Flames	Formal	Yes	D2	1,0	62,50
436	2017/11/29	14:01:00	14:05:00	14:19:00	15:21:00	0:13	0:04	1:20	C	2	3	Other Services	Special Services	Tree	Yes	P1	0,0	0,00
437	2017/11/29	18:00:00	18:03:00	18:10:00	18:53:00	0:20	0:03	0:53	C	2	5	Residential	Cooking	Formal	Yes	P1	1,0	50,00
438	2017/11/30	00:14:00	00:16:00	00:24:00	01:16:00	0:10	0:02	1:02	C	2	5	Residential	Arson	Formal	Yes	P1	1,0	100,00
439	2017/11/30	11:24:00	11:34:00	11:45:00	13:29:00	0:42	0:10	2:05	C	1	1	Other Services	Special Services	Water Supply	Yes	P1	5,0	119,05
440	2017/11/30	13:13:00	13:16:00	13:25:00	13:58:00	0:20	0:03	0:45	C	3	2	Residential	Open Flames	Informal	Yes	P1	2,0	100,00
441	2017/11/30	14:16:00	14:17:00	14:20:00	15:32:00	0:47	0:01	1:16	C	3	3	Other	Electrical Faults	Power Station	Yes	P1	5,0	106,38
442	2017/11/30	16:18:00	16:18:00	16:33:00	16:57:00	0:25	0:00	0:39	C	3	3	Residential	Open Flames	Formal	Yes	P1	1,0	40,00
443	2017/12/01	18:39:00	18:42:00	19:00:00	19:27:00	0:16	0:03	0:48	C	1	1	Other	Other	Tree Fallen	Yes	P1	0,0	0,00
444	2017/12/01	21:17:00	21:19:00	21:30:00	22:30:00	0:44	0:02	1:13	D	1	2	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
445	2017/12/02	02:56:00	02:59:00	03:10:00	04:00:00	0:42	0:03	1:04	E	1	2	Residential	Open Flames	Informal	Yes	P1	1,0	23,81
446	2017/12/02	10:01:00	11:36:00	11:50:00	12:20:00	0:17	1:35	2:19	C	1	0	Other Services	Special Services	Water Supply	Yes	P5	3,0	176,47
447	2017/12/03	18:19:00	18:19:00	18:30:00	19:00:00	0:09	0:00	0:41	C	1	0	Other Services	Special Services	Water Supply	Yes	P5	3,0	333,33
448	2017/12/04	10:55:00	10:55:00	11:07:00	11:40:00	0:12	0:00	0:45	A	1	2	Other Services	Special Services	Water Supply	Yes	P1	0,2	16,67
449	2017/12/04	21:57:00	22:00:00	22:18:00	22:49:00	0:19	0:03	0:52	C	2	3	Other	Open Flames	Grass	Yes	P1	1,0	52,63
450	2017/12/05	10:33:00	10:33:00	10:40:00	11:15:00	0:12	0:00	0:42	C	1	1	Other	Open Flames	Grass	Yes	WT1	1,0	83,33
451	2017/12/05	12:50:00	12:55:00	13:03:00	13:31:00	0:10	0:05	0:41	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	100,00
452	2017/12/06	03:24:00	03:27:00	03:34:00	04:10:00	0:27	0:03	0:46	D	1	3	Residential	Open Flames	Informal	Yes	P1	3,0	111,11
453	2017/12/07	02:33:00	02:36:00	02:47:00	03:23:00	0:24	0:03	0:50	C	1	4	Transport	Electrical Faults	Car Fire	Yes	P5	2,0	83,33
454	2017/12/07	08:31:00	08:34:00	08:44:00	09:37:00	0:06	0:03	1:06	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	166,67
455	2017/12/07	12:37:00	12:39:00	12:48:00	14:17:00	1:20	0:02	1:40	B	2	1	Other	Arson	Tyres	Yes	P1	10,0	125,00
456	2017/12/08	16:10:00	16:12:00	16:25:00	17:38:00	0:10	0:02	1:28	C	1	1	Other	Open Flames	Tyres	Yes	P5	1,0	100,00
457	2017/12/09	12:55:00	12:58:00	13:15:00	13:57:00	0:42	0:03	1:02	C	1	2	Other Services	Special Services	Water Supply	Yes	P1	2,0	47,62
458	2017/12/09	21:07:00	21:08:00	21:19:00	22:10:00	0:39	0:01	1:03	C	2	1	Residential	Smoking	Formal	Yes	D6	2,0	51,28
459	2017/12/10	12:08:00	12:10:00	12:20:00	13:05:00	0:18	0:02	0:57	E	1	4	Residential	Undetermined	Informal	Yes	P1	3,0	166,67
460	2017/12/11	11:19:00	11:20:00	11:28:00	11:50:00	0:14	0:01	0:31	C	1	1	Other	Open Flames	Rubbish	Yes	D2	0,2	14,29
461	2017/12/11	17:46:00	17:47:00	17:57:00	18:19:00	0:22	0:01	0:33	C	1	1	Other	Open Flames	Rubbish	Yes	D2	0,3	13,64
462	2017/12/12	11:02:00	11:05:00	11:11:00	12:15:00	0:43	0:03	1:13	C	2	4	Other	Open Flames	Grass	Yes	P1	2,0	46,51
463	2017/12/12	16:39:00	16:42:00	16:48:00	17:03:00	0:10	0:03	0:24	B	1	3	Other	Open Flames	Tyres	Yes	P1	1,0	100,00
464	2017/12/12	21:03:00	21:04:00	21:16:00	21:53:00	0:33	0:01	0:50	C	1	3	Residential	Arson	Formal	Yes	P1	3,0	90,91
465	2017/12/12	23:24:00	23:26:00	23:37:00	01:28:00	0:32	0:02	1:04	C	1	3	Residential	Arson	Formal	Yes	P1	3,0	93,75
466	2017/12/13	09:52:00	09:55:00	10:04:00	10:42:00	0:30	0:03	0:50	E	1	5	Residential	Open Flames	Informal	Yes	P1	2,0	66,67
467	2017/12/13	20:11:00	20:12:00	20:20:00	21:05:00	0:20	0:01	0:54	E	2	4	Other	Open Flames	Veld Fire	Yes	P1	0,0	0,00
468	2017/12/14	08:34:00	08:37:00	08:46:00	09:57:00	1:00	0:03	1:23	B	1	1	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
469	2017/12/14	13:24:00	13:27:00	13:40:00	14:30:00	0:45	0:03	1:06	C	1	2	Other	Open Flames	Tyres	Yes	P1	2,0	44,44
470	2017/12/14	15:50:00	15:53:00	16:15:00	17:20:00	1:07	0:03	1:30	C	1	2	Other Services	Special Services	Water Supply	Yes	P1	2,0	29,85
471	2017/12/14	19:45:00	19:48:00	19:56:00	22:00:00	2:00	0:03	2:15	A	1	2	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
472	2017/12/15	05:09:00	05:12:00	05:20:00	06:16:00	0:58	0:03	1:07	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	17,24
473	2017/12/15	15:29:00	15:31:00	15:41:00	16:40:00	1:01	0:02	1:11	C	1	1	Other	Open Flames	Rubbish	Yes	D6	0,0	0,00
474	2017/12/15	15:27:00	15:28:00	15:31:00	16:16:00	0:47	0:01	0:49	C	1	1	Other	Open Flames	Rubbish	Yes	D6	0,3	6,38
475	2017/12/16	12:27:00	12:28:00	12:34:00	13:17:00	0:23	0:01	0:50	E	2	2	Residential	Open Flames	Informal	Yes	P1	3,0	130,43

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
476	2017/12/16	21:12:00	21:16:00	21:26:00	21:45:00	0:02	0:04	0:33	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	500,00
477	2017/12/16	23:00:00	23:03:00	23:16:00	23:32:00	0:16	0:03	0:32	C	1	2	Other	Lighting	Palm Tree	Yes	P1	2,0	125,00
478	2017/12/16	23:29:00	23:32:00	23:38:00	00:16:00	0:38	0:03	0:47	C	2	3	Residential	Lighting	Formal	Yes	P1	3,0	78,95
479	2017/12/16	00:12:00	00:14:00	00:27:00	00:50:00	0:02	0:02	0:38	E	2	3	Residential	Open Flames	Informal	Yes	P1	0,0	0,00
480	2017/12/17	02:07:00	02:09:00	02:18:00	03:10:00	0:34	0:02	1:03	C	2	3	Residential	Welding	Formal	Yes	P1	1,0	29,41
481	2017/12/18	23:51:00	23:54:00	00:08:00	00:37:00	0:46	0:03	0:46	E	2	3	Residential	Undetermined	Informal	Yes	P1	0,0	0,00
482	2017/12/18	08:15:00	08:25:00	08:36:00	09:18:00	0:35	0:10	1:03	C	1	1	Other	Open Flames	Electrical Cable	Yes	WT1	0,0	0,00
483	2017/12/18	09:53:00	10:02:00	10:07:00	10:40:00	0:20	0:09	0:47	C	1	3	Other Services	Special Services	Medical	Yes	P1	0,0	0,00
484	2017/12/19	02:16:00	02:19:00	02:25:00	03:09:00	0:38	0:03	0:53	C	1	2	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
485	2017/12/20	11:33:00	11:36:00	11:41:00	12:40:00	1:00	0:03	1:07	B	1	3	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
486	2017/12/21	23:20:00	23:23:00	23:34:00	00:03:00	0:16	0:03	0:56	E	2	4	Residential	Undetermined	Informal	Yes	P1	2,0	125,00
487	2017/12/23	14:23:00	14:28:00	14:40:00	15:35:00	0:22	0:05	1:12	C	2	4	Residential	Open Flames	Informal	Yes	P2	2,0	90,91
488	2017/12/23	22:26:00	22:28:00	22:50:00	23:56:00	0:52	0:02	1:30	C	3	4	Residential	Undetermined	Formal	Yes	P1	7,0	134,62
489	2017/12/24	00:08:00	00:09:00	00:11:00	01:47:00	0:31	0:01	1:39	C	3	4	Residential	Arson	Informal	Yes	P1	1,0	32,26
490	2017/12/24	02:10:00	02:14:00	02:19:00	03:45:00	0:49	0:04	1:35	C	3	2	Storage	Undetermined	Store Room	Yes	P1	1,0	20,41
491	2017/12/24	11:08:00	11:10:00	22:19:00	11:39:00	0:05	0:02	0:31	C	3	3	Residential	Electrical Faults	Formal	Yes	P1	0,0	0,00
492	2017/12/24	20:17:00	20:20:00	20:22:00	21:03:00	0:28	0:03	0:46	C	1	2	Other	Open Flames	Palm Tree	Yes	P1	1,0	35,71
493	2017/12/25	13:10:00	13:15:00	13:23:00	14:27:00	0:39	0:05	1:17	C	2	5	Other	Open Flames	Rubbish	Yes	P1	3,0	76,92
494	2017/12/25	13:41:00	13:43:00	13:56:00	14:23:00	0:42	0:02	0:42	C	3	3	Storage	Open Flames	Store Room	Yes	P1		0,00
495	2017/12/27	20:16:00	20:19:00	20:26:00	20:46:00	0:27	0:03	0:30	C	2	4	Residential	Open Flames	Informal	Yes	P1	0,1	3,70
496	2017/12/27	21:48:00	21:50:00	21:59:00	22:31:00	0:41	0:02	0:43	E	1	3	Residential	Undetermined	Informal	Yes	P1	2,0	48,78
497	2017/12/27	14:53:00	14:56:00	15:09:00	15:50:00	0:41	0:03	0:57	C	2	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
498	2017/12/29	15:14:00	15:17:00	15:19:00	15:31:00	0:10	0:03	0:17	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	100,00
499	2017/12/30	05:59:00	06:05:00	06:38:00	08:37:00	1:59	0:06	2:38	D	1	2	Other Services	Rescues	Bull in Drain	Yes	P1	0,0	0,00
500	2017/12/31	02:21:00	02:24:00	02:33:00	03:10:00	0:15	0:03	0:49	E	2	3	Residential	Other	Formal	Yes	P1	2,0	133,33
501	2017/12/31	03:50:00	03:52:00	03:56:00	05:26:00	1:22	0:02	1:36	C	3	3	Residential	Open Flames	Formal	Yes	P1	15,0	182,93
502	2017/12/31	20:47:00	20:50:00	20:53:00	21:57:00	1:04	0:03	1:10	C	3	2	Residential	Open Flames	Formal	Yes	P1	8,0	125,00
503	2017/12/31	23:30:00	23:30:00	23:40:00	00:00:00	0:17	0:00	1:30	C	1	2	Other	Open Flames	Veld Fire	Yes	WT1	1,0	58,82
504	2018/01/01	07:36:00	07:39:00	07:44:00	08:21:00	0:27	0:03	0:45	C	1	3	Residential	Open Flames	Formal	Yes	P1	1,0	37,04
505	2018/01/01	14:25:00	14:27:00	14:34:00	14:45:00	0:11	0:02	0:20	C	2	3	Residential	Open Flames	Informal	Yes	P2	1,0	90,91
506	2018/01/02	01:00:00	01:03:00	01:07:00	01:16:00	0:09	0:03	0:16	A	1	3	Other Services	Hazmat	Oil	Yes	P1	0,0	0,00
507	2018/01/02	09:49:00	09:49:00	09:55:00	12:35:00	2:30	0:00	2:46	D	2	3	Other	Open Flames	Grass	Yes	P1	1,0	6,67
508	2018/01/02	10:35:00	10:38:00	10:43:00	11:25:00	0:09	0:03	0:50	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	111,11
509	2018/01/02	16:20:00	16:25:00	16:40:00	17:01:00	0:10	0:05	0:41	E	1	0	Other Services	Special Services	Water Supply	Yes	WT1	5,0	500,00
510	2018/01/02	17:13:00	17:15:00	17:22:00	17:41:00	0:08	0:02	0:28	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	125,00
511	2018/01/03	19:16:00	19:17:00	19:27:00	20:20:00	0:10	0:01	1:04	C	2	7	Other	Open Flames	Veld Fire	Yes	P2	1,0	100,00
512	2018/01/03	20:33:00	20:34:00	21:29:00	22:50:00	0:24	0:01	2:17	C	1	0	Other	Open Flames	Grass	Yes	D2	0,0	0,00
513	2018/01/03	22:51:00	22:51:00	23:03:00	23:21:00	0:18	0:00	0:30	C	3	6	Residential	Open Flames	Informal	Yes	P2	2,0	111,11
514	2018/01/04	14:16:00	14:19:00	14:31:00	14:50:00	0:30	0:03	0:34	B	2	3	Other	Open Flames	Grass	Yes	P1	0,5	16,67
515	2018/01/04	22:58:00	23:01:00	23:08:00	23:18:00	0:04	0:03	0:20	B	1	2	Other	Open Flames	Grass	Yes	P1	1,0	250,00
516	2018/01/05	09:12:00	09:14:00	09:28:00	10:04:00	0:26	0:02	0:52	C	3	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
517	2018/01/05	16:42:00	16:43:00	17:00:00	18:04:00	1:18	0:01	1:22	C	1	1	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
518	2018/01/06	07:53:00	07:59:00	08:12:00	08:33:00	0:10	0:06	0:40	C	3	5	Other	Open Flames	Veld Fire	Yes	P1	1,0	100,00
519	2018/01/06	12:27:00	12:28:00	12:33:00	12:38:00	1:03	0:01	0:11	C	2	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
520	2018/01/06	16:08:00	16:08:00	16:19:00	17:20:00	1:04	0:00	1:12	C	2	0	Other	Open Flames	Grass	Yes	D2	0,0	0,00
521	2018/01/06	22:55:00	22:58:00	23:04:00	23:51:00	0:34	0:03	0:56	C	3	6	Residential	Arson	Informal	Yes	P1	1,0	29,41
522	2018/01/07	11:44:00	11:48:00	11:54:00	12:16:00	0:13	0:04	0:32	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	76,92
523	2018/01/07	11:46:00	11:48:00	11:54:00	12:41:00	0:41	0:02	0:55	C	2	2	Other	Open Flames	Veld Fire	Yes	P2	1,0	24,39
524	2018/01/07	13:13:00	13:16:00	13:24:00	14:47:00	0:54	0:03	1:34	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	18,52
525	2018/01/07	17:18:00	17:19:00	17:31:00	18:06:00	0:19	0:01	0:48	C	1	2	Other	Open Flames	Veld Fire	Yes	P1	1,0	52,63
526	2018/01/07	18:12:00	18:13:00	18:16:00	18:43:00	0:20	0:01	0:31	C	1	1	Other Services	Special Services	Medical	Yes	WT1	0,0	0,00
527	2018/01/08	23:52:00	23:54:00	00:03:00	00:37:00	0:22	0:02	0:30	E	1	2	Other	Open Flames	Dumping Site	Yes	P1	3,0	136,36
528	2018/01/09	08:04:00	08:08:00	08:12:00	08:32:00	0:38	0:04	0:28	A	1	2	Other Services	Hazmat	Diesel Spillage	Yes	P1	0,0	0,00

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
529	2018/01/09	16:54:00	16:57:00	17:03:00	18:25:00	1:00	0:03	1:31	C	1	4	Residential	Open Flames	Formal	Yes	P1	1,0	16,67
530	2018/01/10	12:24:00	12:27:00	12:41:00	15:15:00	2:41	0:03	2:51	C	3	3	Other	Open Flames	Grass	Yes	P1	20,0	124,22
531	2018/01/10	17:34:00	17:37:00	18:07:00	18:52:00	0:30	0:03	1:18	D	2	3	Other	Open Flames	Grass	Yes	P1	0,5	16,67
532	2018/01/11	06:34:00	06:37:00	06:46:00	07:10:00	0:07	0:03	0:36	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	142,86
533	2018/01/11	07:45:00	07:48:00	08:45:00	10:54:00	8:06	0:03	3:09	D	1	2	Other	Open Flames	Sludge	Yes	WT2	10,0	20,58
534	2018/01/11	16:23:00	16:33:00	16:52:00	17:33:00	0:18	0:10	1:10	B	1	1	Other	Open Flames	Grass	Yes	P2	0,0	0,00
535	2018/01/12	15:45:00	15:48:00	15:55:00	16:31:00	0:36	0:03	0:46	C	2	4	Residential	Cooking	Formal	Yes	P1	5,0	138,89
536	2018/01/12	21:10:00	21:31:00	21:43:00	22:20:00	0:30	0:21	1:10	C	1	3	Other Services	Special Services	Water Supply	Yes	P1	4,0	133,33
537	2018/01/13	22:30:00	22:31:00	22:40:00	23:45:00	0:47	0:01	1:15	C	2	4	Other	Open Flames	Veld Fire	Yes	P1	0,0	0,00
538	2018/01/14	03:43:00	03:43:00	03:55:00	04:56:00	0:30	0:00	1:13	E	1	3	Residential	Undetermined	Informal	Yes	P1	5,0	166,67
539	2018/01/14	21:26:00	21:28:00	21:35:00	21:56:00	0:15	0:02	0:30	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	66,67
540	2018/01/15	14:59:00	15:00:00	15:13:00	16:31:00	0:35	0:01	1:32	C	1	2	Other	Open Flames	Tree	Yes	P1	2,0	57,14
541	2018/01/16	19:21:00	19:22:00	19:37:00	20:09:00	0:23	0:01	0:48	C	1	1	Other	Open Flames	Tree	Yes	P2	2,0	86,96
542	2018/01/16	11:35:00	11:37:00	11:47:00	12:50:00	0:17	0:02	1:15	C	2	5	Residential	Undetermined	Informal	Yes	P1	2,0	117,65
543	2018/01/17	19:00:00	19:03:00	19:14:00	19:38:00	0:30	0:03	0:38	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	33,33
544	2018/01/17	22:54:00	22:57:00	23:15:00	23:37:00	0:39	0:03	0:43	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	25,64
545	2018/01/17	23:32:00	23:35:00	23:48:00	00:21:00	0:33	0:03	1:01	C	1	3	Residential	Open Flames	Formal	Yes	P1	2,0	60,61
546	2018/01/18	01:35:00	01:38:00	01:51:00	02:23:00	0:35	0:03	0:48	C	1	3	Other	Open Flames	Rubbish	Yes	P1	2,0	57,14
547	2018/01/18	12:58:00	13:02:00	13:04:00	13:35:00	0:27	0:04	0:37	B	1	1	Other Services	Special Services	Water Supply	Yes	WT2	0,0	0,00
548	2018/01/18	16:17:00	16:19:00	16:37:00	17:58:00	1:21	0:02	1:41	C	1	3	Residential	Open Flames	Formal	Yes	P2	3,0	37,04
549	2018/01/20	08:14:00	08:17:00	08:27:00	08:46:00	0:20	0:03	0:32	C	2	2	Other	Open Flames	Grass	Yes	P2	2,0	100,00
550	2018/01/20	08:51:00	08:54:00	09:08:00	10:30:00	0:40	0:03	1:39	C	2	3	Other	Electrical Faults	Electricity Box	Yes	P2	1,0	25,00
551	2018/01/20	14:23:00	14:26:00	14:32:00	15:35:00	0:39	0:03	1:12	C	2	3	Residential	Electrical Faults	Formal	Yes	P2	4,0	102,56
552	2018/01/21	05:20:00	05:23:00	05:30:00	06:15:00	0:29	0:03	0:55	C	2	3	Residential	Arson	Formal	Yes	P1	4,0	137,93
553	2018/01/21	11:38:00	11:40:00	11:57:00	13:30:00	0:51	0:02	1:52	C	1	1	Other Services	Special Services	Water Supply	Yes	WT2	2,0	39,22
554	2018/01/21	12:37:00	12:39:00	12:46:00	13:16:00	0:13	0:02	0:39	C	2	3	Commercial	Other	Supermarket	Yes	P2	0,0	0,00
555	2018/01/21	19:12:00	19:13:00	19:25:00	20:25:00	0:47	0:01	1:13	C	1	1	Residential	Undetermined	Informal	Yes	WT1	2,0	42,55
556	2018/01/21	22:28:00	22:32:00	22:34:00	23:00:00	0:21	0:04	0:32	B	1	2	Other	Open Flames	Tree	Yes	P2	2,0	95,24
557	2018/01/22	15:03:00	15:06:00	15:10:00	15:30:00	0:13	0:03	0:27	C	1	3	Other	Open Flames	Tree	Yes	P2	1,0	76,92
558	2018/01/23	22:16:00	22:19:00	22:35:00	23:39:00	0:37	0:03	1:23	D	1	2	Residential	Electrical Faults	Formal	Yes	P1	2,0	54,05
559	2018/01/24	01:05:00	01:08:00	01:23:00	01:59:00	0:37	0:03	0:54	D	1	2	Residential	Electrical Faults	Formal	Yes	P1	1,0	27,03
560	2018/01/24	12:48:00	12:52:00	13:08:00	14:01:00	0:31	0:04	1:13	D	1	1	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
561	2018/01/25	16:24:00	16:26:00	16:42:00	16:50:00	0:04	0:02	0:26	C	2	4	Other Services	Special Services	Tree	Yes	P1	0,0	0,00
562	2018/01/27	14:11:00	14:20:00	14:25:00	15:38:00	1:13	0:09	1:27	C	2	2	Other Services	Special Services	Tree	Yes	P1	0,0	0,00
563	2018/01/27	14:18:00	15:31:00	15:43:00	20:24:00	4:47	1:13	6:06	C	1	1	Other Services	Special Services	Roof Blown Off	Yes	D6	0,0	0,00
564	2018/01/27	21:53:00	22:00:00	22:15:00	03:11:00	4:56	0:07	6:03	D	3	2	Transport	Open Flames	MVA	Yes	WT1	60,0	202,70
565	2018/01/28	16:29:00	16:29:00	16:45:00	18:35:00	1:50	0:00	2:06	D	1	1	Other	Open Flames	Lucern	Yes	WT1	10,0	90,91
566	2018/01/29	12:18:00	12:18:00	12:25:00	13:30:00	1:03	0:00	1:12	D	1	2	Other	Open Flames	Grass	Yes	WT1	1,0	15,87
567	2018/01/29	23:33:00	23:40:00	23:59:00	00:44:00	0:42	0:07	1:07	D	1	3	Other	Open Flames	Grass	Yes	WT1	2,0	47,62
568	2018/01/31	07:38:00	07:42:00	07:59:00	08:33:00	0:06	0:04	0:55	E	1	2	Other	Open Flames	Tyres	Yes	P1	1,0	166,67
569	2018/01/31	14:22:00	14:23:00	14:43:00	17:00:00	2:08	0:01	2:38	C	1	0	Other Services	Special Services	Water Supply	Yes	WT2	2,0	15,63
570	2018/01/31	17:17:00	17:26:00	17:38:00	18:33:00	1:00	0:09	1:16	C	1	2	Other Services	Special Services	Cutting Tree	Yes	P1	0,0	0,00
571	2018/02/01	23:35:00	23:37:00	23:45:00	00:28:00	0:38	0:02	1:03	A	2	2	Commercial	Other	Building	Yes	P1	0,0	0,00
572	2018/02/02	14:45:00	14:48:00	14:51:00	18:35:00	3:38	0:03	3:50	C	1	2	Other Services	Special Services	Water Supply	Yes	WT2	30,0	137,61
573	2018/02/02	22:30:00	22:30:00	22:44:00	00:20:00	1:44	0:00	3:14	E	1	3	Residential	Open Flames	Informal	Yes	P2	3,0	28,85
574	2018/02/03	07:54:00	07:56:00	08:03:00	09:02:00	0:31	0:02	1:08	C	2	3	Commercial	Electrical Faults	Store Room	Yes	P1	3,0	96,77
575	2018/02/03	15:17:00	15:17:00	15:27:00	16:00:00	0:19	0:00	0:43	C	1	2	Residential	Arson	Informal	Yes	P1	2,0	105,26
576	2018/02/04	09:40:00	09:42:00	10:00:00	17:02:00	7:00	0:02	7:22	C	1	0	Other Services	Special Services	Water Supply	Yes	WT2	30,0	71,43
577	2018/02/04	21:16:00	21:19:00	21:36:00	22:16:00	0:34	0:03	1:00	C	1	1	Residential	Arson	Informal	Yes	P1	1,0	29,41
578	2018/02/08	13:54:00	13:56:00	13:57:00	14:21:00	0:16	0:02	0:27	A	1	2	Transport	Electrical Faults	Car Fire	Yes	P1	1,0	62,50
579	2018/02/08	09:15:00	09:15:00	09:30:00	10:57:00	1:30	0:00	1:42	C	1	1	Other Services	Special Services	Water Supply	Yes	P2	2,0	22,22
580	2018/02/08	09:24:00	09:27:00	09:40:00	11:26:00	0:33	0:03	2:02	C	1	2	Other Services	Special Services	Water Supply	Yes	WT1	3,0	90,91
581	2018/02/08	13:00:00	13:03:00	13:52:00	18:00:00	4:00	0:03	5:00	C	2	2	Other Services	Special Services	Water Supply	Yes	WT2	25,0	104,17

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
582	2018/02/08	22:24:00	22:27:00	22:48:00	23:33:00	0:35	0:03	1:09	E	2	2	Residential	Arson	Informal	Yes	P1	3,0	85,71
583	2018/02/09	09:19:00	09:30:00	09:42:00	11:22:00	1:06	0:11	2:03	C	1	0	Other Services	Special Services	Water Supply	Yes	WT2	10,0	151,52
584	2018/02/09	18:25:00	18:25:00	18:34:00	19:08:00	0:07	0:00	0:43	C	1	3	Other Services	Special Services	Medical	Yes	WT1	0,0	0,00
585	2018/02/10	21:18:00	21:19:00	21:27:00	21:54:00	0:15	0:01	0:36	C	1	2	Residential	Open Flames	Formal	Yes	WT1	1,0	66,67
586	2018/02/11	09:30:00	09:30:00	10:00:00	13:22:00	3:52	0:00	3:52	C	2	2	Other Services	Special Services	Water Supply	Yes	P2	20,0	86,21
587	2018/02/13	15:50:00	15:56:00	16:08:00	17:37:00	1:41	0:06	1:47	C	1	2	Other Services	Special Services	Roof Blown Off	Yes	P2	0,0	0,00
588	2018/02/13	15:50:00	17:37:00	18:15:00	18:30:00	1:41	1:47	2:40	C	1	2	Other Services	Special Services	Roof Blown Off	Yes	P2	0,0	0,00
589	2018/02/13	15:50:00	15:56:00	16:11:00	18:30:00	1:41	0:06	2:40	C	1	2	Other Services	Special Services	Roof Blown Off	Yes	P2	0,0	0,00
590	2018/02/18	09:58:00	10:32:00	11:32:00	13:45:00	3:00	0:34	3:47	C	1	2	Other Services	Special Services	Water Supply	Yes	WT2	20,0	111,11
591	2018/02/19	19:53:00	19:56:00	20:11:00	22:40:00	2:44	0:03	2:47	C	1	0	Other Services	Special Services	Water Supply	Yes	WT2	10,0	60,98
592	2018/02/19	21:40:00	21:41:00	21:48:00	22:51:00	0:31	0:01	1:11	E	1	2	Residential	Open Flames	Formal	Yes	P2	3,0	96,77
593	2018/02/20	16:11:00	16:13:00	16:30:00	18:15:00	1:30	0:02	2:04	C	1	0	Other Services	Special Services	Water Supply	Yes	WT2	2,0	22,22
594	2018/02/21	21:06:00	21:12:00	21:15:00	21:30:00	0:12	0:06	0:24	A	1	2	Other	Electrical Faults	Alarm	Yes	P1	0,0	0,00
595	2018/02/22	07:57:00	08:00:00	08:03:00	08:32:00	0:16	0:03	0:35	C	1	3	Other	Open Flames	Rubbish	Yes	P2	1,0	62,50
596	2018/02/22	14:23:00	14:27:00	15:17:00	17:52:00	3:29	0:04	3:29	C	1	0	Other Services	Special Services	Water Supply	Yes	WT2	5,0	23,92
597	2018/02/23	11:02:00	11:02:00	11:30:00	13:00:00	3:58	0:00	1:58	E	1	2	Other Services	Special Services	Water Supply	Yes	WT1	10,0	42,02
598	2018/02/23	16:42:00	16:42:00	17:20:00	21:44:00	5:00	0:00	5:02	C	1	1	Other Services	Special Services	Water Supply	Yes	WT2	20,0	66,67
599	2018/02/23	17:20:00	17:30:00	17:35:00	18:08:00	0:24	0:10	0:48	C	2	3	Residential	Electrical Faults	Formal	Yes	P2	5,0	208,33
600	2018/02/24	19:19:00	19:21:00	19:25:00	20:00:00	0:14	0:02	0:41	C	1	1	Other Services	Special Services	Tree	Yes	WT2	0,0	0,00
601	2018/02/26	00:59:00	01:02:00	01:12:00	02:05:00	0:32	0:03	1:06	C	1	3	Residential	Open Flames	Informal	Yes	P2	2,0	62,50
602	2018/03/03	02:43:00	02:43:00	02:51:00	03:39:00	0:48	0:00	0:56	C	1	3	Residential	Undetermined	Informal	Yes	WT1	1,0	20,83
603	2018/03/04	15:11:00	15:11:00	15:32:00	16:42:00	1:09	0:00	1:31	C	1	0	Other Services	Special Services	Water Supply	Yes	WT2	1,0	14,49
604	2018/03/05	18:40:00	18:43:00	18:45:00	19:33:00	0:15	0:03	0:53	E	1	4	Residential	Undetermined	Informal	Yes	P2	1,0	66,67
605	2018/03/07	11:32:00	11:36:00	11:44:00	12:09:00	0:25	0:04	0:37	A	1	1	Other Services	Special Services	Road Clean	Yes	P1	1,0	40,00
606	2018/03/07	18:46:00	18:47:00	18:55:00	19:15:00	0:18	0:01	0:29	C	1	1	Other	Lighting	Palm Tree	Yes	P1	1,0	55,56
607	2018/03/08	15:55:00	15:58:00	16:15:00	18:39:00	2:22	0:03	2:44	C	1	3	Other Services	Special Services	Repairing Roof	Yes	P1	0,0	0,00
608	2018/03/08	18:41:00	18:42:00	18:53:00	20:03:00	0:30	0:01	1:22	C	3	6	Residential	Smoking	Formal	Yes	P1	1,0	33,33
609	2018/03/09	20:28:00	20:30:00	20:31:00	20:59:00	0:24	0:02	0:31	A	2	6	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
610	2018/03/10	11:17:00	11:17:00	11:30:00	13:02:00	1:43	0:00	1:45	E	1	0	Other Services	Special Services	Water Supply	Yes	WT2	10,0	97,09
611	2018/03/11	01:17:00	01:23:00	01:30:00	01:49:00	0:13	0:06	0:32	D	1	4	Other	Electrical Faults	Tramsformer	Yes	P2	0,0	0,00
612	2018/03/11	10:35:00	10:35:00	10:38:00	11:12:00	0:07	0:00	0:37	C	1	2	Other	Open Flames	Grass	Yes	WT1	1,0	142,86
613	2018/03/11	18:15:00	18:20:00	18:31:00	19:10:00	0:04	0:05	0:55	C	1	4	Residential	Electrical Faults	Formal	Yes	P2	1,0	250,00
614	2018/03/13	14:49:00	14:51:00	14:55:00	15:07:00	0:05	0:02	0:18	C	1	2	Other	Lighting	Palm Tree	Yes	P1	1,0	200,00
615	2018/03/14	20:44:00	20:48:00	21:02:00	21:28:00	0:27	0:04	0:44	C	1	2	Other	Electrical Faults	Electricity Pole	Yes	WT1	0,0	0,00
616	2018/03/15	15:47:00	15:47:00	16:06:00	19:51:00	4:00	0:00	4:04	C	1	2	Other Services	Special Services	Roof	Yes	WT1	0,0	0,00
617	2018/03/15	17:58:00	17:59:00	18:14:00	20:15:00	2:16	0:01	2:17	D	1	0	Other Services	Special Services	Water Supply	Yes	P5	5,0	36,76
618	2018/03/18	13:40:00	14:32:00	14:43:00	23:14:00	8:00	0:52	9:34	C	2	3	Other Services	Special Services	Rainstorm	Yes	P1	0,0	0,00
619	2018/03/18	14:19:00	14:20:00	14:56:00	19:57:00	5:25	0:01	5:38	C	1	2	Other Services	Special Services	Roof Blown Off	Yes	WT1	0,0	0,00
620	2018/03/19	20:07:00	20:08:00	20:18:00	20:35:00	0:11	0:01	0:28	D	1	2	Other	Open Flames	Grass	Yes	WT1	2,0	181,82
621	2018/03/20	20:29:00	20:33:00	20:46:00	21:42:00	0:48	0:04	1:13	D	1	2	Other Services	Rescues	MVA	Yes	WT1	1,0	20,83
622	2018/03/23	08:35:00	08:37:00	08:44:00	09:36:00	0:08	0:02	1:01	C	1	3	Other	Electrical Faults	Electricity Pole	Yes	P2	0,0	0,00
623	2018/03/25	03:42:00	03:46:00	03:52:00	04:16:00	0:12	0:04	0:34	C	1	4	Residential	Open Flames	Formal	Yes	P2	1,0	83,33
624	2018/03/25	18:11:00	18:13:00	18:30:00	18:59:00	0:19	0:02	0:48	E	1	2	Residential	Electrical Faults	Formal	Yes	P1	2,0	105,26
625	2018/03/26	15:27:00	15:30:00	15:33:00	18:18:00	2:19	0:03	2:51	C	2	4	Residential	Cooking	Flats	Yes	P1	12,0	86,33
626	2018/03/26	22:14:00	22:29:00	22:34:00	00:17:00	1:07	0:15	2:03	C	2	3	Other	Open Flames	Tree Stamps	Yes	P2	4,0	59,70
627	2018/03/27	11:57:00	12:01:00	12:08:00	12:29:00	0:21	0:04	0:32	C	1	3	Residential	Cooking	Formal	Yes	P1	2,0	95,24
628	2018/03/28	09:05:00	09:08:00	09:17:00	10:02:00	0:36	0:03	0:57	C	1	2	Residential	Cooking	Formal	Yes	P1	2,0	55,56
629	2018/03/29	08:52:00	08:52:00	09:30:00	18:02:00	9:00	0:00	9:10	C	1	0	Other Services	Special Services	Water Supply	Yes	P1	20,0	37,04
630	2018/03/30	01:04:00	01:07:00	01:21:00	02:04:00	0:17	0:03	1:00	E	1	3	Residential	Open Flames	Formal	Yes	P2	2,0	117,65
631	2018/03/31	07:31:00	07:34:00	07:49:00	09:16:00	0:52	0:03	1:45	B	2	3	Other Services	Hazmat	Gas Leak	Yes	P1	0,0	0,00
632	2018/04/01	01:59:00	02:02:00	02:06:00	04:01:00	1:50	0:03	2:02	C	2	3	Other Services	Rescues	Entrapment	Yes	P1	1,0	9,09
633	2018/04/01	14:02:00	14:05:00	14:15:00	14:45:00	0:34	0:03	0:43	C	2	3	Residential	Other	Informal	Yes	P1	3,0	88,24
634	2018/04/02	17:14:00	17:14:00	17:28:00	18:31:00	0:57	0:00	1:17	E	1	0	Other Services	Special Services	Water Supply	Yes	WT2	5,0	87,72

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
635	2018/04/02	20:58:00	21:00:00	21:06:00	22:06:00	0:29	0:02	1:08	E	1	3	Residential	Open Flames	Formal	Yes	P2	3,0	103,45
636	2018/04/02	21:58:00	21:58:00	21:58:00	22:34:00	0:18	0:00	0:36	C	1	3	Other	Open Flames	Rubbish	Yes	P2	1,0	55,56
637	2018/04/03	00:08:00	00:10:00	00:18:00	00:46:00	0:19	0:02	0:38	B	1	2	Other	Open Flames	Rubbish	Yes	P1	2,0	105,26
638	2018/04/07	08:11:00	08:14:00	08:17:00	08:59:00	0:38	0:03	0:48	C	1	3	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
639	2018/04/08	17:54:00	17:54:00	17:56:00	19:15:00	1:18	0:00	1:21	C	3	4	Residential	Heating	Formal	Yes	P1	5,0	64,10
640	2018/04/09	21:37:00	21:40:00	21:49:00	22:36:00	0:33	0:03	0:59	C	1	2	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
641	2018/04/13	07:02:00	07:10:00	07:32:00	10:08:00	1:49	0:08	3:06	C	2	3	Storage	Lighting	Lucern	Yes	P5	15,0	137,61
642	2018/04/16	14:22:00	14:25:00	14:45:00	15:31:00	0:23	0:03	1:09	C	1	3	Other	Electrical Faults	DB Box	Yes	P2	0,0	0,00
643	2018/04/16	15:16:00	15:16:00	15:30:00	18:33:00	3:17	0:00	3:17	D	1	2	Other Services	Special Services	Water Supply	Yes	P2	10,0	50,76
644	2018/04/21	01:29:00	01:33:00	01:38:00	03:20:00	1:30	0:04	1:51	C	3	7	Industry	Electrical Faults	Truck	Yes	P1	5,0	55,56
645	2018/04/21	13:14:00	13:18:00	13:30:00	15:30:00	2:12	0:04	2:16	C	2	3	Commercial	Electrical Faults	Powerstation	Yes	P2	0,0	0,00
646	2018/04/22	03:12:00	03:16:00	03:27:00	03:55:00	0:26	0:04	0:43	E	1	3	Residential	Open Flames	Formal	Yes	P2	2,0	76,92
647	2018/04/22	13:27:00	13:28:00	13:35:00	15:13:00	1:38	0:01	1:46	D	1	3	Other Services	Special Services	MVA	Yes	P5	3,0	30,61
648	2018/04/22	13:39:00	13:39:00	13:48:00	15:00:00	1:21	0:00	1:21	E	1	0	Other Services	Special Services	Water Supply	Yes	WT2	5,0	61,73
649	2018/04/24	19:35:00	19:35:00	19:40:00	20:38:00	0:36	0:00	1:03	C	1	3	Other Services	Special Services	Medical	Yes	P5	0,0	0,00
650	2018/04/27	14:56:00	14:59:00	15:10:00	15:32:00	0:21	0:03	0:36	B	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	47,62
651	2018/04/27	20:13:00	20:14:00	20:14:00	20:29:00	0:14	0:01	0:16	C	1	1	Other	Open Flames	Grass	Yes	P2	1,0	71,43
652	2018/04/28	03:53:00	03:56:00	04:00:00	04:32:00	0:34	0:03	0:39	C	1	2	Residential	Electrical Faults	Formal	Yes	P1	1,0	29,41
653	2018/04/28	15:17:00	15:20:00	15:35:00	16:30:00	0:40	0:03	1:13	C	1	2	Residential	Arson	Informal	Yes	P2	2,0	50,00
654	2018/04/30	10:16:00	10:19:00	10:47:00	16:18:00	3:00	0:03	6:02	B	1	0	Other Services	Special Services	Water Supply	Yes	WT2	20,0	111,11
655	2018/05/01	14:42:00	14:45:00	15:00:00	16:23:00	0:50	0:03	1:41	C	1	0	Other Services	Special Services	Water Supply	Yes	WT2	2,0	40,00
656	2018/05/01	15:32:00	15:37:00	16:11:00	17:36:00	1:22	0:05	2:04	C	1	5	Residential	Arson	Informal	Yes	P2	1,0	12,20
657	2018/05/02	00:40:00	00:43:00	00:55:00	01:32:00	0:30	0:03	0:52	E	1	3	Residential	Arson	Informal	Yes	P1	1,0	33,33
658	2018/05/02	11:41:00	11:41:00	11:48:00	12:24:00	0:09	0:00	0:43	C	1	2	Other	Open Flames	Rubbish	Yes	P2	1,0	111,11
659	2018/05/02	20:21:00	20:23:00	20:35:00	21:08:00	0:12	0:02	0:47	E	1	3	Residential	Open Flames	Informal	Yes	P1	1,0	83,33
660	2018/05/05	05:48:00	05:48:00	05:51:00	08:20:00	2:16	0:00	2:32	C	2	3	Commercial	Open Flames	Formal	Yes	P2	30,0	220,59
661	2018/05/10	14:01:00	14:03:00	14:07:00	15:03:00	0:42	0:02	1:02	C	3	8	Residential	Electrical Faults	Formal	Yes	P2	5,0	119,05
662	2018/05/11	01:06:00	01:09:00	01:13:00	02:24:00	0:54	0:03	1:18	B	1	3	Other Services	Rescues	Car Fire	Yes	P2	1,0	18,52
663	2018/05/13	22:34:00	22:37:00	22:38:00	22:47:00	0:08	0:03	0:13	A	1	1	Other	Open Flames	Tyres	Yes	P1	1,0	125,00
664	2018/05/18	12:09:00	12:09:00	12:13:00	12:47:00	0:15	0:00	0:38	C	1	2	Other	Open Flames	Rubbish	Yes	P2	2,0	133,33
665	2018/05/18	13:00:00	13:00:00	13:06:00	13:12:00	0:02	0:00	0:12	A	1	2	Institutional	Electrical Faults	Electricity Pole	Yes	P1	0,0	0,00
666	2018/05/21	17:23:00	17:25:00	17:40:00	18:57:00	1:05	0:02	1:34	C	1	1	Other Services	Special Services	Water Supply	Yes	WT2	2,0	30,77
667	2018/05/21	20:07:00	20:10:00	20:18:00	20:41:00	0:27	0:03	0:34	C	1	2	Residential	Open Flames	Formal	Yes	P1	2,0	74,07
668	2018/05/22	11:21:00	11:21:00	11:35:00	12:41:00	1:20	0:00	1:20	D	1	3	Other Services	Special Services	Water Supply	Yes	P5	5,0	62,50
669	2018/05/24	10:57:00	11:00:00	11:35:00	13:57:00	2:45	0:03	3:00	D	1	1	Other Services	Special Services	Water Supply	Yes	P5	2,0	12,12
670	2018/05/25	20:58:00	21:00:00	21:25:00	22:00:00	0:36	0:02	1:02	C	1	3	Residential	Open Flames	Informal	Yes	P2	1,0	27,78
671	2018/05/26	14:32:00	14:33:00	14:50:00	16:30:00	1:05	0:01	1:58	C	1	1	Other Services	Special Services	Water Supply	Yes	WT2	2,0	30,77
672	2018/05/26	16:06:00	16:09:00	16:18:00	18:30:00	1:24	0:03	2:24	E	3	7	Industry	Welding	Mining	Yes	P1	12,0	142,86
673	2018/05/26	23:07:00	23:08:00	23:22:00	00:14:00	0:33	0:01	1:07	C	1	1	Other	Open Flames	Wood	Yes	P5	1,0	30,30
674	2018/05/27	12:37:00	12:40:00	13:00:00	16:28:00	3:20	0:03	3:51	C	1	1	Other Services	Special Services	Water Supply	Yes	P5	10,0	50,00
675	2018/05/28	23:30:00	23:30:00	23:38:00	00:27:00	0:45	0:00	0:57	E	1	3	Residential	Open Flames	Formal	Yes	P5	2,0	44,44
676	2018/05/29	15:00:00	15:02:00	15:30:00	18:17:00	3:00	0:02	3:17	C	1	2	Other Services	Special Services	Water Supply	Yes	P5	5,0	27,78
677	2018/05/29	19:43:00	19:47:00	19:56:00	21:31:00	1:46	0:04	1:48	C	3	5	Residential	Electrical Faults	Formal	Yes	P1	20,0	188,68
678	2018/05/30	15:51:00	15:51:00	16:10:00	19:04:00	2:13	0:00	3:13	E	1	0	Other Services	Special Services	Water Supply	Yes	WT2	20,0	150,38
679	2018/05/31	10:19:00	10:22:00	10:25:00	13:15:00	2:40	0:03	2:56	D	1	1	Other Services	Special Services	Water Supply	Yes	WT2	10,0	62,50
680	2018/06/01	15:14:00	15:14:00	16:45:00	18:05:00	0:35	0:00	2:51	C	1	1	Other Services	Special Services	Water Supply	Yes	WT2	10,0	285,71
681	2018/06/02	02:12:00	02:16:00	02:18:00	02:52:00	0:21	0:04	0:40	E	1	3	Residential	Open Flames	Informal	Yes	P2	1,0	47,62
682	2018/06/02	07:11:00	07:17:00	07:25:00	08:10:00	0:11	0:06	0:59	C	1	3	Other	Open Flames	Palm Tree	Yes	P2	2,0	181,82
683	2018/06/02	10:11:00	10:11:00	10:21:00	10:45:00	1:16	0:00	0:34	E	1	3	Other Services	Special Services	Water Supply	Yes	P5	50,0	657,89
684	2018/06/02	23:19:00	23:21:00	23:51:00	00:18:00	0:17	0:02	0:59	E	1	3	Other Services	Special Services	Water Supply	Yes	P2	1,0	58,82
685	2018/06/03	04:17:00	04:22:00	04:26:00	05:07:00	0:50	0:05	0:50	E	1	2	Residential	Open Flames	Informal	Yes	P2	1,0	20,00
686	2018/06/03	14:39:00	15:01:00	15:07:00	15:27:00	0:09	0:22	0:48	A	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	111,11
687	2018/06/03	16:11:00	16:14:00	16:22:00	16:55:00	0:18	0:03	0:44	D	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
688	2018/06/04	12:06:00	12:09:00	12:16:00	13:04:00	0:25	0:03	0:58	E	1	2	Residential	Open Flames	Informal	Yes	P2	2,0	80,00
689	2018/06/04	18:31:00	18:33:00	18:37:00	19:11:00	0:26	0:02	0:40	C	1	4	Residential	Open Flames	Informal	Yes	P2	2,0	76,92
690	2018/06/05	02:15:00	02:18:00	02:30:00	03:11:00	0:33	0:03	0:56	C	1	4	Residential	Open Flames	Informal	Yes	P2	2,0	60,61
691	2018/06/05	04:15:00	04:18:00	04:22:00	04:55:00	0:31	0:03	0:40	C	1	2	Other	Electrical Faults	Electricity Pole	Yes	P1	0,0	0,00
692	2018/06/05	15:52:00	15:54:00	16:00:00	19:10:00	2:56	0:02	3:18	C	1	2	Other Services	Special Services	Water Supply	Yes	P5	2,0	11,36
693	2018/06/07	00:08:00	00:11:00	00:15:00	00:54:00	0:31	0:03	0:46	C	1	2	Commercial	Open Flames	Outside Storage	Yes	P1	3,0	96,77
694	2018/06/07	02:13:00	02:16:00	02:20:00	02:33:00	0:10	0:03	0:20	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	100,00
695	2018/06/08	00:53:00	00:56:00	01:03:00	02:01:00	0:35	0:03	1:08	C	1	4	Residential	Open Flames	Formal	Yes	P1	2,0	57,14
696	2018/06/09	13:52:00	13:54:00	14:17:00	16:54:00	2:10	0:02	3:02	D	1	2	Other	Open Flames	Grass	Yes	P2	2,0	15,38
697	2018/06/10	20:32:00	20:35:00	20:52:00	22:00:00	1:03	0:03	1:28	C	1	2	Residential	Undetermined	Informal	Yes	P5	2,0	31,75
698	2018/06/10	05:00:00	05:03:00	05:13:00	06:17:00	0:43	0:03	1:17	C	1	3	Residential	Open Flames	Informal	Yes	P2	2,0	46,51
699	2018/06/10	11:06:00	11:06:00	11:30:00	14:06:00	2:39	0:00	3:00	E	1	2	Other Services	Special Services	Water Supply	Yes	P5	2,0	12,58
700	2018/06/10	12:03:00	12:05:00	12:30:00	14:10:00	1:40	0:02	2:07	C	1	2	Other Services	Special Services	Water Supply	Yes	WT2	2,0	20,00
701	2018/06/12	04:35:00	04:38:00	04:54:00	05:26:00	0:23	0:03	0:51	E	1	3	Residential	Open Flames	Informal	Yes	P1	1,0	43,48
702	2018/06/12	08:10:00	08:12:00	08:22:00	09:15:00	0:48	0:02	1:05	C	1	2	Other Services	Special Services	Water Supply	Yes	P1	2,0	41,67
703	2018/06/13	16:29:00	16:34:00	16:42:00	18:00:00	0:46	0:05	1:31	B	2	1	Other	Open Flames	Grass	Yes	P2	1,0	21,74
704	2018/06/13	20:09:00	20:12:00	20:17:00	20:45:00	0:18	0:03	0:36	C	1	2	Other	Open Flames	Grass	Yes	P1	2,0	111,11
705	2018/06/15	20:35:00	20:40:00	20:50:00	21:18:00	0:20	0:05	0:43	C	1	1	Industry	Electrical Faults	Mini Sub	Yes	P1	1,0	50,00
706	2018/06/16	15:50:00	15:55:00	16:10:00	16:31:00	0:15	0:05	0:41	C	1	1	Other	Open Flames	Rubbish	Yes	P1	1,0	66,67
707	2018/06/17	10:14:00	10:17:00	10:26:00	10:54:00	0:14	0:03	0:40	C	1	1	Other	Open Flames	Rubbish	Yes	P1	2,0	142,86
708	2018/06/17	13:34:00	13:37:00	13:44:00	14:02:00	0:12	0:03	0:28	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	83,33
709	2018/06/18	13:57:00	14:00:00	14:06:00	14:44:00	0:09	0:03	0:47	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	111,11
710	2018/06/18	16:00:00	16:03:00	16:10:00	16:45:00	0:55	0:03	0:45	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	18,18
711	2018/06/18	17:05:00	17:08:00	17:10:00	18:30:00	1:20	0:03	1:25	E	2	2	Public Assembly	Electrical Faults	Hall	Yes	P1	0,0	0,00
712	2018/06/19	08:50:00	08:50:00	09:03:00	09:21:00	0:30	0:00	0:31	B	1	1	Other Services	Special Services	Water Supply	Yes	WT2	1,0	33,33
713	2018/06/20	11:06:00	11:06:00	11:42:00	13:53:00	1:13	0:00	2:47	C	1	0	Other Services	Special Services	Cutting Tree	Yes	P1	0,0	0,00
714	2018/06/20	23:55:00	23:56:00	00:10:00	00:23:00	0:28	0:01	0:28	C	1	0	Residential	Open Flames	Grass	Yes	P2	0,0	0,00
715	2018/06/21	10:25:00	10:25:00	10:25:00	14:52:00	0:46	0:00	4:27	C	1	1	Other Services	Special Service	-	Yes	SNK	0,0	0,00
716	2018/06/21	12:27:00	12:27:00	12:28:00	13:15:00	0:24	0:00	0:48	C	1	1	Other	Open Flames	Grass	Yes	P1	0,0	0,00
717	2018/06/21	14:34:00	14:39:00	14:47:00	15:38:00	0:41	0:05	1:04	E	1	1	Other	Open Flames	Grass	Yes	P1	0,0	0,00
718	2018/06/21	16:17:00	16:20:00	16:32:00	17:13:00	0:27	0:03	0:56	E	1	1	Other	Open Flames	Grass	Yes	P1	1,0	37,04
719	2018/06/21	16:25:00	16:32:00	16:42:00	17:12:00	0:30	0:07	0:47	C	1	1	Other	Open Flames	Tyres	Yes	WT2	1,0	33,33
720	2018/06/21	17:25:00	17:27:00	17:44:00	18:10:00	0:06	0:02	0:45	C	1	1	Other	Open Flames	Grass	Yes	P1	2,0	333,33
721	2018/06/22	12:15:00	12:18:00	12:28:00	13:00:00	0:29	0:03	0:45	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	34,48
722	2018/06/22	13:00:00	13:03:00	13:08:00	13:21:00	0:12	0:03	0:21	D	1	2	Other	Open Flames	Grass	Yes	P1	1,0	83,33
723	2018/06/22	15:54:00	15:56:00	16:11:00	17:24:00	1:03	0:02	1:30	C	2	4	Residential	Electrical	Formal	Yes	P1	1,0	15,87
724	2018/06/22	17:59:00	18:03:00	18:13:00	20:59:00	2:38	0:04	3:00	C	1	5	Other Services	Rescues	MVA	Yes	P1	4,0	25,32
725	2018/06/22	21:27:00	21:34:00	21:35:00	21:38:00	0:01	0:07	0:11	B	1	5	Other Services	Rescues	MVA	Yes	P1	1,0	1000,00
726	2018/06/23	01:23:00	01:38:00	01:38:00	01:41:00	0:56	0:15	0:18	B	1	4	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
727	2018/06/23	13:01:00	13:04:00	13:16:00	13:47:00	0:16	0:03	0:46	C	1	5	Other	Open Flames	Tree	Yes	P1	2,0	125,00
728	2018/06/23	15:01:00	15:05:00	15:13:00	16:04:00	0:35	0:04	1:03	C	1	5	Other	Open Flames	Grass	Yes	P5	2,0	57,14
729	2018/06/23	17:52:00	17:55:00	18:10:00	18:30:00	0:20	0:03	0:38	C	1	2	Other Services	Special Service	Water Supply	Yes	P1	1,0	50,00
730	2018/06/23	19:19:00	19:24:00	19:35:00	20:19:00	0:41	0:05	1:00	C	1	5	Other	Open Flames	Grass	Yes	P1	2,0	48,78
731	2018/06/25	13:58:00	14:05:00	14:14:00	15:50:00	1:20	0:07	1:52	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
732	2018/06/26	13:12:00	13:15:00	13:26:00	14:15:00	0:22	0:03	1:03	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	45,45
733	2018/06/26	14:53:00	14:56:00	15:03:00	16:00:00	0:35	0:03	1:07	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	28,57
734	2018/06/26	02:13:00	02:15:00	02:27:00	02:50:00	0:30	0:02	0:37	C	1	3	Other	Open Flames	Grass	Yes	P5	3,0	100,00
735	2018/06/27	08:53:00	09:10:00	09:23:00	10:47:00	1:48	0:17	1:54	D	1	2	Other Services	Special Service	Water Supply	Yes	P1	10,0	92,59
736	2018/06/27	18:11:00	18:16:00	18:41:00	00:58:00	3:42	0:05	4:54	D	2	3	Commercial	Electrical Faults	Supermarket	Yes	P1	40,0	180,18
737	2018/06/28	11:50:00	11:53:00	13:22:00	15:09:00	2:33	0:03	3:19	C	1	1	Commercial	Electrical Faults	Supermarket	Yes	WT2	8,0	52,29
738	2018/06/28	16:57:00	17:00:00	17:15:00	18:26:00	1:00	0:03	1:29	C	1	0	Other Services	Special Service	Water Supply	Yes	WT2	2,0	33,33
739	2018/06/28	17:50:00	17:53:00	18:15:00	18:44:00	0:38	0:03	0:54	B	2	1	Other	Open Flames	Grass	Yes	P1	1,0	26,32
740	2018/06/29	19:19:00	19:22:00	19:33:00	20:06:00	0:19	0:03	0:47	D	1	3	Transport	Electrical Faults	Car	Yes	P1	2,0	105,26

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
741	2018/06/30	06:00:00	06:00:00	06:08:00	07:08:00	0:17	0:00	1:08	C	1	1	Residential	Open Flames	Informal	Yes	P5	2,0	117,65
742	2018/06/30	10:09:00	10:11:00	10:15:00	10:28:00	0:06	0:02	0:19	A	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	166,67
743	2018/06/30	23:07:00	23:11:00	23:13:00	23:18:00	0:05	0:04	0:11	A	1	3	Other	Open Flames	Tyres	Yes	P1	1,0	200,00
744	2018/07/01	00:52:00	00:55:00	01:09:00	01:35:00	0:09	0:03	0:43	D	1	3	Residential	Open Flames	Informal	Yes	P1	1,0	111,11
745	2018/07/01	01:47:00	01:49:00	02:02:00	03:05:00	0:34	0:02	1:18	C	1	3	Residential	Electrical Faults	Informal	Yes	P1	3,0	88,24
746	2018/07/01	04:17:00	04:20:00	04:29:00	08:00:00	2:44	0:03	3:43	D	2	3	Commercial	Undetermined	Storage	Yes	P1	25,0	152,44
747	2018/07/03	10:08:00	10:10:00	10:13:00	10:21:00	0:02	0:02	0:13	A	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	500,00
748	2018/07/03	11:58:00	12:00:00	12:04:00	13:30:00	1:18	0:02	1:32	C	1	2	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
749	2018/07/03	13:47:00	13:48:00	13:56:00	14:34:00	0:13	0:01	0:47	C	1	2	Residential	Open Flames	Informal	Yes	P2	1,0	76,92
750	2018/07/03	16:42:00	16:42:00	17:00:00	19:06:00	2:24	0:00	2:24	E	1	2	Other Services	Special Service	Water Supply	Yes	P5	20,0	138,89
751	2018/07/03	20:56:00	20:59:00	21:09:00	22:15:00	0:31	0:03	1:19	C	3	4	Residential	Electrical	Informal	Yes	P1	5,0	161,29
752	2018/07/04	12:36:00	12:39:00	13:00:00	14:52:00	1:00	0:03	2:16	C	1	2	Other Services	Special Service	Water Supply	Yes	P5	6,0	100,00
753	2018/07/04	18:20:00	18:24:00	18:32:00	19:03:00	0:40	0:04	0:43	C	1	2	Residential	Electrical	Informal	Yes	P1	1,0	25,00
754	2018/07/04	20:18:00	20:21:00	20:25:00	22:02:00	1:17	0:03	1:44	C	3	6	Residential	Arson	Informal	Yes	P1	12,0	155,84
755	2018/07/05	11:20:00	11:21:00	11:31:00	11:48:00	0:12	0:01	0:28	A	1	2	Residential	Arson	Informal	Yes	P2	1,0	83,33
756	2018/07/05	12:08:00	12:11:00	12:15:00	12:55:00	0:13	0:03	0:47	D	1	1	Other	Open Flames	Grass	Yes	P1	0,0	0,00
757	2018/07/05	19:01:00	19:11:00	19:29:00	19:59:00	0:07	0:10	0:58	D	1	1	Other	Open Flames	Grass	Yes	P2	0,0	0,00
758	2018/07/05	14:36:00	14:36:00	15:10:00	19:21:00	4:45	0:00	4:45	E	1	0	Other Services	Special Service	Water Supply	Yes	WT2	20,0	70,18
759	2018/07/07	00:18:00	00:21:00	00:34:00	01:56:00	0:42	0:03	1:38	C	1	3	Residential	Open Flames	Informal	Yes	P2	2,0	47,62
760	2018/07/08	10:25:00	10:30:00	11:06:00	18:15:00	7:20	0:05	7:50	C	1	0	Other Services	Special Service	Water Supply	Yes	WT2	20,0	45,45
761	2018/07/08	21:33:00	21:35:00	21:43:00	21:52:00	0:11	0:02	0:19	B	1	2	Other	Open Flames	Grass	Yes	P1	1,0	90,91
762	2018/07/09	05:11:00	05:13:00	05:32:00	07:09:00	1:22	0:02	1:58	C	1	3	Other	Open Flames	Grass	Yes	P2	2,0	24,39
763	2018/07/11	10:55:00	10:55:00	10:59:00	11:35:00	0:30	0:00	0:40	C	1	0	Other Services	Special Service	Water Supply	Yes	WT1	2,0	66,67
764	2018/07/11	12:14:00	12:17:00	12:25:00	12:52:00	0:25	0:03	0:38	C	3	5	Residential	Open Flames	Informal	Yes	P1	2,0	80,00
765	2018/07/11	17:37:00	17:40:00	17:54:00	18:21:00	0:26	0:03	0:44	C	2	2	Other	Open Flames	Grass	Yes	P1	2,0	76,92
766	2018/07/12	12:21:00	12:23:00	12:33:00	13:22:00	0:44	0:02	1:01	D	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
767	2018/07/12	12:49:00	13:27:00	14:01:00	16:25:00	2:13	0:38	3:36	C	1	3	Public assembly	Arson	Hall	Yes	P1	5,0	37,59
768	2018/07/12	14:08:00	14:10:00	14:23:00	15:16:00	0:50	0:02	1:08	C	1	2	Other	Open Flames	Grass	Yes	WT1	1,0	20,00
769	2018/07/12	23:15:00	23:18:00	23:22:00	01:24:00	1:02	0:03	2:09	C	1	2	Commercial	Undetermined	Storage	Yes	WT1	1,0	16,13
770	2018/07/14	02:10:00	02:13:00	02:31:00	02:38:00	0:03	0:03	0:28	C	2	2	Residential	Open Flames	Informal	Yes	P1	1,0	333,33
771	2018/07/14	02:24:00	02:28:00	02:36:00	03:38:00	0:44	0:04	1:14	E	2	4	Commercial	Arson	Supermarket	Yes	P1	5,0	113,64
772	2018/07/14	06:21:00	06:22:00	06:34:00	13:21:00	6:57	0:01	7:00	E	2	2	Other Services	Hazmat	-	Yes	P1	0,0	0,00
773	2018/07/14	06:50:00	06:57:00	07:08:00	07:58:00	0:44	0:07	1:08	E	1	4	Commercial	Arson	Tuckshop	Yes	P1	3,0	68,18
774	2018/07/14	13:06:00	13:09:00	13:13:00	14:36:00	1:23	0:03	1:30	B	1	5	Other Services	Special Service	MVA	Yes	P1	0,0	0,00
775	2018/07/14	15:00:00	15:00:00	15:20:00	19:45:00	3:40	0:00	4:45	D	1	2	Other Services	Special Service	Water Supply	Yes	WT1	1,0	4,55
776	2018/07/15	00:56:00	01:00:00	01:08:00	01:32:00	0:20	0:04	0:36	C	2	6	Commercial	Arson	Tuckshop	Yes	P1	4,0	200,00
777	2018/07/15	15:10:00	15:14:00	15:21:00	15:49:00	0:13	0:04	0:39	E	2	4	Residential	Arson	Informal	Yes	P1	2,0	153,85
778	2018/07/16	11:39:00	11:40:00	11:54:00	13:00:00	1:08	0:01	1:21	C	1	2	Other	Open Flames	Grass	Yes	P2	1,0	14,71
779	2018/07/17	14:25:00	14:28:00	15:21:00	18:40:00	2:39	0:03	4:15	C	1	1	Other Services	Special Service	Water Supply	Yes	WT2	1,0	6,29
780	2018/07/17	15:18:00	15:21:00	15:28:00	16:14:00	0:27	0:03	0:56	B	1	2	Other	Open Flames	Grass	Yes	P1	1,0	37,04
781	2018/07/17	18:18:00	18:21:00	18:36:00	18:46:00	0:07	0:03	0:28	C	1	4	Other	Open Flames	Grass	Yes	P3	0,0	0,00
782	2018/07/17	17:37:00	17:37:00	18:00:00	19:44:00	0:44	0:00	2:07	E	1	2	Other Services	Special Service	Water Supply	Yes	WT1	10,0	227,27
783	2018/07/18	11:00:00	11:00:00	11:35:00	19:51:00	7:25	0:00	8:51	C	2	2	Other Services	Special Service	Water Supply	Yes	P1	3,0	6,74
784	2018/07/18	17:20:00	17:21:00	17:36:00	18:00:00	0:27	0:01	0:40	C	2	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
785	2018/07/19	08:38:00	08:38:00	08:55:00	09:46:00	1:08	0:00	1:08	D	1	1	Other Services	Special Service	Water Supply	Yes	WT1	10,0	147,06
786	2018/07/19	10:40:00	11:31:00	12:39:00	15:06:00	2:35	0:51	4:26	E	1	1	Other Services	Special Service	Water Supply	Yes	WT2	30,0	193,55
787	2018/07/20	05:47:00	05:50:00	05:55:00	06:01:00	0:02	0:03	0:14	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	500,00
788	2018/07/20	09:36:00	09:40:00	10:00:00	19:50:00	9:50	0:04	10:14	D	1	2	Other Services	Special Service	Water Supply	Yes	WT1	1,0	1,69
789	2018/07/20	10:00:00	10:03:00	10:10:00	10:28:00	0:12	0:03	0:28	C	1	3	Other Services	Special Service	Water Supply	Yes	P1	1,0	83,33
790	2018/07/20	13:34:00	13:39:00	13:50:00	14:50:00	0:54	0:05	1:16	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	18,52
791	2018/07/22	13:30:00	13:33:00	13:38:00	14:09:00	0:15	0:03	0:39	B	1	3	Other	Open Flames	Rubbish	Yes	P3	1,0	66,67
792	2018/07/22	15:44:00	15:47:00	16:00:00	16:59:00	0:01	0:03	1:15	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	2000,00
793	2018/07/22	16:46:00	16:49:00	16:49:00	17:20:00	0:34	0:03	0:34	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	29,41

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
794	2018/07/23	08:20:00	08:22:00	08:22:00	08:26:00	0:04	0:02	0:06	A	1	2	Other	Open Flames	Grass	Yes	P1	1,0	250,00
795	2018/07/24	16:37:00	19:08:00	19:36:00	21:28:00	2:00	2:31	4:51	C	2	2	Other Services	Special Service	Water Supply	Yes	P1	2,0	16,67
796	2018/07/24	22:36:00	22:39:00	22:53:00	23:31:00	0:39	0:03	0:55	D	1	3	Other	Open Flames	Grass	Yes	P1	1,0	25,64
797	2018/07/25	00:44:00	00:45:00	01:06:00	01:52:00	0:40	0:01	1:08	C	1	3	Commercial	Arson	Tuckshop	Yes	P3	2,0	50,00
798	2018/07/25	15:15:00	15:16:00	15:23:00	16:32:00	0:50	0:01	1:17	D	1	4	Transport	Lightning	Bakkie	Yes	P1	10,0	200,00
799	2018/07/27	00:45:00	00:48:00	01:51:00	03:50:00	2:06	0:03	3:05	D	1	2	Transport	Open Flames	Truck	Yes	WT2	2,0	15,87
800	2018/07/27	11:22:00	11:23:00	11:40:00	12:05:00	0:25	0:01	0:43	B	1	1	Other	Open Flames	Rubbish	Yes	D6	1,0	40,00
801	2018/07/27	12:54:00	12:55:00	13:02:00	13:55:00	0:53	0:01	1:01	D	1	2	Other	Open Flames	Grass	Yes	D6	1,0	18,87
802	2018/07/27	16:40:00	16:42:00	17:00:00	18:10:00	1:02	0:02	1:30	B	1	1	Other	Open Flames	Grass	Yes	D6	1,0	16,13
803	2018/07/27	18:10:00	18:10:00	18:20:00	18:55:00	0:14	0:00	0:45	A	1	1	Other	Open Flames	Grass	Yes	D6	1,0	71,43
804	2018/07/28	17:56:00	17:57:00	18:06:00	18:42:00	0:12	0:01	0:46	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	83,33
805	2018/07/29	11:53:00	11:57:00	11:59:00	12:16:00	0:15	0:04	0:23	A	1	1	Other	Open Flames	Rubbish	Yes	WT2	1,0	66,67
806	2018/07/29	16:05:00	16:05:00	16:10:00	16:55:00	0:17	0:00	0:50	C	1	1	Other	Open Flames	Grass	Yes	D6	1,0	58,82
807	2018/07/30	04:46:00	04:49:00	05:05:00	06:48:00	1:59	0:03	2:02	E	1	3	Residential	Undetermined	Formal	Yes	P1	3,0	25,21
808	2018/07/30	08:29:00	08:29:00	08:40:00	09:22:00	0:42	0:00	0:53	C	2	1	Public assembly	Open Flames	Hall	Yes	P1	0,0	0,00
809	2018/07/31	05:36:00	05:41:00	05:45:00	06:08:00	0:23	0:05	0:32	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
810	2018/07/31	09:07:00	09:10:00	09:18:00	09:27:00	0:06	0:03	0:20	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	166,67
811	2018/07/31	10:28:00	10:30:00	10:30:00	10:40:00	1:25	0:02	0:12	D	2	5	Other	Arson	Cottom	Yes	P1	15,0	176,47
812	2018/07/31	13:04:00	13:06:00	13:20:00	13:36:00	0:06	0:02	0:32	C	1	4	Residential	Electrical	Flat	Yes	P1	1,0	166,67
813	2018/07/31	15:45:00	15:47:00	16:06:00	16:30:00	0:09	0:02	0:45	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	111,11
814	2018/07/31	17:30:00	17:39:00	17:45:00	17:53:00	0:10	0:09	0:23	C	2	3	Other	Open Flames	Grass	Yes	P1	1,0	100,00
815	2018/08/01	13:45:00	13:45:00	13:50:00	15:43:00	1:53	0:00	1:58	C	1	3	Residential	Open Flames	Formal	Yes	P1	0,0	0,00
816	2018/08/01	23:44:00	23:50:00	00:00:00	00:22:00	0:22	0:06	0:38	C	2	1	Other	Open Flames	Grass	Yes	P1	2,0	90,91
817	2018/08/02	19:14:00	19:16:00	19:26:00	20:33:00	0:33	0:02	1:19	E	1	3	Residential	Open Flames	Informal	Yes	WT2	1,0	30,30
818	2018/08/03	02:25:00	02:26:00	02:42:00	03:22:00	0:21	0:01	0:57	E	1	3	Residential	Open Flames	Informal	Yes	WT2	2,0	95,24
819	2018/08/03	15:20:00	15:20:00	15:32:00	16:20:00	0:48	0:00	1:00	C	1	3	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
820	2018/08/03	20:21:00	20:24:00	20:37:00	21:05:00	0:28	0:03	0:44	C	1	3	Other	Open Flames	Grass	Yes	WT2	0,8	28,57
821	2018/08/04	20:46:00	20:51:00	20:59:00	22:30:00	1:31	0:05	1:44	C	2	5	Residential	Undetermined	Informal	Yes	P1	1,0	10,99
822	2018/08/05	02:40:00	02:45:00	02:54:00	03:56:00	1:02	0:05	1:16	C	2	4	Residential	Arson	Informal	Yes	P1	0,0	0,00
823	2018/08/05	13:16:00	13:17:00	13:49:00	14:52:00	1:02	0:01	1:36	C	1	1	Other	Open Flames	Grass	Yes	WT1	5,0	80,65
824	2018/08/05	19:28:00	19:31:00	19:37:00	20:18:00	0:32	0:03	0:50	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	31,25
825	2018/08/05	19:38:00	19:39:00	19:48:00	21:02:00	1:42	0:01	1:24	C	1	3	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
826	2018/08/06	09:11:00	09:11:00	09:20:00	11:44:00	2:24	0:00	2:33	C	1	2	Other Services	Special Service	Water Supply	Yes	WT1	10,0	69,44
827	2018/08/06	11:02:00	11:09:00	11:14:00	12:03:00	0:45	0:07	1:01	B	1	3	Other Services	Special Service	Water Supply	Yes	P1	0,0	0,00
828	2018/08/06	17:58:00	18:02:00	18:07:00	18:21:00	0:08	0:04	0:23	B	1	4	Other	Open Flames	Grass	Yes	P1	1,0	125,00
829	2018/08/06	18:34:00	18:38:00	18:53:00	19:08:00	0:12	0:04	0:34	C	1	2	Other	Open Flames	Grass	Yes	P3	0,0	0,00
830	2018/08/07	03:26:00	03:30:00	03:35:00	05:40:00	0:10	0:04	2:14	D	2	6	Other Services	Special Service	Water Supply	Yes	P1	0,0	0,00
831	2018/08/07	09:53:00	09:58:00	10:02:00	11:05:00	1:17	0:05	1:12	A	3	5	Public assembly	Electrical	Hall	Yes	P5	0,0	0,00
832	2018/08/08	10:49:00	10:50:00	11:00:00	11:30:00	0:06	0:01	0:41	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	166,67
833	2018/08/08	11:51:00	11:51:00	11:56:00	12:23:00	0:24	0:00	0:32	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	41,67
834	2018/08/08	16:10:00	16:16:00	16:21:00	17:30:00	1:06	0:06	1:20	C	1	1	Other Services	Special Service	Water Supply	Yes	WT2	10,0	151,52
835	2018/08/09	07:27:00	07:30:00	07:35:00	08:38:00	1:01	0:03	1:11	B	1	1	Other Services	Special Service	Water Supply	Yes	WT2	10,0	163,93
836	2018/08/09	13:06:00	13:10:00	14:40:00	20:34:00	7:14	0:04	7:28	C	1	3	Other Services	Special Service	Water Supply	Yes	WT1	15,0	34,56
837	2018/08/10	14:06:00	14:07:00	14:20:00	14:57:00	0:10	0:01	0:51	C	1	2	Other	Open Flames	Grass	Yes	WT1	2,0	200,00
838	2018/08/10	18:54:00	18:54:00	19:04:00	19:47:00	0:15	0:00	0:53	C	1	2	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
839	2018/08/11	13:12:00	13:13:00	13:20:00	14:06:00	0:36	0:01	0:54	E	1	3	Other	Open Flames	Grass	Yes	P1	2,0	55,56
840	2018/08/11	20:58:00	21:04:00	21:11:00	21:23:00	0:06	0:06	0:25	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	166,67
841	2018/08/13	03:17:00	03:18:00	03:27:00	04:01:00	0:17	0:01	0:44	C	1	2	Residential	Open Flames	Formal	Yes	P3	2,0	117,65
842	2018/08/13	12:04:00	12:06:00	12:15:00	16:52:00	4:18	0:02	4:48	C	1	2	Other Services	Special Service	Water Supply	Yes	WT1	10,0	38,76
843	2018/08/13	20:01:00	20:02:00	20:17:00	20:44:00	0:26	0:01	0:43	C	1	4	Other	Open Flames	Grass	Yes	P3	1,0	38,46
844	2018/08/13	22:46:00	22:49:00	22:53:00	23:30:00	0:44	0:03	0:44	C	1	4	Residential	Smoking	Formal	Yes	P3	3,0	68,18
845	2018/08/13	23:25:00	23:26:00	23:27:00	00:00:00	0:16	0:01	0:35	C	1	3	Residential	Cooking	Informal	Yes	P3	2,0	125,00
846	2018/08/14	00:04:00	00:06:00	00:08:00	01:57:00	1:39	0:02	1:53	C	2		Residential	Cooking	Informal	Yes	P3	4,0	40,40

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
847	2018/08/14	09:06:00	09:06:00	09:15:00	11:04:00	1:58	0:00	1:58	D	1	1	Other Services	Special Service	Water Supply	Yes	P3	10,0	84,75
848	2018/08/15	02:57:00	02:59:00	03:01:00	04:30:00	1:10	0:02	1:33	A	2	3	Storage	Arson	Storeroom	Yes	P1	8,0	114,29
849	2018/08/15	07:52:00	07:55:00	08:02:00	08:19:00	0:11	0:03	0:27	C	1	3	Other	Open Flames	Grass	Yes	WT1	1,0	90,91
850	2018/08/15	12:19:00	12:25:00	12:33:00	14:54:00	2:11	0:06	2:35	D	1	2	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
851	2018/08/15	14:38:00	14:40:00	15:00:00	15:44:00	0:50	0:02	1:06	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	20,00
852	2018/08/15	16:11:00	16:13:00	16:38:00	17:55:00	1:06	0:02	1:44	D	1	2	Other	Open Flames	Grass	Yes	WT1	1,0	15,15
853	2018/08/15	17:06:00	17:08:00	17:18:00	18:34:00	0:31	0:02	1:28	C	1	2	Other	Open Flames	Grass	Yes	P3	1,0	32,26
854	2018/08/16	12:18:00	12:23:00	12:29:00	12:58:00	0:18	0:05	0:40	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	55,56
855	2018/08/16	15:38:00	15:39:00	15:55:00	18:29:00	2:14	0:01	2:51	E	2	5	Other	Open Flames	Grass	Yes	P1	1,0	7,46
856	2018/08/16	15:51:00	16:53:00	16:59:00	18:31:00	0:40	1:02	2:40	D	1	0	Other Services	Special Service	Water Supply	Yes	P1	1,0	25,00
857	2018/08/16	20:57:00	21:01:00	21:03:00	21:47:00	0:19	0:04	0:50	C	1	3	Other Services	Special Service	Water Supply	Yes	P1	0,0	0,00
858	2018/08/17	07:52:00	07:53:00	08:00:00	08:20:00	0:10	0:01	0:28	C	1	3	Other	Open Flames	Grass	Yes	WT1	1,0	100,00
859	2018/02/17	16:58:00	17:00:00	17:15:00	19:50:00	2:30	0:02	2:52	C	1	2	Other Services	Special Service	Water Supply	Yes	P1	10,0	66,67
860	2018/08/17	18:19:00	18:22:00	18:30:00	18:57:00	0:18	0:03	0:38	C	1	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
861	2015/08/17	20:58:00	21:08:00	21:42:00	22:00:00	0:18	0:10	1:02	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	55,56
862	2018/08/17	23:45:00	23:48:00	23:58:00	00:19:00	0:17	0:03	0:34	C	1	3	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
863	2018/08/18	12:28:00	12:30:00	12:50:00	13:55:00	1:00	0:02	1:27	C	1	3	Other	Open Flames		Yes	P1	0,0	0,00
864	2018/08/18	16:28:00	16:30:00	16:45:00	19:18:00	2:30	0:02	2:50	C	1	1	Other Services	Special Service	Water Supply	Yes	WT1	10,0	66,67
865	2018/08/19	12:42:00	12:43:00	13:00:00	14:00:00	1:30	0:01	1:18	C	1	2	Other Services	Special Service	Water Supply	Yes	WT1	3,0	33,33
866	2018/08/20	09:15:00	09:15:00	09:30:00	11:30:00	1:21	0:00	2:15	E	1	0	Other Services	Special Service	Water Supply	Yes	WT1	10,0	123,46
867	2018/08/20	11:57:00	11:58:00	11:58:00	12:11:00	0:14	0:01	0:14	D	1	2	Other	Open Flames	Rubbish	Yes	P3	1,0	71,43
868	2018/08/20	18:34:00	18:38:00	18:49:00	20:03:00	1:08	0:04	1:29	B	2	3	Industry	Welding	Scrapmetal	Yes	P1	15,0	220,59
869	2018/08/20	20:10:00	20:10:00	20:15:00	21:05:00	0:39	0:00	0:55	C	1	0	Other Services	Special Service	Water Supply	Yes	WT2	10,0	256,41
870	2018/08/21	15:16:00	15:19:00	15:26:00	16:35:00	0:58	0:03	1:19	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	34,48
871	2018/08/21	18:06:00	18:08:00	18:20:00	19:00:00	0:27	0:02	0:54	C	1	1	Other	Open Flames	Grass	Yes	D6	1,0	37,04
872	2018/08/22	11:47:00	11:51:00	11:59:00	13:30:00	1:31	0:04	1:43	C	1	1	Other Services	Special Service	Water Supply	Yes	WT2	0,0	0,00
873	2018/08/23	17:07:00	17:10:00	17:24:00	17:36:00	0:17	0:03	0:29	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
874	2018/08/24	19:09:00	19:13:00	19:37:00	20:06:00	0:57	0:04	0:57	C	1	3	Other Services	Special Service	MVA	Yes	P1	0,0	0,00
875	2018/08/24	19:30:00	19:35:00	19:46:00	20:14:00	0:05	0:05	0:44	C	1	2	Other	Open Flames	Grass	Yes	P3	1,0	200,00
876	2018/08/25	01:47:00	01:52:00	01:59:00	02:58:00	0:28	0:05	1:11	E	1	2	Residential	Electrical	Informal	Yes	P3	1,0	35,71
877	2018/08/25	12:30:00	12:32:00	12:36:00	13:12:00	0:36	0:02	0:42	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	27,78
878	2018/08/25	16:44:00	17:04:00	17:43:00	22:31:00	3:55	0:20	5:47	D	1	1	Other	Open Flames	Grass	Yes	D6	1,0	4,26
879	2018/08/25	18:56:00	18:59:00	19:04:00	19:19:00	0:11	0:03	0:23	B	1	4	Other	Open Flames	Rubbish	Yes	P1	1,0	90,91
880	2018/08/25	20:05:00	20:08:00	20:23:00	21:02:00	0:23	0:03	0:57	E	1	4	Residential	Open Flames	Informal	Yes	P1	2,0	86,96
881	2018/08/25	23:07:00	23:08:00	23:13:00	23:44:00	0:14	0:01	0:37	C	1	2	Other	Open Flames	Grass	Yes	P3	1,0	71,43
882	2018/08/25	23:22:00	23:24:00	23:28:00	23:42:00	0:12	0:02	0:20	B	2	4	Other	Open Flames	Rubbish	Yes	P1	1,0	83,33
883	2018/08/25	09:15:00	09:18:00	09:23:00	09:31:00	0:03	0:03	0:16	B	1	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
884	2018/08/26	17:39:00	17:42:00	17:50:00	18:38:00	0:39	0:03	0:59	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	25,64
885	2018/08/28	09:55:00	09:55:00	10:05:00	10:35:00	0:25	0:00	0:40	C	1	2	Other Services	Special Service	Water Supply	Yes	WT1	10,0	400,00
886	2018/08/28	13:36:00	13:39:00	13:43:00	13:43:00	0:37	0:03	0:07	E	1	2	Residential	Undetermined	Informal	Yes	P3	1,0	27,03
887	2018/08/29	13:08:00	13:09:00	13:24:00	16:00:00	2:36	0:01	2:52	C	2	3	Other	Open Flames	Grass	Yes	WT1	1,0	6,41
888	2018/08/29	16:53:00	16:57:00	17:05:00	17:50:00	0:55	0:04	0:57	C	2	1	Other	Open Flames	Grass	Yes	P1	1,0	18,18
889	2018/08/30	20:52:00	20:53:00	20:59:00	21:38:00	0:39	0:01	0:46	E	1	2	Residential	Electrical	Informal	Yes	P3	1,0	25,64
890	2018/08/31	09:34:00	09:37:00	09:49:00	10:36:00	0:47	0:03	1:02	E	1	3	Transport	Open Flames	Car	Yes	P3	1,0	21,28
891	2018/09/01	12:00:00	12:02:00	12:25:00	14:11:00	1:46	0:02	2:11	C	1	0	Other Services	Special Service	Water Supply	Yes	P5	5,0	47,17
892	2018/08/31	14:16:00	14:18:00	14:29:00	16:36:00	2:07	0:02	2:20	C	1	3	Other	Open Flames	Rubbish	Yes	P3	1,0	7,87
893	2018/08/31	14:41:00	14:41:00	14:43:00	16:36:00	4:10	0:00	1:55	C	1	3	Other Services	Special Service	Water Supply	Yes	WT1	5,0	20,00
894	2018/08/31	23:22:00	23:23:00	23:29:00	00:11:00	0:31	0:01	0:49	C	1	3	Residential	Open Flames	Rubbish	Yes	P3	0,0	0,00
895	2018/09/01	12:11:00	12:12:00	12:14:00	12:43:00	0:57	0:01	0:32	C	2	3	Other	Open Flames	Grass	Yes	P5	0,7	12,28
896	2018/09/01	11:20:00	11:20:00	11:41:00	12:04:00	0:25	0:00	0:44	C	2	3	Other	Open Flames	Grass	Yes	P5	0,9	36,00
897	2018/09/01	12:50:00	12:50:00	13:09:00	14:59:00	2:09	0:00	2:09	E	2	2	Other	Open Flames	Grass	Yes	P3	1,0	7,75
898	2018/09/01	16:55:00	16:55:00	17:11:00	18:19:00	1:24	0:00	1:24	C	2	3	Other	Open Flames	Grass	Yes	P3	1,0	11,90
899	2018/09/01	22:09:00	22:09:00	22:18:00	22:54:00	1:12	0:00	0:45	C	1	3	Residential	Undetermined	Grass	Yes	P3	1,0	13,89

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
900	2018/09/02	06:48:00	06:50:00	06:58:00	08:11:00	1:13	0:02	1:23	C	1	3	Residential	Undetermined	Informal	Yes	P3	2,0	27,40
901	2018/09/02	06:46:00	06:50:00	06:58:00	08:08:00	1:13	0:04	1:22	C	2	4	Residential	Undetermined	Informal	Yes	D6	2,0	27,40
902	2018/09/02	20:58:00	20:59:00	21:09:00	22:08:00	0:57	0:01	1:10	C	1	3	Residential	Arson	Informal	Yes	P1	1,0	17,54
903	2018/09/03	13:50:00	13:53:00	13:56:00	14:40:00	0:37	0:03	0:50	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	27,03
904	2018/09/03	14:45:00	14:47:00	14:59:00	15:31:00	0:16	0:02	0:46	C	1	4	Other	Open Flames	Tyres	Yes	P1	1,0	62,50
905	2018/09/04	08:58:00	09:12:00	09:20:00	09:46:00	1:06	0:14	0:48	C	3	4	Residential	Electrical	Informal	Yes	P1	1,0	15,15
906	2018/09/04	16:42:00	16:46:00	16:57:00	18:27:00	1:30	0:04	1:45	C	2	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
907	2018/09/05	00:02:00	00:06:00	00:11:00	00:35:00	0:36	0:04	0:33	C	1	2	Residential	Undetermined	Informal	Yes	P1	0,0	0,00
908	2018/09/05	07:26:00	07:26:00	07:42:00	09:52:00	1:10	0:00	2:26	C	1	3	Other Services	Special Service	Water Supply	Yes	WT1	1,0	14,29
909	2018/09/05	09:00:00	09:25:00	09:35:00	10:59:00	0:59	0:25	1:59	C	1	0	Other Services	Special Service	Water Supply	Yes	WT2	10,0	169,49
910	2018/09/05	09:53:00	09:53:00	10:05:00	10:47:00	0:54	0:00	0:54	E	1	1	Other Services	Special Service	Water Supply	Yes	WT1	10,0	185,19
911	2018/09/05	11:53:00	11:55:00	12:03:00	12:43:00	0:30	0:02	0:50	B	1	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
912	2018/09/05	13:40:00	13:43:00	13:51:00	15:57:00	2:14	0:03	2:17	C	1	4	Other	Arson	Grass	Yes	P1	15,0	111,94
913	2018/09/06	07:07:00	07:12:00	07:39:00	08:06:00	0:13	0:05	0:59	C	1	2	Other	Open Flames	Grass	Yes	P5	1,0	76,92
914	2018/09/06	07:40:00	07:42:00	07:49:00	08:05:00	0:05	0:02	0:25	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	200,00
915	2018/09/06	08:54:00	08:57:00	09:00:00	09:10:00	0:10	0:03	0:16	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	100,00
916	2018/09/06	09:53:00	09:53:00	10:08:00	10:20:00	0:28	0:00	0:27	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
917	2018/09/06	13:42:00	13:45:00	13:57:00	14:35:00	0:38	0:03	0:53	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	26,32
918	2018/09/06	14:44:00	14:47:00	14:54:00	15:51:00	0:56	0:03	1:07	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	17,86
919	2018/09/06	15:51:00	15:52:00	16:07:00	16:17:00	0:10	0:01	0:26	C	2	2	Other	Open Flames	Tree	Yes	P1	1,0	100,00
920	2018/09/06	16:42:00	16:54:00	16:54:00	17:20:00	0:26	0:12	0:38	C	2	3	Other	Open Flames	Grass	Yes	WT2	1,0	38,46
921	2018/09/06	18:37:00	18:37:00	18:43:00	21:14:00	2:17	0:00	2:37	C	1	2	Other Services	Special Service	Water Supply	Yes	P1	5,0	36,50
922	2018/09/07	09:55:00	09:59:00	10:13:00	11:21:00	0:26	0:04	1:26	C	2	4	Residential	Electrical	Informal	Yes	P1	3,0	115,38
923	2018/09/08	09:45:00	09:45:00	10:00:00	12:50:00	3:05	0:00	3:05	E	1	1	Other Services	Special Service	Water Supply	Yes	WT1	20,0	108,11
924	2018/09/08	15:38:00	15:43:00	15:52:00	16:50:00	1:07	0:05	1:12	C	2	3	Other	Open Flames	Grass	Yes	P1	2,0	29,85
925	2018/09/08	18:38:00	18:38:00	19:00:00	20:55:00	2:17	0:00	2:17	E	1	1	Other Services	Special Service	Water Supply	Yes	WT1	10,0	72,99
926	2018/09/08	21:28:00	21:28:00	21:40:00	22:44:00	0:43	0:00	1:16	C	1	1	Residential	Heating	Informal	Yes	WT1	3,0	69,77
927	2018/09/09	15:39:00	15:43:00	15:46:00	16:19:00	0:20	0:04	0:40	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
928	2018/09/10	08:16:00	08:17:00	08:22:00	09:09:00	0:47	0:01	0:53	C	2	3	Residential	Electrical	Informal	Yes	P5	1,0	21,28
929	2018/09/12	02:02:00	02:06:00	02:12:00	02:39:00	0:22	0:04	0:37	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	45,45
930	2018/09/12	07:22:00	07:25:00	07:33:00	08:54:00	1:07	0:03	1:32	C	1	2	Public assembly	Arson	One Stop Shop	Yes	P1	5,0	74,63
931	2018/09/12	19:23:00	19:28:00	19:36:00	20:09:00	0:33	0:05	0:46	C	1	2	Other	Open Flames	Grass	Yes	P1		0,00
932	2018/09/13	07:11:00	07:13:00	07:20:00	09:49:00	2:17	0:02	2:38	C	1	1	Other Services	Special Service	Water Supply	Yes	WT1	2,0	14,60
933	2018/09/13	13:36:00	13:37:00	13:45:00	14:08:00	0:05	0:01	0:32	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	200,00
934	2018/09/13	14:52:00	14:53:00	15:13:00	16:08:00	0:37	0:01	1:16	D	1	3	Other	Open Flames	Grass	Yes	P5	2,0	54,05
935	2018/09/13	17:15:00	17:15:00	18:00:00	18:58:00	0:43	0:00	1:43	D	1	1	Other Services	Special Service	Water Supply	Yes	WT1	10,0	232,56
936	2018/09/13	18:58:00	19:01:00	19:05:00	19:19:00	0:08	0:03	0:21	B	1	2	Other	Open Flames	Grass	Yes	P1	1,0	125,00
937	2018/09/14	20:05:00	20:08:00	20:17:00	20:30:00	0:11	0:03	0:25	C	1	3	Other	Open Flames		Yes	P1	0,0	0,00
938	2018/09/15	11:07:00	11:10:00	11:10:00	11:50:00	0:26	0:03	0:43	B	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
939	2018/09/15	12:58:00	13:00:00	13:55:00	15:27:00	2:10	0:02	2:29	D	1	3	Other	Open Flames	Grass	Yes	P5	1,0	7,69
940	2018/09/15	23:19:00	23:21:00	23:33:00	00:02:00	0:28	0:02	0:43	E	1	2	Residential	Open Flames	Informal	Yes	P5	0,0	0,00
941	2018/09/16	12:33:00	13:04:00	13:19:00	16:49:00	3:26	0:31	4:16	D	5	3	Other	Open Flames	Grass	Yes	P1	12,0	58,25
942	2018/09/16	14:44:00	14:47:00	15:07:00	15:30:00	0:27	0:03	0:46	C	1	1	Other	Open Flames	Grass	Yes	P5	1,0	37,04
943	2018/09/16	17:14:00	17:17:00	17:31:00	17:33:00	0:12	0:03	0:19	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
944	2018/09/17	09:26:00	09:29:00	10:40:00	09:38:00	0:25	0:03	0:12	E	1	2	Residential	Open Flames	Informal	Yes	P5	3,0	120,00
945	2018/09/17	10:38:00	10:40:00	11:03:00	11:45:00	0:37	0:02	1:07	B	1	4	Other	Open Flames	Grass	Yes	P1	3,0	81,08
946	2018/09/17	11:00:00	11:01:00	11:05:00	11:23:00	0:06	0:01	0:23	C	1	2	Other	Open Flames	Grass	Yes	P5	1,0	166,67
947	2018/09/17	13:10:00	13:11:00	13:15:00	14:14:00	0:55	0:01	1:04	C	1	3	Residential	Open Flames	Formal	Yes	P1	8,0	145,45
948	2018/09/17	19:31:00	19:35:00	19:41:00	20:09:00	0:15	0:04	0:38	B	1	4	Other	Open Flames	Trunk Smouldering	Yes	WT2	1,0	66,67
949	2018/09/17	19:58:00	20:01:00	20:07:00	20:48:00	0:13	0:03	0:50	C	1	2	Residential	Arson	Informal	Yes	P5	1,0	76,92
950	2018/09/17	20:01:00	20:04:00	20:10:00	20:29:00	0:13	0:03	0:28	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	76,92
951	2018/09/18	22:39:00	22:47:00	22:51:00	23:22:00	0:07	0:08	0:43	E	1	2	Residential	Arson	Informal	Yes	P5	1,0	142,86
952	2018/09/18	11:11:00	11:12:00	11:23:00	12:45:00	0:36	0:01	1:34	C	1	4	Residential	Open Flames	Formal	Yes	P1	3,0	83,33

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
953	2018/09/18	13:06:00	13:09:00	13:21:00	14:15:00	0:51	0:03	1:09	C	1	4	Residential	Undetermined	Informal	Yes	P1	2,0	39,22
954	2018/09/18	17:04:00	17:07:00	17:34:00	18:01:00	0:23	0:03	0:57	B	1	3	Other	Open Flames	Grass	Yes	P1	1,0	43,48
955	2018/09/18	18:24:00	18:26:00	18:38:00	19:40:00	1:00	0:02	1:16	D	1	4	Other	Open Flames	Grass	Yes	P1	2,0	33,33
956	2018/09/18	18:37:00	18:48:00	19:34:00	19:59:00	1:08	0:11	1:22	C	1	3	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
957	2018/09/18	19:09:00	19:12:00	19:38:00	20:29:00	1:17	0:03	1:20	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	12,99
958	2018/09/18	22:52:00	22:55:00	23:05:00	23:17:00	0:12	0:03	0:25	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	166,67
959	2018/09/19	10:03:00	10:06:00	10:17:00	15:46:00	5:40	0:03	5:43	D	1	5	Other	Arson	Tyres	Yes	P1	20,0	58,82
960	2018/09/19	23:49:00	23:52:00	00:02:00	00:19:00	0:07	0:03	0:30	C	1	2	Other	Other	Palm Tree	Yes	WT2	1,0	142,86
961	2018/09/20	09:00:00	09:04:00	09:10:00	09:30:00	0:14	0:04	0:30	A	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	71,43
962	2018/09/20	09:56:00	09:59:00	09:59:00	10:10:00	1:00	0:03	0:14	C	1	3	Other Services	Special Service	Water Supply	Yes	WT1	0,0	0,00
963	2018/09/22	09:55:00	09:57:00	10:02:00	10:44:00	0:15	0:02	0:49	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	66,67
964	2018/09/22	11:23:00	11:25:00	11:30:00	11:55:00	0:15	0:02	0:32	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
965	2018/09/22	17:44:00	17:44:00	17:51:00	18:30:00	0:21	0:00	0:46	D	1	1	Other	Open Flames	Grass	Yes	WT1	1,0	47,62
966	2018/09/22	23:25:00	23:28:00	23:39:00	00:15:00	0:12	0:03	0:50	E	1	1	Residential	Arson	Informal	Yes	P5	1,0	83,33
967	2018/09/24	11:07:00	11:09:00	11:12:00	12:11:00	0:34	0:02	1:04	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	29,41
968	2018/09/24	18:16:00	18:18:00	18:23:00	18:39:00	0:14	0:02	0:23	B	1	2	Other	Open Flames	Grass	Yes	P1	1,0	71,43
969	2018/09/24	12:48:00	12:50:00	13:00:00	13:06:00	0:18	0:02	0:18	C	1	3	Other	Open Flames	Copperwire	Yes	P1	0,0	0,00
970	2018/09/25	13:07:00	13:07:00	13:16:00	13:22:00	0:01	0:00	0:15	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	1000,00
971	2018/09/25	16:43:00	16:49:00	16:54:00	17:35:00	0:31	0:06	0:52	C	1	2	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
972	2018/09/26	20:04:00	20:07:00	20:10:00	20:56:00	0:14	0:03	0:52	C	1	2	Residential	Undetermined	Formal	Yes	P1	2,0	142,86
973	2018/09/26	23:54:00	23:57:00	01:08:00	01:25:00	0:15	0:03	1:31	E	1	3	Residential	Open Flames	Informal	Yes	P5	0,0	0,00
974	2018/09/27	08:43:00	08:45:00	08:57:00	09:16:00	0:13	0:02	0:33	C	1	3	Other	Welding	Tree	Yes	WT2	0,0	0,00
975	2018/09/27	11:34:00	11:36:00	11:42:00	12:30:00	0:56	0:02	0:56	E	1	2	Residential	Undetermined	Informal	Yes	P5	3,0	53,57
976	2018/09/27	15:57:00	16:00:00	16:13:00	17:53:00	1:40	0:03	1:56	C	1	2	Other Services	Special Service	MVA	Yes	P1	0,0	0,00
977	2018/09/27	16:03:00	16:07:00	16:09:00	17:47:00	1:07	0:04	1:44	C	2	1	Other	Open Flames	Grass	Yes	P5	4,0	59,70
978	2018/09/28	06:57:00	09:51:00	10:40:00	20:45:00	9:05	2:54	13:48	B	1	3	Other Services	Special Service	Water Supply	Yes	WT1	20,0	36,70
979	2018/09/28	08:07:00	08:09:00	08:13:00	08:34:00	0:56	0:02	0:56	B	1	2	Public Assembly	Electrical Faults	Hall	Yes	P1	0,0	0,00
980	2018/09/28	09:42:00	10:21:00	11:32:00	12:23:00	0:51	0:39	2:41	C	1	1	Other Services	Hazmat	Chemical Spillages	Yes	P1	0,0	0,00
981	2018/09/28	15:57:00	16:09:00	16:19:00	17:08:00	0:29	0:12	1:11	C	2	1	Other	Open Flames	Rubbish	Yes	P5	0,0	0,00
982	2018/09/29	12:58:00	13:02:00	13:11:00	13:47:00	0:57	0:04	0:49	C	2	5	Residential	Open Flames	Informal	Yes	P1	1,0	17,54
983	2018/09/29	14:39:00	14:42:00	15:06:00	15:42:00	0:40	0:03	1:03	C	1	4	Residential	Open Flames	Informal	Yes	P5	1,0	25,00
984	2018/09/29	16:04:00	16:05:00	16:18:00	16:41:00	0:44	0:01	0:37	C	1	3	Residential	Electrical	Informal	Yes	P5	0,0	0,00
985	2018/09/29	22:28:00	22:29:00	22:40:00	23:29:00	0:10	0:01	1:01	C	1	3	Residential	Smoking	Informal	Yes	P5	2,0	200,00
986	2018/09/30	00:48:00	00:49:00	01:05:00	01:36:00	0:05	0:01	0:48	C	3	3	Residential	Undetermined	Informal	Yes	P5	1,0	200,00
987	2018/09/30	16:04:00	16:06:00	16:11:00	16:43:00	0:10	0:02	0:39	C	1	3	Residential	Undetermined	Informal	Yes	P5	2,0	200,00
988	2018/09/30	20:45:00	20:49:00	20:55:00	21:27:00	0:14	0:04	0:42	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	71,43
989	2018/10/01	06:02:00	06:07:00	06:11:00	06:25:00	0:31	0:05	0:23	B	1	1	Other	Open Flames	Rubbish	Yes	P1	1,0	32,26
990	2018/10/01	11:29:00	11:34:00	11:48:00	13:18:00	0:29	0:05	1:49	C	1	2	Residential	Electrical	Formal	Yes	P5	5,0	172,41
991	2018/10/02	06:48:00	06:55:00	07:10:00	07:18:00	0:05	0:07	0:30	A	1	2	Other	Open Flames	Rubbish	Yes	P5	1,0	200,00
992	2018/10/02	10:24:00	10:26:00	10:35:00	11:03:00	0:25	0:02	0:39	C	2	2	Other	Open Flames	Grass	Yes	P5	0,0	0,00
993	2018/10/02	20:03:00	20:04:00	20:14:00	21:15:00	0:09	0:01	1:12	C	1	4	Other	Open Flames	Grass	Yes	P5	1,0	111,11
994	2018/10/02	21:23:00	21:23:00	21:39:00	22:25:00	0:25	0:00	1:02	E	1	4	Residential	Cooking	Informal	Yes	P5	2,0	80,00
995	2018/10/02	22:39:00	22:43:00	22:55:00	00:37:00	0:28	0:04	1:58	B	1	4	Other	Open Flames	Grass	Yes	P1	1,0	35,71
996	2018/10/03	09:35:00	09:39:00	09:45:00	10:18:00	0:23	0:04	0:43	C	1	2	Other	Open Flames	Grass	Yes	P5	1,0	43,48
997	2018/10/03	12:40:00	12:44:00	12:52:00	13:22:00	0:13	0:04	0:42	D	1	2	Other	Open Flames	Grass	Yes	P1	1,0	76,92
998	2018/10/03	15:35:00	15:35:00	15:57:00	16:07:00	0:10	0:00	0:32	E	1	0	Other Services	Special Service	Water Supply	Yes	WT2	10,0	1000,00
999	2018/10/03	16:03:00	16:06:00	16:12:00	16:27:00	0:13	0:03	0:24	C	1	1	Other	Open Flames	Rubbish	Yes	P1	1,0	76,92
1000	2018/10/03	17:08:00	17:10:00	17:20:00	18:02:00	0:26	0:02	0:54	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	38,46
1001	2018/10/04	07:32:00	07:35:00	07:40:00	07:52:00	0:05	0:03	0:20	B	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	200,00
1002	2018/10/04	08:33:00	08:35:00	08:43:00	09:36:00	0:26	0:02	1:03	B	1	2	Other	Open Flames	Grass	Yes	P1	1,0	38,46
1003	2018/10/04	22:08:00	22:10:00	22:12:00	22:28:00	0:30	0:02	0:20	B	1	2	Other	Alarm	Formal	Yes	P1	0,0	0,00
1004	2018/10/05	16:15:00	16:18:00	16:18:00	17:13:00	0:36	0:03	0:58	C	1	3	Residential	Arson	Rubbish	Yes	P1	1,0	27,78
1005	2018/10/06	02:12:00	02:14:00	02:25:00	02:55:00	0:20	0:02	0:43	E	1	2	Residential	Open Flames	Informal	Yes	P1	1,0	50,00

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1006	2018/10/06	04:37:00	04:40:00	04:55:00	05:26:00	0:16	0:03	0:49	E	1	3	Residential	Open Flames	Formal	Yes	P1	1,0	62,50
1007	2018/10/06	19:16:00	19:18:00	19:25:00	19:57:00	0:26	0:02	0:41	E	1	2	Residential	Open Flames	Informal	Yes	P1	1,0	38,46
1008	2018/10/06	23:48:00	23:53:00	00:31:00	01:45:00	0:36	0:05	1:58	D	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1009	2018/10/07	06:18:00	06:21:00	06:24:00	06:35:00	0:07	0:03	0:17	B	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	142,86
1010	2018/10/07	13:20:00	14:14:00	14:57:00	16:31:00	1:33	0:54	3:11	D	1	0	Other	Open Flames	Grass	Yes	D6	0,0	0,00
1011	2018/10/07	17:09:00	17:16:00	17:33:00	17:51:00	0:42	0:07	0:42	C	1	1	Residential	Arson	Formal	Yes	P1	0,0	0,00
1012	2018/10/07	17:59:00	18:04:00	18:22:00	19:43:00	0:52	0:05	1:44	E	2	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1013	2018/10/08	11:12:00	11:13:00	11:32:00	12:11:00	0:59	0:01	0:59	C	2	5	Other	Open Flames	Grass	Yes	P5	0,0	0,00
1014	2018/10/08	13:38:00	13:41:00	13:45:00	16:07:00	1:40	0:03	2:29	E	3	5	Institutional	Open Flames	University	Yes	P1	3,0	30,00
1015	2018/10/08	14:54:00	15:49:00	16:24:00	18:23:00	1:23	0:55	3:29	B	2	4	Other	Open Flames	Grass	Yes	P5	2,0	24,10
1016	2018/10/08	15:51:00	15:52:00	16:20:00	17:26:00	0:56	0:01	1:35	B	1	1	Other	Open Flames	Grass	Yes	P1	1,0	17,86
1017	2018/10/08	17:07:00	17:07:00	17:20:00	18:19:00	0:59	0:00	1:12	C	1	2	Other Services	Special Service	Water Supply	Yes	WT1	2,0	33,90
1018	2018/10/09	12:58:00	13:08:00	13:08:00	14:51:00	0:57	0:10	1:53	C	1	2	Other	Open Flames	Grass	Yes	P5	4,0	70,18
1019	2018/10/09	14:19:00	14:23:00	14:34:00	15:27:00	1:08	0:04	1:08	B	1	2	Other	Open Flames	Grass	Yes	P1	1,0	14,71
1020	2019/10/09	16:25:00	16:28:00	16:34:00	17:12:00	0:17	0:03	0:47	E	1	2	Residential	Open Flames	Informal	Yes	P5	0,0	0,00
1021	2018/10/11	12:50:00	12:53:00	12:54:00	13:01:00	0:13	0:03	0:11	C	1	3	Other Services	Special Service	Water Supply	Yes	P1	0,0	0,00
1022	2018/10/11	13:12:00	13:13:00	13:19:00	13:42:00	0:14	0:01	0:30	E	1	3	Residential	Open Flames	Informal	Yes	P1	2,0	142,86
1023	2018/10/11	14:47:00	14:50:00	14:53:00	15:19:00	0:16	0:03	0:32	B	1	2	Commercial	Open Flames	Hair Salon	Yes	P1	1,0	62,50
1024	2018/10/11	19:44:00	19:50:00	19:50:00	19:54:00	0:10	0:06	0:10	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	100,00
1025	2018/10/12	20:29:00	20:32:00	20:48:00	22:29:00	1:02	0:03	2:00	C	1	2	Residential	Electrical Faults	Informal	Yes	WT1	0,0	0,00
1026	2018/10/12	23:02:00	23:03:00	23:15:00	23:45:00	0:41	0:01	0:43	C	1	3	Residential	Undetermined	Informal	Yes	WT2	1,0	24,39
1027	2018/10/13	07:30:00	07:37:00	07:44:00	07:59:00	0:06	0:07	0:29	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	166,67
1028	2018/10/13	14:20:00	14:22:00	14:40:00	16:03:00	1:23	0:02	1:43	C	1	3	Institutional	Open Flames	University	Yes	WT2	1,0	12,05
1029	2018/10/13	16:39:00	16:40:00	16:53:00	17:20:00	0:32	0:01	0:41	C	2	3	Residential	Arson	Informal	Yes	WT2	1,0	31,25
1030	2018/10/15	14:57:00	15:00:00	15:00:00	15:42:00	0:23	0:03	0:45	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	43,48
1031	2018/10/10	11:13:00	17:54:00	18:06:00	19:44:00	0:59	6:41	8:31	C	1	3	Other Services	Special Service	Water Supply	Yes	WT1	20,0	338,98
1032	2018/10/17	07:45:00	07:52:00	08:05:00	08:31:00	0:22	0:07	0:46	C	1	3	Other	Open Flames	Tyres	Yes	P1	1,0	45,45
1033	2018/10/18	14:26:00	14:29:00	14:38:00	15:31:00	0:33	0:03	1:05	B	2	2	Other	Open Flames	Grass	Yes	P1	1,0	30,30
1034	2018/10/19	02:29:00	02:32:00	02:50:00	04:11:00	1:10	0:03	1:42	C	2	2	Storage	Arson	Storeroom	Yes	P1	2,0	28,57
1035	2018/10/19	10:09:00	10:12:00	10:16:00	11:22:00	0:28	0:03	1:13	C	1	3	Other	Open Flames	Rubbish	Yes	P1	3,0	107,14
1036	2018/10/19	18:05:00	18:05:00	18:20:00	19:00:00	0:40	0:00	0:55	C	1	0	Other Services	Special Service	Medical	Yes	D2	0,0	0,00
1037	2018/10/20	14:29:00	14:31:00	14:39:00	15:05:00	0:18	0:02	0:36	C	1	3	Residential	Open Flames	Formal	Yes	P1	2,0	111,11
1038	2018/10/20	19:02:00	19:07:00	19:13:00	19:55:00	0:53	0:05	0:53	D	1	2	Other	Open Flames	Grass	Yes	P5	0,0	0,00
1039	2018/10/21	11:25:00	11:28:00	11:31:00	11:45:00	0:07	0:03	0:20	B	1	2	Other	Open Flames	Grass	Yes	P1	1,0	142,86
1040	2018/10/23	13:27:00	13:27:00	13:27:00	14:47:00	0:09	0:00	1:20	C	1	2	Other	Open Flames	Grass	Yes	WT1	1,0	111,11
1041	2018/10/24	11:39:00	11:40:00	12:18:00	13:00:00	1:21	0:01	1:21	E	2	4	Other	Open Flames	Grass	Yes	P5	0,0	0,00
1042	2018/10/24	23:36:00	23:43:00	23:51:00	00:02:00	0:26	0:07	0:26	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1043	2018/10/25	11:25:00	11:25:00	11:43:00	12:22:00	0:34	0:00	0:57	C	2	3	Other	Open Flames	Grass	Yes	P5	1,0	29,41
1044	2018/10/25	18:09:00	18:14:00	18:23:00	19:33:00	0:03	0:05	1:24	C	1	1	Other	Open Flames	Grass	Yes	D6	1,0	333,33
1045	2018/10/26	10:55:00	11:09:00	11:23:00	12:08:00	0:10	0:14	1:13	C	1	2	Other Services	Special Service	Water Supply	Yes	WT2	2,0	200,00
1046	2018/10/27	00:02:00	00:03:00	00:09:00	01:09:00	0:47	0:01	1:07	C	3	5	Other	Open Flames	Grass	Yes	P1	2,0	42,55
1047	2018/10/27	13:31:00	13:32:00	13:45:00	15:33:00	1:16	0:01	2:02	C	1	4	Residential	Undetermined	Formal	Yes	P5	5,0	65,79
1048	2018/10/27	15:12:00	15:17:00	15:36:00	20:39:00	5:27	0:05	5:27	C	1	2	Other Services	Special Service	Water Supply	Yes	WT2	5,0	15,29
1049	2018/10/27	15:42:00	15:46:00	15:50:00	16:30:00	0:40	0:04	0:48	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	25,00
1050	2018/10/27	17:00:00	17:04:00	17:11:00	17:27:00	0:34	0:04	0:27	C	2	2	Other Services	Special Service	Water Supply	Yes	P1	0,0	0,00
1051	2018/10/27	19:43:00	19:47:00	19:57:00	20:53:00	0:46	0:04	1:10	C	2	2	Other	Open Flames	Grass	Yes	P1	1,0	21,74
1052	2018/10/28	03:58:00	03:58:00	04:19:00	05:00:00	0:40	0:00	1:02	C	1	4	Residential	Smoking	Informal	Yes	P5	1,0	25,00
1053	2018/10/28	13:04:00	13:06:00	13:11:00	13:30:00	0:26	0:02	0:26	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	38,46
1054	2018/10/28	16:33:00	16:35:00	17:02:00	19:00:00	3:05	0:02	2:27	C	1	3	Other Services	Special Service	Water Supply	Yes	WT1	5,0	27,03
1055	2018/10/28	19:46:00	19:50:00	20:07:00	20:26:00	0:34	0:04	0:40	C	1	1	Other	Open Flames	Informal	Yes	P1	1,0	29,41
1056	2018/10/28	21:26:00	21:30:00	21:37:00	22:02:00	0:10	0:04	0:36	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	100,00
1057	2018/10/28	22:25:00	22:27:00	22:38:00	01:01:00	1:23	0:02	2:36	C	3	3	Other Services	Special Service	MVA	Yes	P1	0,0	0,00
1058	2018/10/29	02:14:00	02:15:00	02:27:00	03:48:00	0:43	0:01	1:34	C	1	3	Other	Open Flames	Informal	Yes	P5	1,0	23,26

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1059	2018/10/29	05:01:00	05:03:00	05:14:00	05:54:00	0:46	0:02	0:53	C	1	3	Other	Open Flames	Informal	Yes	P5	1,0	21,74
1060	2018/10/29	09:24:00	09:24:00	09:49:00	13:13:00	3:25	0:00	3:49	C	1	1	Other	Open Flames	Grass	Yes	D4	10,0	48,78
1061	2018/10/29	11:21:00	11:25:00	11:34:00	12:25:00	0:35	0:04	1:04	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	28,57
1062	2018/10/29	21:27:00	21:29:00	21:41:00	22:21:00	0:19	0:02	0:54	C	1	3	Other	Open Flames	Rubbish	Yes	P3	1,0	52,63
1063	2018/10/30	08:02:00	08:08:00	08:26:00	09:02:00	0:33	0:06	1:00	C	1	1	Other Services	Special Service	MVA	Yes	P1	0,0	0,00
1064	2018/10/30	12:32:00	12:34:00	12:41:00	12:57:00	0:14	0:02	0:25	C	1	1	Residential	Open Flames	Informal	Yes	WT1	1,0	71,43
1065	2018/10/30	20:01:00	20:02:00	20:14:00	21:08:00	0:31	0:01	1:07	C	1	4	Other	Open Flames	Grass	Yes	P5	1,0	32,26
1066	2018/10/31	15:40:00	15:47:00	15:52:00	18:19:00	2:32	0:07	2:39	D	1	3	Other	Open Flames	Grass	Yes	P3	1,0	6,58
1067	2018/11/02	16:55:00	17:06:00	17:10:00	17:30:00	0:35	0:11	0:35	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	28,57
1068	2018/11/02	22:36:00	22:38:00	22:41:00	23:45:00	0:45	0:02	1:09	E	2	3	Residential	undetermined	Informal	Yes	P3	5,0	111,11
1069	2018/11/03	10:01:00	10:02:00	10:11:00	10:35:00	0:20	0:01	0:34	B	1	2	Other	Open Flames	Rubbish	Yes	P3	1,0	50,00
1070	2018/11/03	17:16:00	17:19:00	17:23:00	17:53:00	0:37	0:03	0:37	E	1	2	Residential	Open Flames	Informal	Yes	P3	1,0	27,03
1071	2018/11/04	11:13:00	11:14:00	11:16:00	11:35:00	0:20	0:01	0:22	C	1	2	Residential	Open Flames	Informal	Yes	P3	1,0	50,00
1072	2018/11/04	20:33:00	20:37:00	20:50:00	21:47:00	0:25	0:04	1:14	E	1	2	Residential	Open Flames	Informal	Yes	P3	1,0	40,00
1073	2018/11/05	00:08:00	00:13:00	00:30:00	01:01:00	0:19	0:05	0:53	C	1	2	Residential	Open Flames	Formal	Yes	P3	1,0	52,63
1074	2018/11/05	12:19:00	12:21:00	12:28:00	13:18:00	0:34	0:02	0:59	E	2	4	Residential	Open Flames	Informal	Yes	P3	2,0	58,82
1075	2018/11/05	13:51:00	13:54:00	14:07:00	17:17:00	3:00	0:03	3:26	D	2	3	Other	Open Flames	Grass	Yes	P3	1,0	5,56
1076	2018/11/05	15:38:00	15:45:00	16:36:00	17:34:00	2:00	0:07	1:56	C	1	2	Other Services	Special Service	Water Supply	Yes	WT1	2,0	16,67
1077	2018/11/05	18:21:00	18:25:00	18:35:00	18:35:00	0:18	0:04	0:14	B	1	4	Other	Open Flames	Rubbish	Yes	P1	2,0	111,11
1078	2018/11/05	21:25:00	21:31:00	21:39:00	23:26:00	1:26	0:06	2:01	B	3	5	Other	Open Flames	Grass	Yes	P1	3,0	34,88
1079	2018/11/06	12:42:00	12:45:00	12:49:00	13:33:00	0:36	0:03	0:51	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	27,78
1080	2018/11/07	07:45:00	07:48:00	07:56:00	08:10:00	0:12	0:03	0:25	C	1	3	Other	Open Flames	Grass	Yes	P3	0,0	0,00
1081	2018/11/07	07:48:00	07:50:00	08:04:00	08:56:00	1:05	0:02	1:08	C	1	2	Other	Open Flames	Grass	Yes	P1	2,0	30,77
1082	2018/11/07	13:30:00	13:34:00	13:45:00	15:35:00	1:21	0:04	2:05	C	1	3	Other	Open Flames	Grass	Yes	P3	2,0	24,69
1083	2018/11/07	16:48:00	16:50:00	17:06:00	17:48:00	0:31	0:02	1:00	C	1	3	Other	Electrical	Lamppost	Yes	P3	1,0	32,26
1084	2018/11/08	17:50:00	17:50:00	18:08:00	19:01:00	0:35	0:00	1:11	D	1	0	Other	Open Flames	Grass	Yes	D2	0,0	0,00
1085	2018/11/08	18:43:00	18:49:00	18:56:00	19:12:00	0:06	0:06	0:29	C	1	3	Other	Open Flames	Grass	Yes	P3	1,0	166,67
1086	2018/11/09	10:28:00	10:31:00	10:43:00	12:23:00	1:18	0:03	1:55	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	12,82
1087	2018/11/09	13:52:00	13:55:00	14:02:00	22:30:00	8:00	0:03	8:38	B	2	4	Other	Open Flames	Rubbish	Yes	P1	10,0	20,83
1088	2018/11/09	16:00:00	16:06:00	16:17:00	16:45:00	0:32	0:06	0:45	E	1	3	Residential	Open Flames	Informal	Yes	P1	1,0	31,25
1089	2018/11/09	16:33:00	16:38:00	17:24:00	18:20:00	1:17	0:05	1:47	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	12,99
1090	2018/11/10	00:42:00	00:42:00	00:53:00	02:49:00	1:04	0:00	2:07	E	1	2	Residential	Open Flames	Informal	Yes	P3	2,0	31,25
1091	2018/11/10	01:51:00	01:52:00	02:03:00	03:16:00	0:28	0:01	1:25	E	1	3	Residential	Open Flames	Informal	Yes	P3	1,0	35,71
1092	2018/11/10	10:50:00	10:53:00	11:10:00	12:58:00	1:37	0:03	2:08	C	1	2	Other Services	Special Service	Water Supply	Yes	WT1	3,0	30,93
1093	2018/11/10	15:11:00	15:17:00	15:34:00	15:58:00	0:32	0:06	0:47	B	1	0	Other	Open Flames	Grass	Yes	P1	1,0	31,25
1094	2018/11/10	15:59:00	16:02:00	16:20:00	20:41:00	4:14	0:03	4:42	D	3	2	Other	Open Flames	Grass	Yes	WT1	3,0	11,81
1095	2018/11/10	10:40:00	10:51:00	11:01:00	19:18:00	8:38	0:11	8:38	A	1	2	Other Services	Special Service	Water Supply	Yes	P3	1,0	1,93
1096	2018/11/10	19:44:00	19:47:00	20:02:00	20:36:00	0:41	0:03	0:52	C	1	2	Other Services	Special Service	Water Supply	Yes	P3	0,0	0,00
1097	2018/11/10	21:06:00	21:09:00	21:22:00	21:40:00	0:20	0:03	0:34	C	1	3	Other	Open Flames	Grass	Yes	P3	1,0	50,00
1098	2018/11/11	08:27:00	09:33:00	10:00:00	20:30:00	12:03	1:06	12:03	C	1	2	Other Services	Special Service	Water Supply	Yes	WT1	1,0	1,38
1099	2018/11/11	13:29:00	13:31:00	13:45:00	15:00:00	0:01	0:02	1:31	C	1	3	Other	Open Flames	Grass	Yes	P3	1,0	1000,00
1100	2018/11/11	15:10:00	15:13:00	15:25:00	16:28:00	12:03	0:03	1:18	C	2	3	Residential	Electrical	Formal	Yes	P3	5,0	6,92
1101	2018/11/11	17:23:00	17:23:00	17:32:00	17:52:00	0:14	0:00	0:29	C	1	2	Other	Open Flames	Copperwire	Yes	P3	0,0	0,00
1102	2018/11/12	14:11:00	14:15:00	14:17:00	14:24:00	0:08	0:04	0:13	C	1	2	Other Services	Special Service	MVA	Yes	P1	0,0	0,00
1103	2018/11/12	20:14:00	20:16:00	20:20:00	20:28:00	0:03	0:02	0:14	C	1	3	Other	Open Flames	Thornbush	Yes	P1	1,0	333,33
1104	2018/11/12	22:46:00	22:57:00	23:05:00	23:37:00	0:04	0:11	0:51	C	1	4	Other	Open Flames	Rubbish	Yes	P3	1,0	250,00
1105	2018/11/13	19:08:00	19:10:00	19:35:00	20:05:00	0:12	0:02	0:57	C	1	3	Other	Open Flames	Tree	Yes	P1	1,0	83,33
1106	2018/11/14	01:38:00	01:43:00	01:51:00	02:14:00	0:19	0:05	0:36	C	1	4	Residential	Open Flames	Informal	Yes	P3	0,0	0,00
1107	2018/11/14	08:40:00	08:50:00	08:58:00	09:55:00	0:57	0:10	1:15	C	2	3	Other	Open Flames	Grass	Yes	D6	1,0	17,54
1108	2018/11/14	08:40:00	08:41:00	08:49:00	09:55:00	1:01	0:01	1:15	C	1	3	Other	Open Flames	Grass	Yes	WT2	2,0	32,79
1109	2018/11/14	20:07:00	20:08:00	20:22:00	22:12:00	1:27	0:01	2:05	E	1	4	Other Services	Special Service	Snake in House	Yes	P3	0,0	0,00
1110	2018/11/15	10:27:00	10:28:00	10:34:00	11:30:00	0:23	0:01	1:03	E	1	4	Residential	Electrical	Informal	Yes	P3	2,0	86,96
1111	2018/11/15	22:00:00	22:05:00	22:15:00	23:13:00	0:19	0:05	1:13	C	1	2	Residential	Cooking	Formal	Yes	P3	0,0	0,00

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1112	2018/11/16	12:34:00	12:36:00	12:40:00	13:36:00	0:38	0:02	1:02	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	52,63
1113	2018/11/16	14:18:00	14:20:00	14:24:00	15:20:00	0:39	0:02	1:02	C	1	3	Other	Open Flames	Grass	Yes	P3	2,0	51,28
1114	2018/11/16	19:48:00	19:50:00	19:54:00	20:51:00	0:43	0:02	1:03	C	1	2	Other	Electrical	Grass	Yes	P1	3,0	69,77
1115	2018/11/16	21:48:00	21:51:00	22:04:00	22:25:00	0:08	0:03	0:37	C	1	3	Other	Open Flames	Grass	Yes	P3	0,0	0,00
1116	2018/11/19	20:09:00	20:09:00	20:40:00	22:14:00	0:50	0:00	2:05	D	1	1	Other	Open Flames	Grass	Yes	WT1	3,0	60,00
1117	2018/11/20	14:21:00	14:35:00	14:45:00	15:18:00	0:15	0:14	0:57	C	1	3	Other Services	Special Service	Roof Blown Away	Yes	WT2	0,0	0,00
1118	2018/11/20	15:43:00	16:31:00	17:10:00	19:55:00	4:12	0:48	4:12	C	1	2	Other Services	Special Service	Roof Blown Away	Yes	D6	0,0	0,00
1119	2018/11/21	13:21:00	13:24:00	13:24:00	15:30:00	1:47	0:03	2:09	C	2	4	Other	Open Flames	Grass	Yes	P1	3,0	28,04
1120	2018/11/21	13:42:00	13:43:00	13:50:00	15:30:00	1:13	0:01	1:48	B	3	6	Commercial	Other	Shooting Range	Yes	P1	0,0	0,00
1121	2018/11/23	16:38:00	16:40:00	16:50:00	17:31:00	0:24	0:02	0:53	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1122	2018/11/24	02:30:00	02:33:00	02:40:00	03:07:00	0:25	0:03	0:37	D	1	1	Other	Open Flames	Grass	Yes	WT1	1,0	40,00
1123	2018/11/24	17:42:00	17:48:00	18:10:00	19:10:00	1:03	0:06	1:28	B	1	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1124	2018/11/24	23:12:00	23:15:00	23:21:00	23:47:00	0:21	0:03	0:35	E	1	2	Residential	Open Flames	Informal	Yes	P1	2,0	95,24
1125	2018/11/25	15:06:00	15:15:00	15:23:00	17:16:00	0:24	0:09	2:10	C	1	4	Other	Open Flames	Grass	Yes	P3	1,0	41,67
1126	2018/11/25	19:49:00	19:51:00	19:55:00	20:48:00	0:24	0:02	0:59	C	1	2	Other	Lightning	Palm Tree	Yes	P1	1,0	41,67
1127	2018/11/26	06:48:00	06:54:00	06:56:00	07:17:00	0:06	0:06	0:29	C	1	1	Other	Open Flames	Rubbish	Yes	P1	1,0	166,67
1128	2018/11/26	06:48:00	06:54:00	07:01:00	07:17:00	0:19	0:06	0:29	A	1	1	Other	Open Flames	Rubbish	Yes	P1	2,0	105,26
1129	2018/11/26	17:00:00	17:04:00	17:11:00	17:24:00	0:02	0:04	0:24	B	1	4	Other Services	Special Service	Remove Tree on Road	Yes	P1	0,0	0,00
1130	2018/11/27	18:28:00	18:33:00	18:33:00	19:55:00	0:51	0:05	1:27	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	19,61
1131	2018/11/28	07:49:00	07:52:00	07:57:00	08:31:00	0:27	0:03	0:42	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1132	2018/11/29	14:37:00	14:38:00	14:51:00	15:05:00	0:22	0:01	0:28	D	1	2	Other	Open Flames	Grass	Yes	WT1	1,0	45,45
1133	2018/11/30	06:32:00	06:35:00	06:45:00	07:20:00	0:23	0:03	0:48	C	1	3	Residential	Open Flames	Informal	Yes	P3	2,0	86,96
1134	2018/11/30	18:56:00	18:58:00	19:03:00	20:03:00	0:36	0:02	1:07	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	27,78
1135	2018/11/30	22:49:00	22:53:00	22:55:00	23:02:00	0:56	0:04	0:13	C	2	2	Other	Open Flames	Grass	Yes	P1	1,0	17,86
1136	2018/12/01	11:34:00	11:36:00	11:40:00	11:54:00	0:05	0:02	0:20	B	1	3	Other	Open Flames	Grass	Yes	P1	1,0	200,00
1137	2018/12/01	12:05:00	12:07:00	12:12:00	12:24:00	0:03	0:02	0:19	B	1	2	Other	Open Flames	Rubbish	Yes	P1	0,0	0,00
1138	2018/12/01	19:56:00	20:00:00	20:12:00	20:19:00	0:05	0:04	0:23	C	1	1	Other	Open Flames	Grass	Yes	D4	1,0	200,00
1139	2018/12/02	08:55:00	08:57:00	09:10:00	11:44:00	0:57	0:02	2:49	C	1	0	Other Services	Special Service	Water Supply	Yes	WT2	5,0	87,72
1140	2018/12/03	09:37:00	09:40:00	10:03:00	11:20:00	1:50	0:03	1:43	D	1	2	Other Services	Special Service	MVA	Yes	P1	3,0	27,27
1141	2018/12/03	12:38:00	12:39:00	12:49:00	13:12:00	0:22	0:01	0:34	A	2	7	Institutional	Smoking	Hospital	Yes	P1	0,0	0,00
1142	2018/12/03	13:26:00	13:29:00	13:37:00	18:12:00	3:16	0:03	4:46	B	2	2	Industry	Welding	Scrapyard	Yes	P1	15,0	76,53
1143	2018/12/03	15:00:00	15:00:00	15:21:00	16:28:00	1:02	0:00	1:28	C	1	4	Residential	Open Flames	Formal	Yes	P3	0,0	0,00
1144	2018/12/03	18:26:00	18:28:00	18:58:00	19:27:00	1:02	0:02	1:01	C	1	1	Other	Open Flames	Grass	Yes	D2	1,0	16,13
1145	2018/12/04	16:42:00	16:45:00	16:57:00	17:46:00	0:37	0:03	1:04	C	2	4	Other	Open Flames	Grass	Yes	P1	5,0	135,14
1146	2018/12/04	16:56:00	17:01:00	17:47:00	18:24:00	0:12	0:05	1:28	D	1	3	Transport	Electrical Faults	Bakkie	Yes	P3	2,0	166,67
1147	2018/12/04	18:26:00	18:26:00	18:35:00	19:36:00	0:29	0:00	1:10	C	1	3	Residential	Open Flames	Formal	Yes	P3	2,0	68,97
1148	2018/12/05	13:39:00	13:41:00	13:57:00	15:15:00	1:15	0:02	1:36	D	2	4	Other	Open Flames	Grass	Yes	P1	4,0	53,33
1149	2018/12/05	15:37:00	15:38:00	16:18:00	17:05:00	1:18	0:01	1:28	D	1	1	Other	Open Flames	Grass	Yes	D4	0,0	0,00
1150	2018/12/05	15:03:00	15:10:00	15:15:00	16:35:00	0:40	0:07	1:32	C	1	2	Other Services	Special Service	Water Supply	Yes	WT2	2,0	50,00
1151	2018/12/05	21:49:00	21:51:00	22:04:00	22:30:00	0:41	0:02	0:41	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	24,39
1152	2018/12/06	10:34:00	10:35:00	10:43:00	11:20:00	0:22	0:01	0:46	D	1	2	Other	Open Flames	Grass	Yes	WT1	2,0	90,91
1153	2018/12/06	15:11:00	15:13:00	15:25:00	21:50:00	6:13	0:02	6:39	D	4	8	Other	Open Flames	Grass	Yes	P1	30,0	80,43
1154	2018/12/06	16:07:00	16:07:00	16:25:00	16:46:00	0:21	0:00	0:39	E	1	2	Other Services	Special Service	Water Supply	Yes	WT1	5,0	238,10
1155	2018/12/06	16:46:00	16:46:00	17:14:00	17:58:00	0:28	0:00	1:12	D	1	2	Other	Open Flames	Grass	Yes	WT1	2,0	71,43
1156	2018/12/07	07:44:00	07:52:00	08:03:00	08:26:00	0:07	0:08	0:42	C	1	3	Residential	Open Flames	Informal	Yes	P1	1,0	142,86
1157	2018/12/07	21:00:00	21:03:00	21:12:00	22:09:00	0:30	0:03	1:09	E	1	2	Residential	Open Flames	Informal	Yes	P5	3,0	100,00
1158	2018/12/08	22:30:00	22:38:00	22:46:00	22:55:00	0:12	0:08	0:25	C	1	2	Other	Open Flames	Tyres	Yes	P1	1,0	83,33
1159	2018/12/09	04:12:00	04:13:00	04:25:00	05:58:00	0:56	0:01	1:46	C	1	4	Commercial	Open Flames	Tuckshop	Yes	P5	3,0	53,57
1160	2017/12/10	15:46:00	15:50:00	16:40:00	17:49:00	0:15	0:04	2:03	C	1	0	Other Services	Special Service	Water Supply	Yes	WT2	3,0	200,00
1161	2018/12/10	15:46:00	15:50:00	15:57:00	16:51:00	0:19	0:04	1:05	C	1	3	Residential	Open Flames	Formal	Yes	P5	2,0	105,26
1162	2018/12/11	14:57:00	15:00:00	15:15:00	15:41:00	0:23	0:03	0:44	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	43,48

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1163	2018/12/11	16:15:00	16:19:00	17:47:00	17:47:00	0:48	0:04	1:32	C	1	4	Residential	Arson	Formal	Yes	P5	3,0	62,50
1164	2018/12/12	02:24:00	02:25:00	02:38:00	03:00:00	0:36	0:01	0:36	C	1	3	Residential	Open Flames	Informal	Yes	P5	2,0	55,56
1165	2018/12/12	15:05:00	15:18:00	15:20:00	17:13:00	1:36	0:13	2:08	D	4	7	Other	Open Flames	Grass	Yes	P5	8,0	83,33
1166	2018/12/12	17:28:00	17:28:00	17:34:00	18:25:00	0:45	0:00	0:57	C	1	0	Other Services	Special Service	Water Supply	Yes	WT2	10,0	222,22
1167	2018/12/12	17:52:00	17:59:00	18:08:00	19:09:00	1:17	0:07	1:17	C	1	3	Other Services	Special Service	Roof Blown Away	Yes	P5	0,0	0,00
1168	2018/12/12	17:57:00	18:00:00	18:06:00	18:34:00	0:20	0:03	0:37	C	1	4	Other	Open Flames	Grass	Yes	P1	3,0	150,00
1169	2018/12/12	19:23:00	19:23:00	19:38:00	20:05:00	0:08	0:00	0:42	C	1	4	Other	Open Flames	Grass	Yes	P5	1,0	125,00
1170	2018/12/13	01:15:00	01:19:00	01:24:00	01:58:00	0:15	0:04	0:43	E	1	3	Residential	Open Flames	Informal	Yes	P5	2,0	133,33
1171	2018/12/13	02:17:00	02:18:00	02:29:00	03:42:00	0:51	0:01	1:25	E	1	3	Residential	Open Flames	Informal	Yes	P5	3,0	58,82
1172	2018/12/13	08:38:00	08:43:00	08:48:00	09:08:00	0:10	0:05	0:30	E	1	3	Residential	Open Flames	Informal	Yes	P1	1,0	100,00
1173	2018/12/14	17:19:00	17:19:00	17:30:00	18:15:00	0:56	0:00	0:56	D	3	3	Other	Open Flames	Coals	Yes	P1	15,0	267,86
1174	2018/12/14	08:44:00	08:45:00	08:50:00	09:10:00	0:21	0:01	0:26	E	1	3	Residential	Open Flames	Informal	Yes	P1	1,0	47,62
1175	2018/12/14	17:20:00	17:23:00	17:24:00	18:15:00	0:30	0:03	0:55	C	1	0	Other Services	Special Service	Water Supply	Yes	WT2	10,0	333,33
1176	2018/12/14	22:06:00	22:06:00	22:15:00	23:17:00	0:54	0:00	1:11	C	1	2	Other	Open Flames	Grass	Yes	P1	2,0	37,04
1177	2018/12/15	03:45:00	03:50:00	03:56:00	04:08:00	0:14	0:05	0:23	C	1	2	Other Services	Special Service	Tree on Road	Yes	P1	0,0	0,00
1178	2018/12/15	09:37:00	09:46:00	09:48:00	10:16:00	0:25	0:09	0:39	E	1	2	Residential	Open Flames	Informal	Yes	P1	1,0	40,00
1179	2018/12/15	15:31:00	15:34:00	15:43:00	15:53:00	0:07	0:03	0:22	D	1	1	Other	Open Flames	Grass	Yes	P1	1,0	142,86
1180	2018/12/15	16:40:00	16:44:00	16:53:00	17:42:00	0:19	0:04	1:02	E	1	1	Residential	Arson	Informal	Yes	P1	1,0	52,63
1181	2018/12/15	17:50:00	17:54:00	17:56:00	18:23:00	0:13	0:04	0:33	C	2	4	Residential	Open Flames	Formal	Yes	P1	1,0	76,92
1182	2018/12/15	19:26:00	19:50:00	20:00:00	20:06:00	0:06	0:24	0:40	C	1	1	Other Services	Special Service	Roof Blown Away	Yes	WT2	0,0	0,00
1183	2018/12/15	22:30:00	22:34:00	22:46:00	23:47:00	0:43	0:04	1:17	E	1	3	Residential	Open Flames	Informal	Yes	P1	5,0	116,28
1184	2018/12/16	02:12:00	02:16:00	02:25:00	03:04:00	0:38	0:04	0:52	E	1	3	Residential	Open Flames	Informal	Yes	P1	0,0	0,00
1185	2018/12/16	22:08:00	22:08:00	22:19:00	22:59:00	0:32	0:00	0:51	C	2	2	Residential	Electrical	Formal	Yes	P1	1,0	31,25
1186	2018/12/17	13:16:00	13:22:00	13:28:00	14:14:00	0:17	0:06	0:58	B	2	5	Commercial	Cooking	Shoprite Supermakert	Yes	P1	0,0	0,00
1187	2018/12/18	09:15:00	09:18:00	09:24:00	09:56:00	0:41	0:03	0:41	E	1	2	Residential	Open Flames	Informal	Yes	P1	2,0	48,78
1188	2018/12/19	07:39:00	07:40:00	07:47:00	08:46:00	0:08	0:01	1:07	B	2	3	Commercial	Open Flames	Foschini	Yes	P1	20,0	2500,00
1189	2018/12/19	17:17:00	17:18:00	17:55:00	18:31:00	1:06	0:01	1:14	A	1	1	Other	Open Flames	Coals	Yes	P1	1,0	15,15
1190	2018/12/19	18:51:00	19:08:00	19:15:00	20:02:00	0:47	0:17	1:11	C	2	5	Other	Open Flames	Grass	Yes	WT2	1,0	21,28
1191	2018/12/19	20:02:00	20:04:00	20:15:00	22:05:00	1:11	0:02	2:03	B	3	2	Other	Open Flames	Grass	Yes	P1	14,0	197,18
1192	2018/12/19	21:14:00	21:15:00	21:27:00	22:07:00	0:40	0:01	0:53	C	2	4	Transport	Open Flames	Car	Yes	WT2	5,0	125,00
1193	2018/12/24	07:26:00	07:31:00	07:39:00	08:14:00	0:24	0:05	0:48	C	2	3	Residential	Open Flames	Formal	Yes	WT2	10,0	416,67
1194	2018/12/20	03:21:00	03:24:00	03:32:00	05:32:00	2:00	0:03	2:11	C	2	7	Residential	Open Flames	Formal	Yes	WT2	15,0	125,00
1195	2018/12/20	18:05:00	18:07:00	18:15:00	20:07:00	1:04	0:02	2:02	A	1	1	Other	Open Flames	Coals	Yes	P1	24,0	375,00
1196	2018/12/20	19:33:00	19:48:00	19:52:00	20:26:00	0:27	0:15	0:53	B	1	1	Other	Open Flames	Tree	Yes	WT2	1,0	37,04
1197	2018/12/21	07:25:00	07:28:00	07:35:00	10:46:00	2:16	0:03	3:21	C	1	2	Other	Open Flames	Grass	Yes	P1	10,0	73,53
1198	2018/12/21	10:33:00	10:34:00	10:51:00	10:58:00	0:07	0:01	0:25	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1199	2018/12/21	10:35:00	10:46:00	10:53:00	12:11:00	0:04	0:11	1:36	C	1	1	Other	Open Flames	Tree	Yes	WT2	3,0	750,00
1200	2018/12/21	18:05:00	18:06:00	18:31:00	19:20:00	1:30	0:01	1:15	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	11,11
1201	2018/12/21	23:40:00	23:46:00	23:57:00	01:37:00	1:40	0:06	1:57	C	2	5	Other	Open Flames	Grass	Yes	D2	5,0	50,00
1202	2018/12/22	11:15:00	11:18:00	11:29:00	12:52:00	0:41	0:03	1:37	C	1	5	Residential	Open Flames	Informal	Yes	P1	5,0	121,95
1203	2018/12/22	11:48:00	11:48:00	12:03:00	12:11:00	0:13	0:00	0:23	C	1	2	Other	Open Flames	Rubbish	Yes	P1	0,0	0,00
1204	2018/12/22	22:27:00	22:28:00	22:32:00	23:09:00	0:18	0:01	0:42	C	1	3	Other	Open Flames	Rubbish	Yes	WT2	1,0	55,56
1205	2018/12/23	00:46:00	00:46:00	00:58:00	01:48:00	0:36	0:00	1:02	C	1	4	Residential	Open Flames	Informal	Yes	WT2	3,0	83,33
1206	2018/12/23	19:47:00	19:50:00	19:59:00	22:15:00	2:00	0:03	2:28	C	2	4	Residential	Electrical	Formal	Yes	P1	10,0	83,33
1207	2018/12/24	15:48:00	15:52:00	16:00:00	16:44:00	0:16	0:04	0:56	E	3	3	Residential	Electrical	Informal	Yes	P1	0,0	0,00
1208	2018/12/25	14:38:00	14:39:00	14:43:00	14:52:00	0:07	0:01	0:14	C	1	2	Other Services	Special Service	Medical	Yes	D2	0,0	0,00
1209	2018/12/25	21:15:00	21:17:00	21:44:00	22:52:00	0:23	0:02	1:37	C	1	3	Other	Open Flames	Grass	Yes	WT2	10,0	434,78
1210	2018/12/25	23:20:00	23:20:00	23:31:00	00:03:00	0:24	0:00	0:43	C	1	7	Residential	Arson	Formal	Yes	P1	1,0	41,67
1211	2018/12/26	00:19:00	00:19:00	00:19:00	01:13:00	0:42	0:00	0:54	C	2	6	Residential	Undetermined	Informal	Yes	P1	2,0	47,62
1212	2018/12/26	15:40:00	15:50:00	15:59:00	16:50:00	0:26	0:10	1:10	C	1	4	Other	Open Flames	Tree	Yes	P1	3,0	115,38
1213	2018/12/26	15:44:00	15:45:00	16:06:00	17:36:00	0:50	0:01	1:52	D	2	2	Other	Open Flames	Grass	Yes	WT2	3,0	60,00

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1214	2018/12/26	21:43:00	21:46:00	21:56:00	22:41:00	0:25	0:03	0:58	B	1	3	Other	Open Flames	Grass	Yes	P1	3,0	120,00
1215	2018/12/27	14:00:00	14:06:00	14:15:00	14:34:00	0:41	0:06	0:34	C	2	3	Other	Open Flames	Grass	Yes	P1	1,0	24,39
1216	2014/12/27	15:14:00	15:14:00	15:25:00	16:49:00	1:15	0:00	1:35	C	3	6	Residential	Open Flames	Formal	Yes	P1	13,0	173,33
1217	2018/12/27	22:19:00	22:19:00	22:29:00	22:52:00	0:16	0:00	0:33	C	2	3	Other	Open Flames	Grass	Yes	P1	1,0	62,50
1218	2018/12/28	18:32:00	18:32:00	18:43:00	19:17:00	0:12	0:00	0:45	C	1	3	Other	Open Flames	Tree	Yes	P1	1,0	83,33
1219	2018/12/29	12:36:00	12:46:00	12:50:00	13:03:00	0:06	0:10	0:27	C	1	2	Other	Open Flames	Rubbish	Yes	WT2	1,0	166,67
1220	2018/12/29	16:57:00	16:57:00	17:03:00	17:23:00	0:14	0:00	0:26	C	1	1	Other Services	Special Service	Medical	Yes	D2	0,0	0,00
1221	2018/12/31	02:31:00	02:34:00	02:36:00	02:56:00	0:18	0:03	0:25	C	1	3	Residential	Open Flames	Informal	Yes	WT2	2,0	111,11
1222	2018/12/31	02:56:00	03:02:00	03:08:00	05:01:00	1:47	0:06	2:05	C	1	3	Transport	Arson	Car	Yes	P1	3,0	28,04
1223	2018/12/31	21:13:00	21:16:00	21:20:00	21:31:00	0:40	0:03	0:18	C	2	4	Other	Open Flames	Grass	Yes	P1	1,0	25,00
1224	2019/01/01	01:55:00	01:58:00	02:04:00	02:32:00	0:23	0:03	0:37	C	1	5	Residential	Open Flames	Formal	Yes	WT2	2,0	86,96
1225	2019/01/01	02:37:00	02:38:00	02:47:00	03:24:00	0:20	0:01	0:47	C	2	3	Residential	Undetermined	Informal	Yes	WT2	3,0	150,00
1226	2019/01/01	14:34:00	14:35:00	14:42:00	15:25:00	0:25	0:01	0:51	E	1	2	Residential	Open Flames	Informal	Yes	P1	1,0	40,00
1227	2019/01/01	16:02:00	16:04:00	16:06:00	16:25:00	0:09	0:02	0:23	C	1	2	Other	Open Flames	Braai coal	Yes	P1	1,0	111,11
1228	2019/01/01	18:11:00	18:11:00	18:20:00	18:56:00	0:45	0:00	0:45	C	1	2	Other Services	Special Service	Medical	Yes	D2	0,0	0,00
1229	2019/01/01	22:07:00	22:10:00	22:19:00	22:41:00	0:10	0:03	0:34	B	1	2	Other	Open Flames		Yes	P1	1,0	100,00
1230	2019/01/05	23:35:00	23:37:00	23:44:00	01:12:00	1:22	0:02	0:37	C	1	2	Other	Open Flames	Tree	Yes	P1	1,0	12,20
1231	2019/01/07	14:20:00	14:22:00	14:33:00	16:59:00	3:12	0:02	2:39	C	3	4	Other	Open Flames	Grass	Yes	P1	15,0	78,13
1232	2019/01/08	12:38:00	12:45:00	13:01:00	13:15:00	0:18	0:07	0:37	C	3	4	Other	Open Flames	Grass	Yes	P1	1,0	55,56
1233	2019/01/10	21:34:00	21:35:00	21:44:00	22:23:00	0:32	0:01	0:49	C	2	3	Other	Open Flames	Rubbish	Yes	P1	1,0	31,25
1234	2019/01/11	16:13:00	16:17:00	16:24:00	17:48:00	1:24	0:04	1:35	E	1	3	Other	Open Flames	Grass	Yes	P1	3,0	35,71
1235	2019/01/11	17:39:00	17:42:00	17:49:00	18:27:00	0:26	0:03	0:48	C	1	2	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
1236	2019/01/12	07:53:00	08:06:00	08:13:00	09:26:00	0:07	0:13	1:33	E	1	1	Other	Open Flames	Grass	Yes	D6	1,0	142,86
1237	2019/01/12	11:12:00	11:14:00	11:28:00	12:39:00	1:05	0:02	1:27	C	1	5	Other	Open Flames	Grass	Yes	P1	5,0	76,92
1238	2019/01/12	14:45:00	14:50:00	14:54:00	16:25:00	1:19	0:05	1:40	E	2	6	Other	Open Flames	Grass	Yes	P1	5,0	63,29
1239	2019/01/14	15:32:00	15:54:00	16:05:00	17:11:00	0:40	0:22	1:39	C	3	5	Other	Open Flames	Grass	Yes	P1	1,0	25,00
1240	2019/01/15	09:07:00	09:10:00	09:19:00	11:00:00	1:06	0:03	1:53	B	2	4	Other	Open Flames	Tyres	Yes	P1	15,0	227,27
1241	2019/01/15	14:17:00	14:22:00	14:39:00	14:59:00	0:04	0:05	0:42	D	1	2	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
1242	2019/01/15	15:58:00	16:00:00	16:08:00	16:23:00	0:06	0:02	0:25	C	1	4	Other	Open Flames	Rubbish	Yes	P1	1,0	166,67
1243	2019/01/16	02:55:00	02:58:00	03:06:00	03:30:00	0:12	0:03	0:35	E	1	2	Residential	Open Flames	Informal	Yes	WT2	1,0	83,33
1244	2019/01/16	12:13:00	12:13:00	12:46:00	13:09:00	0:46	0:00	0:56	C	1	3	Other Services	Special Service	Water Supply	Yes	WT1	10,0	217,39
1245	2019/01/16	17:03:00	17:07:00	17:20:00	19:17:00	1:17	0:04	2:14	B	1	4	Other Services	Special Service	MVA	Yes	P1	5,0	64,94
1246	2019/01/16	20:07:00	20:15:00	20:24:00	20:43:00	0:04	0:08	0:36	C	3	5	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1247	2019/01/17	16:21:00	16:23:00	16:36:00	17:22:00	0:29	0:02	1:01	D	1	4	Other	Open Flames	Grass	Yes	P1	1,0	34,48
1248	2019/01/17	21:26:00	21:29:00	21:36:00	21:56:00	0:11	0:03	0:30	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1249	2019/01/18	13:24:00	13:26:00	13:32:00	14:00:00	0:26	0:02	0:36	C	1	4	Other	Open Flames	Rubbish	Yes	P1	1,0	38,46
1250	2019/01/18	19:45:00	19:48:00	19:58:00	20:45:00	0:42	0:03	1:00	D	2	4	Other	Open Flames	Grass	Yes	P1	2,0	47,62
1251	2019/01/18	14:02:00	14:05:00	14:12:00	23:02:00	9:00	0:03	9:00	B	4	9	Other	Welding / Cutting	Informal	Yes	WT2	61,0	112,96
1252	2019/01/18	20:16:00	20:18:00	20:23:00	20:33:00	0:12	0:02	0:17	A	1	3	Other Services	Special Service	MVA	Yes	WT2	0,0	0,00
1253	2018/01/18	21:45:00	21:47:00	21:58:00	22:30:00	0:32	0:02	0:45	D	1	3	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
1254	2019/01/19	13:34:00	13:37:00	13:50:00	14:07:00	0:21	0:03	0:33	C	1	3	Other	Open Flames	Grass	Yes	WT2	1,0	47,62
1255	2019/01/20	15:34:00	15:36:00	15:55:00	17:33:00	0:49	0:02	1:59	E	1	1	Other	Open Flames	Rubbish	Yes	D6	1,0	20,41
1256	2019/01/21	08:05:00	08:06:00	08:18:00	09:34:00	1:04	0:01	1:29	E	1	2	Transport	Welding/Cutting	Train	Yes	P1	10,0	156,25
1257	2019/01/21	10:04:00	10:04:00	10:15:00	12:37:00	1:50	0:00	2:33	C	1	3	Other Services	Special Service	Water Supply	Yes	WT1	10,0	90,91
1258	2019/01/22	14:01:00	14:03:00	15:00:00	17:03:00	1:30	0:02	3:02	E	1	2	Other Services	Special Service	Water Supply	Yes	WT1	10,0	111,11
1259	2019/01/23	15:07:00	15:13:00	15:23:00	16:26:00	0:18	0:06	1:19	E	1	3	Residential	Undetermined	Informal	Yes	WT2	0,0	0,00
1260	2019/01/23	19:25:00	19:29:00	19:43:00	20:28:00	0:22	0:04	1:03	C	1	3	Other	Open Flames	Grass	Yes	WT2	1,0	45,45
1261	2019/01/23	20:27:00	20:28:00	20:46:00	21:13:00	0:12	0:01	0:46	C	1	3	Other	Open Flames	Palm Tree	Yes	WT2	1,0	83,33
1262	2019/01/24	14:20:00	14:23:00	14:41:00	15:17:00	0:31	0:03	0:57	C	1	4	Other	Open Flames	Rubbish	Yes	P1	0,0	0,00
1263	2019/01/24	16:51:00	16:53:00	16:59:00	17:22:00	0:17	0:02	0:31	C	1	4	Other Services	Special Service	Water Supply	Yes	P1	0,0	0,00
1264	2019/01/24	19:00:00	20:45:00	21:00:00	22:20:00	1:15	1:45	3:20	C	1	2	Other Services	Special Service	Water Supply	Yes	WT1	1,0	13,33
1265	2019/01/26	16:08:00	16:09:00	16:13:00	16:56:00	0:40	0:01	0:48	C	1	2	Other	Electrical Faults	Electrical Pole	Yes	WT2	0,0	0,00
1266	2019/01/26	19:33:00	19:36:00	19:46:00	20:47:00	0:25	0:03	1:14	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	40,00

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1267	2019/01/27	07:33:00	08:38:00	09:00:00	14:32:00	5:00	1:05	6:59	C	1	3	Other Services	Special Service	Water Supply	Yes	P3	10,0	33,33
1268	2019/01/27	12:00:00	12:10:00	12:21:00	12:36:00	0:10	0:10	0:36	B	1	3	Other Services	Special Service	Water Supply	Yes	P1	1,0	100,00
1269	2019/01/27	23:51:00	23:55:00	00:04:00	00:55:00	0:26	0:04	0:56	E	1	2	Residential	Open Flames	Informal	Yes	WT2	3,0	115,38
1270	2019/01/28	06:28:00	06:31:00	06:35:00	07:21:00	0:40	0:03	0:53	C	1	2	Other Services	Rescues	Car in water	Yes	P1	0,0	0,00
1271	2019/01/29	17:39:00	17:40:00	17:42:00	18:02:00	0:12	0:01	0:23	A	1	4	Transport	Electrical Faults	Car	Yes	P1	1,0	83,33
1272	2019/01/29	22:00:00	22:03:00	22:08:00	22:26:00	0:13	0:03	0:26	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	76,92
1273	2019/01/30	10:05:00	10:08:00	10:12:00	11:30:00	0:42	0:03	1:25	A	1	5	Residential	Open Flames	Formal	Yes	P1	8,0	190,48
1274	2019/01/30	11:27:00	12:00:00	12:17:00	12:50:00	0:40	0:33	1:23	C	1	2	Other Services	Special Service	Roof Blown Away	Yes	WT1	0,0	0,00
1275	2019/02/01	23:51:00	23:54:00	00:29:00	01:07:00	0:16	0:03	1:16	C	1	4	Other	Electrical Faults	DB Box	Yes	P1	0,0	0,00
1276	2019/02/04	08:06:00	08:15:00	08:21:00	12:18:00	3:28	0:09	4:12	C	2	8	Institutional	Undetermined	Creche	Yes	P1	40,0	192,31
1277	2019/02/05	09:27:00	09:30:00	09:48:00	12:00:00	2:00	0:03	2:33	C	1	4	Institutional	Other	Creche	Yes	P1	1,0	8,33
1278	2019/02/06	09:00:00	09:02:00	09:08:00	09:27:00	0:16	0:02	0:27	A	1	4	Other	Open Flames	Rubbish	Yes	P1	2,0	125,00
1279	2019/02/06	09:33:00	09:35:00	09:48:00	10:25:00	0:17	0:02	0:52	D	1	5	Transport	Electrical	Car	Yes	P1	1,0	58,82
1280	2019/02/06	10:39:00	10:39:00	11:02:00	11:25:00	0:02	0:00	0:46	C	1	4	Other	Open Flames	Rubbish	Yes	WT2	0,0	0,00
1281	2019/02/08	16:11:00	16:13:00	16:22:00	16:39:00	0:17	0:02	0:28	C	1	4	Other	Open Flames	Grass	Yes	P1	2,0	117,65
1282	2019/02/08	16:39:00	16:40:00	16:51:00	17:03:00	0:12	0:01	0:24	C	1	4	Other	Lightning	Palm Tree	Yes	P1	2,0	166,67
1283	2019/12/09	02:58:00	03:03:00	03:15:00	04:02:00	0:11	0:05	1:04	E	1	4	Residential	Open Flames	Informal	Yes	WT2	1,0	90,91
1284	2019/02/09	15:19:00	15:20:00	15:33:00	15:54:00	0:06	0:01	0:35	C	1	4	Residential	Electrical Faults	Informal	Yes	WT2	1,0	166,67
1285	2019/02/09	15:28:00	15:32:00	15:45:00	16:20:00	0:23	0:04	0:52	B	1		Other	Open Flames	Grass	Yes	P1	3,0	130,43
1286	2019/02/11	15:28:00	15:30:00	15:42:00	16:13:00	0:23	0:02	0:45	B	1	3	Other	Lightning	Palm Tree	Yes	WT2	1,0	43,48
1287	2019/02/19	00:27:00	00:30:00	00:41:00	00:57:00	0:05	0:03	0:30	C	1	4	Other	Open Flames	Rubbish	Yes	P1	1,0	200,00
1288	2019/02/20	11:04:00	11:07:00	11:12:00	11:19:00	0:05	0:03	0:15	A	1	5	Other	Arson	Tyres	Yes	P1	1,0	200,00
1289	2019/02/23	16:17:00	16:28:00	16:33:00	16:46:00	0:02	0:11	0:29	C	1	2	Other	Open Flames	Palm Tree	Yes	P1	1,0	500,00
1290	2019/02/23	20:26:00	20:28:00	20:29:00	20:54:00	0:23	0:02	0:28	B	1	2	Other Services	Special Service	MVA	Yes	P1	0,0	0,00
1291	2019/02/23	22:42:00	22:46:00	23:05:00	23:54:00	0:42	0:04	1:12	C	1	2	Other Services	Special Service	MVA	Yes	P1	1,0	23,81
1292	2019/02/24	03:32:00	03:37:00	03:45:00	04:56:00	0:25	0:05	1:24	E	1	3	Residential	Open Flames	Informal	Yes	WT2	1,0	40,00
1293	2019/02/24	19:39:00	19:42:00	19:56:00	20:41:00	1:02	0:03	1:02	D	1	4	Transport	Open Flames	Bakkie	Yes	WT2	1,0	16,13
1294	2019/02/24	20:49:00	20:50:00	21:02:00	21:21:00	0:31	0:01	0:32	C	1	4	Other	Electrical Faults	Substation	Yes	WT2	0,0	0,00
1295	2019/02/24	22:39:00	22:39:00	22:51:00	01:09:00	0:40	0:00	2:30	C	1	3	Residential	Open Flames	Informal	Yes	WT1	2,0	50,00
1296	2019/02/25	10:35:00	10:37:00	10:45:00	11:19:00	0:33	0:02	0:44	A	1	4	Other	Open Flames	Rubbish	Yes	P1	2,0	60,61
1297	2015/02/25	14:25:00	14:28:00	14:35:00	15:00:00	0:35	0:03	0:35	C	1	3	Residential	Undetermined	Informal	Yes	P1	1,0	28,57
1298	2019/02/25	19:08:00	19:11:00	19:33:00	20:12:00	0:40	0:03	1:04	D	1	3	Other	Open Flames	Rubbish	Yes	P1	3,0	75,00
1299	2019/03/01	05:04:00	05:05:00	05:12:00	05:31:00	5:31	0:01	0:27	C	1	3	Other	Electrical	DB Box	Yes	WT2	0,0	0,00
1300	2019/03/02	18:33:00	18:34:00	18:40:00	19:46:00	0:23	0:01	1:13	C	1	3	Residential	Open Flames	Informal	Yes	WT2	2,0	86,96
1301	2019/03/02	23:45:00	23:48:00	00:04:00	00:54:00	0:39	0:03	1:09	E	1	4	Residential	Open Flames	Informal	Yes	WT2	2,0	51,28
1302	2019/03/03	03:07:00	03:10:00	03:20:00	04:22:00	1:07	0:03	1:15	C	1	3	Institutional	Open Flames	Creche	Yes	WT2	0,0	0,00
1303	2019/03/03	07:50:00	07:52:00	08:03:00	08:49:00	0:30	0:02	0:59	C	1	3	Institutional	Open Flames	Creche	Yes	WT2	2,0	66,67
1304	2019/03/03	21:09:00	21:15:00	21:23:00	21:39:00	0:30	0:06	0:30	C	1	3	Other Services	Special Service	Remove Tree on Road	Yes	P1	0,0	0,00
1305	2019/03/04	13:42:00	13:45:00	13:52:00	14:18:00	0:25	0:03	0:36	E	1	4	Residential	Undetermined	Informal	Yes	P1	1,0	40,00
1306	2019/03/04	16:48:00	16:48:00	17:04:00	18:06:00	1:14	0:00	1:18	C	2	1	Other	Open Flames	Grass	Yes	WT2	2,0	27,03
1307	2019/03/05	15:57:00	16:00:00	16:08:00	17:05:00	0:47	0:03	1:08	C	1	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1308	2019/03/05	22:01:00	22:04:00	22:09:00	22:26:00	0:14	0:03	0:25	C	1	5	Other	Open Flames	Grass	Yes	P1	1,0	71,43
1309	2019/03/05	23:29:00	23:30:00	23:40:00	00:49:00	0:48	0:01	1:20	C	2	7	Residential	Other	Informal	Yes	P1	3,0	62,50
1310	2019/03/06	11:08:00	11:16:00	11:26:00	12:05:00	0:19	0:08	0:57	C	2	2	Other	Open Flames	Rubbish	Yes	WT2	1,0	52,63
1311	2019/03/06	14:04:00	14:05:00	14:20:00	14:54:00	0:21	0:01	0:50	C	1	3	Other	Open Flames	Grass	Yes	WT2	1,0	47,62
1312	2019/03/07	15:12:00	15:14:00	15:40:00	16:10:00	0:50	0:02	0:58	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	20,00
1313	2019/03/11	08:42:00	08:47:00	08:56:00	09:17:00	0:02	0:05	0:35	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	500,00
1314	2018/03/11	15:12:00	15:16:00	15:24:00	15:46:00	0:05	0:04	0:34	C	1	3	Other	Open Flames	Tree	Yes	P1	1,0	200,00
1315	2019/03/17	03:25:00	03:28:00	03:34:00	04:12:00	0:22	0:03	0:47	B	1	3	Transport	Electrical	Car	Yes	P1	4,0	181,82
1316	2019/03/19	12:53:00	12:55:00	13:04:00	13:39:00	0:21	0:02	0:46	C	2	6	Transport	Arson	Truck	Yes	P1	3,0	142,86
1317	2019/03/19	19:45:00	19:51:00	20:14:00	20:34:00	0:28	0:06	0:49	E	1	3	Other	Open Flames	Tree	Yes	WT2	1,0	35,71
1318	2019/03/21	09:50:00	09:52:00	10:03:00	11:58:00	2:00	0:02	2:08	C	1	2	Residential	Open Flames	Formal	Yes	WT1	3,0	25,00

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1319	2019/03/21	14:40:00	14:43:00	14:48:00	15:05:00	0:17	0:03	0:25	A	1	3	Other	Open Flames	Palm Tree	Yes	P1	2,0	117,65
1320	2019/03/23	21:10:00	21:14:00	21:45:00	22:29:00	1:19	0:04	1:19	C	1	3	Other	Open Flames	Informal	Yes	WT2	2,0	25,32
1321	2019/03/24	17:54:00	17:54:00	18:04:00	19:11:00	0:40	0:00	1:17	C	1	3	Residential	Arson	Formal	Yes	WT2	3,0	75,00
1322	2019/03/28	20:51:00	20:56:00	20:58:00	22:12:00	1:07	0:05	1:21	C	2	7	Industry	Electrical Faults	Factory	Yes	P1	0,0	0,00
1323	2019/03/29	15:42:00	15:45:00	15:54:00	17:01:00	0:45	0:03	1:19	D	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1324	2019/03/31	22:23:00	22:28:00	23:11:00	23:56:00	1:07	0:05	1:33	D	1	2	Other Services	Special Services	Rescues	Yes	P1	1,0	14,93
1325	2019/04/02	04:08:00	04:13:00	04:18:00	04:35:00	0:14	0:05	0:27	C	1	3	Other	Open Flames	Rubbish	Yes	P1	2,0	142,86
1326	2019/04/03	17:33:00	17:36:00	17:40:00	18:13:00	0:16	0:03	0:40	C	1	2	Other	Open Flames	Tree	Yes	P1	2,0	125,00
1327	2019/04/04	02:25:00	02:28:00	02:32:00	02:45:00	0:08	0:03	0:20	C	1	4	Other	Open Flames	Tree	Yes	P1	2,0	250,00
1328	2019/04/04	19:09:00	19:12:00	19:21:00	20:52:00	0:40	0:03	1:43	C	1	4	Other	Electrical Faults	Lamp post	Yes	P1	0,0	0,00
1329	2019/04/18	23:17:00	23:20:00	23:37:00	00:12:00	0:47	0:03	0:55	D	1	3	Transport	Undetermined	Car	Yes	P1	3,0	63,83
1330	2019/04/19	20:00:00	20:05:00	20:09:00	21:15:00	0:54	0:05	1:15	B	1	2	Commercial	Open Flames	Jewellery Store	Yes	P1	0,0	0,00
1331	2019/04/26	22:02:00	22:05:00	22:15:00	22:24:00	0:17	0:03	0:22	D	1	3	Transport	Electrical Faults	Car	Yes	P1	1,0	58,82
1332	2019/04/29	18:47:00	18:49:00	18:55:00	19:26:00	0:14	0:02	0:39	B	2	7	Other	Open Flames	Grass	Yes	P1	1,0	71,43
1333	2019/05/01	15:55:00	15:59:00	16:08:00	17:13:00	1:00	0:04	1:18	B	1	3	Other Services	Special Services	MVA	Yes	P1	0,0	0,00
1334	2019/05/02	21:56:00	21:59:00	22:03:00	22:03:00	1:00	0:03	0:07	C	1	2	Residential	Open Flames	Informal	Yes	P3	2,0	33,33
1335	2019/05/04	06:50:00	06:56:00	06:56:00	07:04:00	0:05	0:06	0:14	B	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	200,00
1336	2019/05/05	00:44:00	00:47:00	00:50:00	01:20:00	0:11	0:03	0:36	E	1	2	Residential	Open Flames	Formal	Yes	WT2	0,0	0,00
1337	2019/05/11	03:26:00	03:28:00	03:38:00	04:48:00	0:45	0:02	1:22	C	1	2	Residential	Open Flames	Formal	Yes	WT 2	3,0	66,67
1338	2019/05/12	06:58:00	07:00:00	07:05:00	07:17:00	0:14	0:02	0:19	C	1	1	Other	Open Flames	Tree	Yes	P1	1,0	71,43
1339	2019/05/12	22:03:00	22:06:00	22:16:00	22:39:00	0:21	0:03	0:36	C	1	2	Other	Undetermined	Tree	Yes	P1	1,0	47,62
1340	2019/05/13	03:05:00	03:15:00	03:22:00	04:32:00	1:04	0:10	1:27	B	2	2	Commercial	Undetermined	Storage	Yes	P2	12,0	187,50
1341	2019/05/14	21:43:00	21:45:00	21:50:00	22:15:00	0:25	0:02	0:32	C	1	2	Residential	Cooking	Informal	Yes	WT 2	2,0	80,00
1342	2019/05/16	08:49:00	08:52:00	09:08:00	10:03:00	0:52	0:03	1:14	C	1	3	Other Services	Hazmat	Chemicals	Yes	P1	0,0	0,00
1343	2019/05/17	05:00:00	05:03:00	05:10:00	05:22:00	0:16	0:03	0:22	A	1	2	Other	Open Flames	Rubbish	Yes	P1	3,0	187,50
1344	2019/05/19	19:33:00	19:34:00	19:46:00	20:28:00	0:08	0:01	0:55	C	1	3	Other	Open Flames	Rubbish	Yes	WT 2	1,0	125,00
1345	2019/05/19	20:19:00	20:23:00	20:27:00	20:43:00	0:10	0:04	0:24	C	1	3	Other	Electrical Faults	Electricity Transformer	Yes	P1	0,0	0,00
1346	2019/05/20	09:09:00	09:12:00	09:16:00	10:15:00	0:57	0:03	1:06	C	3	5	Residential	Electrical Faults	House	Yes	WT2	5,0	87,72
1347	2019/05/20	16:32:00	16:37:00	16:54:00	17:31:00	0:37	0:05	0:59	C	2	6	Other Services	Special Services	MVA	Yes	P1	0,0	0,00
1348	2019/05/22	16:31:00	16:34:00	16:38:00	17:06:00	0:23	0:03	0:35	E	1	3	Residential	Open Flames	Shack	Yes	WT 2	1,0	43,48
1349	2019/05/23	11:10:00	11:12:00	11:27:00	11:41:00	0:15	0:02	0:31	C	2	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1350	2019/05/24	16:41:00	16:45:00	16:49:00	17:05:00	0:16	0:04	0:24	B	1	1	Other	Open Flames	Grass	Yes	P1	1,0	62,50
1351	2019/05/28	17:23:00	17:30:00	17:44:00	18:09:00	0:20	0:07	0:46	C	1	1	Other	Lightning	Tree	Yes	P1	1,0	50,00
1352	2019/05/29	17:30:00	17:36:00	17:40:00	17:56:00	0:10	0:06	0:26	E	1	4	Other	Open Flames	Rubbish	Yes	P1	1,0	100,00
1353	2019/05/29	20:42:00	20:47:00	20:56:00	21:57:00	0:49	0:05	1:15	C	1	2	Transport	Open Flames	Truck	Yes	P1	1,0	20,41
1354	2019/05/30	16:10:00	16:12:00	16:36:00	17:45:00	1:12	0:02	1:35	C	1	3	Transport	Electrical Faults	Ambulance	Yes	WT 2	3,0	41,67
1355	2019/06/01	00:57:00	01:00:00	01:02:00	01:35:00	0:10	0:03	0:38	E	1	3	Residential	Open Flames	Informal	Yes	P1	1,0	100,00
1356	2019/06/01	18:44:00	18:46:00	18:56:00	19:14:00	0:14	0:02	0:30	E	1	3	Residential	Open Flames	Informal	Yes	P1	1,0	71,43
1357	2019/06/02	19:10:00	19:13:00	19:25:00	20:08:00	0:17	0:03	0:58	C	2	3	Residential	Open Flames	Informal	Yes	P1	1,0	58,82
1358	2019/06/02	21:24:00	21:25:00	21:33:00	22:15:00	0:29	0:01	0:51	E	1	1	Residential	Undetermined	Informal	Yes	WT 2	1,0	34,48
1359	2019/06/03	07:11:00	07:13:00	07:23:00	07:28:00	0:04	0:02	0:17	C	1	1	Other	Open Flames	Rubbish	Yes	P1	1,0	250,00
1360	2019/06/04	09:34:00	09:37:00	09:47:00	10:34:00	0:14	0:03	1:00	E	1	4	Residential	Arson	Informal	Yes	P1	1,0	71,43
1361	2019/06/06	15:08:00	15:11:00	15:16:00	15:26:00	0:03	0:03	0:18	B	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	333,33
1362	2019/06/07	16:39:00	16:41:00	17:00:00	17:26:00	0:41	0:02	0:47	D	1	3	Other	Open Flames	Grass	Yes	P1	1,0	24,39
1363	2019/06/07	19:32:00	19:35:00	19:43:00	19:56:00	0:17	0:03	0:24	C	1	3	Other	Open Flames	Tree	Yes	P1	2,0	117,65
1364	2019/06/08	20:39:00	20:41:00	20:59:00	21:22:00	0:35	0:02	0:43	C	1	1	Other	Open Flames	Grass	Yes	P5	1,0	28,57
1365	2019/06/09	16:08:00	16:08:00	16:25:00	16:59:00	0:20	0:00	0:51	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	50,00
1366	2019/06/10	22:19:00	22:24:00	22:31:00	22:51:00	0:11	0:05	0:32	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	90,91
1367	2019/06/11	01:35:00	01:39:00	01:49:00	02:49:00	1:29	0:04	1:14	C	1	2	Commercial	Open Flames	Hardware Store	Yes	P1	3,0	33,71
1368	2019/06/12	10:19:00	10:24:00	10:28:00	10:37:00	0:13	0:05	0:18	B	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	76,92
1369	2019/06/12	13:10:00	13:12:00	13:20:00	14:04:00	0:30	0:02	0:54	C	1	4	Other	Open Flames	Rubbish	Yes	P1	1,0	33,33
1370	2019/06/14	13:37:00	13:38:00	13:46:00	13:59:00	1:28	0:01	0:22	C	1	2	Commercial	Cooking	Tuckshop	Yes	P1	5,0	56,82
1371	2019/06/15	05:43:00	05:43:00	05:52:00	07:01:00	0:06	0:00	1:18	C	1	3	Residential	Open Flames	Informal	Yes	P1	1,0	166,67

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1372	2019/06/15	18:10:00	18:15:00	18:26:00	18:53:00	0:21	0:05	0:43	C	1	1	Other	Open Flames	Rubbish	Yes	P1	1,0	47,62
1373	2019/06/16	20:14:00	20:18:00	20:27:00	20:57:00	0:17	0:04	0:43	C	1	1	Storage	Open Flames	Storeroom	Yes	P1	4,0	235,29
1374	2019/06/19	16:18:00	16:21:00	16:39:00	17:35:00	1:17	0:03	1:17	C	1	1	Other	Open Flames	Grass	Yes	D2	1,0	12,99
1375	2019/06/21	13:12:00	13:15:00	13:17:00	14:30:00	0:35	0:03	1:18	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	28,57
1376	2019/06/21	13:23:00	13:25:00	13:55:00	14:49:00	1:05	0:02	1:26	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1377	2019/06/22	13:01:00	13:02:00	13:10:00	13:24:00	0:13	0:01	0:23	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1378	2019/06/23	17:18:00	17:24:00	17:29:00	18:09:00	0:21	0:06	0:51	D	1	3	Transport	Arson	Truck	Yes	P1	4,0	190,48
1379	2019/06/24	07:10:00	07:13:00	07:20:00	07:59:00	0:33	0:03	0:49	A	1	4	Commercial	Arson	Old Facotry	Yes	P1	5,0	151,52
1380	2019/06/24	17:31:00	17:34:00	17:37:00	17:52:00	0:18	0:03	0:21	C	1	3	Other	Open Flames	Oil	Yes	P1	0,0	0,00
1381	2019/06/26	12:37:00	12:40:00	12:48:00	13:12:00	0:05	0:03	0:35	C	2	6	Other	Open Flames	Grass	Yes	P1	1,0	200,00
1382	2019/06/27	12:44:00	12:45:00	12:49:00	13:41:00	0:45	0:01	0:57	D	1	5	Other Services	Hazmat	Diesel Spillage	Yes	P5	0,0	0,00
1383	2019/06/29	11:41:00	11:43:00	11:55:00	12:48:00	0:04	0:02	1:07	C	1	2	Other	Open Flames	Grass	Yes	D2	0,3	75,00
1384	2019/06/30	19:41:00	19:41:00	19:50:00	20:25:00	0:21	0:00	0:44	C	1	3	Residential	Undetermined	Informal	Yes	P1	2,0	95,24
1385	2019/07/03	03:39:00	03:45:00	03:55:00	04:15:00	0:13	0:06	0:36	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	76,92
1386	2019/07/04	15:07:00	15:11:00	15:18:00	16:47:00	1:18	0:04	1:40	C	3	4	Other	Open Flames	Grass	Yes	P1	0,5	6,41
1387	2019/07/04	18:21:00	18:23:00	18:33:00	19:03:00	0:34	0:02	0:42	B	2	3	Other	Open Flames	Rubbish	Yes	P1	1,0	29,41
1388	2019/07/05	18:22:00	18:25:00	18:25:00	19:18:00	0:23	0:03	0:56	C	1	2	Other	Open Flames	Grass	Yes	P5	1,0	43,48
1389	2019/07/05	19:19:00	19:20:00	19:28:00	20:46:00	0:42	0:01	1:27	C	2	4	Residential	Undetermined	Informal	Yes	P1	5,0	119,05
1390	2019/07/06	08:58:00	09:00:00	09:08:00	10:07:00	0:23	0:02	1:09	A	1	4	Other	Open Flames	Rubbish	Yes	P1	2,0	86,96
1391	2019/07/06	14:07:00	14:08:00	14:11:00	15:00:00	0:21	0:01	0:53	C	1	5	Residential	Undetermined	Informal	Yes	P1	3,0	142,86
1392	2019/07/06	15:04:00	15:06:00	15:19:00	16:00:00	0:34	0:02	0:56	C	1	1	Other	Open Flames	Grass	Yes	D2	0,0	0,00
1393	2019/07/06	16:26:00	16:29:00	16:37:00	17:04:00	0:33	0:03	0:38	C	1	4	Residential	Other	Formal	Yes	P1	4,0	121,21
1394	2019/07/06	16:44:00	16:46:00	16:50:00	17:50:00	0:34	0:02	1:06	C	1	3	Other	Open Flames	Rubbish	Yes	P1	2,0	58,82
1395	2019/07/09	06:37:00	06:40:00	06:50:00	07:36:00	0:42	0:03	0:59	C	1	3	Residential	Open Flames	Informal	Yes	P5	1,0	23,81
1396	2019/07/10	17:27:00	17:28:00	17:41:00	18:17:00	0:28	0:01	0:50	C	2	3	Other	Open Flames	Rubbish	Yes	P5	0,4	14,29
1397	2019/07/10	17:40:00	17:41:00	18:29:00	18:47:00	1:00	0:01	1:07	C	2	3	Other	Open Flames	Grass	Yes	P5	1,0	16,67
1398	2019/07/11	22:39:00	22:42:00	22:51:00	23:31:00	0:30	0:03	0:52	E	1	4	Residential	Open Flames	Informal	Yes	P1	2,0	66,67
1399	2019/07/12	11:12:00	11:15:00	11:26:00	12:26:00	0:41	0:03	1:14	C	2	4	Other	Open Flames	Rubbish	Yes	P1	1,0	24,39
1400	2019/07/12	16:18:00	16:20:00	16:26:00	18:00:00	1:16	0:02	1:42	C	1	3	Residential	Open Flames	Formal	Yes	P1	1,0	13,16
1401	2019/07/12	20:31:00	20:31:00	20:40:00	21:07:00	0:14	0:00	0:36	C	1	2	Other Services	Special Services	Medical	Yes	D2	0,0	0,00
1402	2019/07/12	23:08:00	23:08:00	23:20:00	00:24:00	0:43	0:00	1:16	C	1	2	Other Services	Special Services	Medical	Yes	D2	0,0	0,00
1403	2019/07/13	12:02:00	12:05:00	12:22:00	13:12:00	0:45	0:03	1:10	C	1	2	Other	Open Flames	Grass	Yes	P5	1,0	22,22
1404	2019/07/13	14:49:00	14:54:00	14:58:00	15:28:00	0:21	0:05	0:39	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	47,62
1405	2019/07/13	15:24:00	15:25:00	15:40:00	17:16:00	1:00	0:01	1:52	C	1	2	Other	Open Flames	Grass	Yes	P5	1,0	16,67
1406	2019/07/13	18:00:00	18:05:00	18:13:00	18:22:00	0:05	0:05	0:22	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1407	2019/07/13	18:13:00	18:21:00	18:29:00	18:59:00	0:21	0:08	0:46	C	1	2	Other	Open Flames	Grass	Yes	P5	1,0	47,62
1408	2019/07/15	21:40:00	21:45:00	21:49:00	22:02:00	0:09	0:05	0:22	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	111,11
1409	2019/07/15	23:15:00	23:19:00	23:27:00	00:13:00	0:25	0:04	0:58	C	1	4	Residential	Open Flames	Formal	Yes	P1	0,0	0,00
1410	2019/07/16	08:05:00	08:08:00	08:22:00	12:40:00	4:18	0:03	4:35	D	1	2	Other	Open Flames	Manure	Yes	P1	20,0	77,52
1411	2019/07/16	15:09:00	15:10:00	15:37:00	15:48:00	0:05	0:01	0:39	C	1	4	Other	Open Flames	Rubbish	Yes	P5	2,0	400,00
1412	2019/07/16	16:05:00	16:13:00	16:23:00	17:36:00	1:03	0:08	1:31	C	2	7	Residential	Arson	Informal	Yes	P1	5,0	79,37
1413	2019/07/17	12:12:00	12:17:00	12:21:00	12:56:00	0:29	0:05	0:44	C	1	1	Other	Open Flames	Rubbish	Yes	D7	1,0	34,48
1414	2019/07/17	13:08:00	13:13:00	13:23:00	14:00:00	0:30	0:05	0:52	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	33,33
1415	2019/07/17	13:15:00	13:17:00	13:20:00	13:52:00	0:25	0:02	0:37	C	1	4	Other	Open Flames	Grass	Yes	D7	0,0	0,00
1416	2019/07/17	18:24:00	18:25:00	18:33:00	19:03:00	0:20	0:01	0:39	C	1	2	Other	Open Flames	Grass	Yes	WT1	1,0	50,00
1417	2019/07/17	15:12:00	15:18:00	15:31:00	16:02:00	0:32	0:06	0:50	C	1	2	Other	Open Flames	Rubbish	Yes	WT1	1,0	31,25
1418	2019/07/17	18:24:00	18:25:00	18:33:00	19:03:00	0:20	0:01	0:39	C	1	3	Other	Open Flames	Grass	Yes	WT1	1,0	50,00
1419	2019/07/18	15:17:00	15:17:00	15:25:00	15:30:00	0:05	0:00	0:13	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1420	2019/07/18	15:51:00	15:54:00	15:59:00	16:29:00	0:26	0:03	0:38	C	1	3	Other	Open Flames	Tree	Yes	P1	1,0	38,46
1421	2019/07/18	20:33:00	20:37:00	21:43:00	21:01:00	0:14	0:04	0:28	C	1	4	Other	Open Flames	Rubbish	Yes	P1	1,0	71,43
1422	2019/07/18	22:28:00	22:33:00	22:37:00	22:53:00	0:13	0:05	0:25	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	76,92
1423	2019/07/19	15:19:00	15:27:00	15:29:00	15:46:00	0:10	0:08	0:27	C	1	3	Other	Open Flames	Rubbish	Yes	P1	2,0	200,00
1424	2019/07/19	16:26:00	16:27:00	16:37:00	17:51:00	1:14	0:01	1:25	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1425	2019/07/19	18:39:00	18:41:00	19:05:00	19:18:00	0:46	0:02	0:39	C	1	1	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1426	2019/07/20	18:42:00	18:43:00	18:54:00	19:08:00	0:06	0:01	0:26	C	1	0	Other	Open Flames	Rubbish	Yes	P1	1,0	166,67
1427	2019/07/22	10:37:00	10:55:00	11:11:00	11:50:00	0:08	0:18	1:13	C	1	4	Other	Open Flames	Rubbish	Yes	D7	1,0	125,00
1428	2019/07/23	11:30:00	11:33:00	11:48:00	13:25:00	0:47	0:03	1:55	C	1	1	Other	Open Flames	Grass	Yes	D7	1,0	21,28
1429	2019/07/23	17:02:00	17:05:00	17:16:00	17:57:00	0:32	0:03	0:55	C	1	4	Other	Open Flames	Grass	Yes	P1	3,0	93,75
1430	2019/07/24	19:50:00	19:50:00	20:01:00	20:59:00	0:29	0:00	1:09	C	1	2	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
1431	2019/07/24	19:58:00	20:05:00	20:09:00	21:09:00	1:04	0:07	1:11	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1432	2019/07/25	08:11:00	08:20:00	08:58:00	10:58:00	1:01	0:09	2:47	C	1	4	Other	Open Flames	Manure	Yes	P1	5,0	81,97
1433	2019/07/26	20:20:00	20:23:00	20:31:00	20:52:00	0:29	0:03	0:32	D	2	3	Other	Open Flames	Grass	Yes	P1	1,0	34,48
1434	2019/07/27	06:28:00	06:35:00	06:42:00	07:11:00	0:24	0:07	0:43	C	1	2	Other	Open Flames	Grass	Yes	P1	2,0	83,33
1435	2019/07/27	17:48:00	17:48:00	17:54:00	18:59:00	0:49	0:00	1:11	D	2	2	Other Services	Hazmat	Road Cleaning	Yes	WT1	0,0	0,00
1436	2019/07/29	22:05:00	22:09:00	22:15:00	22:34:00	0:13	0:04	0:29	B	1	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1437	2019/07/30	09:31:00	09:35:00	09:43:00	10:20:00	0:37	0:04	0:49	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	27,03
1438	2019/07/30	18:27:00	18:32:00	18:40:00	19:11:00	0:25	0:05	0:44	C	1	4	Other	Open Flames	Grass	Yes	P1	4,0	160,00
1439	2019/07/30	22:07:00	22:12:00	22:24:00	23:16:00	0:52	0:05	1:09	B	2	6	Public Assembly	Open Flames	Hall	Yes	P5	2,0	38,46
1440	2019/07/31	02:32:00	02:35:00	02:42:00	04:02:00	0:05	0:03	1:30	E	1	2	Residential	Open Flames	Informal	Yes	P5	5,0	1000,00
1441	2019/07/31	23:34:00	23:36:00	23:36:00	23:48:00	0:08	0:02	0:14	E	1	2	Residential	Open Flames	Informal	Yes	P5	1,0	125,00
1442	2019/08/01	21:03:00	21:06:00	21:17:00	21:37:00	0:04	0:03	0:34	C	1	1	Residential	Open Flames	Formal	Yes	P5	1,0	250,00
1443	2019/08/01	21:57:00	21:58:00	22:05:00	22:48:00	0:11	0:01	0:51	E	1	1	Residential	Open Flames	Informal	Yes	P5	1,0	90,91
1444	2019/08/02	06:40:00	06:44:00	06:48:00	06:55:00	0:02	0:04	0:15	B	1	4	Other	Open Flames	Grass	Yes	P1	1,0	500,00
1445	2019/08/02	15:34:00	15:40:00	15:50:00	16:29:00	0:39	0:06	0:55	C	2	4	Other	Open Flames	Rubbish	Yes	P1	1,0	25,64
1446	2019/08/02	22:15:00	22:21:00	22:27:00	23:36:00	0:44	0:06	1:21	C	2	3	Other	Open Flames	Scrapmetal	Yes	P5	5,0	113,64
1447	2019/08/03	16:18:00	16:21:00	16:43:00	20:04:00	2:54	0:03	3:46	D	2	2	Other Services	Special Service	MVA	Yes	WT1	0,0	0,00
1448	2019/08/03	17:50:00	17:53:00	17:58:00	18:52:00	0:26	0:03	1:02	C	2	5	Residential	Open Flames	Formal	Yes	P5	0,0	0,00
1449	2019/08/04	02:14:00	02:14:00	02:28:00	04:23:00	0:46	0:00	2:09	E	1	1	Residential	Open Flames	Informal	Yes	WT1	3,0	65,22
1450	2019/08/04	02:15:00	02:20:00	02:25:00	03:15:00	0:34	0:05	1:00	C	2	3	Other Services	Special Service	MVA	Yes	P5	0,0	0,00
1451	2019/08/04	09:40:00	09:42:00	09:45:00	10:30:00	0:07	0:02	0:50	E	1	2	Residential	Cooking	Informal	Yes	P1	0,0	0,00
1452	2019/08/04	13:12:00	13:14:00	13:34:00	15:09:00	1:47	0:02	1:57	D	2	4	Other Services	Special Service	MVA	Yes	WT1	0,0	0,00
1453	2019/08/04	13:48:00	13:56:00	14:14:00	15:38:00	0:56	0:08	1:50	D	2	2	Other	Open Flames	Grass	Yes	D7	0,0	0,00
1454	2019/08/04	20:45:00	20:48:00	20:54:00	21:10:00	0:10	0:03	0:25	C	2	2	Other	Open Flames	Palm Tree	Yes	P1	1,0	100,00
1455	2019/08/05	08:42:00	08:43:00	08:48:00	09:13:00	0:15	0:01	0:31	E	2	6	Residential	Open Flames	Informal	Yes	P5	1,0	66,67
1456	2019/08/05	09:05:00	09:07:00	09:12:00	10:26:00	0:50	0:02	1:21	B	1	4	Other	Open Flames	Grass	Yes	P1	6,0	120,00
1457	2019/08/06	17:03:00	17:08:00	17:14:00	17:30:00	0:04	0:05	0:27	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	250,00
1458	2019/08/06	23:04:00	23:08:00	23:13:00	00:25:00	0:32	0:04	1:21	E	1	3	Residential	Open Flames	Informal	Yes	P1	1,0	31,25
1459	2019/08/07	14:29:00	14:30:00	14:42:00	19:32:00	4:04	0:01	5:03	D	1	3	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
1460	2019/08/07	17:30:00	17:34:00	17:50:00	19:07:00	0:56	0:04	1:37	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	17,86
1461	2019/08/08	07:46:00	07:49:00	07:56:00	08:10:00	0:04	0:03	0:24	B	1	0	Other	Open Flames	Grass	Yes	P1	1,0	250,00
1462	2019/08/09	12:28:00	12:31:00	12:58:00	13:20:00	0:04	0:03	0:52	B	2	2	Other	Open Flames	Grass	Yes	D7	0,0	0,00
1463	2019/08/09	15:45:00	15:48:00	15:54:00	16:09:00	0:07	0:03	0:24	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	142,86
1464	2019/08/10	22:22:00	22:26:00	22:54:00	23:19:00	0:39	0:04	0:57	E	1	4	Residential	Arson	Informal	Yes	P1	1,0	25,64
1465	2019/08/13	10:48:00	10:52:00	11:00:00	11:18:00	0:08	0:04	0:30	B	1	4	Other	Electrical Faults	DB Box	Yes	P1	0,0	0,00
1466	2019/08/13	12:16:00	12:19:00	12:23:00	12:44:00	0:12	0:03	0:28	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	83,33
1467	2019/08/13	14:53:00	14:55:00	14:59:00	15:34:00	0:12	0:02	0:41	C	1	3	Other	Open Flames	Rubbish	Yes	P5	1,0	83,33
1468	2019/08/13	17:28:00	17:30:00	17:35:00	18:15:00	0:11	0:02	0:47	C	2	7	Residential	Open Flames	Formal	Yes	P5	1,0	90,91
1469	2019/08/15	09:44:00	09:47:00	09:56:00	10:15:00	0:41	0:03	0:31	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	24,39
1470	2019/08/15	13:36:00	13:41:00	13:46:00	14:26:00	1:01	0:05	0:50	B	2	4	Public Assembly	Electrical Faults	DB Box	Yes	P5	0,0	0,00
1471	2019/08/15	16:19:00	16:22:00	16:43:00	17:55:00	0:21	0:03	1:36	C	2	2	Other	Open Flames	Grass	Yes	P5	0,0	0,00
1472	2019/08/16	11:45:00	11:47:00	12:04:00	12:29:00	0:25	0:02	0:44	D	1	1	Other	Open Flames	Grass	Yes	D7	1,0	40,00
1473	2019/08/16	15:45:00	15:48:00	16:00:00	22:00:00	5:28	0:03	6:15	C	2	6	Institutional	Arson	Hospital	Yes	P1	8,0	24,39
1474	2019/08/16	23:53:00	23:57:00	00:18:00	01:01:00	0:39	0:04	1:08	E	1	3	Residential	Open Flames	Informal	Yes	P5	1,0	25,64
1475	2019/08/17	20:58:00	21:00:00	21:14:00	22:53:00	0:36	0:02	1:55	C	1	2	Residential	Electrical Faults	Informal	Yes	P5	1,0	27,78
1476	2019/08/17	21:27:00	21:30:00	21:36:00	21:43:00	0:08	0:03	0:16	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	125,00
1477	2019/08/18	12:02:00	12:05:00	12:08:00	12:35:00	0:11	0:03	0:33	A	1	2	Other	Open Flames	Grass	Yes	P1	1,0	90,91

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1478	2019/08/18	17:22:00	17:25:00	17:36:00	18:25:00	0:47	0:03	1:03	C	1	3	Residential	Open Flames	Informal	Yes	P5	0,0	0,00
1479	2019/08/19	10:35:00	10:38:00	10:50:00	11:29:00	0:27	0:03	0:54	C	1	4	Other	Open Flames	Grass	Yes	P1	2,0	74,07
1480	2019/08/19	16:11:00	16:11:00	16:18:00	17:06:00	0:55	0:00	0:55	C	1	2	Other	Open Flames	Tree	Yes	WT1	2,0	36,36
1481	2019/08/19	17:07:00	17:09:00	17:21:00	17:47:00	0:13	0:02	0:40	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	76,92
1482	2019/08/19	17:39:00	17:39:00	17:48:00	18:44:00	0:16	0:00	1:05	C	1	2	Other	Open Flames	Tree	Yes	WT1	2,0	125,00
1483	2019/08/19	19:12:00	19:16:00	19:20:00	19:39:00	0:10	0:04	0:27	B	1	4	Other	Open Flames	Rubbish	Yes	P1	1,0	100,00
1484	2019/08/20	09:00:00	09:03:00	09:48:00	13:30:00	4:00	0:03	4:30	D	1	2	Other	Open Flames	Grass	Yes	P1	3,0	12,50
1485	2019/08/20	13:36:00	13:39:00	13:48:00	17:40:00	3:50	0:03	4:04	A	2	5	Commercial	Electrical Faults	Tuck Shop	Yes	P1	0,0	0,00
1486	2019/08/21	17:55:00	17:55:00	18:08:00	19:58:00	0:07	0:00	2:03	C	1	0	Other Services	Special Service	Water Suppl	Yes	WT2	10,0	1428,57
1487	2019/08/21	20:08:00	20:10:00	20:18:00	21:11:00	1:38	0:02	1:03	C	2	8	Other Services	Special Service	MVA	Yes	P1	0,0	0,00
1488	2019/08/22	12:57:00	13:00:00	13:16:00	14:05:00	0:35	0:03	1:08	C	2	4	Other	Open Flames	Grass	Yes	P1	1,0	28,57
1489	2019/08/23	12:18:00	12:18:00	12:29:00	13:25:00	1:35	0:00	1:07	C	1	1	Other	Open Flames	Grass	Yes	P1	2,0	21,05
1490	2019/08/24	04:04:00	04:10:00	04:21:00	05:13:00	0:42	0:06	1:09	E	1	3	Residential	Open Flames	Informal	Yes	P5	1,0	23,81
1491	2019/08/25	02:43:00	02:45:00	02:55:00	03:35:00	0:16	0:02	0:52	E	1	3	Residential	Open Flames	Informal	Yes	P5	1,0	62,50
1492	2019/08/25	10:22:00	10:27:00	10:40:00	11:09:00	0:22	0:05	0:47	C	1	3	Other Services	Hazmat	Oil Spillage	Yes	P5	0,0	0,00
1493	2019/08/25	13:17:00	13:17:00	13:32:00	14:07:00	0:53	0:00	0:50	D	1	5	Other	Open Flames	Grass	Yes	P1	2,0	37,74
1494	2019/08/26	13:59:00	14:02:00	14:09:00	15:00:00	0:27	0:03	1:01	C	1	2	Residential	Other	Formal	Yes	P1	3,0	111,11
1495	2019/08/26	17:50:00	17:53:00	18:00:00	19:58:00	0:48	0:03	2:08	E	1	4	Other	Open Flames	Rubbish	Yes	P1	5,0	104,17
1496	2019/08/27	17:36:00	17:37:00	18:52:00	18:18:00	1:02	0:01	0:42	A	1	4	Other	Open Flames	Grass	Yes	P1	2,0	32,26
1497	2019/08/28	21:11:00	21:13:00	21:18:00	22:31:00	1:00	0:02	1:20	D	1	3	Other	Open Flames	Grass	Yes	WT1	3,0	50,00
1498	2019/08/29	15:02:00	15:02:00	15:20:00	16:49:00	0:12	0:00	1:47	E	1	2	Other	Open Flames	Grass	Yes	P5	2,0	166,67
1499	2019/08/29	18:21:00	18:21:00	18:37:00	18:56:00	0:07	0:00	0:35	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	285,71
1500	2019/08/30	12:51:00	12:53:00	13:00:00	13:16:00	0:15	0:02	0:25	B	1	1	Transport	Undetermined	Car	Yes	P1	2,0	133,33
1501	2019/08/30	15:20:00	15:23:00	15:27:00	16:05:00	0:38	0:03	0:45	C	1	1	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
1502	2019/08/30	19:28:00	19:30:00	19:40:00	20:16:00	0:35	0:02	0:48	C	1	2	Residential	Open Flames	Informal	Yes	WT1	2,0	57,14
1503	2019/08/31	13:01:00	13:04:00	13:16:00	13:51:00	0:21	0:03	0:50	D	1	2	Other	Open Flames	Grass	Yes	P5	1,0	47,62
1504	2019/08/31	14:04:00	14:07:00	14:15:00	14:55:00	0:43	0:03	0:51	C	2	1	Other	Open Flames	Grass	Yes	P1	1,0	23,26
1505	2019/08/31	17:29:00	17:35:00	17:47:00	18:22:00	0:40	0:06	0:53	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	25,00
1506	2019/08/31	19:40:00	19:44:00	19:51:00	20:07:00	0:14	0:04	0:27	C	1	1	Other	Open Flames	Tree	Yes	P1	1,0	71,43
1507	2019/08/31	22:19:00	22:20:00	22:39:00	22:54:00	0:26	0:01	0:35	C	1	2	Other	Open Flames	Grass	Yes	P5	1,0	38,46
1508	2019/09/01	12:01:00	12:03:00	12:25:00	13:00:00	0:43	0:02	0:59	C	1	3	Residential	Electrical Faults	Informal	Yes	P5	0,0	0,00
1509	2019/09/02	03:05:00	03:11:00	03:17:00	04:11:00	0:26	0:06	1:06	C	1	2	Residential	Open Flames	Formal	Yes	P5	3,0	115,38
1510	2019/09/02	04:20:00	04:21:00	04:36:00	06:50:00	1:32	0:01	2:30	C	3	3	Commecial	Electric Faults	Supermarket	Yes	P1	0,0	0,00
1511	2019/09/03	08:57:00	09:02:00	09:10:00	11:16:00	1:40	0:05	2:19	C	3	6	Residential	Electric Faults	Formal	Yes	P1	2,0	20,00
1512	2019/09/03	12:00:00	12:06:00	12:08:00	12:15:00	0:05	0:06	0:15	C	1	4	Other	Open Flames	Rubbish	Yes	P1	1,0	200,00
1513	2019/09/03	12:18:00	12:18:00	12:44:00	12:54:00	0:22	0:00	0:36	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	45,45
1514	2019/09/03	15:23:00	15:25:00	15:39:00	16:45:00	0:35	0:02	1:22	B	1	4	Other	Open Flames	Grass	Yes	P1	4,0	114,29
1515	2019/09/03	18:28:00	18:36:00	18:45:00	19:07:00	0:19	0:08	0:39	C	1	3	Other	Open Flames	Grass	Yes	P5	2,0	105,26
1516	2019/09/04	18:36:00	18:40:00	18:51:00	19:32:00	0:11	0:04	0:56	E	2	1	Other	Open Flames	Grass	Yes	P5	2,0	181,82
1517	2019/09/04	18:59:00	19:04:00	19:13:00	19:26:00	0:04	0:05	0:27	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	250,00
1518	2019/09/05	10:03:00	10:06:00	10:08:00	10:30:00	0:13	0:03	0:27	A	1	3	Other Services	Hazmat	-	Yes	P1	0,0	0,00
1519	2019/09/05	16:35:00	16:38:00	16:53:00	17:24:00	0:40	0:03	0:49	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	25,00
1520	2019/09/06	16:50:00	16:53:00	16:57:00	17:57:00	0:05	0:03	1:07	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	200,00
1521	2019/09/07	10:52:00	11:03:00	11:09:00	11:28:00	0:16	0:11	0:36	C	1	0	Other	Open Flames	Grass	Yes	D6	0,0	0,00
1522	2019/09/07	14:59:00	15:03:00	15:10:00	16:00:00	0:33	0:04	1:01	C	1	1	Other	Open Flames	Grass	Yes	D6	1,0	30,30
1523	2019/09/07	19:04:00	19:07:00	19:18:00	19:44:00	0:18	0:03	0:40	C	2	2	Other	Open Flames	Grass	Yes	P1	1,0	55,56
1524	2019/09/07	19:05:00	19:05:00	19:13:00	20:36:00	1:07	0:00	1:31	C	1	1	Other Services	Special Service	MVA	Yes	P5	0,0	0,00
1525	2019/09/08	01:20:00	01:36:00	01:36:00	02:15:00	0:55	0:16	0:55	E	2	3	Residential	Open Flames	Informal	Yes	P5	1,0	18,18
1526	2019/09/08	17:07:00	17:10:00	17:17:00	18:00:00	0:41	0:03	0:53	C	1	0	Other	Open Flames	Grass	Yes	D6	0,0	0,00
1527	2019/09/08	17:20:00	17:25:00	17:27:00	17:36:00	0:09	0:05	0:16	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1528	2019/09/08	18:44:00	18:44:00	18:50:00	19:20:00	0:06	0:00	0:36		1	2	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
1529	2019/09/09	15:04:00	15:05:00	15:16:00	16:15:00	1:00	0:01	1:11	C	1	2	Other	Open Flames	Tyres	Yes	WT1	2,0	33,33
1530	2019/09/09	15:20:00	15:25:00	15:32:00	16:17:00	0:25	0:05	0:57	C	1	3	Residential	Open Flames	Informal	Yes	P1	3,0	120,00

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1531	2019/09/10	08:38:00	08:38:00	08:42:00	12:02:00	3:12	0:00	3:24	C	1	3	Other	Open Flames	Tyres	Yes	WT1	4,0	20,83
1532	2019/09/10	10:23:00	10:31:00	10:34:00	11:00:00	0:13	0:08	0:37	C	1	0	Other	Open Flames	Grass	Yes	D6	2,0	153,85
1533	2019/09/10	12:19:00	12:20:00	12:22:00	13:10:00	0:51	0:01	0:51	C	1	3	Other	Open Flames	Grass	Yes	WT1	2,0	39,22
1534	2019/09/10	14:10:00	14:12:00	14:20:00	14:58:00	0:48	0:02	0:48	C	1	0	Other	Open Flames	Grass	Yes	D6	2,0	41,67
1535	2019/09/10	21:50:00	21:51:00	22:00:00	23:31:00	0:50	0:01	1:41	C	1	3	Public Assembly	Open Flames	Community Hall	Yes	WT1	10,0	200,00
1536	2019/09/11	07:25:00	07:25:00	07:30:00	08:31:00	0:21	0:00	1:06	E	1	3	Residential	Electrical Faults	Informal	Yes	WT1	1,0	47,62
1537	2019/09/12	02:48:00	02:50:00	05:02:00	07:28:00	4:00	0:02	4:40	D	1	2	Other	Open Flames	Grass	Yes	WT1	3,0	12,50
1538	2019/09/12	05:59:00	06:01:00	06:09:00	06:23:00	0:10	0:02	0:24	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	100,00
1539	2019/09/12	11:01:00	11:04:00	11:08:00	11:52:00	0:35	0:03	0:51	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1540	2019/09/12	12:55:00	12:56:00	13:06:00	14:05:00	0:52	0:01	1:10	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	19,23
1541	2019/09/13	01:06:00	01:09:00	01:13:00	02:38:00	0:38	0:03	1:32	B	1	2	Industry	Open Flames	Old Building	Yes	P1	5,0	131,58
1542	2019/09/13	15:33:00	15:37:00	15:48:00	16:15:00	0:23	0:04	0:42	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	43,48
1543	2019/09/14	04:44:00	04:46:00	04:55:00	06:17:00	1:03	0:02	1:33	C	1	3	Residential	Undetermined	Formal	Yes	WT2	4,0	63,49
1544	2019/09/14	09:56:00	09:58:00	10:09:00	10:41:00	0:20	0:02	0:45	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	50,00
1545	2019/09/14	18:08:00	18:09:00	18:13:00	19:04:00	1:05	0:01	0:56	C	1	3	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
1546	2019/09/14	20:57:00	21:00:00	21:05:00	21:56:00	0:15	0:03	0:59	C	1	2	Other	Open Flames	Grass	Yes	WT1	1,0	66,67
1547	2019/09/15	18:30:00	18:33:00	18:39:00	19:40:00	0:18	0:03	1:10	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	55,56
1548	2019/09/16	17:29:00	17:32:00	17:34:00	17:44:00	0:05	0:03	0:15	B	1	4	Other	Open Flames	Grass	Yes	P1	1,0	200,00
1549	2019/09/16	18:36:00	18:38:00	18:46:00	18:59:00	0:07	0:02	0:23	B	1	4	Other	Open Flames	Grass	Yes	P1	1,0	142,86
1550	2019/09/17	07:06:00	07:11:00	07:17:00	08:05:00	0:18	0:05	0:59	C	1	4	Other Services	Special Service	MVA	Yes	P1	0,0	0,00
1551	2019/09/18	08:05:00	08:10:00	08:19:00	08:32:00	0:07	0:05	0:27	B	1	2	Other	Open Flames	Rubbish	Yes	P5	2,0	285,71
1552	2019/09/18	21:29:00	21:34:00	21:47:00	21:55:00	0:02	0:05	0:26	C	1	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1553	2019/09/19	09:42:00	09:44:00	09:55:00	10:59:00	1:11	0:02	1:17	C	1	1	Other	Open Flames	Grass	Yes	D7	1,0	14,08
1554	2019/09/19	17:08:00	17:14:00	17:28:00	18:15:00	0:35	0:06	1:07	C	1	2	Residential	Undetermined	Formal	Yes	P1	0,0	0,00
1555	2019/09/19	19:03:00	19:05:00	19:12:00	19:41:00	0:15	0:02	0:38	C	1	2	Other Services	Special Services	Medical	Yes	WT1	0,0	0,00
1556	2019/09/19	23:40:00	23:43:00	23:53:00	00:33:00	0:34	0:03	0:53	C	1	2	Public Assembly	Undetermined	Hall	Yes	WT2	0,0	0,00
1557	2019/09/20	05:02:00	05:05:00	05:18:00	05:42:00	0:27	0:03	0:40	D	1	2	Other	Open flames	Grass	Yes	P1	1,0	37,04
1558	2019/09/20	13:39:00	13:46:00	14:00:00	14:35:00	0:18	0:07	0:56	D	2	4	Other	Open flames	Grass	Yes	P1	10,0	555,56
1559	2019/09/20	16:54:00	16:56:00	17:08:00	17:40:00	0:14	0:02	0:46	E	1	2	Residential	Undtermined	Informal	Yes	P1	1,0	71,43
1560	2019/09/21	02:52:00	02:55:00	03:04:00	03:14:00	0:17	0:03	0:22	B	1	2	Other	Open Flames	Grass	Yes	P1	1,0	58,82
1561	2019/09/21	15:58:00	16:02:00	16:09:00	17:56:00	0:30	0:04	1:58	C	1	2	Other	Open Flames	Grass	Yes	P1	4,0	133,33
1562	2019/09/21	17:25:00	17:29:00	17:40:00	17:51:00	0:06	0:04	0:26	C	1	2	Other	Open Flames	Grass	Yes	WT1	1,0	166,67
1563	2019/09/21	23:23:00	23:29:00	23:42:00	00:26:00	0:36	0:06	1:13	C	1	2	Residential	Open Flames	Formal	Yes	P1	1,0	27,78
1564	2019/09/22	12:02:00	12:05:00	12:07:00	12:13:00	0:17	0:03	0:11	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	58,82
1565	2019/09/22	19:18:00	19:21:00	19:34:00	21:02:00	0:50	0:03	1:44	C	1	3	Storage	Undetermined	Container	Yes	WT2	5,0	100,00
1566	2019/09/23	16:15:00	16:18:00	16:20:00	16:51:00	0:23	0:03	0:36	C	1	2	Residential	Electrical Faults	Formal	Yes	P1	0,0	0,00
1567	2019/09/25	07:35:00	07:36:00	07:55:00	08:37:00	0:27	0:01	1:02	C	2	3	Residential	Undetermined	Informal	Yes	WT2	1,0	37,04
1568	2019/09/25	10:39:00	10:42:00	10:54:00	12:04:00	0:43	0:03	1:25	D	1	3	Storage	Arson	Container	Yes	WT2	3,0	69,77
1569	2019/09/26	06:52:00	06:52:00	08:07:00	08:39:00	0:32	0:00	1:47	C	1	3	Other	Open Flames	Tree	Yes	WT1	1,0	31,25
1570	2019/09/26	09:22:00	09:24:00	09:29:00	09:42:00	0:17	0:02	0:20	C	1	1	Other	Open Flames	Rubbish	Yes	P1	1,0	58,82
1571	2019/09/27	11:51:00	11:53:00	12:26:00	13:31:00	1:13	0:02	1:40	C	1	1	Residential	Open Flames	Grass	Yes	WT1	1,0	13,70
1572	2019/09/28	10:06:00	10:09:00	10:12:00	10:26:00	0:12	0:03	0:20	C	1	3	Other	Open Flames	Tree	Yes	P1	1,0	83,33
1573	2019/09/28	15:30:00	15:33:00	15:39:00	16:43:00	1:06	0:03	1:13	C	1	4	Other Services	Rescues	MVA	Yes	P1	0,0	0,00
1574	2019/09/28	10:06:00	10:08:00	10:12:00	10:26:00	0:14	0:02	0:20	A	1	2	Other	Open Flames	Tree	Yes	P1	1,0	71,43
1575	2019/09/29	09:27:00	09:30:00	09:39:00	10:12:00	0:30	0:03	0:45	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	33,33
1576	2019/09/29	15:08:00	15:20:00	15:31:00	16:07:00	0:59	0:12	0:59	D	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	16,95
1577	2019/09/29	21:33:00	21:35:00	21:55:00	22:32:00	0:26	0:02	0:59	C	1	3	Residential	Open Flames	Formal	Yes	WT2	1,0	38,46
1578	2019/09/30	16:27:00	16:30:00	16:36:00	16:56:00	0:16	0:03	0:29	C	1	1	Other	Open Flames	Rubbish	Yes	P1	2,0	125,00
1579	2019/10/01	09:44:00	09:46:00	10:00:00	11:00:00	1:11	0:02	1:16	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	14,08
1580	2019/10/01	22:48:00	22:50:00	23:12:00	02:12:00	1:10	0:02	3:24	C	1	3	Residential	Electric Faults	Informal	Yes	WT2	2,0	28,57
1581	2019/10/01	23:17:00	23:19:00	23:39:00	23:53:00	0:21	0:02	0:36	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	47,62
1582	2019/10/02	16:57:00	16:59:00	17:05:00	17:18:00	0:04	0:02	0:21	C	1	5	Other	Open Flames	Grass	Yes	P1	1,0	250,00
1583	2019/10/05	00:08:00	00:08:00	00:12:00	01:05:00	0:47	0:00	0:57	C	2	8	Residential	Arson	Formal	Yes	P1	5,0	106,38

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1584	2019/10/05	03:52:00	03:55:00	04:08:00	04:34:00	0:12	0:03	0:42	E	1	4	Residential	Open Flames	Formal	Yes	WT2	2,0	166,67
1585	2019/10/05	10:53:00	10:53:00	11:03:00	11:49:00	0:26	0:00	0:56	E	1	3	Residential	Arson	Formal	Yes	WT1	2,0	76,92
1586	2019/10/05	11:20:00	11:20:00	11:24:00	11:44:00	0:14	0:00	0:24	E	1	2	Residential	Undetermined	Formal	Yes	WT1	3,0	214,29
1587	2019/10/05	12:13:00	12:13:00	12:22:00	12:43:00	0:14	0:00	0:30	E	1	3	Other	Open Flames	Rubbish	Yes	WT1	3,0	214,29
1588	2019/10/05	13:31:00	13:34:00	14:04:00	15:38:00	0:50	0:03	2:07	D	1	3	Other	Open Flames	Grass	Yes	P1	2,0	40,00
1589	2019/10/05	17:54:00	17:56:00	18:10:00	18:31:00	0:09	0:02	0:37	E	1	2	Transport	Undetermined	Taxi	Yes	WT2	1,0	111,11
1590	2019/10/05	19:27:00	19:31:00	19:40:00	19:59:00	0:10	0:04	0:32	B	1	4	Other	Open Flames	Grass	Yes	P1	1,0	100,00
1591	2019/10/06	04:20:00	04:26:00	04:36:00	05:35:00	0:46	0:06	1:15	C	1	4	Residential	Smoking	Formal	Yes	WT2	3,0	65,22
1592	2019/10/06	13:37:00	13:39:00	13:43:00	14:03:00	0:03	0:02	0:26	A	1	4	Other	Open Flames	Tree	Yes	P1	2,0	666,67
1593	2019/10/06	14:28:00	14:31:00	14:36:00	14:43:00	0:04	0:03	0:15	C	1	4	Other	Cooking	Tree	Yes	P1	1,0	250,00
1594	2019/10/07	16:15:00	16:20:00	16:25:00	16:54:00	0:18	0:05	0:39	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	55,56
1595	2019/10/08	06:43:00	06:49:00	06:55:00	09:00:00	2:04	0:06	2:17	C	1	2	Residential	Open Flames	Formal	Yes	WT2	2,0	16,13
1596	2019/10/08	15:45:00	15:46:00	15:54:00	16:09:00	0:05	0:01	0:24	C	1	3	Other	Open Flames	Grass	Yes	WT2	1,0	200,00
1597	2019/10/08	19:16:00	19:19:00	19:25:00	19:56:00	0:23	0:03	0:40	E	1	4	Other	Open Flames	Grass	Yes	P1	5,0	217,39
1598	2019/10/09	04:41:00	04:45:00	04:53:00	05:02:00	0:04	0:04	0:21	C	1	4	Other	Arson	Palm Tree	Yes	P1	1,0	250,00
1599	2019/10/09	13:42:00	13:45:00	13:50:00	14:04:00	0:09	0:03	0:22	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	111,11
1600	2019/10/09	22:38:00	22:40:00	22:44:00	22:56:00	0:06	0:02	0:18	C	1	5	Other	Open Flames	Tree	Yes	P1	1,0	166,67
1601	2019/10/10	16:51:00	16:54:00	17:02:00	17:30:00	0:09	0:03	0:39	C	1	3	Other	Open Flames	Grass	Yes	WT2	1,0	111,11
1602	2019/10/11	08:16:00	08:19:00	08:30:00	09:00:00	0:37	0:03	0:44	B	1	3	Other	Open Flames	Grass	Yes	P5	1,0	27,03
1603	2019/10/11	13:27:00	13:30:00	13:38:00	15:56:00	0:15	0:03	2:29	B	1	3	Other	Open Flames	Grass	Yes	P1	1,0	66,67
1604	2019/10/12	06:49:00	06:51:00	07:02:00	07:14:00	0:10	0:02	0:25	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	100,00
1605	2019/10/12	17:07:00	17:09:00	17:34:00	18:20:00	0:50	0:02	1:13	C	1	1	Other Services	Special service	Medical	Yes	D2	0,0	0,00
1606	2019/10/12	22:12:00	22:15:00	22:24:00	22:49:00	0:25	0:03	0:37	C	1	2	Residential	Open Flames	Informal	Yes	WT2	1,0	40,00
1607	2019/10/13	04:33:00	04:35:00	04:39:00	05:56:00	1:23	0:02	1:23	C	1	2	Residential	Electrical faults	Informal	Yes	WT2	3,0	36,14
1608	2019/10/13	08:04:00	08:08:00	08:17:00	09:00:00	0:41	0:04	0:56	C	1	3	Residential	Open Flames	Informal	Yes	WT2	1,0	24,39
1609	2019/10/13	14:01:00	14:03:00	14:17:00	15:43:00	0:51	0:02	1:42	C	1	1	Other Services	Special service	Medical	Yes	D2	0,0	0,00
1610	2019/10/13	16:40:00	16:43:00	16:57:00	17:47:00	0:57	0:03	1:07	C	1	3	Other	Open Flames	Rubbish	Yes	P1	2,0	35,09
1611	2019/10/14	06:19:00	06:21:00	06:33:00	07:01:00	0:24	0:02	0:42	C	1	3	Residential	Open Flames	Informal	Yes	WT2	2,0	83,33
1612	2019/10/14	07:10:00	07:13:00	07:23:00	08:06:00	0:30	0:03	0:56	C	1	2	Residential	Undetermined	Informal	Yes	P1	3,0	100,00
1613	2019/10/14	12:58:00	13:00:00	13:06:00	14:42:00	0:25	0:02	1:44	C	2	9	Other	Open Flames	Grass	Yes	P1	4,0	160,00
1614	2019/10/14	16:58:00	17:01:00	17:09:00	17:32:00	0:16	0:03	0:34	C	1	5	Other	Open Flames	Grass	Yes	P1	5,0	312,50
1615	2019/10/16	09:00:00	09:13:00	09:32:00	11:20:00	1:26	0:13	2:20	D	1	3	Other	Other	Sludge	Yes	WT2	10,0	116,28
1616	2019/10/16	14:06:00	14:24:00	14:38:00	16:08:00	1:22	0:18	2:02	C	2	9	Residential	Arson	Formal	Yes	P1	10,0	121,95
1617	2019/10/16	20:34:00	20:35:00	20:43:00	21:05:00	0:13	0:01	0:31	B	1	5	Industry	Arson	Delapidated Structure	Yes	P1	2,0	153,85
1618	2019/10/16	21:08:00	21:12:00	21:19:00	21:46:00	0:18	0:04	0:38	C	1	6	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1619	2019/10/17	19:36:00	19:40:00	19:51:00	20:23:00	0:20	0:04	0:47	D	1	4	Other	Open Flames	Grass	Yes	WT2	1,0	50,00
1620	2019/10/18	11:29:00	11:29:00	11:30:00	12:40:00	1:00	0:00	1:11	D	1	2	Other	Open Flames	Grass	Yes	P1	1,0	16,67
1621	2019/10/18	12:38:00	13:20:00	13:25:00	15:08:00	0:43	0:42	2:30	C	3	2	Other	Open Flames	Grass	Yes	P1	4,0	93,02
1622	2019/10/18	15:19:00	15:19:00	15:38:00	16:08:00	0:06	0:00	0:49	C	2	0	Other	Open Flames	Grass	Yes	P1	1,0	166,67
1623	2019/10/18	15:28:00	15:30:00	15:37:00	17:18:00	0:52	0:02	1:50	D	1	3	Other	Open Flames	Grass	Yes	P1	1,0	19,23
1624	2019/10/18	16:56:00	16:57:00	17:31:00	18:27:00	0:36	0:01	1:31	C	3	5	Other	Open Flames	Grass	Yes	P1	1,0	27,78
1625	2019/10/18	19:08:00	19:10:00	19:27:00	20:16:00	0:43	0:02	1:08	C	2	4	Other	Open Flames	Grass	Yes	P1	10,0	232,56
1626	2019/10/18	23:52:00	23:52:00	00:03:00	00:13:00	0:09	0:00	0:21	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1627	2019/10/19	00:24:00	00:24:00	00:35:00	00:59:00	0:15	0:00	0:35	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	66,67
1628	2019/10/19	02:54:00	02:58:00	03:03:00	03:56:00	0:42	0:04	1:02	B	1	4	Other	Open Flames	Grass	Yes	P1	5,0	119,05
1629	2019/10/19	09:57:00	09:57:00	10:09:00	10:25:00	0:18	0:00	0:28	C	1	4	Other	Open Flames	Rubbish	Yes	P1	1,0	55,56
1630	2019/10/19	23:05:00	23:06:00	23:13:00	23:53:00	0:15	0:01	0:48	E	1	3	Other	Open Flames	Container	Yes	WT2	1,0	66,67
1631	2019/10/20	03:23:00	03:26:00	03:32:00	06:10:00	2:11	0:03	2:47	B	1	5	Other Services	Special service	MVA	Yes	P1	1,0	7,63
1632	2019/10/20	12:22:00	12:22:00	12:28:00	13:36:00	0:18	0:00	1:14	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	55,56
1633	2019/10/20	14:47:00	14:47:00	15:01:00	15:38:00	0:19	0:00	0:51	C	1	2	Other	Open Flames	Grass	Yes	WT1	1,0	52,63
1634	2019/10/20	22:12:00	22:15:00	22:23:00	23:32:00	1:03	0:03	1:20	B	2	7	Storage	Open Flames	Car	Yes	P1	5,0	79,37
1635	2019/10/22	05:20:00	05:23:00	05:33:00	06:11:00	0:37	0:03	0:51	B	2	7	Storage	Open Flames	Car	Yes	P1	2,0	54,05
1636	2019/10/22	05:52:00	08:52:00	08:55:00	09:24:00	0:23	3:00	3:32	E	1	3	Residential	Open Flames	Informal	Yes	WT2	0,0	0,00

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1637	2019/10/24	12:24:00	12:38:00	12:48:00	13:27:00	0:28	0:14	1:03	E	1	4	Other	Open Flames	Grass	Yes	P1	2,0	71,43
1638	2019/10/25	21:22:00	21:25:00	21:37:00	22:14:00	0:37	0:03	0:52	C	1	2	Other	Open Flames	Grass	Yes	P1	2,0	54,05
1639	2019/10/26	07:33:00	07:35:00	07:41:00	08:05:00	0:18	0:02	0:32	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	55,56
1640	2019/10/26	09:05:00	09:17:00	09:27:00	10:13:00	0:32	0:12	1:08	C	1	2	Residential	Electrical Faults	Formal	Yes	WT2	1,0	31,25
1641	2019/10/27	13:32:00	13:33:00	15:35:00	16:32:00	0:30	0:01	3:00	C	1	1	Residential	Arson	Informal	Yes	WT2	1,0	33,33
1642	2019/10/27	19:14:00	19:22:00	19:40:00	22:00:00	2:00	0:08	2:46	C	1	1	Residential	Open Flames	Formal	Yes	WT2	5,0	41,67
1643	2019/10/28	06:41:00	06:43:00	06:54:00	07:06:00	0:13	0:02	0:25	C	1	3	Other	Open Flames	Tree	Yes	P1	1,0	76,92
1644	2019/10/29	15:03:00	15:05:00	15:40:00	16:05:00	0:25	0:02	1:02	C	1	2	Other	Open Flames	Tree	Yes	P1	1,0	40,00
1645	2019/11/01	02:29:00	02:31:00	02:35:00	04:46:00	1:39	0:02	2:17	D	2	3	Commercial	Open Flames	Lucern	Yes	P1	10,0	101,01
1646	2019/11/01	07:25:00	07:27:00	07:34:00	07:58:00	0:23	0:02	0:33	A	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	43,48
1647	2019/11/01	15:09:00	15:12:00	15:18:00	15:45:00	1:03	0:03	0:36	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1648	2019/11/01	19:49:00	19:51:00	19:58:00	20:46:00	1:28	0:02	0:57	C	2	5	Other	Open Flames	Grass	Yes	P1	2,0	22,73
1649	2019/11/01	21:40:00	21:43:00	21:46:00	22:34:00	1:28	0:03	0:54	C	1	2	Other Services	Special Service	Water Supply	Yes	WT2	2,0	22,73
1650	2019/11/01	21:50:00	21:50:00	22:05:00	22:33:00	0:18	0:00	0:43	E	1	4	Residential	Open Flames	Informal	Yes	P1	2,0	111,11
1651	2019/11/02	13:01:00	13:04:00	13:07:00	13:42:00	0:20	0:03	0:41	A	1	3	Other	Open Flames	Rubbish	Yes	P1	3,0	150,00
1652	2019/11/02	18:57:00	19:01:00	19:18:00	19:33:00	0:15	0:04	0:36	C	1	1	Other	Open Flames	Grass	Yes	D2	0,0	0,00
1653	2019/11/02	21:52:00	21:58:00	22:11:00	23:15:00	1:04	0:06	1:23	C	1	0	1	Special Service	Water Supply	Yes	WT2	4,0	62,50
1654	2019/11/02	23:29:00	23:32:00	23:43:00	23:56:00	0:09	0:03	0:27	E	1	4	Residential	Open Flames	Informal	Yes	P1	2,0	222,22
1655	2019/11/02	23:55:00	23:58:00	00:02:00	01:59:00	0:56	0:03	2:04	C	1	4	Other Services	Special Service	MVA	Yes	P1	0,0	0,00
1656	2019/11/03	01:18:00	01:20:00	01:37:00	03:00:00	1:23	0:02	1:42	E	1	4	Residential	Open Flames	Informal	Yes	P1	3,0	36,14
1657	2019/11/03	05:12:00	05:17:00	05:23:00	05:52:00	0:08	0:05	0:40	C	1	3	Residential	Arson	Informal	Yes	P1	2,0	250,00
1658	2019/11/03	08:59:00	09:04:00	09:10:00	09:38:00	0:15	0:05	0:39	E	1	2	Residential	Arson	Informal	Yes	P1	2,0	133,33
1659	2019/11/03	18:05:00	18:08:00	18:17:00	18:32:00	0:04	0:03	0:27	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	250,00
1660	2019/11/04	00:40:00	00:41:00	00:56:00	01:36:00	0:26	0:01	0:56	C	1	4	Residential	Open Flames	Informal	Yes	P1	2,0	76,92
1661	2019/11/04	20:13:00	20:17:00	20:23:00	20:32:00	0:08	0:04	0:19	B	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	125,00
1662	2019/11/05	14:47:00	14:50:00	15:00:00	17:05:00	1:47	0:03	2:18	D	2	4	Other	Open Flames	Grass	Yes	P1	3,0	28,04
1663	2019/11/05	20:10:00	20:12:00	20:39:00	21:16:00	0:10	0:02	1:06	C	1	4	Other	Open Flames	Manure	Yes	WT2	1,0	100,00
1664	2019/11/06	07:07:00	07:09:00	07:20:00	08:07:00	0:38	0:02	1:00	D	1	2	Other	Open Flames	Tree	Yes	P1	2,0	52,63
1665	2019/11/07	11:48:00	13:05:00	13:20:00	14:39:00	0:50	1:17	2:51	D	1	2	Other	Open Flames	Grass	Yes	D6	1,0	20,00
1666	2019/11/08	18:58:00	19:02:00	19:10:00	20:41:00	1:23	0:04	1:43	C	2	4	Transport	Arson	Car	Yes	P1	4,0	48,19
1667	2019/11/08	23:37:00	23:39:00	23:55:00	01:18:00	1:23	0:02	1:41	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	12,05
1668	2019/11/09	02:59:00	03:01:00	03:09:00	03:54:00	0:34	0:02	0:55	C	1	2	Residential	Open Flames	Formal	Yes	WT2	2,0	58,82
1669	2019/11/09	19:08:00	19:10:00	19:21:00	19:48:00	0:21	0:02	0:40	D	1	2	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
1670	2019/11/09	21:06:00	21:09:00	21:13:00	21:30:00	0:11	0:03	0:24	C	1	2	Other	Electrical Faults	Electricity Pole	Yes	WT2	1,0	90,91
1671	2019/11/09	21:32:00	21:35:00	21:47:00	22:15:00	0:28	0:03	0:43	C	1	3	Residential	Open Flames	Informal	Yes	WT2	2,0	71,43
1672	2019/11/09	22:02:00	22:05:00	23:10:00	23:30:00	0:22	0:03	1:28	C	1	2	Residential	Other	Formal	Yes	P1	3,0	136,36
1673	2019/11/10	13:24:00	13:27:00	13:45:00	15:19:00	1:45	0:03	1:55	D	1	2	Other	Open Flames	Grass	Yes	P1	2,0	19,05
1674	2019/11/10	13:31:00	13:33:00	13:54:00	14:29:00	0:45	0:02	0:58	C	1	2	Residential	Arson	Formal	Yes	WT2	2,0	44,44
1675	2019/11/10	22:50:00	22:53:00	22:59:00	23:55:00	0:21	0:03	1:05	C	1	2	Residential	Arson	Informal	Yes	WT1	2,0	95,24
1676	2019/11/11	04:04:00	04:07:00	04:17:00	04:27:00	0:23	0:03	0:23	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	43,48
1677	2019/11/11	17:40:00	17:44:00	17:54:00	18:24:00	0:14	0:04	0:44	C	1	5	Other Services	Special Service	MVA	Yes	P1	0,0	0,00
1678	2019/11/13	12:24:00	12:24:00	12:30:00	12:45:00	0:24	0:00	0:21	C	1	2	Residential	Open Flames	Informal	Yes	WT1	1,0	41,67
1679	2019/11/13	19:58:00	20:01:00	20:13:00	20:37:00	0:14	0:03	0:39	C	1	3	Other	Open Flames	Rubbish	Yes	WT2	0,0	0,00
1680	2019/11/14	07:25:00	07:27:00	07:33:00	07:59:00	0:19	0:02	0:34	A	1	4	Other	Open Flames	Grass	Yes	P1	2,0	105,26
1681	2019/11/14	20:15:00	20:18:00	20:35:00	20:52:00	0:19	0:03	0:37	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	52,63
1682	2019/11/15	15:39:00	15:44:00	16:05:00	16:37:00	0:07	0:05	0:58	C	1	5	Other	Open Flames	Rubbish	Yes	P1	1,0	142,86
1683	2019/11/15	18:07:00	18:10:00	18:18:00	18:36:00	0:10	0:03	0:29	C	1	5	Other	Open Flames	Grass	Yes	P1	1,0	100,00
1684	2019/11/15	20:51:00	20:55:00	20:58:00	01:14:00	4:16	0:04	4:24	A	1	5	Other Services	Hazmat	-	Yes	P1	0,0	0,00
1685	2019/11/16	10:57:00	10:57:00	11:00:00	15:03:00	4:03	0:00	4:06	A	2	6	Other Services	Hazmat	-	Yes	P1	5,0	20,58
1686	2019/11/17	13:50:00	13:51:00	14:35:00	16:33:00	2:14	0:01	2:43	C	2	6	Other	Open Flames	Grass	Yes	P1	2,0	14,93
1687	2019/11/17	15:49:00	15:51:00	15:55:00	16:17:00	0:22	0:02	0:28	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	45,45
1688	2019/11/17	18:58:00	19:03:00	19:11:00	20:50:00	1:06	0:05	1:52	D	1	3	Other	Open Flames	Grass	Yes	P1	1,0	15,15
1689	2019/11/17	22:49:00	22:51:00	23:02:00	23:23:00	0:10	0:02	0:34	C	2	5	Other	Open Flames	Rubbish	Yes	P5	1,0	100,00

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1690	2019/11/18	01:44:00	01:47:00	02:14:00	02:37:00	0:15	0:03	0:53	D	1	2	Industry	Arson	Machinery	Yes	WT1	2,0	133,33
1691	2019/11/18	15:02:00	15:05:00	15:09:00	15:29:00	0:06	0:03	0:27	C	1	2	Residential	Open Flames	Informal	Yes	P5	0,0	0,00
1692	2019/11/18	19:21:00	19:24:00	19:55:00	20:43:00	0:35	0:03	1:22	C	1	1	Other	Open Flames	Tree	Yes	D7	1,0	28,57
1693	2019/11/19	00:40:00	00:43:00	01:17:00	02:27:00	1:20	0:03	1:47	D	1	3	Transport	Open Flames	Truck	Yes	P1	5,0	62,50
1694	2019/11/19	07:57:00	08:10:00	08:26:00	09:14:00	0:31	0:13	1:17	C	1	4	Other	Open Flames	Rubbish	Yes	P1	3,0	96,77
1695	2019/11/19	12:48:00	12:54:00	13:04:00	13:28:00	0:04	0:06	0:40	E	1	1	Other	Open Flames	Rubbish	Yes	P5	1,0	250,00
1696	2019/11/19	15:00:00	15:01:00	15:09:00	17:50:00	2:19	0:01	2:50	D	1	4	Other	Open Flames	Grass	Yes	P1	2,0	14,39
1697	2019/11/19	22:22:00	22:25:00	22:29:00	22:39:00	0:07	0:03	0:17	B	1	4	Other	Open Flames	Grass	Yes	P1	1,0	142,86
1698	2019/11/20	12:08:00	12:10:00	12:15:00	12:53:00	0:45	0:02	0:45	C	1	1	Other	Open Flames	Grass	Yes	D7	1,0	22,22
1699	2019/11/21	15:35:00	15:37:00	15:41:00	16:27:00	0:22	0:02	0:52	C	1	2	Other	Open Flames	Rubbish	Yes	P5	3,0	136,36
1700	2019/11/22	12:41:00	12:48:00	12:51:00	12:56:00	0:15	0:07	0:15	A	1	2	Other	Open Flames	Rubbish	Yes	P1	2,0	133,33
1701	2019/11/22	13:49:00	13:51:00	13:55:00	14:37:00	0:47	0:02	0:47	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	21,28
1702	2019/11/23	09:02:00	09:04:00	18:21:00	19:31:00	0:56	0:02	10:29	C	1	1	Other	Open Flames	Rubbish	Yes	WT2	1,0	17,86
1703	2019/11/23	10:30:00	10:33:00	10:39:00	11:02:00	0:21	0:03	0:32	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	47,62
1704	2019/11/23	12:20:00	12:23:00	12:25:00	12:57:00	0:20	0:03	0:37	C	1	2	Residential	Open Flames	Rubbish	Yes	P1	1,0	50,00
1705	2019/11/23	14:25:00	14:26:00	14:42:00	15:08:00	0:18	0:01	0:43	C	1	2	Other	Open Flames	Informal	Yes	P1	1,0	55,56
1706	2019/11/23	18:17:00	18:23:00	18:32:00	19:40:00	1:00	0:06	1:23	B	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	16,67
1707	2019/11/23	23:22:00	23:25:00	23:31:00	23:54:00	0:23	0:03	0:32	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	43,48
1708	2019/11/24	11:53:00	11:58:00	02:03:00	03:56:00	1:45	0:05	2:10	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	19,05
1709	2019/11/24	15:20:00	15:23:00	15:35:00	16:20:00	0:43	0:03	1:00	C	1	2	Residential	Open Flames	Informal	Yes	WT1	2,0	46,51
1710	2019/11/24	19:16:00	19:19:00	19:29:00	20:49:00	1:17	0:03	1:33	D	1	3	Industry	Electrical Faults	Power Station	Yes	P1	0,0	0,00
1711	2019/11/25	12:43:00	12:43:00	12:49:00	13:15:00	0:13	0:00	0:32	A	1	3	Other	Open Flames	Grass	Yes	P1	2,0	153,85
1712	2019/11/26	15:04:00	15:19:00	15:36:00	18:21:00	2:40	0:15	3:17	D	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1713	2019/11/26	19:14:00	19:19:00	19:53:00	20:40:00	1:15	0:05	1:26	D	1	1	Other	Open Flames	Grass	Yes	WT1	1,0	13,33
1714	2019/11/27	10:21:00	10:21:00	10:26:00	10:36:00	0:16	0:00	0:15	C	1	3	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
1715	2019/11/27	15:44:00	15:47:00	16:00:00	16:17:00	0:08	0:03	0:33	E	1	3	Residential	Undetermined	Informal	Yes	P1	0,0	0,00
1716	2019/11/27	19:15:00	19:33:00	19:49:00	22:01:00	2:28	0:18	2:46	D	4	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1717	2019/11/28	10:55:00	10:59:00	11:17:00	12:31:00	0:54	0:04	1:36	D	2	3	Other Services	Rescues	Helicopter Crash	Yes	WT2	0,0	0,00
1718	2019/11/28	18:21:00	18:24:00	18:38:00	19:55:00	1:23	0:03	1:34	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	12,05
1719	2019/11/28	20:44:00	20:53:00	21:00:00	21:10:00	0:14	0:09	0:26	C	1	2	Other	Open Flames	Reeds	Yes	WT2	1,0	71,43
1720	2019/11/29	02:51:00	02:53:00	03:12:00	03:44:00	0:38	0:02	0:53	C	1	2	Residential	Open Flames	Formal	Yes	P1	3,0	78,95
1721	2019/11/29	08:04:00	08:07:00	08:10:00	08:59:00	0:30	0:03	0:55	B	1	2	Other	Open Flames	Grass	Yes	P1	3,0	100,00
1722	2019/11/29	09:24:00	09:29:00	09:33:00	10:00:00	0:36	0:05	0:36	A	1	2	Other Services	Special Services	MVA	Yes	P1	0,0	0,00
1723	2019/11/29	11:55:00	11:56:00	12:35:00	13:24:00	0:28	0:01	1:29	D	1	2	Other	Open Flames	Grass	Yes	P1	2,0	71,43
1724	2019/11/29	16:03:00	16:16:00	16:23:00	16:30:00	0:07	0:13	0:27	A	1	2	Other	Open Flames	Grass	Yes	P1	1,0	142,86
1725	2019/11/29	17:38:00	17:45:00	17:49:00	17:58:00	0:05	0:07	0:20	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1726	2019/11/30	09:48:00	09:52:00	10:01:00	10:56:00	0:27	0:04	1:08	B	1	2	Transport	Open Flames	Truck Fire	Yes	P1	3,0	111,11
1727	2019/11/30	11:27:00	11:27:00	11:27:00	11:53:00	0:05	0:00	0:26	D	1	3	Other	Open Flames	Grass	Yes	P1	1,0	200,00
1728	2019/11/30	15:38:00	15:39:00	16:13:00	16:32:00	0:09	0:01	0:54	D	1	3	Other	Lightning	Grass	Yes	P1	1,0	111,11
1729	2019/11/30	15:55:00	15:55:00	16:00:00	16:02:00	0:02	0:00	0:07	B	1	2	Other	Open Flames	Grass	Yes	P1	1,0	500,00
1730	2019/11/30	16:40:00	16:41:00	16:46:00	17:20:00	0:19	0:01	0:40	B	1	2	Transport	Open Flames	Truck Fire	Yes	P1	3,0	157,89
1731	2019/11/30	21:06:00	21:10:00	21:16:00	22:54:00	1:04	0:04	1:48	C	2	2	Residential	Open Flames	Formal	Yes	P1	3,0	46,88
1732	2019/12/01	02:14:00	02:17:00	02:20:00	02:53:00	0:33	0:03	0:39	C	1	1	Other	Open Flames	Grass	Yes	P1	2,0	60,61
1733	2019/12/01	10:18:00	10:20:00	10:22:00	10:35:00	0:07	0:02	0:17	A	1	1	Other	Open Flames	Rubbish	Yes	P1	1,0	142,86
1734	2019/12/01	10:30:00	10:31:00	10:34:00	10:37:00	0:03	0:01	0:07	C	1	1	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1735	2019/12/01	15:42:00	15:47:00	15:52:00	16:05:00	0:06	0:05	0:23	C	1	1	Commercial	Undetermined	PnP Alarm	Yes	P1	0,0	0,00
1736	2019/12/01	16:09:00	16:09:00	16:14:00	16:27:00	0:07	0:00	0:18	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	142,86
1737	2019/12/01	17:56:00	17:59:00	18:07:00	18:44:00	0:28	0:03	0:48	C	1	1	Transport	Electrical Faults	Car	Yes	P1	3,0	107,14
1738	2019/12/01	22:56:00	22:56:00	23:16:00	00:33:00	1:37	0:00	1:37	C	1	2	Other Services	Special Service	Medical	Yes	P5	0,0	0,00
1739	2019/12/01	23:29:00	23:29:00	23:51:00	00:33:00	0:54	0:00	1:25	C	1	1	Other Services	Special Service	Medical	Yes	D2	0,0	0,00
1740	2019/12/02	06:05:00	06:08:00	06:23:00	06:42:00	0:06	0:03	0:37	C	1	1	Other	Open Flames	Rubbish	Yes	P1	1,0	166,67
1741	2019/12/02	08:53:00	08:59:00	09:08:00	11:05:00	1:00	0:06	2:12	C	1	4	Residential	Open Flames	Informal	Yes	P1	3,0	50,00
1742	2019/12/04	11:36:00	11:41:00	11:54:00	12:11:00	0:20	0:05	0:35	C	1	3	Residential	Electrical Faults	Informal	Yes	P1	0,0	0,00

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1743	2019/12/04	17:10:00	17:14:00	17:25:00	18:15:00	0:21	0:04	1:05	C	1	3	Residential	Other	Formal	Yes	P1	0,0	0,00
1744	2019/12/06	13:50:00	13:53:00	13:59:00	14:50:00	0:24	0:03	1:00	C	1	3	Residential	Heating	Formal	Yes	P1	0,0	0,00
1745	2019/12/06	18:21:00	18:23:00	18:45:00	22:18:00	3:10	0:02	3:57	D	1	2	Other	Open Flames	Grass	Yes	P1	1,0	5,26
1746	2019/12/06	22:45:00	22:48:00	22:59:00	23:38:00	0:23	0:03	0:53	E	1	3	Residential	Open Flames	Informal	Yes	P1	1,0	43,48
1747	2019/12/06	20:13:00	20:17:00	20:30:00	20:44:00	0:18	0:04	0:31	E	1	3	Residential	Open Flames	Formal	Yes	P1	0,0	0,00
1748	2019/12/08	05:34:00	05:38:00	05:45:00	06:07:00	0:16	0:04	0:33	E	1	3	Residential	Open Flames	Informal	Yes	P1	1,0	62,50
1749	2019/12/09	15:36:00	15:39:00	15:54:00	16:19:00	0:05	0:03	0:43	B	1	4	Industry	Electrical Faults	DB Box	Yes	P1	0,0	0,00
1750	2019/12/13	11:04:00	11:06:00	11:11:00	11:36:00	0:04	0:02	0:32	B	1	1	Other	Open Flames	Dustbin	Yes	P1	1,0	250,00
1751	2019/12/13	11:58:00	12:00:00	12:14:00	13:10:00	0:26	0:02	1:12	E	1	1	Residential	Open Flames	Informal	Yes	P1	2,0	76,92
1752	2019/12/14	20:38:00	20:38:00	20:48:00	21:18:00	0:12	0:00	0:40	B	1	1	Residential	Open Flames	Informal	Yes	P1	1,0	83,33
1753	2019/12/15	12:52:00	12:52:00	13:08:00	13:26:00	0:18	0:00	0:34	C	1	2	Other Services	Special Service	Medical	Yes	D2	0,0	0,00
1754	2019/12/15	20:38:00	20:41:00	20:44:00	21:00:00	0:11	0:03	0:22	B	1	2	Other	Open Flames	Rubbish	Yes	P1	2,0	181,82
1755	2019/12/16	06:30:00	06:34:00	06:37:00	06:54:00	0:17	0:04	0:24	B	1	1	Institutional	Cooking	Pots	Yes	P1	0,0	0,00
1756	2019/12/16	11:46:00	11:49:00	11:59:00	12:12:00	0:10	0:03	0:26	D	1	3	Other	Open Flames	Tree	Yes	P1	1,0	100,00
1757	2019/12/17	01:10:00	01:18:00	02:21:00	21:48:00	0:20	0:08	20:38	C	1	2	Other	Open Flames	Rubbish	Yes	WT2	1,0	50,00
1758	2019/12/17	22:34:00	22:37:00	22:58:00	01:20:00	1:22	0:03	2:45	D	1	2	Other	Open Flames	Grass	Yes	P1	4,0	48,78
1759	2019/12/18	09:40:00	09:43:00	10:08:00	11:12:00	1:00	0:03	1:32	C	1	2	Other	Open Flames	Rubbish	Yes	WT2	2,0	33,33
1760	2019/12/19	21:48:00	21:50:00	21:53:00	22:13:00	0:15	0:02	0:25	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	66,67
1761	2019/12/21	09:33:00	09:35:00	09:44:00	10:17:00	0:32	0:02	0:44	C	1	2	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
1762	2019/12/21	18:51:00	18:54:00	19:05:00	19:45:00	0:43	0:03	0:54	C	1	2	Residential	Arson	Informal	Yes	P1	2,0	46,51
1763	2019/12/23	17:06:00	17:11:00	17:18:00	18:04:00	0:58	0:05	0:58	C	1	2	Other	Open Flames	Electricity Pole	Yes	WT2	1,0	17,24
1764	2019/12/23	20:34:00	20:36:00	20:58:00	21:20:00	0:18	0:02	0:46	C	2	3	Other Services	Hazmat	Cleaning Chemical	Yes	P1	0,0	0,00
1765	2019/12/24	13:06:00	13:09:00	13:38:00	14:06:00	0:29	0:03	1:00	C	1	2	Transport	Open Flames	Car	Yes	P1	2,0	68,97
1766	2019/12/24	19:52:00	19:55:00	20:16:00	20:38:00	0:35	0:03	0:46	C	1	3	Other	Open Flames	Rubbish	Yes	P1	3,0	85,71
1767	2019/12/24	23:02:00	23:05:00	23:10:00	00:30:00	0:50	0:03	1:28	D	1	2	Residential	Cooking	Formal	Yes	WT2	2,0	40,00
1768	2019/12/25	02:02:00	02:05:00	02:10:00	02:37:00	0:47	0:03	0:35	A	1	3	Other	Open Flames	Grass	Yes	P1	1,0	21,28
1769	2019/12/25	14:31:00	14:33:00	14:39:00	15:50:00	0:29	0:02	1:19	C	1	1	Residential	Open Flames	Formal	Yes	P1	1,0	34,48
1770	2019/12/26	13:55:00	13:58:00	14:19:00	14:40:00	0:30	0:03	0:45	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	33,33
1771	2019/12/26	18:07:00	18:16:00	18:20:00	18:59:00	0:30	0:09	0:52	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	33,33
1772	2019/12/28	12:57:00	12:58:00	13:16:00	13:40:00	0:18	0:01	0:43	C	1	1	Other	Open Flames	Grass	Yes	D7	0,0	0,00
1773	2019/12/29	22:26:00	22:29:00	22:37:00	23:14:00	0:22	0:03	0:48	C	1	1	Residential	Arson	Informal	Yes	P1	0,0	0,00
1774	2019/12/31	11:11:00	11:13:00	11:17:00	11:55:00	0:33	0:02	0:44	C	1	3	Other Services	Special Service	-	Yes	P1	0,0	0,00
1775	2019/12/31	17:53:00	17:54:00	18:13:00	18:54:00	0:22	0:01	1:01	C	1	2	Other	Lightning	Electricity Pole	Yes	WT2	0,0	0,00
1776	2020/01/01	10:21:00	10:24:00	10:50:00	11:50:00	0:58	0:03	1:29	D	1	3	Other	Open Flames	Grass	Yes	WT2	2,0	34,48
1777	2020/01/01	16:07:00	16:10:00	16:16:00	17:59:00	1:17	0:03	1:52	B	1	3	Other	Open Flames	Grass	Yes	WT2	2,0	25,97
1778	2020/01/02	16:09:00	16:10:00	16:21:00	16:52:00	0:11	0:01	0:43	C	1	2	Other	Open Flames	Rubbish	Yes	WT2	1,0	90,91
1779	2020/01/02	18:15:00	18:17:00	18:37:00	19:19:00	0:30	0:02	1:04	D	1	3	Other	Open Flames	Grass	Yes	P1	5,0	166,67
1780	2020/01/03	06:18:00	06:21:00	06:24:00	06:50:00	0:09	0:03	0:32	C	1	3	Residential	Open Flames	Formal	Yes	WT2	1,0	111,11
1781	2020/01/03	13:30:00	13:35:00	13:43:00	14:42:00	0:54	0:05	1:12	B	1	3	Other	Open Flames	Grass	Yes	P1	2,0	37,04
1782	2020/01/03	16:54:00	17:00:00	17:32:00	18:43:00	1:31	0:06	1:49	C	1	3	Other Services	Special Service	Roof Blown Away	Yes	WT2	0,0	0,00
1783	2020/01/05	23:39:00	23:42:00	23:51:00	00:05:00	0:14	0:03	0:46	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	71,43
1784	2020/01/08	08:53:00	08:53:00	08:59:00	09:08:00	0:09	0:00	0:15	C	1	2	Other	Open Flames	Rubbish	Yes	P1	2,0	222,22
1785	2020/01/08	09:08:00	09:08:00	09:11:00	09:21:00	0:06	0:00	0:13	A	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	166,67
1786	2020/01/08	12:51:00	12:54:00	13:03:00	13:27:00	0:07	0:03	0:36	C	1	3	Other	Open Flames	Rubbish	Yes	WT2	2,0	285,71
1787	2020/01/10	13:53:00	13:54:00	14:16:00	14:58:00	0:14	0:01	1:05	D	1	4	Transport	Undetermined	Car	Yes	P1	2,0	142,86
1788	2020/01/11	06:44:00	06:48:00	06:54:00	07:05:00	0:07	0:04	0:21	A	1	5	Other	Open Flames	Rubbish	Yes	P1	1,0	142,86
1789	2020/01/11	16:43:00	16:48:00	16:53:00	17:20:00	0:11	0:05	0:37	C	1	4	Transport	Arson	Carvan	Yes	P5	2,0	181,82
1790	2020/01/11	19:27:00	19:27:00	19:30:00	20:27:00	0:15	0:00	1:00	C	1	3	Other Services	Special Service	Medical	Yes	WT2	0,0	0,00
1791	2020/01/11	21:23:00	21:23:00	21:40:00	22:01:00	0:05	0:00	0:38	C	1	3	Other Services	Special Service	Medical	Yes	WT2	0,0	0,00
1792	2020/01/12	16:23:00	16:26:00	16:41:00	16:57:00	0:06	0:03	0:34	C	1	3	Other	Lightning	Tree	Yes	P1	1,0	166,67
1793	2020/01/12	21:05:00	21:07:00	21:26:00	22:06:00	0:04	0:02	1:01	D	1	4	Transport	Other	Truck Fire	Yes	WT2	1,0	250,00

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1794	2020/01/13	06:58:00	07:06:00	07:26:00	09:25:00	1:39	0:08	2:27	C	2	8	Institutional	Lightning	School Office Block	Yes	P5	10,0	101,01
1795	2020/01/13	15:40:00	15:42:00	15:53:00	16:40:00	0:55	0:02	1:00	C	1	3	Institutional	Electrical Faults	School	Yes	WT2	1,0	18,18
1796	2020/01/14	12:28:00	12:30:00	12:35:00	12:58:00	0:03	0:02	0:30	A	1	4	Other	Open Flames	Rubbish	Yes	P1	1,0	333,33
1797	2020/01/15	08:16:00	08:18:00	08:27:00	09:43:00	0:14	0:02	1:27	A	1	2	Other	Open Flames	Rubbish	Yes	P1	2,0	142,86
1798	2020/01/17	11:41:00	11:44:00	11:52:00	12:15:00	0:15	0:03	0:34	C	1	2	Other	Open Flames	Rubbish	Yes	P1	2,0	133,33
1799	2020/01/18	13:18:00	13:21:00	13:27:00	14:21:00	0:42	0:03	1:03	C	1	2	Residential	Undetermined	Informal	Yes	WT1	2,0	47,62
1800	2020/01/18	19:08:00	19:11:00	19:26:00	19:40:00	0:30	0:03	0:32	C	1	2	Other	Open Flames	Tree	Yes	P1	1,0	33,33
1801	2020/01/22	13:01:00	13:02:00	14:30:00	15:20:00	0:24	0:01	2:19	C	1	3	Other	Open Flames	Grass	Yes	WT1	1,0	41,67
1802	2020/01/22	14:55:00	14:58:00	15:05:00	15:32:00	0:13	0:03	0:37	A	1	4	Other	Open Flames	Tree	Yes	P1	2,0	153,85
1803	2020/01/25	16:17:00	16:26:00	16:33:00	16:49:00	0:07	0:09	0:32	C	1	2	Other	Open Flames	Grass	Yes	P5	1,0	142,86
1804	2020/01/26	01:50:00	01:55:00	02:04:00	02:46:00	0:32	0:05	0:56	C	1	3	Residential	Open Flames	Formal	Yes	P1	1,0	31,25
1805	2020/01/26	21:35:00	21:38:00	21:53:00	22:16:00	0:17	0:03	0:41	C	1	4	Other	Open Flames	Grass	Yes	P1	2,0	117,65
1806	2020/01/27	22:11:00	22:13:00	22:25:00	23:12:00	0:30	0:02	1:01	C	1	3	Residential	Open Flames	Formal	Yes	P1	1,0	33,33
1807	2020/01/28	08:06:00	08:10:00	08:14:00	08:23:00	0:04	0:04	0:17	A	1	4	Other	Open Flames	R	Yes	P1	1,0	250,00
1808	2020/01/28	09:53:00	09:55:00	10:04:00	10:48:00	0:29	0:02	0:55	C	1	3	Residential	Open Flames	Informal	Yes	P5	3,0	103,45
1809	2020/01/28	14:23:00	14:25:00	14:37:00	15:39:00	0:11	0:02	1:16	E	1	4	Residential	Open Flames	Informal	Yes	P5	2,0	181,82
1810	2020/01/29	13:26:00	13:29:00	13:42:00	16:30:00	0:35	0:03	3:04	B	1	4	Other	Open Flames	Grass	Yes	P1	2,0	57,14
1811	2020/01/29	17:29:00	17:32:00	17:36:00	18:09:00	0:40	0:03	0:40	B	1	4	Other	Open Flames	Grass	Yes	P1	3,0	75,00
1812	2020/01/29	17:38:00	17:41:00	18:00:00	18:34:00	0:30	0:03	0:56	D	1	2	Other Services	Rescues	MVA	Yes	WT2	0,0	0,00
1813	30-02-2020	08:52:00	08:56:00	09:08:00	09:18:00	0:07	0:04	0:26	C	1	4	Other	Open Flames	Electricity Pole	Yes	P1	1,0	142,86
1814	2020/01/30	11:33:00	11:37:00	11:37:00	11:48:00	0:07	0:04	0:15	C	1	4	Other	Cooking	Rubbish	Yes	P1	2,0	285,71
1815	2020/01/30	21:03:00	21:06:00	21:11:00	22:27:00	0:46	0:03	1:24	C	2	5	Residential	Open Flames	Informal	Yes	P1	5,0	108,70
1816	2020/02/01	03:43:00	03:46:00	04:06:00	05:03:00	0:50	0:03	1:20	C	1	4	Residential	Undetermined	Informal	Yes	P1	2,0	40,00
1817	2020/02/01	11:07:00	11:09:00	11:17:00	12:02:00	0:29	0:02	0:55	C	1	2	Residential	Other	Formal	Yes	P1	3,0	103,45
1818	2020/02/03	06:44:00	06:47:00	06:57:00	07:57:00	0:34	0:03	1:13	C	1	3	Residential	Arson	Formal	Yes	P1	4,0	117,65
1819	2020/02/03	08:38:00	08:41:00	08:47:00	08:57:00	0:51	0:03	0:19	C	1	4	Other	Open Flames	Grass	Yes	P1	2,0	39,22
1820	2020/02/03	14:55:00	14:58:00	15:10:00	15:24:00	0:14	0:03	0:29	E	1	5	Residential	Arson	Formal	Yes	P1	2,0	142,86
1821	2020/02/03	20:28:00	20:31:00	20:37:00	20:56:00	0:13	0:03	0:28	E	1	5	Other	Arson	Pole	Yes	P1	2,0	153,85
1822	2020/02/03	22:54:00	22:58:00	23:05:00	23:40:00	0:22	0:04	0:46	C	1	2	Residential	Arson	Formal	Yes	P5	2,0	90,91
1823	2020/02/04	09:39:00	09:45:00	09:48:00	09:54:00	0:05	0:06	0:15	A	1	4	Other	Open Flames	Rubbish	Yes	P1	1,0	200,00
1824	2020/02/04	16:56:00	17:13:00	17:21:00	17:37:00	0:16	0:17	0:41	C	1	4	other	Arson	Tyres	Yes	P1	1,0	62,50
1825	2020/02/04	17:09:00	17:30:00	17:52:00	19:18:00	1:20	0:21	2:09	C	1	3	Other Services	Special Services	Roof Blown Away	Yes	P1	0,0	0,00
1826	2020/02/04	19:37:00	19:39:00	19:49:00	20:08:00	0:24	0:02	0:31	A	1	3	Other	Open Flames		Yes	P1	1,0	41,67
1827	2020/02/04	20:43:00	20:45:00	20:53:00	21:43:00	0:17	0:02	1:00	C	1	4	Other Services	Special Services	Protests	Yes	P1	6,0	352,94
1828	2020/02/08	09:14:00	09:14:00	09:21:00	10:01:00	0:01	0:00	0:47	C	1	3	Other	Other	-	Yes	P1	0,0	0,00
1829	2020/02/09	05:46:00	05:47:00	05:56:00	08:23:00	0:08	0:01	2:37	C	1	3	Residential	Open Flames	Formal	Yes	WT2	2,0	250,00
1830	2020/02/09	19:47:00	19:52:00	19:58:00	20:11:00	0:02	0:05	0:24	C	1	4	Other	Open Flames	Grass	Yes	P5	2,0	1000,00
1831	2020/02/11	08:02:00	08:07:00	08:12:00	08:25:00	0:08	0:05	0:23	C	1	3	Other	Open Flames	Rubbish	Yes	P1	2,0	250,00
1832	2020/02/13	16:40:00	16:51:00	16:55:00	17:10:00	0:45	0:11	0:30	C	4	4	Other	Open Flames	Tyres	Yes	P1	2,0	44,44
1833	2020/02/13	19:07:00	19:08:00	19:08:00	19:20:00	0:02	0:01	0:13	C	2	3	Other	Open Flames	Tyres	Yes	P1	2,0	1000,00
1834	2020/02/14	23:41:00	23:43:00	23:54:00	00:28:00	0:27	0:02	0:46	C	1	2	Other	Open Flames	Rubbish	Yes	WT1	0,0	0,00
1835	2020/02/18	20:54:00	20:58:00	21:08:00	22:17:00	0:28	0:04	1:23	C	1	4	Residential	Open Flames	Formal	Yes	P1	0,0	0,00
1836	2020/02/19	05:38:00	05:41:00	05:47:00	06:34:00	0:46	0:03	0:56	A	1	3	Commercial	Arson	Formal	Yes	P1	4,0	86,96
1837	2020/02/20	15:30:00	15:35:00	15:43:00	16:57:00	1:22	0:05	1:27	C	2	4	Public Assembly	Arson	Offices	Yes	P1	4,0	48,78
1838	2020/02/23	01:28:00	01:33:00	01:39:00	04:00:00	2:17	0:05	2:32	C	2	5	Other	Other	Heat Transfer	Yes	P1	10,0	72,99
1839	2020/02/26	08:03:00	08:03:00	08:05:00	08:20:00	0:12	0:00	0:17	A	1	2	Other	Open Flames	Rubbish	Yes	P1	2,0	166,67
1840	2020/02/26	17:51:00	17:54:00	18:05:00	18:26:00	0:16	0:03	0:35	C	2	3	Other	Open Flames	Rubbish	Yes	P1	2,0	125,00
1841	2020/02/26	05:35:00	05:38:00	05:55:00	07:02:00	0:34	0:03	1:27	C	1	3	Residential	Arson	Informal	Yes	P1	4,0	117,65
1842	2020/02/28	15:26:00	15:29:00	15:44:00	16:24:00	0:24	0:03	0:58	A	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	41,67
1843	2020/02/29	04:55:00	04:58:00	05:07:00	06:31:00	1:12	0:03	1:36	C	2	5	Residential	Arson	Inormal	Yes	P1	6,0	83,33
1844	2020/03/01	09:35:00	09:38:00	09:50:00	10:30:00	0:32	0:03	0:55	C	1	3	Residential	Arson	Inormal	Yes	P1	2,0	62,50
1845	2020/03/03	19:33:00	19:36:00	19:52:00	20:38:00	0:34	0:03	1:05	C	1	4	Residential	Arson	Formal	Yes	P1	2,0	58,82

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1846	2020/03/03	06:10:00	06:13:00	06:25:00	06:54:00	0:20	0:03	0:44	C	1	3	Residential	Open Flames	Formal	Yes	P1	3,0	150,00
1847	2020/03/05	07:31:00	07:33:00	07:42:00	08:13:00	0:11	0:02	0:42	C	1	4	Residential	Arson	Formal	Yes	P5	2,0	181,82
1848	2020/03/06	15:17:00	15:19:00	15:26:00	16:20:00	1:05	0:02	1:03	A	1	2	Other	Open Flames	Rubbish	Yes	WT2	2,0	30,77
1849	2020/03/06	18:39:00	18:41:00	18:45:00	19:09:00	0:44	0:02	0:30	A	1	0	Other	Open Flames	Rubbish	Yes	WT2	2,0	45,45
1850	2020/03/09	17:02:00	17:05:00	17:17:00	18:05:00	0:17	0:03	1:03	B	1	4	Other	Open Flames	Rubbish	Yes	P1	3,0	176,47
1851	2020/03/10	00:37:00	00:39:00	00:46:00	01:04:00	0:27	0:02	0:27	C	1	3	Other	Open Flames	Rubbish	Yes	P1	2,0	74,07
1852	2020/03/11	05:23:00	05:26:00	05:43:00	05:50:00	0:09	0:03	0:27	A	1	3	Other	Open Flames	Rubbish	Yes	P1	2,0	222,22
1853	2020/03/11	05:34:00	05:37:00	05:48:00	05:57:00	0:16	0:03	0:23	A	1	3	Other	Open Flames	Rubbish	Yes	P1	2,0	125,00
1854	2020/03/12	17:35:00	17:40:00	17:46:00	18:27:00	0:10	0:05	0:52	E	1	4	Residential	Open Flames	Informal	Yes	P5	2,0	200,00
1855	2020/03/12	18:40:00	18:44:00	18:50:00	19:25:00	0:28	0:04	0:45	A	1	3	Other	Lightning	Tree	Yes	P1	1,0	35,71
1856	2020/03/15	15:19:00	15:22:00	15:44:00	16:02:00	0:30	0:03	0:43	C	1	4	Other	Electrical Faults	DB Box	Yes	P1	1,0	33,33
1857	2020/03/20	01:55:00	01:58:00	02:13:00	02:37:00	0:25	0:03	0:42	C	1	3	Other	Open Flames	Tree	Yes	P1	0,0	0,00
1858	2020/03/23	03:39:00	03:41:00	03:45:00	03:57:00	0:06	0:02	0:18	C	1	4	Commercial	Arson	Take Away	Yes	P1	1,0	166,67
1859	2020/06/11	13:49:00	13:50:00	14:09:00	14:38:00	0:38	0:01	0:49	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	26,32
1860	2020/06/13	10:18:00	10:21:00	10:33:00	11:01:00	0:11	0:03	0:43	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	90,91
1861	2020/06/15	16:47:00	16:50:00	17:00:00	18:01:00	0:40	0:03	1:14	C	1	4	Other	Open Flames	Grass	Yes	P1	2,0	50,00
1862	2020/06/19	10:10:00	10:10:00	10:38:00	11:10:00	0:40	0:00	1:00	C	1	3	Other Services	Special Services	Water Supply	Yes	P5	1,0	25,00
1863	2020/06/19	13:27:00	13:30:00	13:45:00	14:28:00	0:45	0:03	1:01	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	22,22
1864	2020/06/20	14:22:00	14:25:00	14:48:00	15:49:00	0:36	0:03	1:27	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	27,78
1865	2020/06/21	08:56:00	08:58:00	09:10:00	09:27:00	0:22	0:02	0:31	C	1	1	Other Services	Special Services	Stabbed	Yes	D2	0,0	0,00
1866	2020/06/21	14:50:00	14:57:00	15:07:00	15:28:00	0:17	0:07	0:38	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	58,82
1867	2020/06/22	11:42:00	11:46:00	11:50:00	11:54:00	0:04	0:04	0:12	B	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	250,00
1868	2020/06/22	14:54:00	15:06:00	15:08:00	15:54:00	0:46	0:12	1:00	C	1	3	Other	Open Flames	Grass	Yes	P5	1,0	21,74
1869	2020/06/22	15:54:00	15:58:00	16:07:00	16:47:00	0:27	0:04	0:53	C	1	2	Other	Open Flames	Grass	Yes	P1	3,0	111,11
1870	2020/06/22	17:20:00	17:25:00	17:37:00	18:15:00	0:23	0:05	0:55	C	1	3	Other	Open Flames	Grass	Yes	P5	10,0	434,78
1871	2020/06/22	17:54:00	17:56:00	18:02:00	18:25:00	0:23	0:02	0:31	C	1	2	Other	Open Flames	Grass	Yes	P1	2,0	86,96
1872	2020/06/22	18:29:00	18:29:00	18:41:00	20:17:00	1:25	0:00	1:48	C	1	3	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
1873	2020/06/22	21:29:00	21:33:00	21:39:00	22:38:00	0:42	0:04	1:09	E	3	6	Residential	Open Flames	Informal	Yes	P5	1,0	23,81
1874	2020/06/22	05:45:00	05:52:00	05:58:00	06:13:00	0:08	0:07	0:28	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	125,00
1875	2020/06/23	12:23:00	12:30:00	12:41:00	13:15:00	0:26	0:07	0:52	C	1	3	Other	Open Flames	Tree	Yes	P1	1,0	38,46
1876	2020/06/23	12:31:00	12:34:00	12:48:00	13:25:00	0:29	0:03	0:54	C	1	3	Other	Open Flames	Grass	Yes	WT2	2,0	68,97
1877	2020/06/23	13:23:00	13:26:00	13:33:00	15:18:00	1:34	0:03	1:55	C	1	3	Other	Open Flames	Grass	Yes	WT2	2,0	21,28
1878	2020/06/23	13:25:00	13:28:00	13:46:00	15:57:00	1:50	0:03	2:32	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	9,09
1879	2020/06/23	16:00:00	16:03:00	16:15:00	17:08:00	0:43	0:03	1:08	C	1	4	Other	Open Flames	Grass	Yes	P1	2,0	46,51
1880	2020/06/24	13:05:00	13:10:00	13:21:00	13:58:00	0:36	0:05	0:53	C	1	3	Other	Open Flames	Grass	Yes	P5	0,0	0,00
1881	2020/06/24	13:22:00	13:23:00	13:24:00	13:59:00	0:24	0:01	0:37	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	41,67
1882	2020/06/24	13:58:00	13:59:00	14:11:00	14:47:00	0:15	0:01	0:49	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	66,67
1883	2020/06/24	14:52:00	14:56:00	15:10:00	15:49:00	0:09	0:04	0:57	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	111,11
1884	2020/06/24	16:02:00	16:05:00	16:15:00	16:42:00	0:25	0:03	0:40	C	1	3	Other	Open Flames	Grass	Yes	P1	3,0	120,00
1885	2020/06/24	17:08:00	17:14:00	17:26:00	17:45:00	0:12	0:06	0:37	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1886	2020/06/24	17:47:00	17:47:00	17:57:00	18:17:00	0:11	0:00	0:30	D	1	3	Other	Open Flames	Grass	Yes	P1	2,0	181,82
1887	2020/06/25	13:12:00	13:15:00	13:23:00	14:19:00	0:50	0:03	1:07	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	20,00
1888	2020/06/25	15:56:00	16:03:00	16:13:00	16:58:00	0:26	0:07	1:02	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1889	2020/06/25	20:36:00	20:36:00	20:44:00	21:05:00	0:19	0:00	0:29	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	52,63
1890	2020/06/26	08:44:00	08:47:00	08:57:00	09:09:00	0:10	0:03	0:25	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	100,00
1891	2020/06/26	10:23:00	10:28:00	10:39:00	10:51:00	0:09	0:05	0:28	C	1	3	Other	Open Flames	Rubbish	Yes	P5	1,0	111,11
1892	2020/06/26	10:50:00	10:51:00	11:03:00	11:11:00	0:08	0:01	0:21	C	1	3	Residential	Electrical Faults	Formal	Yes	P5	3,0	375,00
1893	2020/06/26	11:56:00	11:57:00	12:01:00	13:07:00	0:32	0:01	1:11	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	31,25
1894	2020/06/26	14:17:00	14:20:00	14:34:00	15:11:00	0:11	0:03	0:54	B	1	3	Other	Open Flames	Grass	Yes	P1	2,0	181,82
1895	2020/06/26	14:37:00	14:38:00	14:42:00	15:12:00	0:21	0:01	0:35	C	1	3	Residential	Arson	Formal	Yes	P5	2,0	95,24
1896	2020/06/26	18:43:00	18:43:00	18:49:00	21:25:00	2:42	0:00	2:42	C	1	3	Other	Open Flames	Grass	Yes	WT1	1,0	6,17
1897	2020/06/26	19:19:00	19:25:00	19:43:00	20:15:00	0:17	0:06	0:56	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	58,82
1898	2020/06/26	20:06:00	20:06:00	20:19:00	20:26:00	0:07	0:00	0:20	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	142,86

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1899	2020/06/26	20:29:00	20:34:00	20:41:00	21:18:00	0:38	0:05	0:49	C	2	5	Residential	Open Flames	Formal	Yes	P5	2,0	52,63
1900	2020/06/27	14:25:00	14:29:00	14:44:00	15:00:00	0:07	0:04	0:35	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	142,86
1901	2020/06/27	18:29:00	18:29:00	18:39:00	19:12:00	0:13	0:00	0:43	C	1	3	Other Services	Special Services	Medical	Yes	WT1	0,0	0,00
1902	2020/06/27	23:13:00	23:13:00	23:27:00	04:18:00	5:05	0:00	5:05	C	1	2	Residential	Heating	Formal	Yes	WT1	2,0	6,56
1903	2020/06/28	00:06:00	00:11:00	00:20:00	01:10:00	0:38	0:05	1:04	C	1	3	Residential	Heating	Formal	Yes	P1	3,0	78,95
1904	2020/06/28	02:20:00	02:24:00	02:33:00	03:20:00	0:36	0:04	1:00	D	1	3	Other Services	Special Services	MVA	Yes	P1	3,0	83,33
1905	2020/06/28	21:24:00	21:28:00	21:35:00	22:29:00	0:54	0:04	1:05	C	1	3	Residential	Heating	Formal	Yes	P1	1,0	18,52
1906	2020/06/29	14:08:00	14:12:00	14:17:00	14:38:00	0:14	0:04	0:30	A	1	4	Other	Open Flames	Grass	Yes	P1	1,0	71,43
1907	2020/06/30	16:17:00	16:21:00	16:37:00	17:17:00	0:20	0:04	1:00	C	1	3	Other	Open Flames	Grass	Yes	P5	1,0	50,00
1908	2020/06/30	17:46:00	17:46:00	17:56:00	18:30:00	0:09	0:00	0:44	C	1	3	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
1909	2020/06/30	21:18:00	21:22:00	21:27:00	21:43:00	0:13	0:04	0:25	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	76,92
1910	2020/07/01	12:24:00	12:30:00	12:46:00	13:08:00	0:15	0:06	0:44	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	66,67
1911	2020/07/01	13:55:00	14:00:00	14:03:00	15:34:00	1:08	0:05	1:39	C	1	3	Other	Open Flames	Grass	Yes	P1	3,0	44,12
1912	2020/07/01	16:28:00	16:30:00	16:42:00	18:00:00	1:32	0:02	1:32	D	1	4	Other	Open Flames	Grass	Yes	P1	2,0	21,74
1913	2020/07/01	23:17:00	23:22:00	23:38:00	00:30:00	0:44	0:05	1:27	E	1	3	Residential	Open Flames	Informal	Yes	P1	2,0	45,45
1914	2020/07/02	11:57:00	12:01:00	12:11:00	12:46:00	0:28	0:04	0:49	C	1	3	Other	Open Flames	Grass	Yes	P5	2,0	71,43
1915	2020/07/02	14:31:00	14:35:00	14:40:00	14:56:00	0:05	0:04	0:25	B	1	2	Other	Open Flames	Grass	Yes	P5	1,0	200,00
1916	2020/07/03	08:51:00	08:53:00	08:58:00	09:18:00	0:07	0:02	0:27	A	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	142,86
1917	2020/07/03	09:59:00	10:03:00	10:16:00	13:59:00	3:30	0:04	4:00	C	2	4	Other	Open Flames	Grass	Yes	P1	4,0	19,05
1918	2020/07/03	12:06:00	12:17:00	12:28:00	14:06:00	1:13	0:11	2:00	C	1	1	Other	Open Flames	Grass	Yes	WT1	1,0	13,70
1919	2020/07/03	14:32:00	14:50:00	14:56:00	15:52:00	0:29	0:18	1:20	B	1	2	Other	Open Flames	Grass	Yes	P5	0,0	0,00
1920	2020/07/04	13:22:00	13:25:00	13:33:00	15:53:00	2:03	0:03	2:31	D	1	2	Other	Open Flames	Grass	Yes	P1	2,0	16,26
1921	2020/07/04	14:16:00	14:18:00	14:40:00	15:30:00	1:00	0:02	1:14	D	1	3	Other	Open Flames	Grass	Yes	WT2	1,0	16,67
1922	2020/07/04	14:17:00	14:20:00	14:39:00	16:55:00	1:00	0:03	2:38	D	1	3	Other	Open Flames	Grass	Yes	P1	2,0	33,33
1923	2020/07/04	21:06:00	21:18:00	21:23:00	21:35:00	0:15	0:12	0:29	C	1	3	Other	Open Flames	Rubbish	Yes	P1	2,0	133,33
1924	2020/07/05	12:16:00	12:18:00	12:24:00	12:53:00	0:35	0:02	0:37	B	1	3	Other	Open Flames	Grass	Yes	P1	2,0	57,14
1925	2020/07/05	15:09:00	15:16:00	15:23:00	16:42:00	0:45	0:07	1:33	C	1	3	Other	Open Flames	Rubbish	Yes	P1	2,0	44,44
1926	2020/07/05	20:52:00	20:58:00	21:05:00	21:47:00	0:21	0:06	0:55	C	1	3	Other	Open Flames	Rubbish	Yes		3,0	142,86
1927	2020/07/06	03:23:00	03:26:00	03:40:00	05:07:00	1:24	0:03	1:44	C	2	5	Residential	Electrical Faults	Formal	Yes	P1	6,0	71,43
1928	2020/07/06	11:37:00	11:38:00	12:03:00	13:08:00	0:42	0:01	1:31	E	1	3	Residential	Cooking	Informal	Yes	P1	3,0	71,43
1929	2020/07/06	14:48:00	14:52:00	15:00:00	15:05:00	0:05	0:04	0:17	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	200,00
1930	2020/07/06	16:06:00	16:08:00	16:13:00	16:57:00	0:12	0:02	0:51	C	1	2	Other	Open Flames	Rubbish	Yes	P1	3,0	250,00
1931	2020/07/06	16:35:00	16:36:00	16:46:00	17:05:00	0:06	0:01	0:30	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	166,67
1932	2020/07/06	18:22:00	18:26:00	18:32:00	18:44:00	0:06	0:04	0:22	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	166,67
1933	2020/07/07	11:46:00	11:53:00	12:22:00	17:05:00	4:30	0:07	5:19	D	1	5	Other	Open Flames	Grass	Yes	P1	3,0	11,11
1934	2020/07/07	15:50:00	15:53:00	16:04:00	16:30:00	0:32	0:03	0:40	C	1	2	Other	Open Flames	Grass	Yes	WT2	1,0	31,25
1935	2020/07/07	16:11:00	16:15:00	16:30:00	17:26:00	0:51	0:04	1:15	C	1	1	Other	Open Flames	Grass	Yes	WT2	1,0	19,61
1936	2020/07/07	17:27:00	17:30:00	17:41:00	18:00:00	0:24	0:03	0:33	B	1	4	Other	Open Flames	Grass	Yes	P1	1,0	41,67
1937	2020/07/08	11:25:00	11:29:00	11:45:00	11:54:00	0:09	0:04	0:29	C	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	111,11
1938	2020/07/08	11:55:00	11:56:00	12:04:00	12:44:00	0:48	0:01	0:49	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1939	2020/07/08	14:04:00	14:08:00	14:15:00	14:21:00	0:06	0:04	0:17	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	166,67
1940	2020/07/08	14:24:00	14:24:00	14:30:00	14:46:00	0:03	0:00	0:22	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1941	2020/07/09	14:26:00	14:29:00	14:46:00	14:48:00	0:15	0:03	0:22	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	66,67
1942	2020/07/10	07:00:00	07:04:00	07:24:00	07:47:00	0:47	0:04	0:47	D	1	1	Other	Open Flames	Grass	Yes	D6	3,0	63,83
1943	2020/07/10	16:27:00	16:29:00	16:46:00	17:03:00	0:17	0:02	0:36	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	58,82
1944	2020/07/10	17:19:00	17:20:00	17:32:00	17:37:00	0:05	0:01	0:18	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	400,00
1945	2020/07/10	18:52:00	18:59:00	19:10:00	19:37:00	0:11	0:07	0:45	B	1	3	Other	Open Flames	Grass	Yes	P5	1,0	90,91
1946	2020/07/10	20:51:00	20:53:00	20:59:00	21:35:00	0:20	0:02	0:44	C	1	3	Residential	Heating	Informal	Yes	P5	1,0	50,00
1947	2020/07/10	00:40:00	00:45:00	01:03:00	01:26:00	0:07	0:05	0:46	E	1	3	Other	Open Flames	Grass	Yes	P1	1,0	142,86
1948	2020/07/11	11:25:00	11:30:00	11:41:00	12:05:00	0:21	0:05	0:40	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	47,62
1949	2020/07/12	13:03:00	13:25:00	13:36:00	13:39:00	0:03	0:22	0:36	C	1	3	Other	Open Flames	Grass	Yes	P5	2,0	666,67
1950	2020/07/12	15:44:00	15:48:00	15:53:00	16:11:00	0:15	0:04	0:27	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	133,33
1951	2020/07/12	16:14:00	16:14:00	16:20:00	18:03:00	1:49	0:00	1:49	C	1	3	Other	Open Flames	Grass	Yes	WT2	2,0	18,35

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
1952	2020/07/12	20:13:00	20:17:00	20:26:00	20:46:00	0:11	0:04	0:33	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	181,82
1953	2020/07/13	14:44:00	14:57:00	15:22:00	18:09:00	3:00	0:13	3:25	D	1	5	Other	Open Flames	Grass	Yes	P1	3,0	16,67
1954	2020/07/13	18:47:00	18:49:00	19:18:00	22:53:00	3:51	0:02	4:06	B	1	1	Other Services	Hazmat	Diesel Spillage	Yes	D7	2,0	8,66
1955	2020/07/15	07:39:00	07:40:00	07:45:00	09:05:00	1:05	0:01	1:26	B	1	3	Other	Open Flames	Rubbish	Yes	P1	0,0	0,00
1956	2020/07/15	12:28:00	12:32:00	12:36:00	13:10:00	0:26	0:04	0:42	C	1	3	Other	Open Flames	Grass	Yes	P5	1,0	38,46
1957	2020/07/15	14:44:00	14:52:00	14:55:00	15:15:00	0:13	0:08	0:31	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	76,92
1958	2020/07/15	18:50:00	18:53:00	19:09:00	20:12:00	1:00	0:03	1:22	C	1	3	Other	Open Flames	Grass	Yes	P5	3,0	50,00
1959	2020/07/16	15:17:00	15:19:00	15:32:00	16:03:00	0:19	0:02	0:46	B	1	3	Other	Open Flames	Grass	Yes	P1	2,0	105,26
1960	2020/07/16	18:40:00	18:43:00	18:48:00	18:55:00	0:04	0:03	0:15	B	1	2	Other	Open Flames	Grass	Yes	P1	1,0	250,00
1961	2020/07/17	12:26:00	12:29:00	12:33:00	12:50:00	0:13	0:03	0:24	C	1	3	Residential	Heating	Flat	Yes	P1	0,0	0,00
1962	2020/07/17	13:50:00	13:56:00	14:04:00	15:01:00	1:01	0:06	1:11	C	1	3	Other	Open Flames	Grass	Yes	P1	5,0	81,97
1963	2020/07/18	10:45:00	10:45:00	11:15:00	11:30:00	0:35	0:00	0:45	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	28,57
1964	2020/07/18	12:02:00	12:05:00	12:10:00	13:23:00	0:42	0:03	1:21	D	1	3	Residential	Cooking	Informal	Yes	P1	2,0	47,62
1965	2020/07/18	13:26:00	13:29:00	13:41:00	17:28:00	0:43	0:03	4:02	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	23,26
1966	2020/07/18	14:53:00	14:56:00	15:08:00	15:39:00	0:39	0:03	0:46	C	1	3	Residential	Open Flames	Formal	Yes	P5	2,0	51,28
1967	2020/07/18	18:20:00	18:23:00	18:42:00	19:52:00	1:15	0:03	1:32	C	1	3	Other	Open Flames	Grass	Yes	P5	1,0	13,33
1968	2020/07/19	14:38:00	14:41:00	14:58:00	16:53:00	1:00	0:03	2:15	D	1	3	Other	Open Flames	Grass	Yes	P1	1,0	16,67
1969	2020/07/20	18:17:00	18:22:00	18:26:00	18:40:00	0:07	0:05	0:23	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1970	2020/07/20	18:25:00	18:27:00	18:39:00	19:16:00	0:15	0:02	0:51	C	1	3	Other	Open Flames	Grass	Yes	P5	2,0	133,33
1971	2020/07/20	23:40:00	23:41:00	23:45:00	23:57:00	0:10	0:01	0:17	A	1	3	Other	Open Flames	Grass	Yes	P5	1,0	100,00
1972	2020/07/21	02:12:00	02:16:00	02:23:00	02:56:00	0:23	0:04	0:44	C	1	3	Other	Open Flames	Rubbish	Yes	P1	4,0	173,91
1973	2020/07/21	12:51:00	12:54:00	13:06:00	13:26:00	0:18	0:03	0:35	C	1	2	Other	Open Flames	Grass	Yes	P5	1,0	55,56
1974	2020/07/21	15:28:00	15:30:00	15:32:00	15:38:00	0:05	0:02	0:10	A	1	2	Other	Open Flames	Rubbish	Yes	P1	1,0	200,00
1975	2020/07/21	18:23:00	18:25:00	18:40:00	18:51:00	0:17	0:02	0:28	C	1	3	Commercial	Open Flames	Tuck Shop	Yes	P1	2,0	117,65
1976	2020/07/21	20:11:00	20:13:00	20:15:00	20:46:00	0:17	0:02	0:35	C	1	1	Other	Open Flames	Grass	Yes	WT1	0,0	0,00
1977	2020/07/22	10:51:00	10:51:00	11:04:00	11:20:00	0:10	0:00	0:29	A	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	100,00
1978	2020/07/22	14:14:00	14:14:00	14:38:00	15:32:00	0:35	0:00	1:18	E	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	28,57
1979	2020/07/22	15:54:00	16:01:00	16:15:00	16:46:00	0:31	0:07	0:52	D	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	32,26
1980	2020/07/23	00:19:00	00:26:00	00:30:00	00:53:00	0:16	0:07	0:34	C	1	3	Other	Open Flames	Rubbish	Yes	P1	0,0	0,00
1981	2020/07/24	10:54:00	10:57:00	11:10:00	11:45:00	0:22	0:03	0:51	C	1	1	Other	Open Flames	Grass	Yes	D6	1,0	45,45
1982	2020/07/25	00:40:00	00:46:00	00:54:00	01:08:00	0:09	0:06	0:28	C	1	3	Industry	Electrical Faults	DB Box	Yes	P1	0,0	0,00
1983	2020/07/25	13:13:00	13:16:00	13:21:00	13:53:00	0:18	0:03	0:40	C	1	1	Other	Open Flames	Grass	Yes	D6	1,0	55,56
1984	2020/07/26	18:12:00	18:15:00	18:25:00	18:44:00	0:14	0:03	0:32	C	1	1	Other	Open Flames	Grass	Yes	D6	1,0	71,43
1985	2020/07/26	19:14:00	19:19:00	19:22:00	19:47:00	0:25	0:05	0:33	C	1	1	Other	Open Flames	Grass	Yes	D6	1,0	40,00
1986	2020/07/26	20:17:00	20:25:00	20:46:00	20:53:00	0:02	0:08	0:36	C	1	3	Other	Open Flames	Grass	Yes	P5	1,0	500,00
1987	2020/07/26	20:17:00	20:25:00	20:32:00	20:32:00	0:16	0:08	0:15	B	1	3	Other	Open Flames	Grass	Yes	P5	1,0	62,50
1988	2020/07/27	22:23:00	22:30:00	22:38:00	22:48:00	0:08	0:07	0:25	C	1	5	Other	Open Flames	Rubbish	Yes	P1	2,0	250,00
1989	2020/07/27	19:46:00	19:49:00	20:09:00	21:00:00	1:00	0:03	1:14	C	1	1	Other	Open Flames	Grass	Yes	D6	1,0	16,67
1990	2020/07/28	15:42:00	15:46:00	15:55:00	16:05:00	0:05	0:04	0:23	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	200,00
1991	2020/07/28	19:26:00	19:32:00	20:09:00	21:05:00	1:06	0:06	1:39	C	1	3	Other Services	Rescue	Lady Fell on Drain	Yes	P1	0,0	0,00
1992	2020/07/29	12:14:00	12:17:00	12:33:00	13:00:00	0:35	0:03	0:46	C	1	2	Other	Open Flames	Grass	Yes	P5	1,0	28,57
1993	2020/07/29	15:02:00	15:06:00	15:10:00	16:10:00	0:54	0:04	1:08	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	18,52
1994	2020/07/29	15:49:00	15:51:00	15:54:00	17:21:00	0:42	0:02	1:32	C	1	2	Other	Open Flames	Grass	Yes	WT1	5,0	119,05
1995	2020/07/29	18:56:00	19:00:00	19:05:00	19:38:00	0:27	0:04	0:42	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
1996	2020/07/30	07:47:00	07:50:00	07:54:00	11:10:00	3:00	0:03	3:23	C	1	3	Residential	Undetermined	Formal	Yes	P1	0,0	0,00
1997	2020/07/30	10:23:00	11:10:00	11:20:00	18:54:00	7:44	0:47	8:31	B	2	4	Other	Open Flames	Grass	Yes	WT2	10,0	21,55
1998	2020/07/31	01:56:00	02:03:00	02:15:00	03:00:00	0:33	0:07	1:04	C	1	2	Transport	Arson	Caravan	Yes	P1	2,0	60,61
1999	2020/08/01	07:18:00	07:21:00	07:35:00	07:43:00	0:18	0:03	0:25	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	55,56
2000	2020/08/01	15:40:00	15:43:00	15:57:00	16:45:00	0:45	0:03	1:05	C	1	4	Residential	Arson	Informal	Yes	P1	1,0	22,22
2001	2020/08/01	21:21:00	21:23:00	21:33:00	21:53:00	0:26	0:02	0:32	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
2002	2020/08/02	13:26:00	13:30:00	13:42:00	14:13:00	0:28	0:04	0:47	B	1	3	Other	Open Flames	Grass	Yes	P1	1,0	35,71
2003	2020/08/02	14:51:00	14:54:00	15:04:00	15:30:00	0:26	0:03	0:39	B	1	3	Other	Open Flames	Grass	Yes	P1	1,0	38,46
2004	2020/08/02	15:02:00	15:05:00	15:32:00	16:01:00	0:44	0:03	0:59	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	22,73

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
2005	2020/08/02	18:12:00	18:15:00	18:35:00	19:00:00	0:30	0:03	0:48	D	1	2	Other	Open Flames	Grass	Yes	WT1	1,0	33,33
2006	2020/08/03	19:38:00	19:40:00	20:02:00	20:43:00	0:46	0:02	1:05	D	1	4	Other	Open Flames	Grass	Yes	P1	1,0	21,74
2007	2020/08/03	12:26:00	12:30:00	12:35:00	13:15:00	0:40	0:04	0:49	C	1	2	Other	Open Flames	Grass	Yes	P1	1,0	25,00
2008	2020/08/03	21:38:00	21:43:00	21:56:00	22:31:00	0:16	0:05	0:53	B	1	3	Other	Open Flames	Grass	Yes	P1	2,0	125,00
2009	2020/08/04	15:06:00	15:09:00	15:25:00	16:27:00	0:26	0:03	1:21	C	1	3	Residential	Open Flames	Formal	Yes	P1	1,0	38,46
2010	2020/08/04	16:44:00	16:47:00	17:00:00	19:03:00	0:21	0:03	2:19	D	1	3	Other	Open Flames	Tyres	Yes	P5	3,0	142,86
2011	2020/08/05	10:30:00	10:33:00	10:42:00	11:23:00	0:41	0:03	0:53	C	1	2	Other	Open Flames	Rubbish	Yes	P1	6,0	146,34
2012	2020/08/05	11:24:00	11:28:00	11:40:00	12:25:00	0:31	0:04	1:01	D	1	3	Other	Open Flames	Rubbish	Yes	P5	2,0	64,52
2013	2020/08/05	13:07:00	13:14:00	13:28:00	13:58:00	0:10	0:07	0:51	E	1	3	Residential	Open Flames	Formal	Yes	P1	1,0	100,00
2014	2020/08/06	14:26:00	14:28:00	14:28:00	15:28:00	0:47	0:02	1:02	D	1	3	Other	Open Flames	Grass	Yes	P5	3,0	63,83
2015	2020/08/06	11:36:00	11:39:00	11:50:00	14:07:00	2:40	0:03	2:31	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	6,25
2016	2020/08/06	14:47:00	14:50:00	15:11:00	15:40:00	0:30	0:03	0:53	D	1	3	Other	Open Flames	Grass	Yes	P1	2,0	66,67
2017	2020/08/06	18:10:00	18:13:00	18:22:00	18:54:00	0:18	0:03	0:44	C	1	4	Residential	Open Flames	Formal	Yes	P1	1,0	55,56
2018	2020/08/06	19:37:00	19:40:00	19:47:00	21:08:00	1:22	0:03	1:31	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	12,20
2019	2020/08/07	14:47:00	14:53:00	15:03:00	16:18:00	0:49	0:06	1:31	C	2	3	Other	Open Flames	Grass	Yes	P1	1,0	20,41
2020	2020/08/08	13:52:00	13:54:00	14:02:00	15:01:00	0:42	0:02	1:09	C	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
2021	2020/08/08	17:11:00	17:11:00	17:17:00	18:30:00	1:19	0:00	1:19	B	1	1	Other	Open Flames	Grass	Yes	WT1	1,0	12,66
2022	2020/08/08	23:35:00	23:38:00	23:45:00	00:00:00	0:07	0:03	0:25	C	2	5	Other	Open Flames	Grass	Yes	P1	1,0	142,86
2023	2020/08/09	15:20:00	15:25:00	15:27:00	16:06:00	0:22	0:05	0:46	E	3	2	Residential	Open Flames	Informal	Yes	P1	1,0	45,45
2024	2020/08/10	23:55:00	00:04:00	00:08:00	00:10:00	0:09	0:09	0:15	A	1	3	Other	Arson	Rubbish	Yes	P1	2,0	222,22
2025	2020/08/11	05:50:00	05:53:00	06:01:00	07:58:00	1:37	0:03	2:08	A	3	5	Commercial	Electrical Faults	Electricity	Yes	P1	5,0	51,55
2026	2020/08/11	16:39:00	16:44:00	16:54:00	17:56:00	0:48	0:05	1:17	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	20,83
2027	2020/08/12	12:27:00	12:30:00	12:50:00	13:42:00	0:37	0:03	1:15	C	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
2028	2020/08/12	18:13:00	18:16:00	18:29:00	19:09:00	0:33	0:03	0:56	C	1	4	Other	Open Flames	Grass	Yes	P1	0,0	0,00
2029	2020/08/13	11:33:00	11:33:00	11:44:00	12:12:00	0:28	0:00	0:39	D	1	3	Other	Open Flames	Grass	Yes	WT1	5,0	178,57
2030	2020/08/14	05:42:00	05:50:00	06:00:00	06:52:00	0:37	0:08	1:10	E	2	4	Commercial	Electrical Faults	Mobile Shop	Yes	P1	1,0	27,03
2031	2020/08/14	17:36:00	17:40:00	18:05:00	18:41:00	0:50	0:04	1:05	C	1	1	Other	Open Flames	Grass	Yes	D7	1,0	20,00
2032	2020/08/14	20:11:00	20:16:00	20:28:00	20:44:00	0:20	0:05	0:33	D	1	3	Other	Open Flames	Grass	Yes	P1	0,0	0,00
2033	2020/08/15	15:06:00	15:13:00	15:20:00	15:33:00	0:15	0:07	0:27	C	1	4	Other	Open Flames	Grass	Yes	P1	1,0	66,67
2034	2020/08/15	17:20:00	17:23:00	17:30:00	18:02:00	0:34	0:03	0:42	C	1	4	Other	Open Flames	Grass	Yes	P1	2,0	58,82
2035	2020/08/17	19:29:00	19:31:00	19:46:00	20:01:00	0:06	0:02	0:32	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	166,67
2036	2020/08/17	09:40:00	09:40:00	09:55:00	10:20:00	0:08	0:00	0:40	D	1	3	Other	Open Flames	Grass	Yes	WT2	0,0	0,00
2037	2020/08/17	17:42:00	17:46:00	17:50:00	18:03:00	0:08	0:04	0:21	B	1	3	Other	Open Flames	Grass	Yes	P1	1,0	125,00
2038	2020/08/17	20:54:00	20:56:00	20:59:00	21:25:00	0:22	0:02	0:31	C	1	3	Other	Open Flames	Grass	Yes	P1	3,0	136,36
2039	2020/08/18	11:26:00	11:29:00	11:38:00	12:36:00	1:00	0:03	1:10	D	1	4	Storage	Open Flames	Store Room	Yes	P1	4,0	66,67
2040	2020/08/19	05:58:00	06:01:00	06:09:00	06:41:00	0:29	0:03	0:43	D	1	4	Storage	Open Flames	Store Room	Yes	P1	3,0	103,45
2041	2020/08/20	20:40:00	20:43:00	20:51:00	21:14:00	0:24	0:03	0:34	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	41,67
2042	2020/08/21	09:37:00	09:38:00	09:40:00	10:29:00	0:03	0:01	0:52	D	1	3	Industry	Electrical Faults	Electrical Pole	Yes	WT2	1,0	333,33
2043	2020/08/21	10:42:00	10:47:00	10:54:00	11:48:00	0:54	0:05	1:06	C	1	3	Other	Open Flames	Grass	Yes	P1	2,0	37,04
2044	2020/08/21	13:06:00	13:09:00	13:14:00	13:38:00	0:11	0:03	0:32	C	1	3	Other	Open Flames	Tree	Yes	P1	1,0	90,91
2045	2020/08/21	14:54:00	14:58:00	15:04:00	15:20:00	0:06	0:04	0:26	B	1	3	Other	Open Flames	Grass	Yes	P1	1,0	166,67
2046	2020/08/21	19:51:00	19:55:00	20:08:00	20:27:00	0:04	0:04	0:36	C	1	3	Other	Open Flames	Rubbish	Yes	P1	1,0	250,00
2047	2020/08/22	00:30:00	00:37:00	00:44:00	01:16:00	0:14	0:07	0:46	C	1	3	Residential	Open Flames	Formal	Yes	P1	3,0	214,29
2048	2020/08/22	03:59:00	04:07:00	04:14:00	06:07:00	2:00	0:08	2:08	C	1	3	Other	Open Flames	Grass	Yes	P1	5,0	41,67
2049	2020/08/22	12:06:00	12:17:00	12:43:00	13:43:00	0:13	0:11	1:37	D	1	3	Residential	Cooking	Formal	Yes	P1	2,0	153,85
2050	2020/08/22	12:31:00	12:31:00	12:39:00	15:04:00	2:03	0:00	2:33	D	1	3	Other	Open Flames	Grass	Yes	WT1	3,0	24,39
2051	2020/08/22	22:25:00	22:29:00	22:47:00	23:17:00	0:08	0:04	0:52	E	1	3	Residential	Open Flames	Formal	Yes	P1	1,0	125,00
2052	2020/08/23	17:12:00	17:17:00	17:25:00	18:37:00	1:00	0:05	1:25	C	1	1	Other	Open Flames	Grass	Yes	P1	1,0	16,67
2053	2020/08/23	22:32:00	22:41:00	22:57:00	23:29:00	0:07	0:09	0:57	C	1	2	Residential	Open Flames	Formal	Yes	P1	1,0	142,86
2054	2020/08/24	04:14:00	04:20:00	04:23:00	04:32:00	0:07	0:06	0:18	A	1	2	Industry	Electrical Faults	Sub Station	Yes	P1	1,0	142,86
2055	2020/08/25	13:08:00	13:10:00	13:14:00	13:55:00	0:33	0:02	0:47	C	1	2	Other	Open Flames	Grass	Yes	P1	3,0	90,91
2056	2020/08/26	19:32:00	19:35:00	19:45:00	20:36:00	0:35	0:03	1:04	C	1	3	Residential	Open Flames	Informal	Yes	P1	2,0	57,14
2057	2020/08/26	20:59:00	21:00:00	21:07:00	21:30:00	0:18	0:01	0:31	C	1	3	Other	Open Flames	Grass	Yes	P1	1,0	55,56

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CALL NO	DATE	TIME RECEIVED	TIME OUT	TIME ARRIVED	TIME BACK	WORK TIME	TURNOUT	DURATION	CATEGORY	OFFICER	MANPOWER	INCIDENT	PROBABLE CAUSE	SUB-CATEGORY	SERVICE RENDERED	VEHICLES	WATER	FLOW RATE
2058	2020/08/26	20:59:00	21:00:00	21:20:00	21:40:00	0:30	0:01	0:41	D	1	3	Other	Open Flames	Grass	Yes	P1	2,0	66,67
2059	2020/08/27	16:36:00	16:39:00	16:40:00	16:42:00	0:01	0:03	0:06	D	1	2	Other	Open Flames	Grass	Yes	P1	0,0	0,00
2060	2020/08/27	16:41:00	16:41:00	16:44:00	19:34:00	2:53	0:00	2:53	D	1	3	Residential	Open Flames	Formal	Yes	WT1	15,0	86,71

APPENDIX H – PUBLICATION:
Thage, T. & Ilemobade, A. (2023). *Water for firefighting in the Sol Plaatje Municipality*. SAICE Civil Engineering. Vol 31 No 5, June 2023. Pages 19-22.

Water for firefighting in the Sol Plaatje Municipality

South Africa has multiple guidelines in place outlining the requirements for water for firefighting purposes. However, research suggests that these guidelines may no longer be fit for purpose, and revising them could result in water savings.

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Average per capita domestic water consumption in South Africa is about 237 ℓ/c/d. This exceeds the world average of 173 ℓ/c/d (Ngobeni and Breitenbach, 2021). In addition, South Africa's freshwater demand in 2030 is projected to be 17 billion m³/annum against an estimated yield of 15 billion m³/annum (WRG, 2009). This projection means that, in less than 10 years, water demand will outstrip available resources by 12%.

These statistics, among many others, provide a compelling case to re-evaluate how South Africa's freshwater resources, and particularly expensive potable water, are utilised. One initiative in this regard is to align the legislated requirement to cater for specific quantities of water for firefighting (during the design of water networks) with empirical data from firefighting efforts in communities.

The requirements for water for firefighting in communities can be obtained from SANS 10090:2018, The Neighbourhood Planning and Design Guide (commonly known as the Red Book), or municipal documents that refer to these two guidelines. These guidelines specify fire risk categories and, for each category, minimum or total fire flow, minimum hydrant flow and typical fire duration, among other parameters. While total fire flows in the Red Book were recently revised, minimum fire flows in the earlier edition of SANS 10090 are largely the same as the current edition, and thus may no longer be fit for purpose.

In South Africa, some studies have been published that address water provision for firefighting. They include Van Zyl and Haarhoff (1997), Van Zyl, Davy and Haihambo (2011), Myburgh and Jacobs (2014), Mac Bean and Ilemobade (2019), and Essack and Ilemobade (2022). Some highlights from these studies include the following:

- Van Zyl and Haarhoff (1997) reported that peak demands within a section of the City of Johannesburg (CoJ) CBD and a residential area in Mpumalanga were observed only at small intervals during the year and usually did not coincide with fire events that typically took place in mid-winter. This was corroborated by Mac Bean and Ilemobade (2019) for the CoJ, i.e. that the least number of fires started during peak demand periods.
- Average fire flows for 99.9% and 99.6% of fire incidents in the CoJ were less than the minimum and total fire flows specified for the lowest categories in SANS 10090 and the Red Book respectively (Mac Bean and Ilemobade 2019).
- As regards large fires, Van Zyl and Haarhoff (1997) reported that 90% of large fires in the CoJ were extinguished using 440 kℓ of water or less. In recent studies, Myburgh and Jacobs (2014) reported that in three Western Cape municipalities, the average volume used to extinguish large structural and industry fires was 8.6 kℓ or less; and Essack and Ilemobade (2022) reported that the average volume of water used to extinguish large structural and industry fires in the CoJ was 9.63 kℓ. The average volumes in the recent studies are notably lower than the minimum and total volumes specified for even the least affected categories in SANS 10090 (i.e. 1 900 ℓ/min × 60 min = 114 kℓ) and the Red Book (900 ℓ/min × 60 min = 54 kℓ) respectively.
- As regards fire duration, Van Zyl and Haarhoff (1997) reported that it took between 30 and 90 minutes to extinguish large fires in the CoJ. Van Zyl, Davy and Haihambo (2011) reported that more than 87% of residential, commercial and industrial fires in the greater City of Cape Town area were extinguished in 120 minutes or less, and Essack and Ilemobade (2022) reported that 61% (i.e. 54 of the 89) of large fires in their CoJ dataset were extinguished within 30 to 120 minutes.

Based on the highlights from the above studies, the following question is pertinent: Are the water specifications for firefighting in SANS 10090 and the Red Book appropriate for current firefighting efforts?

This study, which ensues from Thage's (2022) MSc Research Report, addresses the above question by investigating water employed to extinguish fires that recently occurred at the Sol Plaatje Municipality (SPM) and compares the same with water for firefighting specifications in SANS 10090 and the Red Book.

CASE STUDY AREA AND METHODOLOGY

The SPM is situated in the Northern Cape (NC) province. According to Statistics South Africa (2016), the NC is the province with the largest land mass (372 889 km²; ~30%) but the lowest population numbers (~1 200 000; 2.1%) in South Africa. The largest proportion of the NC population (~21%) resides in the SPM, making it the largest urban community in the NC.

At the commencement of this study, nine NC municipalities were approached for firefighting data. The SPM graciously

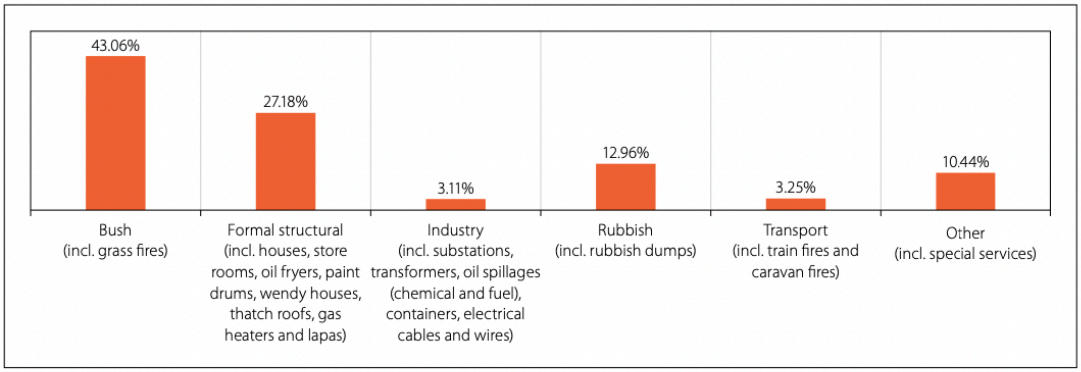

Figure 1 Categorisation of the SPM fires using the FPASA categories

acceded to the request, and the following steps then took place.

Step 1: acquiring, digitising and filtering the data

A total of 3 236 fire incident reports from 21 July 2017 to 27 August 2020 were accessed from the SPM. Since these reports were provided in hardcopy, relevant data was manually extracted and input into a spreadsheet. Thereafter, reports with irregularities (such as duplicate reports with contradictory entries, reports for which no services were rendered and reports with missing relevant data) were removed from the dataset. After filtering, 2 060 fire incidents remained.

Step 2: collation and analysis

The 2 060 records were collated and analysed using criteria that had been employed in SANS 10090, the Red Book, the Fire Protection Association of South Africa's (FPASA) 2011 South African National Fire Statistics report, and previous studies.

In addition, based on the studies by Myburgh and Jacobs (2014) and Essack and Ilemobade (2022), FPASA Category 2 (formal structural and industry) fires were extracted from the dataset of 2 060 records. This resulted in 603 Category 2 fire incidents. Of the 603 incidents, 85 'large' fires remained and were analysed. Van Zyl and Haarhoff (1997) defined large fires as fires that were extinguished using 5 kℓ of water or more.

Step 3: interviews

Interviews were carried out with three officials responsible for firefighting at the SPM and sought to validate the data in the cleaned dataset and to clarify information in some records.

DATA ANALYSIS AND DISCUSSION

Fire risk categories

The 2 060 fire incidents at the SPM were categorised using the FPASA (2011) categories (see Figure 1). The highest number of fire incidents (887; 43.06%) were bush (including grass) fires and the second highest number (560; 27.18%) were formal structural fires. What is evident in Figure 1 is that the distribution is related to the predominant land covers within the SPM i.e. open veld is the predominant land cover at 93% while the built environment is only 4% (SPM, 2020).

Volumes and fire flows employed to extinguish fires

Table 1 shows that the average volume of water and fire flow employed at the SPM to extinguish each category of fire is notably lower than the volume and fire flow specified in SANS 10090 and the Red Book. In fact, only two fire incidents in the SPM, over the three-year period of the dataset, employed fire flows larger than 1 900 ℓ/min, which is the minimum fire flow for the lowest category (Category D1) in SANS 10090. This is similar to Essack and Ilemobade's (2022) report that 99.9% and 99.6% of the fire incidents in the CoJ employed less than the minimum and total fire flows in SANS 10090 and the Red Book respectively.

A second observation worth mentioning is that the average volume of water employed to extinguish all

Table 1 Comparison of the estimated average fire flows, average water volumes and average fire durations at the SPM with those specified in SANS 10090 and the Red Book

FPASA (2011) fire categories	Average fire flow (ℓ/min) of fires at the SPM	Average volume (kℓ) of fires at the SPM	Average duration (minutes) of fires at the SPM	The SANS 10090 minimum fire flow (ℓ/min) from Category D1 to Category B	The Red Book total fire flow (ℓ/min) from low risk to moderate risk 1 categories
Bush	84.11	1.70	20.21	1 900 (equates to a volume of 114 kℓ over the Red Book specified 1 hour duration of fire flow) to 9 000 (equates to a volume of 2 160 kℓ over the Red Book specified 4 hour duration of fire flow)	900 (equates to a volume of 54 kℓ over the Red Book specified 1 hour duration of fire flow) to 3 000 (equates to a volume of 720 kℓ over the Red Book specified 4 hour duration of fire flow)
Rubbish					
Formal structural	78.32	3.03	38.69		
Industry					
Transport	77.90	6.00	77.02		
Other (special services)	20.16	0.43	21.33		

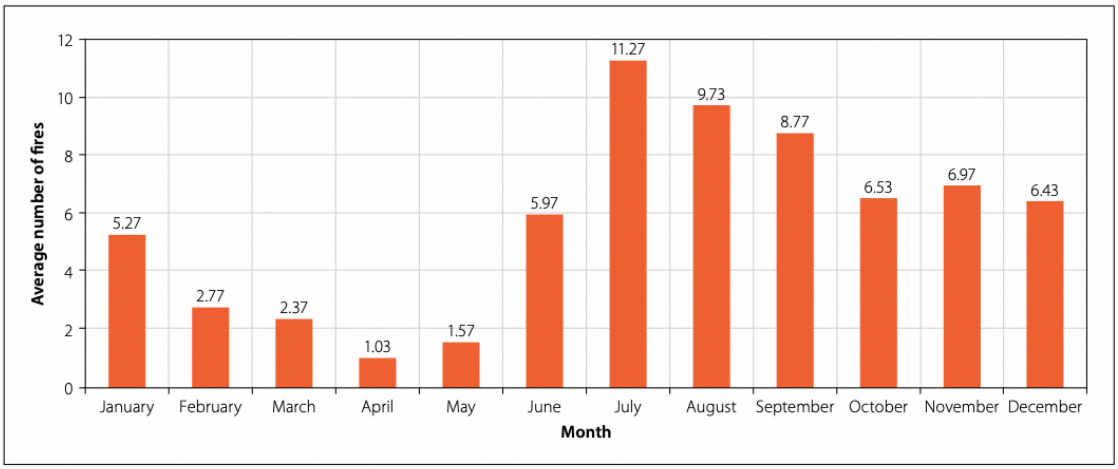

Figure 2 Average number of fire incidents per calendar month at the SPM

categories of fires in the SPM was 6 kℓ or less. In fact, a scatter chart of the 2 060 fire incidents at the SPM showed that 93.3% of fires were extinguished using 7 kℓ of water or less. This result is not surprising as it is similar to results reported by Myburgh and Jacobs (2014), Mac Bean and Ilemobade (2019) and Essack and Ilemobade (2022).

A third observation is that, for each fire category, the average duration of fires is significantly less than specified in the Red Book. An adverse consequence of specifying longer fire durations is that it increases the volume of municipal storage required for firefighting and consequently increases the total capacity of municipal storage. Increased storage capacity increases resources that are expended, as well as water retention times, which negatively affects water quality.

Number of fire incidents

Figure 2 presents the average number of fire incidents per calendar month at the SPM. The pattern is obvious and expected – the number of fire incidents increases and peaks during the dry and cold months (between June and September) and, conversely, decreases and is the lowest during the wet (rainy) months. The higher number of fire incidents during the dry and cold months is caused and/or facilitated by increased use of different energy sources (electricity, wood, paraffin), largely for heating and cooking.

Occurrence of fires

Figure 3 shows the occurrence of fires at the SPM superimposed on a typical residential diurnal water use curve (Scheepers, 2012). The figure shows that while the peak

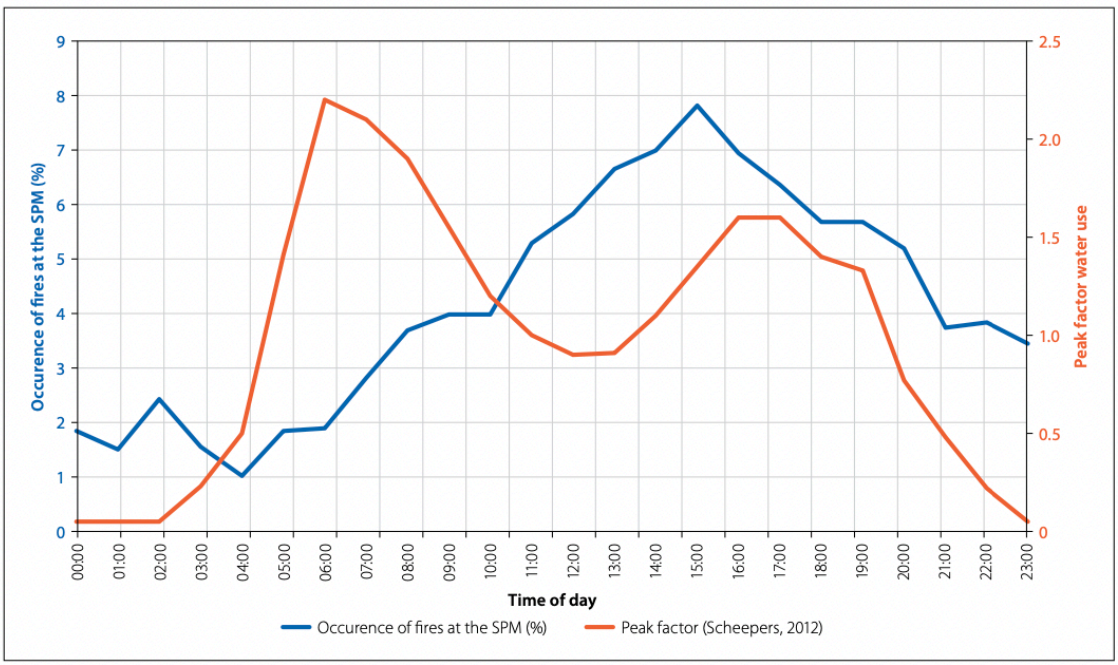

Figure 3 Occurrence of fires at the SPM

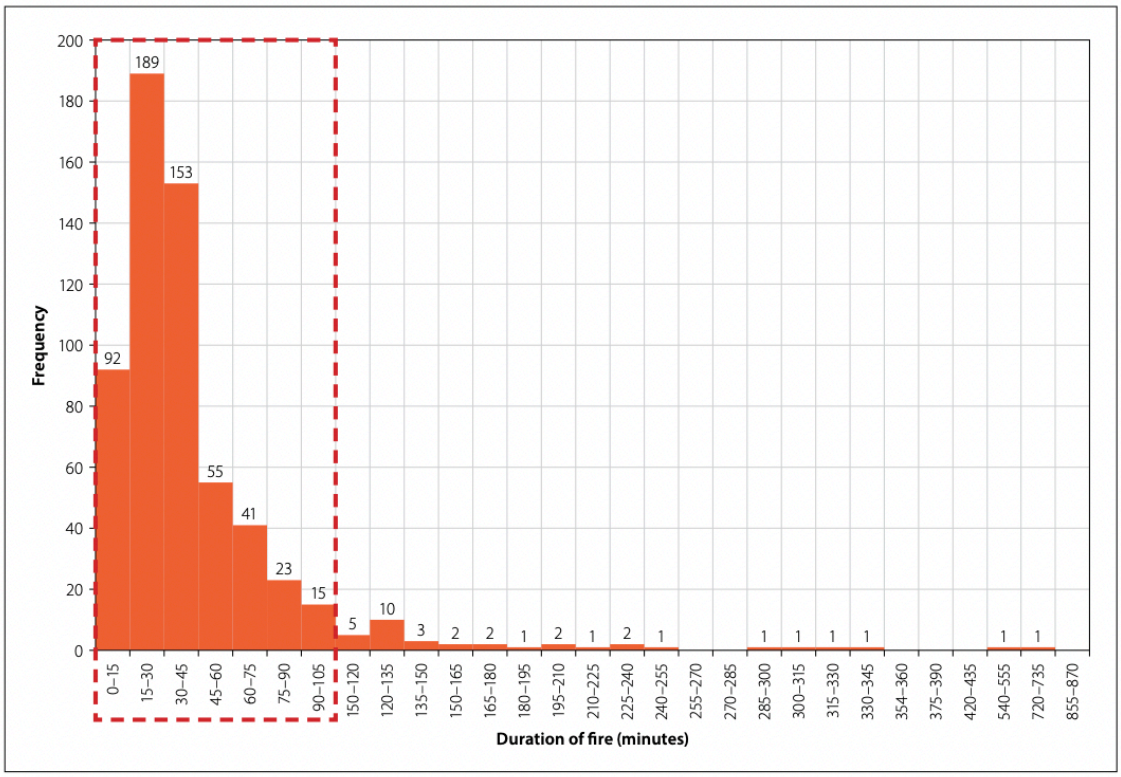

Figure 4 Distribution of fire durations at the SPM

occurrence of fires and the residential peak water use do not coincide in the morning, this is not the case in the afternoon, as the peak occurrence of fires occurs within 1 to 2 hours of the peak water demand. As previously mentioned, this is likely due to the increased use of different energy sources during the busiest time of the day when urban activities slow down and individuals return home. This observation requires further investigation given that water networks must be designed to cater for peak water demand and fire demand occurring simultaneously (CSIR, 2005).

Duration of fire incidents

Based on the frequency distribution shown in Figure 4, the time taken to extinguish 81.4% of fires in the SPM was between 1 and 135 minutes. For large structural and industry fires, the time taken to extinguish 69.41% (59 of 85) of the fires was between 30 and 90 minutes. This is similar to the result reported by Essack and Ilemobade (2022) for the CoJ, i.e. that 60% of large structural and industry fires were extinguished within 30 and 120 minutes.

This information is particularly relevant for SPM firefighting services as it highlights the need for speedy responses to fire callouts, which will result in the timely extinguishing of most fires.

SUMMARY OF HIGHLIGHTS

In summary, the following are highlights from this study which analysed water employed to fight 2 060 fires at the SPM during the period 21 July 2017 to 27 August 2020. Firefighting services at the SPM and similar municipalities will be more efficient when the below highlights are given due consideration.

- The SPM experienced the highest number of fires in its predominant land uses i.e. open veld (bush, grass, vacant/unspecified), followed by the built environment.
- The average volume of water employed to extinguish all categories of fires at the SPM was 6 kℓ or less, with 93.3% of SPM fires extinguished using 7 kℓ of water or less. One implication of this highlight is that a significant number of SPM fires can be extinguished using pre-filled water in fire trucks with capacities of 7 kℓ or more.
- The minimum and total fire flows in SANS 10090 and the Red Book respectively are much larger than the average fire flows employed to extinguish fires in the SPM. This highlight has been corroborated by the other studies undertaken in the CoJ and three municipalities in the Western Cape.
- Annually, the SPM firefighting services should proactively prepare to combat increased fire incidents during the dry and cold months (i.e. June to September, with a recent peak of 12 fires occurring in July), with typical start times in the afternoon (~15:00) and durations of 135 minutes or less.

PERMISSIONS AND ACKNOWLEDGEMENT

Permission to undertake this study was approved by relevant authorities at the Sol Plaatje Municipality and the University of the Witwatersrand, Johannesburg (ethics clearance number CEECC-1491265-2021). Both institutions are gratefully acknowledged.

REFERENCES

References have been omitted due to space limitations. A full list of references can be obtained from the authors. □