Tshwane SPCA: To the Rescue

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List of Acronyms

AHP – Analytical Hierarchy Process

ASM – Animal Shelter Manager

BPMN – Business Process Management Notation

ERD – Entity Relationship Diagram

GIS – Geographical Information System

IACA – International Association of Crime Analysts

IDEF – Integrated Definition

IRR – Internal Rate of Return

KPI's - Key Performance Indicators

LAPD – Los Angeles Police Department

NPV – Net Present Value

NSPCA – National Society for the Prevention of Cruelty to Animals

NYPD – New York Police Department

ROI – Return on Investment

SPC – Statistical Process Control

SPCA – Society for the Prevention of Cruelty to Animals

Executive Summary

The aim of this document is to determine the problems experienced by the Tshwane SPCA located in Waltloo, Pretoria and to define objectives for solving them. The document also aims to investigate the current methods used by the SPCA, to develop and investigate possible methods used to solve similar problems and to use these methods to develop a conceptual design of solutions to the problems, as well as the solutions themselves. The solutions are also to be validated/tested.

The first problem is that the Tshwane Municipality withdrew its funding of the Tshwane SPCA (due to its contract coming to an end) and that sponsorships and donations are declining, reducing the income of the Tshwane SPCA while its expenditures continue to increase every year. It is required that the SPCA becomes self-sustaining using its available resources without relying on donations and to function more like a business than a non-profit organisation so that it can acquire income by offering more desirable services and offering returns to companies that would invest in it. Literature and case studies suggest cause-related marketing - where a corporate sponsor and a non-profit organisation enter into a mutually profitable relationship. For the SPCA to engage a company in such a relationship, a sample proposal that states the value of its contribution to the relationship was created. It shows companies potential returns instead of simply asking for donations.

The second problem is that staff find the current business processes problematic. The Reception department's processes are inefficient, the Inspectorate department is unproductive and both of these departments have no way of planning, analysing results and communicating effectively (they simply deal with problems as they occur). Literature suggests business process improvements using a combination of qualitative and quantitative techniques for establishing best practices and continuously improving those practices. Reception's processes were improved using the qualitative Questioning Technique and Lean principles for services and by designing functional requirements and a data model for the blueprint of an information system that should facilitate these process improvements (since a candidate system was found to be infeasible). To prioritise the inspections for the Inspectorate, a qualitative risk assessment was completed. As suggested by literature, the risk involved in not being able to perform a certain type of inspection was determined from the historical probability that an inspection will have to be performed and the consequence that will result from not being able to perform it (determined using the Analytic Hierarchy Process to qualitatively rank inspection types according to their contribution to the Inspectorate's ultimate objective). An MS Excel system, Inspectorate Report, was also created to allow for improved data recording and analysis. The Inspectorate functions similarly to a police department and literature suggests that such a department makes use of crime mapping and hotspot analysis (geographically plotting occurrences of crime using a Geographical Information System to determine where crime occurs most intensely). This enables

the efficient deployment of resources. To facilitate better planning and the equal distribution of workload between the resources, such a hotspot analysis was performed using the historical occurrences of inspections in Tshwane suburbs. This visual representation of anticipated inspection requirements, along with the Inspectorate Report's capability to assign suburbs to inspectors and their anticipated workload, facilitates better planning and resource deployment.

The last problem is that the buffer or "holding kennels", where arriving animals are kept to be medically examined before being transferred to the normal kennels, does not have sufficient capacity to handle the demand and transferring unexamined animals to the normal kennels poses a great health risk. Since building additional kennels is not a financially viable option, the problem must be solved through changes to other elements in the kennel system. A computer simulation that accurately represents the kennel system was developed and changes to the model were made which reduced the holding kennel queue length and had a significant positive impact on other KPI's.

The document's purpose has been achieved through the description of the SPCA's problems, the investigation of their current methods as well as alternative solutions suggested by literature, the development of conceptual solution designs to the problem and the development and validation of the final detailed solutions.

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1. Introduction

1.1. Organisational Background

The National Society for the Prevention of Cruelty to Animals (NSPCA) is a Non-Profit Organisation that dedicates itself to animal welfare in South Africa. The Tshwane SPCA, located in Waltloo, Pretoria, was founded in 1910 and now serves the entire area of Tshwane (an area that has doubled to about 8300km² in the past year) and aims to enforce animal rights, take care of animals in need, educate the community in respect and care for animals and to aid the community by providing them with affordable animal health care.

The Tshwane SPCA is primarily a service-oriented organisation, but also has a small retail aspect that involves the selling of pet food, pet health- and grooming products and animal medication prescribed by a veterinarian. The services include investigating reports of animal cruelty and the confiscation of animals that fall victim to such cruelty, providing care and shelter to neglected or abandoned animals, assisting in disaster relief by saving animals during natural disasters and accidents, providing veterinary services at affordable prices, educating communities on animal care, setting animals in their care up for adoption, sterilising animals in large numbers to help reduce animal overpopulation and enabling owners to be re-united with a lost pet by taking such animals in and searching for the owner or enabling possible owners to reclaim the animals (Tshwane SPCA n.d.).

1.2. Problem Background

The Tshwane SPCA is dependent on donations or sponsors and on a subsidiary from the Tshwane Municipality to be able to provide these services to the public. The SPCA's contract with the Tshwane Municipality, however, ended early 2011, leaving the Tshwane SPCA to sustain itself on its meagre reserves, on donations that have drastically decreased due to the recent economic crisis and on sponsorships, many of which have also been withdrawn due to companies looking instead toward direct human upliftment as their community projects. The contract has not been renewed as of yet. Figure 1 indicates the way in which the organisation's expenditures exceed its income – a dire situation in the absence of financing.

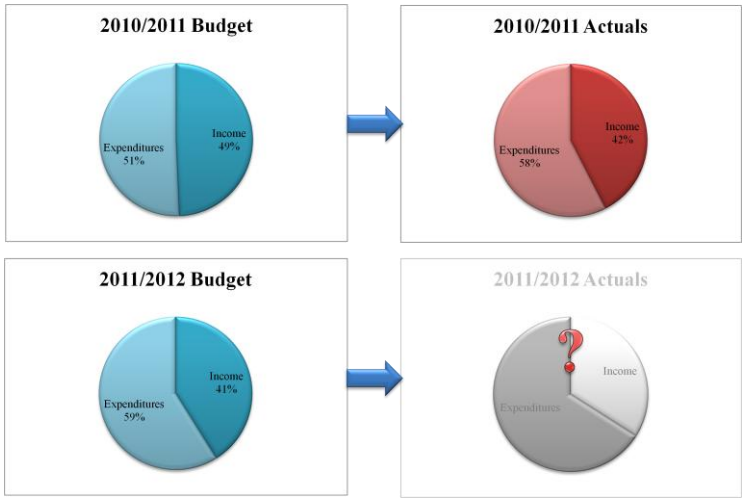

Figure 1 - The Tshwane SPCA budgeted and actual cash flows for 2010/2011 versus the budgeted and potential actual cash flows for 2011/2012.

Since the Tshwane SPCA does not have enough income to acquire more resources and had to reduce its number of employees, the staff and management are currently operating in a manner more akin to crisis management than to pro-active management, control and anticipation. The organisation is severely short-staffed and little attention can be given to improvements in operations and management because the staff is busy dealing with current affairs in order to prevent a further loss of customers or remaining sponsors. It is crucial to plan for the future of the SPCA, but currently the staff is finding it difficult just to manage the immediate demands of the everyday business operations.

2. Project Aim

2.1. Problem Definition & Justification

The aim with this project is to solve three aggregate problems. These problems will now be discussed in more detail.

2.1.1. Funding Problem

The first problem is that, due to the drastic and seemingly long-term reduction in funds and volatility of sponsors, the Tshwane SPCA no longer has sufficient income to cover all its expenses or to provide for contingencies. This is a critical problem because without sufficient funds, the SPCA will cease to exist. The Tshwane SPCA is one of the main animal welfare service providers in Tshwane area, which means that its discontinuation will result in a significant increase in stray animal population, unaddressed animal cruelty and very limited options of animal healthcare for poor communities. This problem is of top priority to the organisation, but should thus also be of high concern to the public and the government. The most probable causes of the problem are visible in Figure 2.

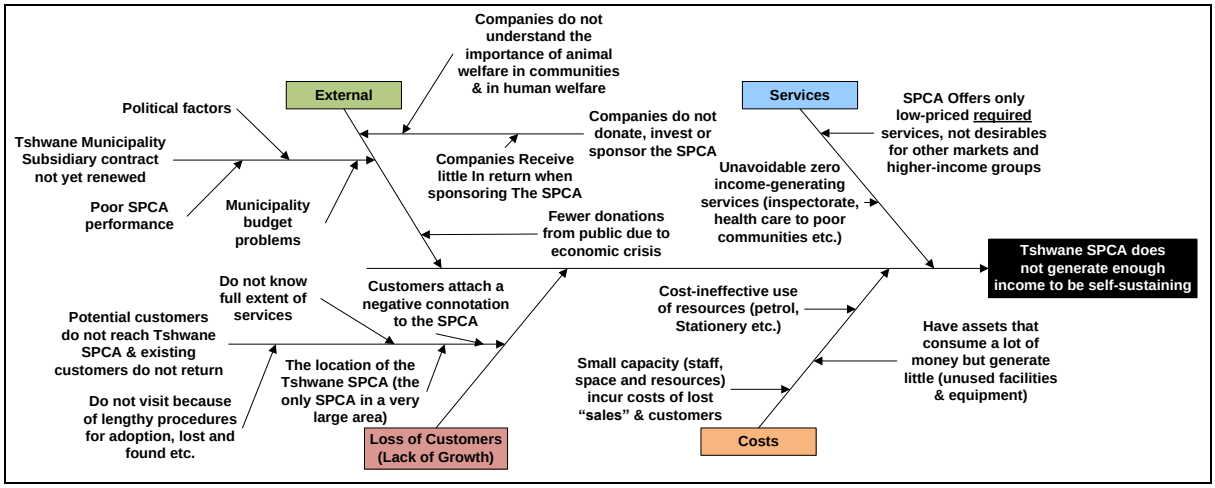

Figure 2 - Cause-and-effect diagram describing possible causes of the Tshwane SPCA problem of lack of income

It is not possible or efficient, however, to address all the causes of the problem. Certain causes are out of the control of the SPCA such as the fact that the public do not have much money to donate anymore and the fact that certain services must be provided to the public free of charge, especially to poor communities. The SPCA is, however, in control of its services, costs and income and can also influence its customers and current as well as potential sponsors. The interrelationships between causes will result in the removal of several other causes – there may be a solution that addresses several causes (that are within the SPCA's control) simultaneously.

2.1.2. Process Inefficiencies

The second problem is that staff cannot keep up with the current workload and cannot analyse their performance or plan for the future. They simply respond to needs as they arise. This is also a very serious problem because it leaves customers with an unprofessional impression. Customers may avoid the Tshwane SPCA because of poor service. Simply managing problems as they occur also leaves no planning for improvements and no standard procedures and metrics against which to measure performance. Apart from general problems such as the lack of performance measures and detailed data for analysis for each department, there are two specific problematic departments. The two departments that are experiencing the most problems are Reception and the Inspectorate. Their problems can now be defined separately.

Reception, firstly, consists of four staff members, each accomplishing not only very diverse administrative and customer service tasks for the Hospital as well as the Kennels, but also interacting with the Kennels department when adoption requests or lost and found claims arrive. These employees also operate the veterinary and pet product shops. The reception staff cannot keep up with

the vast amount of paperwork and the large inflow of work to be processed such as e-mails, phone calls, customers wanting to adopt, owners looking for lost animals, owners bringing their pets to hospital, customers wanting to buy pet products, general queries and taking incoming animals to the kennels. They spend large amounts of time filing, making photocopies and keeping track of their administrative actions, completed using the current information system of paper forms and files.

The Inspectorate department, secondly, allocates different areas to its seven inspectors. Each inspector must go out to inspect cases of animal cruelty, to help animals in need (emergencies) or to inspect homes before adoptions may be approved. The eighth inspector is on standby but is mainly the controller of the Inspectorate operations. This controller handles incoming calls of inspection or aid requests, sends out the inspectors to the pinned locations in their respective areas and handles the inspector reports and other paperwork. The department has no solid means of planning and scheduling inspections and prioritises inspections based on intuition and experience, resulting in inconsistency and poor customer service. The performance data for the department is also not detailed enough to enable management to perform the required analysis. The current information also implies that the inspectors are unproductive and that the workload is not evenly distributed between them.

2.1.3. Capacity Problem

Lastly, the Kennels are experiencing a problem with their "holding kennels". This problem involves the Hospital, Reception and Kennels. When an animal from outside arrives at the SPCA from whatever source, it is compulsory that the veterinarian performs a health examination on the animal. Animals to be examined are kept in "holding cells" before they can be transferred to the kennels lest they contaminate the healthy animals. These holding kennels do not have sufficient capacity to hold all the incoming animals before they can be examined especially since it also serves as a quarantine for sick animals that have been examined. The normal kennels rarely have spare capacity for the animals and even if they did, transferring animals to the normal kennels before they have been examined and treated would pose a major health risk. Since funding does not permit the purchase of additional kennels, this problem must be addressed otherwise. It will possibly have to be solved by reducing the time an animal spends at the SPCA to not only solve the problem of the holding kennels, but also to allow the SPCA to help more animals in the future. Figure 3 indicates the large number of animals that are admitted as opposed to the small number that find homes and leave.

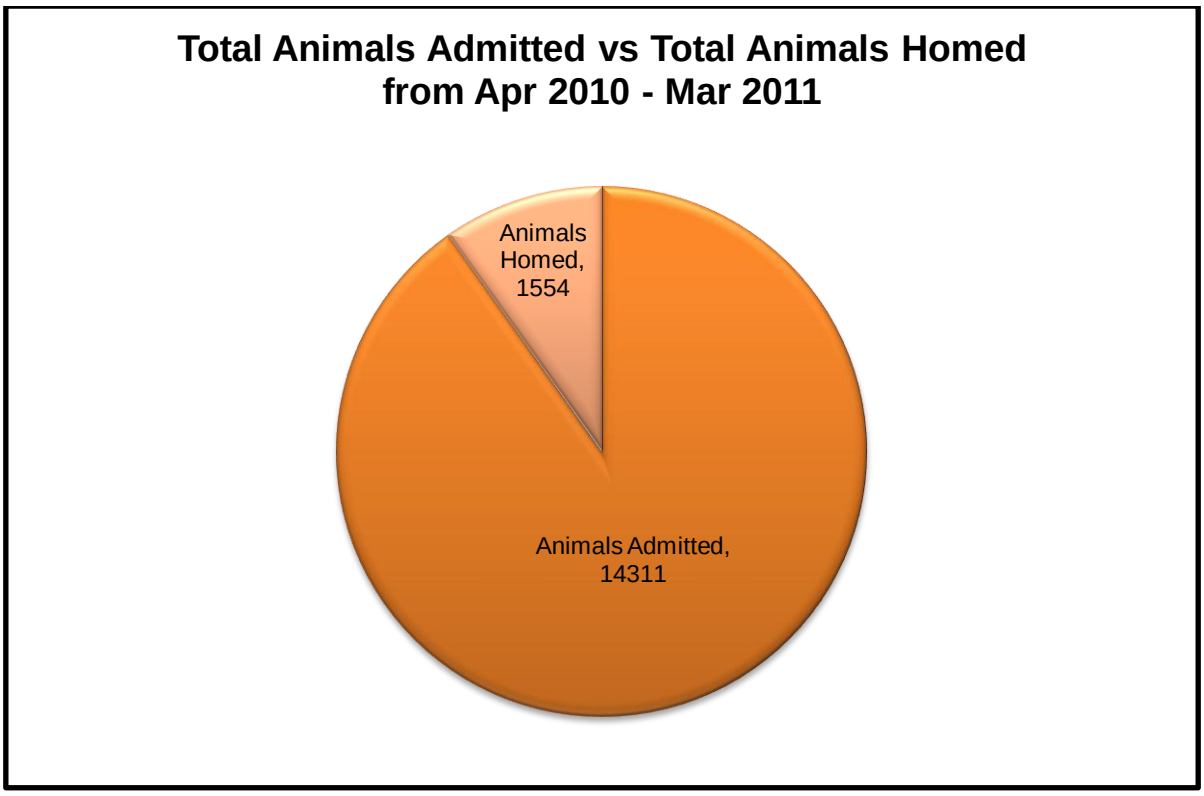

Figure 3 - Graph indicating the total number of animals admitted during 2010/2011 as opposed to the total number of animals homed.

2.2. Aim

Advancing from these comprehensive problem descriptions and analysis, it is now possible to formulate an aim or ultimate goal for the project, which will be achieved with solutions to the high-priority problems mentioned in the above sections.

The aim for this project is to aid the Tshwane SPCA in becoming a self-sustaining NPO by providing it with alternative methods of obtaining funds (thus reducing its dependence on donations and municipality subsidiaries) and to enhance this through sustainability in the form of improvements on current management, planning and processes (including the basis for continuous improvement) – especially on those of problematic departments namely the Inspectorate and Reception departments as well as the Holding Kennels, so that it can ultimately help more animals in the future.

2.3. Objectives

In order to achieve this aim, the root causes of the three main problems discussed above must be eliminated. The resulting objectives are to eliminate the root causes of the problem from the cause-

and-effect diagram in Figure 2, as well as the problems experienced by Inspectorate and Reception. These objectives include the following:

- A possible means with which to enter companies into a profitable business agreement (so that they find contributing to the funds of the Tshwane SPCA a profitable endeavour) must be investigated and designed.
- The possibility of desirable instead of necessary products and/or services to the public must be investigated.
- Operations must be altered so that customers find it easier and more desirable to make use of the SPCA's services.
- Means to utilize current resources and capacity more efficiently must be created.
- Means to aid the Inspectorate in improving its resource utilization must be created.
- The processing that occurs at Reception must be optimised to allow for better control and efficiency.
- A system that will reduce the large amount of time Reception spends on recording, keeping track of and transferring information must be investigated and/or designed.
- Means to enable better performance measurement (data recording and analysis) and continuous improvement must be created where necessary.
- Means to enable animals to exit the system sooner so that more animals can be accommodated and the holding kennels do not overflow must be investigated along with the impact of implementing such changes on the entire kennel system.

2.4. Project Scope

If these objectives are to be achieved, the scope of the study and analysis as well as the boundaries of the parts of the organisation that are to be analysed must be clearly defined.

2.4.1 Organisational boundaries

As a result of the reduction in funds mentioned previously, the Tshwane SPCA is now a small organisation with a staff body consisting of a mere 46 permanent employees. These employees are divided between several departments including Reception (including Lost n Found), Hospital, Fund Raising & Public Relations, Finance, Inspectorate, Kennels and Maintenance. Top management, Mr Rick Allan, has oversight over all departments, with departmental managers reporting directly to him. It was decided to focus on the three most problematic departments for the purpose of this project namely the Inspectorate, Reception and the Kennels (particularly the Holding Kennels).

The Inspectorate Department is a team that consists of 8 inspectors, one of which is a controller that is also available for emergency trips. This team moves out to their designated areas in the Tshwane area to inspect homes, emergencies and cruelty cases. There is thus a very small team of individuals servicing an area of 8300km². This area also encompasses the Centurion area, since the Centurion branch of the Tshwane SPCA is currently serving as a depot for animals; animals are kept there only until they can be transferred to the Waltloo premises. Table 1 displays the throughput of the Inspectorate department for June 2011.

Type of Case	Total nr of Cases
General animal welfare complaint inspection	177
Follow-up of previous case	131
Pre-adoption inspection	206
Post-adoption inspection	16
Rescue/emergency	52
Pro-active inspection	60
Assist other inspectors	18
Total	**660**

Table 1 - Throughput of the Inspectorate Department for June 2011.

All operations of the Inspectorate Department will be analysed in order to achieve the objective of improving the productivity and resource utilization of the department. This includes all the paperwork and statistics submitted by the department, the trips taken by all inspectors on all types of calls (emergencies, inspections etc.) to all possible locations and the methods and procedures of the Inspectorate Control section, including its interaction with the inspectors themselves. The Inspectorate has limited interaction with departments other than top management and Reception.

Reception has four staff members performing the various tasks previously mentioned. Reception often interacts directly with Hospital and Kennels. The Waltloo premises has a total of 258 kennels – 20 holding and quarantine kennels, 45 for boarding, 60 for lost animals, 60 for animals up for adoption, 15 for cats, 20 for puppies and 38 for the hospital.

All operations performed by Reception will be studied in order to streamline the processes and make room for improvements so that staff can plan better, have better control and be able to help customers more efficiently. Since Reception's interaction with the Kennels forms a great part of the problem (Reception staff physically has to take animals to the kennels, leaving other customers in line unattended), this interface will be studied along with the other interfaces as required.

Achieving the objective of finding means to generate more income and helping the SPCA to become more sustainable and self-sufficient in the long term will require investigating potential new investments for the SPCA or sponsor companies on behalf of the SPCA using existing resources such as unutilized land, the Centurion premises, existing kennels and equipment etc. The Centurion premises will not, however, be studied for any other purposes than its possible contribution to new ventures.

Achieving the objective of establishing a stronger basis for performance measurement and continuous improvement will require studying the current management techniques, performance measures, reporting methods and analyses performed by top and departmental managers.

The holding kennels must be studied in order to develop a means to reduce congestion. Since the problem cannot be solved with more kennels, other departments' role in the problem will also be studied including the Hospital that examines the incoming animals, the Kennels that accept the animals examined and deemed healthy, Lost and Found that reunites lost animals with their owners and the Inspectorate that approves adoptions.

2.4.2 Scope of Techniques

Since the Tshwane SPCA is a service organisation (with a small retail component) that processes entities such as customers, reports, phone calls, patients, cruelty claims etc., it is possible to apply most Industrial Engineering techniques that apply to a process or a system.

However, the Tshwane SPCA also has special attributes such as the fact that it is an NPO and that the Inspectorate also has an "emergency" component that cannot be planned for (like a police department). This means that techniques outside of Industrial Engineering can be used or customized and developed to be relevant to the field.

3. Literature Review

Now that the project has clear objectives and deliverables, research must be conducted in order to discover appropriate Industrial Engineering techniques that can be used to solve the problems and achieve the objectives. Since there is a lack of sufficient research, case studies and literature available regarding the improvement of the business processes of animal shelters (especially of the SPCA itself), alternative literature regarding possible techniques to apply to the improvement of similar organisations, departments or projects must be sought out. These techniques can then be combined with appropriate Industrial Engineering techniques so that the ultimate solution will be tailored to the

project, but relevant in the field of Industrial Engineering. The techniques discussed here will be based on literature and case studies from practice.

The first set of techniques to be investigated in this section will be techniques that can be used by the Inspectorate (functioning similarly to a police department) to improve their planning, prioritisation and resource deployment. Business process improvement techniques will then be investigated in order to discover a method to optimise the Reception processes. The use of information systems in business processes will also be studied. Techniques to model the kennel system and to introduce changes to the model that must be investigated so that the effects of changes to system elements other than the holding kennels can be established, will also be studied in this section. Lastly, techniques to increase the income of the SPCA as an NPO will be investigated.

3.1. Tshwane SPCA Inspectorate

The Tshwane SPCA's Inspectorate Department inspects residences before an adoption request can be approved as well as after adoption has been approved and the animal has taken up residence with its new owner, if required. These scheduled and "planned" inspections can be distinguished from the department's "unplanned" responses to claims of animal cruelty, emergency responses to animals in need, owner complaints etc.

3.1.1. Improved Planning, Control & Resource Deployment

The Inspectorate finds it difficult to plan ahead and simply responds to demands for "unplanned" inspections as they occur, often at the expense of the planned home inspections that form part of the adoption procedure and thus contribute to the time it takes to have an animal adopted and out of the kennels (income is also generated from adoptions). The inspectors respond to calls as they see fit which, regardless of how experienced they are, results in inconsistency and an intuitive prioritisation of inspection types that differ from time to time. A more structured approach to the prioritisation of inspection types will allow for better planning, the ability to anticipate where and how frequent demands will arise and an elimination of unnecessary actions.

Furthermore, the data recorded and analysed by the Inspectorate is minimal. The department simply responds to demands, as previously mentioned, and roughly assigns its inspectors to areas where they are responsible for all inspections. This, in combination with a lack of data analysis to facilitate anticipation and planning, results in an uneven distribution of the workload between the inspectors, causing some of them to be unproductive and others unable to keep up with the workload. A more

comprehensive recording and analysis of data will enable improved planning, control and resource deployment.

3.1.1.1. Risk Assessment

One method to prioritise is to focus on high-risk inspections. If not attending to a certain type of inspection involves a low level of risk, it may be acceptable to eliminate it from the Inspectorate priorities. According to the Institute of Risk Management, the Association of Insurance and Risk Managers & the National Forum for Risk Management in the Public Sector (2002), risk can be defined as "the combination of the probability of an event and its consequences." Risk does thus not only concern how likely it is that an event will occur, but also the impact the event will have if it does occur. Basson et al (2010) refers to three types of risk assessment including qualitative, semi-quantitative and full quantitative risk assessment.

Qualitative risk assessment is done when limited information is available about the probability and/or impact of events. A risk matrix of a chosen size is developed and the intensity of the probability as well as the consequence (impact) are indicated. The intersection of a certain probability and consequence intensity will then determine the intensity of the risk associated with the event. Several standards for risk matrixes have been established such as the Australian/New Zealand Standard (AS/NZS 4360) 5x5 risk matrix that classifies consequence i.t.o. the number of injuries, deaths and other losses. However, the 3x3 risk matrix suggested by Basson et al (2010) is more flexible because it is more generic in its use - it simply classifies probability as well as consequence (and thus the risk combination) of the two as either high, medium or low (relative the specific scenario or project). An example of such a matrix is shown if Figure 4.

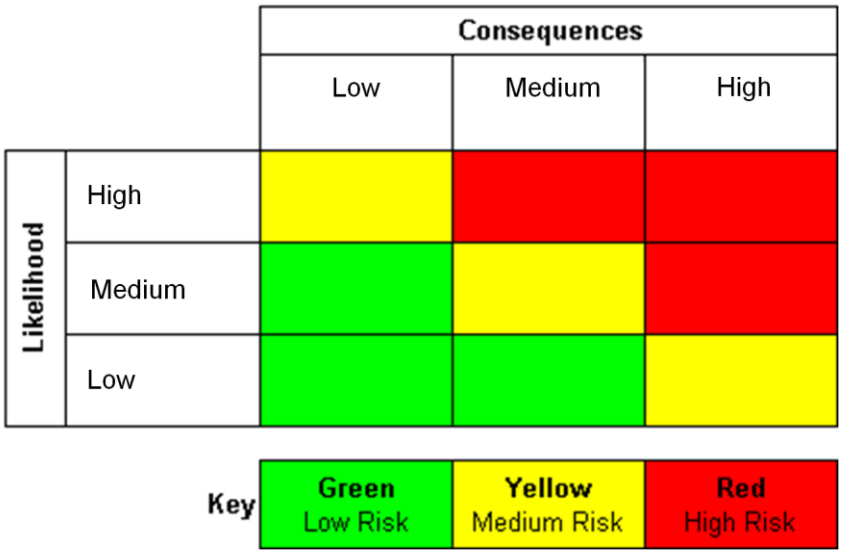

Figure 4 - 3x3 risk matrix for qualitative risk assessment.

Semi-quantitative risk assessment expresses probability and consequence as numbers. These numbers are not, however, the actual probability or impact i.t.o. monetary loss, number of lives lost etc., but rather weights to indicate the intensity of each. The risk is then the product of the numeric probability and consequence weights (R=P x C). It is thus a more accurate assessment and requires more detailed data. The semi-quantitative risk matrix will strongly resemble the qualitative matrix in Figure 4, except that the high, medium and low classifications will be replaced by numeric values.

A full quantitative risk assessment is the most accurate since it uses actual historical data of probabilities (between 0 and 1) and consequences (as actual losses in monetary value). The risk, a value equal to the product of the probability and the consequence, can then be prioritised more accurately.

Since the SPCA is an NPO, its main goal is not to make profits but rather to protect animals and uphold their rights. It is thus important to consider several qualitative factors in risk assessment. Evaluating inspections i.t.o. qualitative importance (which will indicate the intensity of the consequence if the inspection could not be completed) will require a qualitative decision-making tool. Determining the probability that a certain inspection will have to be completed will require the analysis of a large sample of historical inspection data. Mere estimates of the probability will not be necessary since the historical data is available and it is preferred to analyse data because of the enhanced accuracy it offers.

3.1.1.2. Analytical Hierarchy Process (AHP)

The AHP is a decision-making method developed by Thomas L. Saaty to enable decision-makers to prioritise elements that contribute to a certain objective. According to Saaty (2008), intangibles need to be traded off during decision-making, which requires these intangibles or qualitative factors to be measured in relative terms so that they can be prioritised. The AHP accomplishes this by comparing elements (like criteria or sub-objectives such as protecting animals, sustaining a business, having a good public image etc.) using a "scale of absolute judgement". This scale represents how much more one element achieves the main objective than another. This is called pairwise comparison since each element is compared with only one other element at a time. A total weight of importance (priority) can then be obtained through mathematical manipulation of the pairwise comparison matrix.

The method is "hierarchical" because after one level of elements have been compared and prioritised in its achievement of the objective(s) at the higher level, a new lower level can be defined (with

elements on this level now being evaluated i.t.o. their achievement of the objectives contained in the level above them). This is best explained through an example.

Saaty (2008) demonstrates the process with an example where the main objective or goal is to find a perfect job at a university. This objective is on the first level of the hierarchy. The next level will contain criteria for the perfect job such as flexibility, opportunities, reputation, security, salary. The importance of these elements w.r.t. the perfect job at a university are compared in pairs by someone with extensive knowledge on the objective(s) using an absolute scale similar to the one shown in Figure 5, adapted from Saaty (1980).

Importance Rating	Description
1	Alternatives/objectives i and j are of equal value/importance
3	Alternative/objective i is weakly more valuable/important than alternative/objective j
5	Alternative/objective i is strongly more valuable/important than alternative/objective j
7	Alternative/objective i is very strongly more valuable/important than alternative/objective j
9	Alternative/objective i is absolutely more valuable/important than alternative/objective j

Figure 5 - AHP judgement scale.

A pairwise comparison matrix is obtained through pairwise comparison and the final weights of importance for each objective is calculated. The next level of the hierarchy will be where several universities will be judged according to their achievement of the objectives from the previous level. A new pairwise comparison matrix for each higher-level objective will be required for the evaluation of all the universities i.t.o. all the objectives. For example, a pairwise comparison matrix will be required to compare the flexibility of a job at the University of Pretoria with that of all other universities. More matrixes will be required to compare the salary, security, opportunities and reputation of all the universities.

The weight that represents the achievement of a university w.r.t. a certain criteria or objective is then multiplied by the weight of that criteria or objective, the sum of which represents the university's performance w.r.t. the main objective (at the first level of the hierarchy). In the end, the universities are prioritised according to their contribution to the achievement of the main objective and decisions can be based on these priorities.

3.1.1.3. Crime Mapping & Hotspot Analysis with GIS

A technique that will enable a greater awareness of where inspections are most frequently required on the map of Tshwane, is Crime Mapping and Hotspot Analysis. Crime mapping and hotspot analysis was first put to effective use with the CompStat policing system that was implemented in 1994 by William Bratton, the police commissioner of the New York Police Department (NYPD). There are many versions of CompStat, but it is basically a system that identifies recognised and rising crime patterns so that resources may be used more efficiently to target the patterns (Schick 2004). The CompStat process is a generic one and consists of collecting and analyzing crime data, developing tactics and strategies to address the crime problems, deploying resources and measuring the effectiveness of the tactics. The purpose of the CompStat policing system is to reduce crime by pro-actively addressing it. The implementation of a CompStat policing system at the Los Angeles Police Department (LAPD) lead to a significant decrease in violent crimes as well as a reduction in the amount of effort required from the officers, as can be seen in Figure 6.

CompStat Data: Violent Crime in the Operation-South Bureau, Los Angeles Police Department

	Year-to-Date 2003	Year-to-Date 2002	% Change
Violent crimes			
Homicide	127	164	-23
Aggravated assault	3,632	4,024	-10
Rape	171	200	-15
Robbery	2,711	2,919	-7
Domestic violence	2,098	2,284	-8
Total	*8,739*	*9,591*	-9
Officer activity			
Officer-initiated arrests	3,689	3,499	5
Officer-involved shootings	10	12	-17
Personnel complaints	386	472	-18
Officer vehicle pursuits	75	90	-17

Figure 6 - The reduction in violent crimes and officer activity due to CompStat at the LAPD.

Crime mapping and analysis as well as hotspot analysis covers the collection and analysis of crime data that is needed for a pro-active policing strategy. According to the International Association of Crime Analysts (2011), crime analysis can help a police department to be more effective because better information can help to improve safety and quality of life, prioritise investigations, plan for potential resource requirements, educate the public and create strategies and tactics to prevent future incidents.

Crime mapping is a sub-discipline of Geography and Geo-informatics that aims to determine what crime happens where and how often. It maps incidents and identifies hotspots – locations where crimes occur most frequently (Karpilo n.d.). Eck et al (2005) distinguishes between various ways to indicate hot spots such as dot maps for analyzing incidents at specific addresses, line maps for incidents along specific streets or paths and ellipse maps for analyzing incidents that occur within specific areas or neighbourhoods.

Sutton, Dassau & Sutton (2009) describes how to use Geographical Information System (GIS) software such as ArcGIS, QuantumGIS or Microsoft Excel's GIS expansion called SpatialXL, to plot various occurrences or features (vector data) onto a map that consists of a grid of pixels (raster data). Layers are used to plot different features and polygon vector data can be used to divide the map into logical sections (as seen in Figure 7, obtained from Sutton, Dassau & Sutton (2009)) according to suburbs, census tracts etc. and incidents can be plotted on this map using point vector data such as the addresses where crimes occurred. Each vector feature can have attributes such as the average income of a suburb. The various attributes of different features can be used for spatial analysis – the incidents can then be compared with other spatial data such as income groups, educational level of residents, topography etc. to draw connections between crime occurrences and the locations where they occur. Thus, not only can crime mapping be useful for determining where the concentration of crime occurrences is high so that resources can be deployed more efficiently and crimes prevented, but crime mapping can also be used to establish relationships between the crime that is committed and the characteristics of the area where is was committed. Figure 8 (also obtained from Sutton, Dassau & Sutton (2009)) shows how polygon vector data and raster data (assigning a crime intensity value to each cell in a grid) are used to map hotspots.

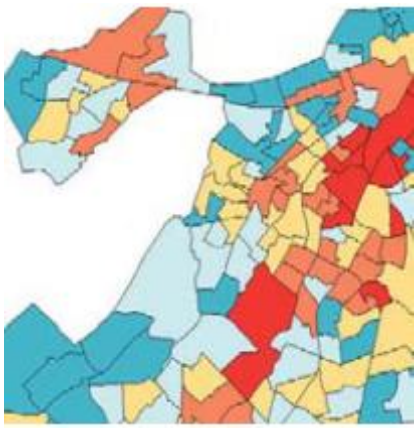

Figure 7- A map divided into logical divisions such as census tracts.

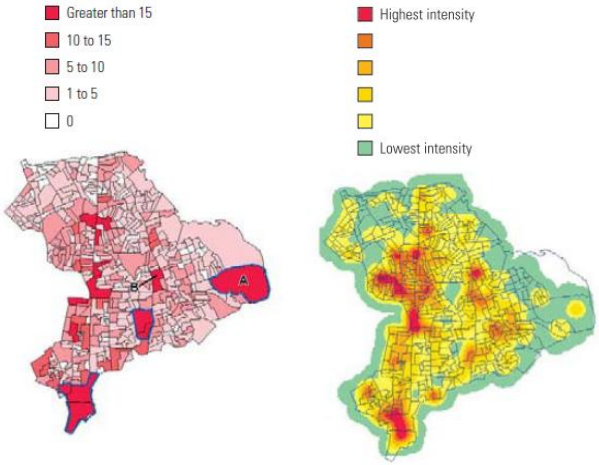

Figure 8 - Hotspots plotted on two maps using polygon vector and raster data respectively.

The indication of the inspection requirements on a map of Tshwane will require that historical data on the geographical occurrences of certain types of inspections will need to be analysed. To perform hotspot analyses frequently in the future, this data must be recorded and analysed on a regular basis.

3.1.1.4. Data Recording & Analysis

Not only the geographical data (as mentioned above), but also all the data required for analysis by the Inspectorate and by management must be recorded. Currently, the Inspectorate has an information system that the controller uses to log all inspections performed by type, inspector, address and date. All this data and more is also recorded on Inspector Reports which are forms completed by the inspectors upon the completion of an inspection. The database is unfortunately incredibly outdated and can generate a limited number of reports in formats that are incompatible with modern software packages such as MS Excel and Access. The inspectors never use the reports that this database can generate. The controller analyses data from the forms on a monthly basis by reading the information contained on the forms and recording the necessary data by hand.

This method is very time-consuming and likely results in inaccurate data. A more effective way to record and analyse data will be using a computer, but since the current database is not fit for this purpose it may have to be replaced by a simpler system or used in conjunction with another system, provided that this recording and analysis does not add too much extra time to recording an inspection electronically. MS Excel can perform several calculations and can analyse data using formulas and graphs. It is perfect for recording and manipulating large amounts of data and an information system resembling that of an MS Access database can be created where access can be limited and predetermined calculations can be performed from data that is entered quickly.

The data required for monthly analysis by the Inspectorate and management includes the following:

- Total number of each type of inspection performed by each inspector.
- Total number of animals handled (admitted to the SPCA) by each inspector and the reasons for handling animals.
- The number of follow-up inspections performed by each inspector.

3.2 Tshwane SPCA Reception Service Counter

Reception is a service department that interacts with most other departments. The processes executed at Reception have inputs from other departments, outputs to be sent to other departments, resources to execute the processes and controls to execute the processes correctly. Such processes can be defined and improved.

3.2.1 Business Process Re-engineering and Continuous Improvement

Any process can be improved or completely re-engineered. According to Gitlow (2005), Deming's Plan, Do, Study, Act (PDSA) cycle can be used to improve a process that has already been standardized (best practices have already been developed for the process). The standard or current process is defined using a flowchart with a chosen notation i.e. Integrated Definition (IDEF), Swimlane diagrams, Business Process Management Notation (BPMN) etc. and key performance indicators (KPI's) are defined for the process. The **Plan** phase then suggests an improved flowchart, the **Do** phase tests the new flowchart during a controlled experiment, the **Study** phase estimates the effectiveness of the proposed flowchart by measuring or estimating the KPI's and the **Act** phase standardises and formalizes the new process if it is accepted, otherwise the Plan phase is executed again.

For the phase where the process and its flowchart are improved, certain other techniques could be applied. A quantitative approach such as Statistical Process Control (SPC) can be applied to the outputs of the process. If the outputs show special causes of variation or are not within management or customer specification limits, the causes for the variation can be found through cause-and-effect diagrams and can be eliminated to improve the process outputs. Statistical methods, however, are for processes with uniform outputs, not for services where each case is different. Therefore, it will be preferable to initially apply qualitative techniques to standardise, simplify and improve the processes before statistical techniques can further and continuously improve the processes. One such qualitative technique is the Questioning Technique which is described by Kanawaty (1992) as the technique through which the critical examination is conducted with each activity subjected to a systematic and progressive set of questions. This technique scrutinizes each part of the process in terms of why, when, where, how and by whom it is done and then suggests other ways to accomplish each

operation. This facilitates the qualitative analysis (and quantitative where possible) of each alternative suggestion and leads to deciding on the most suitable alternative process flow. In suggesting and deciding upon more suitable alternatives, other principles such as Lean Manufacturing can be kept in mind. Jacobs, Chase & Aquilano (2009) mentions Lean principles that can be taken into consideration when improving processes in the service industry such as:

- Upgrade Housekeeping – keep everything constantly ready and only keep necessary items in the work area.
- Upgrade quality – initiate quality at the source.
- Synchronise service with demand to create uniform/level facility loads.
- Eliminate unnecessary activities (activities that do not add value).
- Reorganise physical configuration.
- Introduce demand-pull service scheduling.

A success story of business process improvement that utilized a combination of qualitative and quantitative analysis was discovered during an interview conducted with Cobus Terblanche on 18 July 2011. The South African Military Health Services provided chronic and acute medicine to the South African Military employees and their families. The waiting time in line for medication reached up to 6 hours. The process was analysed and it was discovered that eliminating the need to queue for chronic medicine eliminated 53% of the queue length and reduced the average queuing time to 18 minutes.

3.2.2 Information System Design

In suggesting improved business processes for Reception, management requires that an electronic information system is used to improve the current standardised processes since there is a current lack of any such system. Such a system may be necessary since Reception interacts with all other departments at the Tshwane SPCA. It is thus often necessary for reception to exchange information with other departments. This information, however, is delivered telephonically or on foot and only upon request since it is stored in hard copy at Reception – there is no common database containing relevant information used by several departments (only a database containing microchip information). As a result, there is limited visibility within the small organisation, there is a risk of making mistakes such as putting a boarding animal up for adoption and synchronization is poor. It must first be established, however whether an information system should be integrated into suggestions for improved processes. Bentley & Whitten (2007) mentions James Wetherbe's PIECES framework and its use in discovering problems or opportunities regarding information systems. This framework is used in Appendix A to determine whether there are problems regarding the SPCA's information system (filing and document system) with respect to Performance, Information, Economics, Control, Efficiency and Service. The most prevalent problems were found to be communication problems,

delayed response times to customers and other staff members, excessive information and poor visibility – all of which create a significant opportunity for implementing an information system at the SPCA.

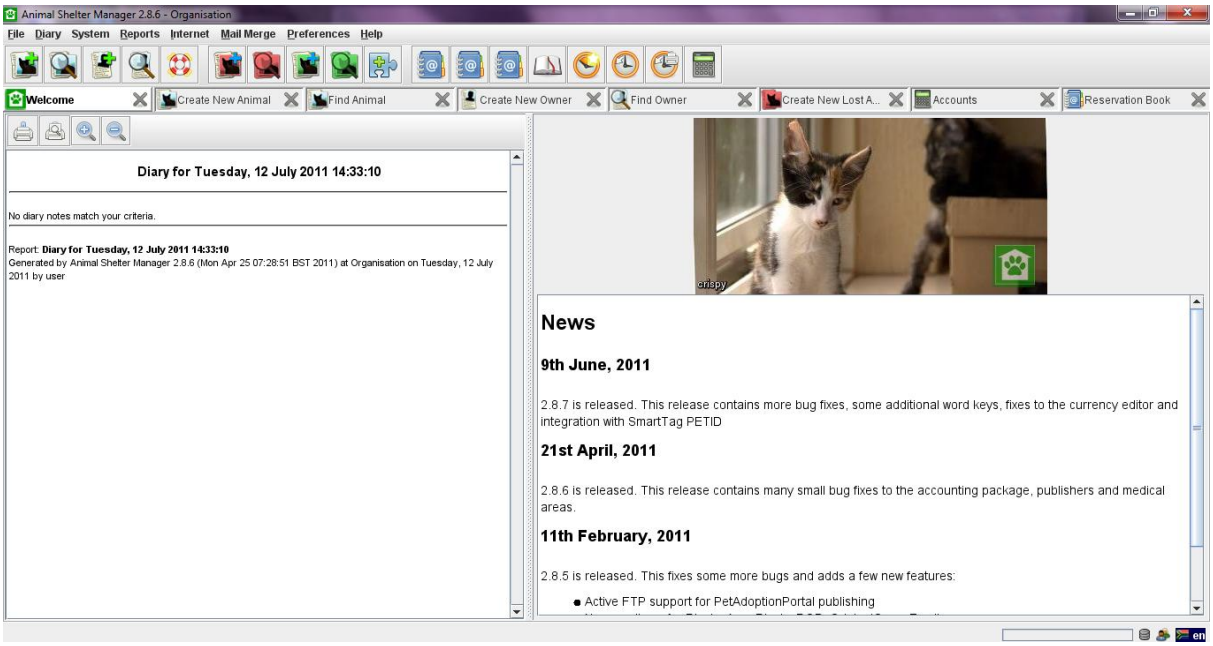

Figure 9 - The Animal Shelter Manager user interface and several of its functionalities opened in tabs beneath the menu toolbar.

In the information age, quick and all-round access to information is crucial for any organisation. There are many existing information systems designed specifically for the management of an animal shelter, most of which are fairly expensive. There is, however an open source option available called ASM. It contains very useful functionalities such as storing information on animals (including their medical history), their locations (kennels), their owners, keeping a diary, tracking lost and found animals, a retail aspect, a financial reporting aspect, readily available statistics (graphs and reports) as well as tracking adoptions, microchips and veterinary actions. Figure 9 above shows the ASM interface.

The feasibility of this system must first be investigated before integrating it with improved business processes. Bentley & Whitten (2007) suggests using a Feasibility Analysis Matrix to evaluate existing candidate systems in terms of operational, technical, economic and schedule feasibility by assigning a qualitative weight of importance (expressed as a percentage) to each type of feasibility. Each candidate system is then evaluated in terms of its performance in each feasibility category and that performance is then rated (expressed as a score out of 100). All the scores of a candidate are multiplied by the weight of the type of feasibility in which the score was achieved, the sum of which represents the candidate's final feasibility rating.

In order to evaluate the feasibility of ASM (the operational feasibility in particular), requirements for the information system must first be developed from the process improvement suggestions. If these requirements are not met by ASM, it will rate poorly in terms of operational feasibility. Bentley & Whitten (2007) suggests use case modelling for creating functional requirements for an information system. Use case modelling captures functional requirements comprehensively and in a manner that facilitates easy communication with the end user. Use case diagrams model the system requirements in terms of business events, the entities interacting with the system (actors) and how the system responds to these interactions. Even though the use case diagram must contain the functional requirements of the system, Cockburn (2001) suggests that no receiver actors should be indicated on the diagram – just one of several methods to prevent the diagram from becoming cluttered. A simple yet comprehensive use case diagram is thus sufficient to represent the main functional requirements of an information system. These diagrams make minimal use of elaborative use cases such as abstract use cases that are "used" by main use cases in executing a business events and extension use cases that extend the functionality of main use cases. Use case diagrams are also accompanied by use case narratives, describing the business event involved in each use case, the alternative business events, the stakeholders and role-players involved etc.

Tshwane SPCA management is not willing to accept a system with a feasibility rating lower than 70%, since the system must not do more harm than good and will be used for a long time after implementation. Thus, if ASM is found to be infeasible in terms of management's criteria, an information system that is tailored to the functional requirements developed using use case modelling and based on process improvement suggestions must be designed. Data modelling could be used to specify data requirements for an information system. Bentley & Whitten (2007) describes data modelling as "a technique for defining business requirements for a database". A certain type of data model called an entity relationship diagram (ERD) can be used to depict data in terms of entities and relationships, using universal notations. Since such a data model, along with use cases as functional requirements, is the "blueprint" for designing a database, developing such a model will enable the detailed design of the information system by a third party that is more experienced in information system design and implementation.

3.3 Holding Kennels

The mere 10 holding kennels (X Kennels) must hold all incoming animals before they can be examined by the veterinarian. To simply build more kennels is not financially feasible and the

problem must be solved by looking at its interface with other departments such as the Hospital and the Inspectorate as well as its impact on the rest of the kennel system and vice versa.

The kennel system consists of various kennels and the performance of the Reception, the Hospital, the Lost n Found as well as the Inspectorate influence the flow of animals through these kennels. As previously mentioned, Reception transfers an adoption request to the Inspectorate who must inspect the home before an adoption can be approved. The entire adoption process (from when the application form is filled in by the prospective owner to when the owner picks up the animal to take it home) usually takes about one week. When an animal leaves the adoption kennels (separate kennels for dogs, puppies and cats) for its new home, a space opens up that can be filled by another animal that is ready for adoption.

The Hospital has two veterinarians that are available to provide private healthcare services to the public from 9A.M. to 11A.M. each weekday. The rest of the time the vets perform scheduled operations, euthanasia, examinations of arriving animals and is also available for emergencies. The Hospital contains ten quarantine kennels (Y Kennels) for animals that suffer from the contagious Parvo virus (cats and dogs with this virus can be kept in the same area since each specie has a different strain of the virus that cannot be contracted by the other) and 38 kennels where injured and sick animals can recover.

Stray animals are kept at Lost and Found's stray kennels for one week before they become available for adoption and are transferred to the adoption kennels. An animal is available for adoption for varying periods of time before euthanasia occurs (the animal is put down), depending on the animal's condition.

If the holding kennels are full, the incoming animals are sent to other available kennels before they can be examined, but only if they are not severely sick or injured. Incoming puppies, however, are only kept at another set of kennels when the holding kennels are full because they are the carriers of the Parvo virus. Incoming animals may not be sent to the boarding kennels, but adoptable animals are healthy enough to stay there if there is no other space for them in the adoption kennels. More than one adoptable puppy or cat can be kept in a kennel at a time.

The kennel system is thus very dynamic and the flow of animals through one set of kennels is dependent on the flow of animals through another as well as on the actions of the Hospital, Reception and Inspectorate. Methods that enable the modelling of such a dynamic system of interdependent components must now be investigated so that the effect that changes to the system will have on the holding kennel congestion can be examined.

3.3.1 Simulation Modelling and Queuing Theory

Queuing theory is used to model a queuing system. To model such a system the input process as well as the output process must be specified (Winston 2004). For example, the input process of the kennel system will be specified by the rate at which animals arrive to wait in the holding kennels until they can be examined by the vet. The output process will be specified by the rate at which they can leave the holding kennels after having been examined. However, since the rate at which animals enter and leave the holding kennels depend on several factors and the problem may lie with other role players or kennels, the object of interest is not only the holding kennel queuing system, but the various queuing subsystems that the kennel system consists of. According to Kelton, Sadowski & Swets (2010), the problem with queuing theory is that it is for long-run performance of a system and does not take into account the natural variability in the system.

A more convenient and accurate way to model such a dynamic system of interdependent components is through the use of simulation modelling with computer software. Kelton Sadowski & Swets (2010) defines simulation modelling or computer simulation as developing models of real-world systems with software that imitates the system's operations and characteristics as they are performed or exhibited over time. They emphasise the advantages of simulation as being able to faithfully create complex models of complex systems. The simulation model also provides flexibility and the ability to experiment with different conditions and study the resulting behaviour of the system. These authors also distinguish between continuous models where the state of the system changes continuously over time and discrete models where discrete or "whole" entities move through the system and where change can only occur at distinguished points in time.

Simulation software can be used to model any system such as a manufacturing plant, a call centre, a road system, a bank etc. as long as it is validated to ensure that it accurately represents the real-world system.

3.4. Tshwane SPCA as NPO

Regardless of its function, the Tshwane SPCA remains a non-profit organisation. This means that the techniques used by other NPO's to attract companies' support, or to attract companies to enter into a mutually beneficial relationship, could also be applicable to the SPCA.

3.4.1. Cause-related Marketing

The Tshwane SPCA has a Fundraising & Public Relations department that consists of a single staff member. This department aims to acquire corporate sponsorships and donations and spends a lot of its time and resources on communicating with the press and public. The way in which the department functions leaves little room for compiling pitches that contain data on how companies can benefit from getting involved with the SPCA. The current method of simply contacting potential sponsors and asking for help will not suffice – corporate sponsors require concrete evidence of potential returns.

The Tshwane SPCA in itself does not have sufficient funding to invest in projects that could render them self-sustaining in the long-term – they still need investors. According to Dees (1998) NPO's are increasingly turning to the private (profit-driven) sector to replace their traditional funding (donations and grants). A possible technique to acquire investors (to get profit-driven companies to enter into a mutually beneficial relationship with the SPCA instead of simply donating) and to empower the SPCA to provide more desirable services to the public in order to become self-sustaining, is cause-related marketing. According to Fritz (n.d.), cause-related marketing is an agreement between a business entity and a non-profit organisation or cause to raise money for a certain cause in such a way that both organisations benefit. It was first implemented by American Express in the 1980's when they partnered with a non-profit organisation to restore the Statue of Liberty in the USA. They donated a portion of each of their credit card purchases to the cause and launched a large advertising campaign. Through this, they raised over $1.7 million for the cause and American Express card usage rose with 27%. The applications for new cards also increased by 45%.

A local case of successful cause-related marketing is that of the dog food company, Royal Canin, with its sponsorship of the Onderstepoort animal blood bank. This resulted in Onderstepoort's pet product shop, the Mog-n-Mutt, changing its sales mix with respect to the products of Royal Canin and its affiliate, Vet's Choice, resulting in overall increase in sales as shown in Table 2.

Year	Royal Canin Sales (tons)	Vet's Choice Sales (tons)	Total (tons)	Total (Rands)	Cumulative Sales Increase
2008					
2009					
2010					

Table 2 - The overall change in sales of Royal Canin and Vet's Choice products at the Onderstepoort Mog-n-Mutt shop due to Royal Canin's sponsorship of the Onderstepoort blood bank (Confidential data).

Fritz (n.d.) also mentions several ways in which cause-related marketing can manifest itself such as through product sales (for example the "Red Campaign" where several companies sold "red versions" of their products and gave some of the profits to HIV/AIDS prevention), by offering customers a choice of adding a donation to their purchases, through long-term co-branded events or programs where the NPO and company team up for a large investment (such as 3M's sponsorship of the London Children's Museum science gallery) or through having the NPO provide a recognition or recommendation of the company's products. Figure 10 shows a campaign that donates profits from the sales of animal clothing to animal welfare causes.

Figure 10 - A campaign that donates a portion of its profits to an animal welfare society.

Organisations will not, however, venture into cause-related marketing if they have no proof of its potential benefits. The NPO must offer a good investment to the corporate sponsor. Martin (2003) provides a checklist of things the NPO must establish or take into account before approaching sponsors including

- ✓ The demographics of the NPO (data on the customers that will participate in the project or cause, their locations, income, loyalty, age groups etc.)
- ✓ Data on potential corporate sponsors (their locations, what they sell and to whom)
- ✓ Testimonials from previous corporate sponsors about the value of the NPO

Bower (2009) provides further ways in which to attract sponsors for cause-related marketing – according to this author the NPO must:

- ✓ Be able to measure the value of the corporate sponsorship in order to provide proof of ROI. Expenses must be budgeted, must show potential returns and should be translated into the value it adds.

- ✓ Re-assess assets and data about what the NPO has to offer (that businesses may find of value) must be provided.
- ✓ Be able to describe the audiences of the project/event/cause to sponsors in detail.

3.4.2. Capital Budgeting and Forecasting

In order for an NPO to provide potential sponsors with the required data (as listed in the above checklists) in the form of a pitch or proposal, other techniques will be required. A capital budget must form the basis of a proposal and can be compiled based on sales and service revenue forecasts or estimations.

Capital budgeting describes how managers plan commitments to projects that have long-term implications (Seal, Garrison & Noreen 2009). It involves investment – committing funds to receive returns in the future. Companies will not invest in a project if they do not have proof that their investment will yield positive returns in the future. Seal, Garrison & Noreen (2009) also mentions two methods of capital budgeting that can be used to indicate whether it is worthwhile to invest in a project or not. The Net Present Value (NPV) method involves discounting all cash flows over the project lifetime using the appropriate discount rate – an NPV that exceeds or equals zero will indicate a project that is worth investing in. With the Internal Rate of Return (IRR) method, the percentage yield of the project is determined by obtaining the discount factor for the net annual cash flow. This discount factor corresponds to a certain discount rate for a the project lifetime in question, the rate then being the yield or IRR of the project.

The values of the cash flows over the project lifetime will not be readily available – they will have to be estimated and predicted. Evans (2010) discusses forecasting methods that require historical data on previous sales and returns from identical or similar projects (such as moving average, exponential smoothing, regression analysis etc.) as well as qualitative or judgmental methods (the Delphi method, visioning, scenario building and historical analogies), none of which will be discussed in detail here. Since a new project that uses the SPCA's assets to generate profits for a company will be suggested, historical data may not be available or will be insufficient. Judgemental methods would then be preferable. According to Lawrence et al (2006, pp. 1), the reduction in accuracy of these methods can be justified by their usefulness: "While previously judgement was thought to be the enemy of accuracy, today judgement is recognised as an indispensable component of forecasting…"

4. Conceptual Solution Design

In view of the success stories from the cases found in industry and literature that (discussed in the previous section), the techniques used in these cases may be developed further to achieve the objectives of this project.

The Inspectorate's problem can be solved with crime mapping and hotspot analysis using a GIS. This visual representation of the frequency of inspection needs aid in achieving the objective of more efficiently employing the resources of the Inspectorate through pro-active management and planning. Furthermore, the various types of inspections performed by the Inspectorate will be prioritised and the most important inspections (the inspections involving the most risk if ignored) will be emphasised. A simple information system will also be designed in MS Excel to facilitate the recording and analysis of the necessary Inspectorate data.

To achieve the objectives of providing better service to customers of the Tshwane SPCA that interact with Reception and to allow the Reception personnel to have better control and be able to communicate better, the Reception processes will be improved. The feasibility of integrating ASM into the Reception processes to facilitate the improvements will also be investigated. If the system is found to be infeasible w.r.t. the process improvements and other SPCA requirements, a new information system will be designed to facilitate the improvements.

Recommendations for solving the holding kennel congestion problem will be made by developing a simulation model based on historical data of the kennel system and defining various changes to the system. The effects of these changes on the holding kennels and the system as a whole will be examined and the most beneficial changes will be suggested in order to achieve the objectives of reducing the holding kennel congestion and of allowing the SPCA to help more animals.

A sample proposal to a corporate sponsor (using the techniques of capital budgeting based on estimations and based on the principles of cause-related marketing) will be developed to achieve the objective of developing a means for the SPCA to acquire a sponsor to enter into a mutually beneficial relationship with them. This solution will also achieve the objective of suggesting more desirable services to the public and utilizing the available assets more effectively. These high-level solution designs will now be discussed in more detail.

4.1 Inspectorate Planning, Control & Resource Deployment Improvement

To enable the Inspectorate to plan better and eliminate unnecessary expenditure of resources on low-priority inspections, the different types of inspections must first be prioritised according to the risk of not attending to them. This way, some inspections may be eliminated completely and high-priority inspections attended to first. To prioritise the inspections according to risk, the probability that an inspection demand will arise along with the importance of that inspection (which can directly be translated as the weight of the impact of not attending to the inspection) will have to be determined. As previously mentioned, the probability that a demand for an inspection will occur can be determined from historical data. The consequence of not attending to the inspection will be assigned a weight using the AHP method. The risk can then be determined from a qualitative risk assessment using a 3x3 risk matrix. Inspections involving low risks can possibly be eliminated, depending on the consequence or impact of the elimination. The inspections can be prioritised according to the risks involved so that the Inspectorate can plan more effectively and the inspectors deployed more efficiently.

For further improvements in planning, control and resource deployment, a hotspot analysis can be performed based on historical data of inspection occurrences of certain types. The proportion or number of inspection occurrences in Tshwane suburbs over a long period of time (but not too long to become irrelevant) can be assigned as attributes of the polygons (representing the suburbs) in ArcGIS and the concentration of the occurrences can be indicated with different colours on the map. This will provide the Inspectorate with a powerful visual representation of the "hotspots" for certain types of inspections so that they may question it and deploy their resources accordingly.

To enable the controller to assign aggregate areas to inspectors that distribute the workload more efficiently, historical data on the proportion of the different types of inspections in each suburb must be analysed. This way, suburbs can be assigned to inspectors and the Inspectorate can view how much of the inspections of each type will occur within the total area containing the assigned suburbs. Each inspector can then be allocated to an aggregate area containing the same amount of pre-adoption inspections, emergency needs etc. as the areas of the other inspectors.

To enable such an allocation and to ensure the sustainability of the hotspot analysis, data must be recorded and analysed more effectively and on a regular basis. A simple MS Excel system will be developed to enable the Inspectorate to record the data they require as well as the data of inspection occurrences per suburb. Such a system must also enable the Inspectorate to allocate its inspectors to various suburbs and the system must respond by displaying the proportion of the total of each type of

inspection that will (approximately) occur within the area. The system must allow the Inspectorate to simply enter the data quickly after the completion of an inspection and then automatically perform calculations to be shown in reports and graphs at the end of each month. Obviously such a system will have to be accompanied by a simple user manual.

4.2 Reception Process Improvement

A full re-engineering of the Reception processes will not be done, but these processes will be improved using the **Plan** phase of Deming's PDSA cycle instead – where process improvements are planned and recommended. Before this method can be applied, however, the current standardised best practice processes must first be understood, defined and formally documented using flowcharts. BPMN 1.1 will be used to document the current processes since this notation is easy to understand, clearly indicates interactions within departments as well as with external parties and because software to map processes in this manner is easily attainable (such as Microsoft Visio and the open source package, Bizagi). The qualitative Questioning Technique will then be used to scrutinise the process and suggest alternatives, continually keeping Lean principles in mind so that wasteful actions are minimized and mainly value-adding operations remain.

Assuming that the recommended process improvements will suggest the integration of an information system into several of the process steps, the recommendations of this nature can be translated into functional requirements for an information system, expressed in the form of use cases. The roles defined in the swim lanes of the flowcharts will resemble only some of the actors interacting with the use cases, since not all of these actors will have responsibilities in the process **execution**, sometimes only in the process **initiation**. The recommendations can also be elaborated to create the use case narratives that are to accompany each use case.

Once the requirements have been defined, the existing candidate system called ASM must be evaluated in terms of its operational, technical, economic and schedule feasibility. An additional feasibility category to be considered is support feasibility, since a system that cannot be supported in the long run is not sustainable and will become obsolete or start impairing business operations. If the system proves to conform to management's feasibility criteria of a minimum of 70% total feasibility, the system can be integrated into the improved business processes – the **Planned** improvements can be formally documented using flowcharts (jumping directly to the **Act** phase, since it will not be possible to conduct a planned experiment for the **Do** phase or to **Study** the results).

If it is found that ASM is not feasible, the blueprint of an information system that absolutely meets the requirements of the process improvements can be designed in the form of an ERD (since the

functional requirements, to which both ASM and a new customised system should adhere, have already been developed in the form of use cases). The entities, relationships and entity attributes can be developed from the use cases as well as the forms used by Reception to store and communicate information. Because this ERD is a data model that uses standardised notation, a more experienced designer will be able to create the database that is specifically tailored to the Tshwane SPCA Reception processes.

4.3 Reduced Congestion at Holding Kennels

Since the solution to accommodating more arriving animals in the holding kennels before they can be examined does not lie with the holding kennels themselves, the entire kennel system and its dependency on other departments must be studied to find a solution. The kennel system will thus be represented by a computer simulation model using the powerful simulation software, Arena, for the following reasons:

- The system is dynamic and relatively complex.
- A simulation model can accurately represent the variability and interaction within the system.
- Changes to the model can easily be made to examine the effects such changes will have on the real-world system.

The simulation model and suggested system changes will be developed by first defining the processes occurring within the kennel system in Arena. In conjunction with modelling the process in Arena, the most recent historical data (as well as estimates from staff where necessary) of animals entering and exiting the kennel system will be analysed and used to specify the process rules and conditions in Arena so that the process can be simulated or executed to represent the actual operation of the kennel system over time. Even though the model must continuously be verified and validated, several statistics and KPI's must also be defined so that the output of the model can be compared to the actual historical data in order to validate the final model. When the model accurately represents the system, several changes can be made to it and the effects of these changes on the KPI's can be examined. The most beneficial system changes may then be used as an improvement recommendation. Figure 11 below illustrates the development of the simulation model and possible system changes. Such a simulation will achieve the objective of developing a means to create solutions to accommodate more animals and prevent holding kennels from overflowing.

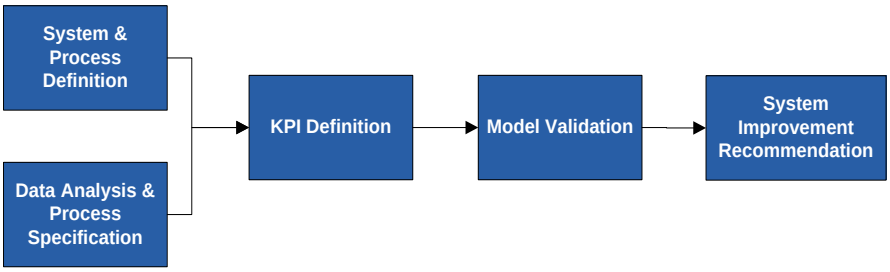

Figure 11 - Development of the kennel system simulation model and change recommendations.

4.4 Corporate Social Investment Proposal

The Tshwane SPCA in itself does not have sufficient funds to invest in new profitable projects that could sustain them on a long-term basis – they still need investors. As previously discussed, investors will not take interest in a project if they have no evidence of the possible benefits and returns. It is thus necessary to approach sponsors and investors with the items on the cause-related marketing checklists. The basis of the proposal must be a capital budget based on estimates or forecasts of the potential sales or service revenue so that investors can see not only the qualitative benefits of investing in the Tshwane SPCA, but also the monetary returns. The proposal must describe how both the SPCA and the corporate sponsor or partner will benefit from the project.

The Tshwane SPCA can "sell" their core services or the use of their assets to corporate sponsors. The assets that they currently possess can be altered or improved to offer desirable services to the public such as using the pool for hydrotherapy for animals, using the available land for a picnic/dog walk area, using the puppies for a petting feature etc. A sample proposal will be compiled. This proposal will "sell" one of the SPCA's assets or services to a company and will describe the qualitative and quantitative advantages of investing in the Tshwane SPCA in the form of financial returns (the NPV of the project) and additional benefits for the SPCA as well as the company. Other inclusions in the proposal will then be what is required according to the concepts of cause-related marketing such as testimonials from previous sponsors, the demographics of the SPCA etc. The proposal will only be a sample to demonstrate the possibilities since each project will be different. This would achieve the objective of helping the Tshwane SPCA to get companies to invest in them and of offering the public more desirable services to increase their income and will also be a step closer to becoming a self-sustaining NPO.

5 Problem Solving & Results

Now that the solutions to the various problems have been conceptualised, they can be developed in detail to achieve the objectives of this project.

5.1 Inspectorate Planning, Control & Resource Deployment Improvement

5.1.1 Risk Assessment

To perform the qualitative risk assessment, the various types of inspections must first be defined. The Inspectorate classifies its inspections using descriptions. Several of these descriptions, however, are similar and the number of classifications can thus be reduced to ten main types of inspections. To determine the probability that an inspection of a certain type will need to be performed, historical data from August 2009 to August 2011 was analysed and the probabilities were calculated as the total number of inspections of a type divided by the sample size (the total number of inspections for the period). This calculation is shown in Table 3 below.

Inspection Type	Total Number of Inspections	Probability of Accepting Case	Cumulative Frequency (%)
PLANNED	1556	0.3880	38.80
ANIMAL CRUELTY	1483	0.3698	75.79
OWNER/NEIGHBOUR ISSUES	222	0.0554	81.32
ANIMALS ABANDONED	209	0.0521	86.53
EMERGENCY RESCUE	175	0.0436	90.90
ANIMAL REMOVAL REQUEST	113	0.0282	93.72
PICK-UPS ON ROUTE	92	0.0229	96.01
PRO-ACTIVE	76	0.0190	97.91
INSTITUTIONAL CRUELTY	75	0.0187	99.78
BREEDING/SELLING	9	0.0022	100.00
GRAND TOTAL	**4010**	1.00	

Table 3 - The probability that an inspection will be completed calculated using the total number of inspections of each type completed from August 2009 to August 2011.

The cumulative probability or frequency of inspection completions adhere to the Pareto principle – defined as the "observation that where a large number of factors or agents contribute to a result, the majority (about 80 percent) of the result is due to the contributions of a minority (about 20 percent) of

factors or agents" (Business Dictionary n.d.) - since only 20% of the inspection types account for about 80% of the total inspections completed, as shown in Figure 12 below. This further enforces the prediction that inspections of certain types may have to be denied attention in order to focus on high-priority inspections.

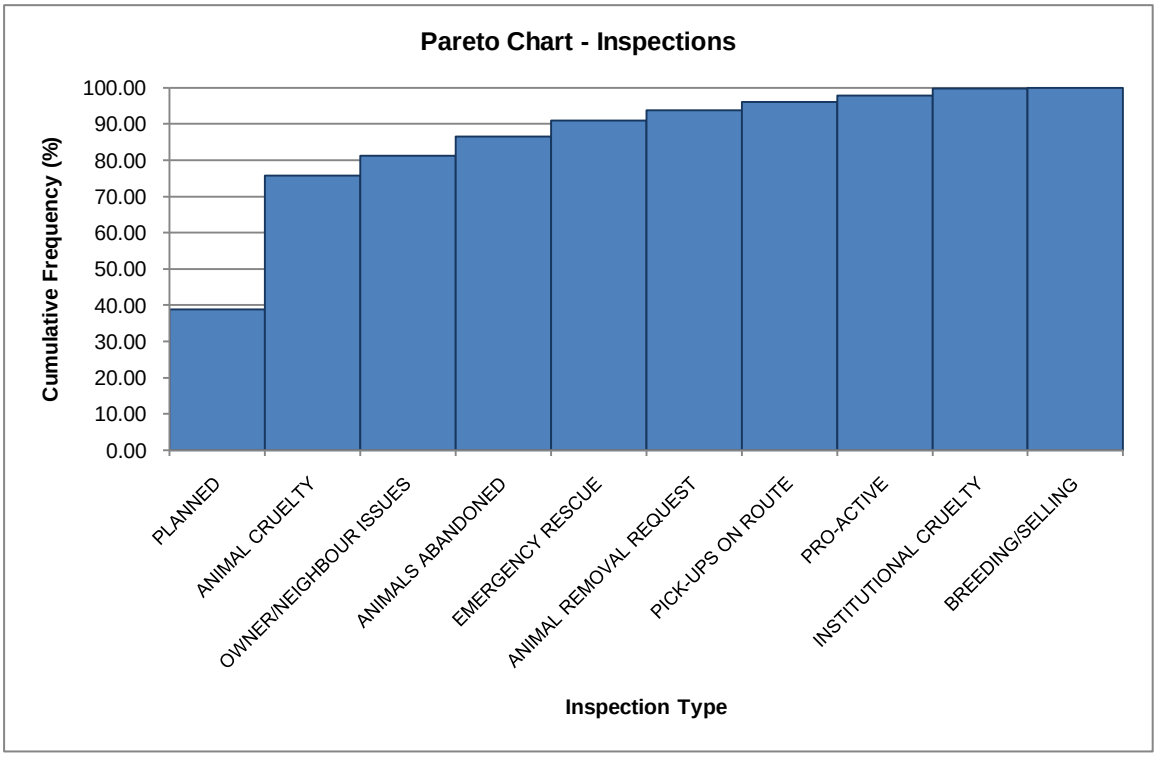

Figure 12 - Pareto chart for inspections.

Now that the probability that an inspection of a certain type will be attended to has been calculated, the importance of inspections must be determined. This was done using the AHP which assigns weights of importance to each type of inspection. The top level of the hierarchy consists of the main objective of the Inspectorate, which is to successfully and sustainably protect animals. At the second level criteria that must be met to achieve this main objective can be found including whether or not and the extent to which animal health and welfare is protected, income is generated for the SPCA, the public has a good image of the SPCA and sustainability is achieved in the form of education, empowerment, long-term benefits for the public and SPCA etc. The criteria are judged i.t.o. how well they contribute to achieving the main objective. And at the third and final level the alternative inspection types can be found - they must be judged according to how well attending to them meets the criteria of the second level. The main objective and criteria are displayed graphically in Figure 13.

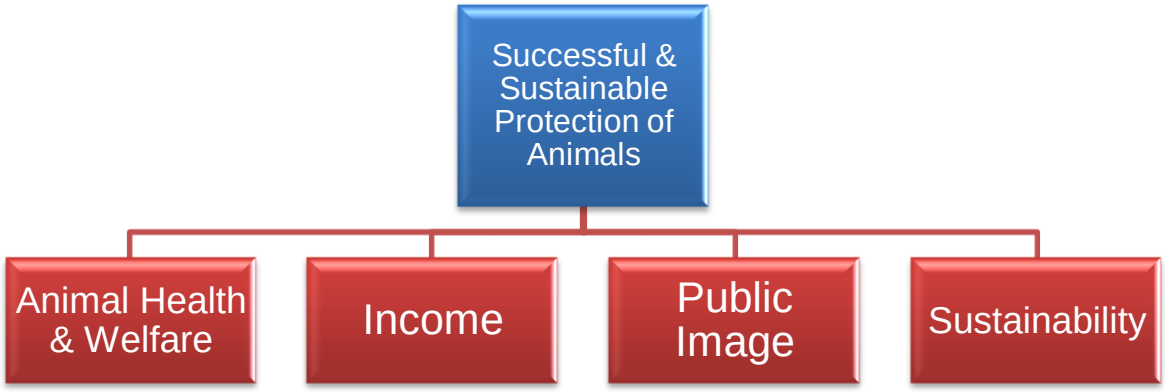

Figure 13 - Hierarchy showing the main objective of the Inspectorate and the criteria to be met in order to satisfy the objective.

The weight of each criterion was determined by performing pairwise comparison using the judgement scale suggested by Basson et al (2010). The pairwise comparison matrix and the intermediate matrix manipulating the ratings are shown in Tables 33-34 (Appendix C) and the final weights of the criteria are shown in Table 4 below.

Criteria	Average Weight
Animal Health & Welfare	0.5052
Income	0.3014
Public Image/Customer Service	0.0530
Sustainability/Empowerment/Promotion	0.1404

Table 4 - The weights of the criteria to be met to achieve the successful and sustainable protection of animals.

The alternative inspection types were compared in pairs w.r.t. how well performing a type of inspection meets each criterion compared to how well another type of inspection does. These pairwise comparison and intermediate matrixes are also shown in Appendix C (Tables 34-42). The final weights of the inspection types were calculated as shown in Table 43 (Appendix C) and displayed in Table 5 below.

Inspection Type	Final Weight
PLANNED	0.15
ANIMAL CRUELTY	0.10
OWNER/NEIGHBOUR ISSUES	0.02
ANIMALS ABANDONED	0.10
EMERGENCY RESCUE	0.17
ANIMAL REMOVAL REQUEST	0.07
PICK-UPS ON ROUTE	0.07
PRO-ACTIVE	0.09
INSTITUTIONAL CRUELTY	0.16
BREEDING/SELLING	0.07

Table 5 - The final weight of importance per inspection type.

These weights represent how well performing an inspection of a certain type contributes to achieving the ultimate objective of the Inspectorate. Not performing an inspection of a certain type will thus have an impact that carries a weight equal to the importance of the inspection type.

Now that the probability that an inspection type will be performed and the consequence of not performing an inspection type have been determined, the qualitative risk assessment can commence. Even though the probabilities are actual values calculated from historical data, they must be compared with consequences that have been weighted based on qualitative factors. It is thus necessary to translate the probabilities and consequences into intensity categories of high, medium and low. The intensity scales are defined in Table 6 below, relative to the maximum and minimum values the probabilities and weights of consequences can reach in this situation.

Probability of Attending to Inspection Type		Consequence (C) of Eliminating Inspection Types	
High	$0.26 < P \leq 0.39$	**High**	$0.12 < C \leq 0.18$
Medium	$0.13 < P \leq 0.26$	**Medium**	$0.06 < C \leq 0.12$
Low	$0 < P \leq 0.13$	**Low**	$0 < C \leq 0.06$

Table 6 - Definition of an intensity scale for probability of having to complete and consequence of not completing certain inspection types.

The 3x3 risk matrix suggested by Basson et al (2010) was used to determine the risks involved in eliminating each inspection type. The intensity of the risks are indicated in Table 7 below. Also indicated in this table is whether the full demand of the inspection type is satisfied. This information should also be taken into account because the Inspectorate does not have any records of the number of requests for inspection **received** (the demand), but only the number of inspection requests **accepted**. The probability of inspection types whose demands are not 100% satisfied will thus be inaccurate since the probability that a need for such an inspection will arise will be higher than the probability of

actually satisfying the need. For these types of inspections, more consideration must thus be given to the consequence than the risk.

Inspection Type	Consequence	Consequence Intensity	Probability	Probability Intensity	Satisfies Demand 100%?	Risk
EMERGENCY RESCUE	0.1725	H	0.0436	L	Yes	M
INSTITUTIONAL CRUELTY	0.1645	H	0.0187	L	Yes	M
PLANNED	0.1480	H	0.3880	H	Yes	H
ANIMALS ABANDONED	0.1012	M	0.0521	L	Yes	L
ANIMAL CRUELTY	0.0972	M	0.3698	H	Yes	H
PRO-ACTIVE	0.0908	M	0.0190	L	No	L
BREEDING/SELLING	0.0691	M	0.0022	L	No	L
ANIMAL REMOVAL REQUEST	0.0689	M	0.0282	L	No	L
PICK-UPS ON ROUTE	0.0682	M	0.0229	L	No	L
OWNER/NEIGHBOUR ISSUES	0.0195	L	0.0554	L	No	L

Table 7 - Risks involved in eliminating inspection types from the Inspectorate priorities.

From the risk assessment it may be concluded that there are several inspection types involving low risk. Inspections with low risks involved in not taking them into account during planning and resource allocation, can now be eliminated as priorities for the Inspectorate because they are either responded to very infrequently or minor consequences will result from not being able to respond to them. However, since several of the inspections involving low risk do not satisfy demand 100%, the probability may be inaccurate (these inspections may actually have to occur more frequently) and the consequence must be given greater consideration.

Thus, for the inspections involving low risk but not satisfying 100% of the demand, consequences of intensity higher than “low” will need to be planned for by means of contingency times since they may or may not involve greater risk than anticipated and can thus not be eliminated as priorities completely. These inspection types include pro-active inspections, breeding/selling inspections, animal removal requests and pick-ups on route. Inspections involving owner/neighbour issues, however, are the only inspections for which the demand cannot be fully satisfied but for which the consequence is still low. Even if the frequency of these inspections were to increase, the risk will still remain “low” (according to the risk matrix). This type of inspection should thus be eliminated from the list of priorities. Also, inspections involving abandoned animals cannot be eliminated from the list of priorities even if the probability is accurate because doing this will result in consequences of “medium” intensity, even if the risk is low.

The Inspectorate priorities can now be listed in order of importance. With owner/neighbour issues eliminated, the remaining inspections should be prioritised according to risk (firstly) and then consequence (secondly). This prioritisation is shown in Table 8 below. As previously mentioned, the inspections with uncertain probabilities involving anything higher than "low" risk must be planned for as well, (even if it is only in the form of an extra time allowance in the scheduling of planned inspections). The occurrence of these low-priority inspections must also be taken into account when allocating inspectors to areas based on the anticipated workload in that area. This means that 5.54% of inspections have been eliminated and a further 12.44% of inspections are of low-priority (this percentage may be higher since some of these inspection requirements were not recorded). The Inspectorate should thus **focus its planning and resource allocation on 82.02% of the inspections**.

Inspection Type	Risk	Consequence	Consequence Intensity	Probability	Probability Intensity	Satisfies Demand 100%? (Probability Accurate?)
1. PLANNED	H	0.1480	H	0.3880	H	Yes
2. ANIMAL CRUELTY	H	0.0972	M	0.3698	H	Yes
3. EMERGENCY RESCUE	M	0.1725	H	0.0436	L	Yes
4. INSTITUTIONAL CRUELTY	M	0.1645	H	0.0187	L	Yes
5. ANIMALS ABANDONED	L	0.1012	M	0.0521	L	Yes
6. PRO-ACTIVE	L	0.0908	M	0.0190	L	No
7. BREEDING/ SELLING	L	0.0691	M	0.0022	L	No
8. ANIMAL REMOVAL REQUEST	L	0.0689	M	0.0282	L	No
9. PICK-UPS ON ROUTE	L	0.0682	M	0.0229	L	No

Table 8- Inspectorate priorities in order of descending importance.

5.1.2 Data Recording & Analysis

From the previous section's prioritisation of inspections, it is suggested that the Inspectorate mainly plans for the high-priority inspections and allocates their resources to geographical areas accordingly. These inspections include:

1. Planned inspections
2. Animal cruelty inspections
3. Emergency rescues
4. Institutional cruelty inspections

Extra capacity allowances must also be provided for the low-priority inspections and this must also be taken into consideration when allocating inspectors to geographical areas. Thus, inspectors must be allocated so as to allow them to perform the anticipated high-priority inspections as anticipated, but the areas to which they are assigned must not contain anticipated high-priority inspections to the extent that no time will be available for the possible low-priority inspections that are anticipated to occur within that area.

The Inspectorate data from August 2009 to August 2011 was analysed and the number of occurrences of high-priority inspections were determined for each suburb. This data was used to perform the hotspot analysis in ArcGIS with the help of the Geo-informatics Department at the University of Pretoria. The three resulting maps are displayed in Figures 46-48 of Appendix D (institutional cruelty occurs very infrequently and a map is not included to display its hotspots). The maps display the suburbs in different colours, depending on the number of inspections that occurred in that suburb during the two years under study (as indicated by the map legends). Figure 45 displays the names of the suburbs under study because they are not included in the hotspot maps due to cluttering. These visual indications of the intensity of anticipated inspections can be a departure point for allocating inspectors to geographical areas containing several suburbs.

A simple Inspectorate Report information system was created in Excel to allow the Inspectorate to assign suburbs to its inspectors. The system then calculates the proportion of each type of inspection that is anticipated to be performed by each inspector based on the historical data of occurrences per suburb. The Inspectorate can then view whether the workload will be equally distributed between the various inspectors.

To ensure the data remains relevant and up to date, the system's historical data should be updated regularly by the user (using more recent data). The system allows the user to record the following monthly data in a fast and easy manner:

- An inspection defined by a unique number or other identifier (that can be chosen by the user)
- The date the inspection request was received
- The date the inspection was completed
- The suburb where the inspection was completed
- The type of inspection that was completed
- A description of the inspection
- The inspector who performed the inspection
- Whether the inspection was a follow-up or not

- What type of animal was handled during the inspection (if any)
- The number of animals handled during the inspection
- The reason for handling animal(s) (if any)

The system also generates a summary report on the monthly data, providing the Inspectorate with all the information it needs in summarised form, including graphs. The user cannot, however edit any information apart from recording the inspections and their details as well as the inspector allocations mentioned above (summary statistics and reports cannot be edited since they are updated automatically after entering new inspection data). The inspection details that can be edited include the suburbs, inspection descriptions and inspectors that can be chosen when recording an inspection. Since the user manual of the system (contained in Appendix E) instructs the user to continually use the newest version of a monthly report to create a new report, the updated information will be carried over and the historical data kept relevant. The CD-ROM attached to this document (in Appendix E) contains the Inspectorate Report system (under the filename of **"Inspectorate Report.xlsx"**).

5.2 Reception Process Improvement

5.2.1 Process Definition

To facilitate the Plan phase (PDSA cycle) of the Reception process improvement, the current standardised best practice processes must first be formally defined and documented. Reception has several main functions and various processes are executed under each function. The information system supporting the processes consists of paper forms that are completed, updated, transferred and filed. The main functions of Reception include the management of:

1. Animal Adoptions
2. Animal Boarding
3. Lost & Found Reports and Claims
4. Animal Admissions

The processes and forms used to perform the functions include the following:

1. Animal Adoptions

1.1 **Adoption Request**: Reception explains the adoption procedure to an interested customer and refers him to the relevant adoption kennels, depending on the type of animal he is interested in adopting.

Forms: None

1.2 **Adoption Application**: A customer that is interested in adopting a certain animal informs Reception that he would either like to temporarily reserve the animal until he can apply for

adoption or immediately apply for adoption so that Reception either temporarily reserves the animal or initiates the finalisation of the adoption application respectively.

Forms: Temporary Reservation Slip, Animal Admission Form

1.3 **Adoption Application Finalisation**: The customer fills in an adoption application and the animal is reserved on its kennel disk as well as on its Admission Form. Reception leaves the application "pending" until full payment and a letter of permission from the customer's lessor is received. The Inspectorate is then informed of the new adoption application so that the pre-adoption inspection can occur (the inspection necessary to determine whether the home is suitable for the animal).

Forms: Adoption Application Form, Animal Admission Form, Adoption List

1.4 **Adoption Finalisation**: The pre-adoption inspection is scheduled and performed by the Inspectorate, followed by a follow-up inspection if necessary. The application is then either approved or declined and Reception is informed. If the application is approved, Reception initiates the readying of the animal for adoption (schedules its vaccination, sterilisation and microchipping with Hospital) so that it can be collected by the customer. If the application is declined, however, Reception refunds the customer partially due to the inspection fees that were already incurred. The animal's Admission Form and Adoption Application are moved around between files that indicate the adoption status in order to keep track of it.

Forms: Adoption List, Adoption Application Form, Animal Admission Form, Microchip Form*****

*Microchip data is also stored on an Excel Spreadsheet

1.5 **Animal Release**: The customer comes to collect the animal and Reception initiates its release from the Kennels. The animal's Microchip File containing the adoption and clinic forms is stored in an archive cabinet.

Forms: Adoption Application Form, Animal Admission Form, Microchip Form

2. Animal Boarding

2.1 **Boarding Booking:** A customer requests to make a booking for the boarding of his animal at the SPCA and Reception documents the details of the booking. The Kennels then assign the boarding animals to kennels and upon realising that the kennels will be overbooked for a certain period, Reception informs the customer of the unfortunate cancellation and refers him to other establishments offering boarding facilities for animals.

Forms: Boarding Bookings List

2.2 Boarding Animal(s) Admission: The boarding animal is admitted only if the customer provides Reception with proof of the animal's vaccination (otherwise the animal's admission to the boarding kennels is denied). The customer pays for the boarding and receives a receipt, a Boarding Form captures the details of the boarding animal, the Kennels admit the animal to its allocated kennel and Reception documents that the animal has been admitted.

Forms: Boarding Bookings List, Boarding Form

2.3 Boarding Animal(s) Release: The customer claims his boarding animal with the receipt he received upon payment and Reception views the Boarding Form to see verify the details of the boarding and to check whether the customer has paid the full amount due. If the customer has not paid the animal cannot be released, otherwise, Reception initiates the release of the animal and documents that the animal has been released.

Forms: Boarding Bookings List, Boarding Form

3. Lost & Found Reports and Claims

3.1 Lost n Found Report & Reconciliation - Telephonic or E-mail: A customer reports (telephonically or by e-mail) that he has lost his pet that he has found a stray animal and would like the SPCA to help search find his pet or find the owner of the stray animal respectively. Lost n Found (an extension of Reception) then documents the details of the lost/found report on a Lost/Found form and searches other documented lost/found reports for a match. If a match is found, the relevant parties are informed and a follow-up communication is performed to establish the outcome of the reconciliation.

Forms: Lost/Found Form

3.2 Lost n Found Report & Reconciliation – In Person: If a customer comes to find his lost pet at the SPCA, Lost n Found refers him to the kennels where he can search for his animal. If the animal is in the stray kennels, the customer pays the pound fees for the animal's upkeep before the animal can be released to the customer. The customer must also formally claim his animal using a Claim Form. Otherwise, if a customer comes to have a stray he found admitted to the SPCA, Reception admits the animal and refers the customer to Lost n Found to relay the details of how the animal was found whereupon Lost n Found completes a Lost/Found Form for the animal.

Forms: Lost/Found Form, Claim Form*

The details of the claim are also captured on a computer

4. Animal Admissions

4.1 Animal Admission: A customer brings an animal to the SPCA to have it admitted and to transfer ownership of the animal to the SPCA. If the animal is a stray it is first scanned for the presence of a microchip so that the original owner can be contacted. Reception facilitates the completion of an Animal Admission Form by the customer and informs Kennels of the new admission so that the animal can be allocated to a kennel and placed in that kennel.

Forms: Animal Admission Form

The flow of these processes are defined in detail, using BPMN swimlane diagrams modelled in Bizagi (see the **"Reception Processes" folder** on the CD-ROM for these detailed processes). The forms used

by Reception, constituting its current information system, can be viewed in Figures 32-44 (Appendix B).

5.2.2 Process Improvements

Now that the processes have been clearly defined and documented, improvements can be suggested using the qualitative Questioning Technique – the Plan phase of the PDSA cycle where process improvements are planned and recommended. All steps in each process have been critically analysed and scrutinised in order to suggest possible improvements or alternative courses of action. However, the process steps that were deemed acceptable are not included in this recommendation for improvement since no alternatives will be suggested for them. Tables 9-12 below display the relevant steps of all processes that were analysed under each function along with the alternative courses of action in terms of **What** else could be done, **Why** it could be done in this alternative way, **Where** else it could be done, **When** else it could be done, **Who** else could do it and **How** else it could be done. The alternative courses of action are numbered with an "*A*" and a number that refers to the number of theprocess.

1. Animal Adoptions

1.1 Adoption Request

Current actions	What (brief description)	Why	Where	When	Who	How (with what?)
Request adoption	A customer arrives at Reception and states interest in adopting an animal.	• The animals up for adoption are located on the premises. • SPCA wants customers to see animals before applying for adoption.	Reception counter	Office hours (Weekdays 8:00-16:30 & Saturdays 8:00-12:00)	Customer	In person, verbally
	A1.1.1 A customer can view which animals are available for adoption while they are not on the premises.	• *It is more convenient for customers.* • *Customers can think thoroughly about their choice.* • *Customers may consider the SPCA more readily when thinking of a new pet.*	*Anywhere (from home, work, the SPCA etc.)*	*Anytime*	*Customer*	• *In person, verbally* • *E-mail* • *Website* • *Database*
Explain adoption policy/ procedure	Reception staff explains the procedure & rules of adopting an animal to an interested customer.	• Customers should know the rules and procedure before they can proceed to choosing an animal. • Customers do not notice and/or read the overhead sign displaying the procedure.	Reception counter	Office hours	Reception staff	• In person, verbally • Telephonically
	A1.1.2 Customers familiarize themselves with the adoption policies & procedures and/or the adoption policies are displayed more prominently and frequently.	• *Reception does not have to waste time with explanations.* • *Other customers are also reminded of the adoption option.*	*Reception counter, but can be viewed again at other locations or the premises or even off the*	*Office hours, with a lasting effect afterwards.*	*Reception staff participates or does nothing at all – customer views procedure.*	• *A simple flyer/brochure highlighting the important steps & rules of adoption can be handed out upon an adoption request* • *A video can be played in the background at Reception – since the*

			premises.			*details are established later when formally applying for adoption.*
	A1.1.3 The adoption policies & procedure can be viewed by the customer before visiting the SPCA premises.	• *Customers not willing to adhere to the requirements need not come all the way to the SPCA premises to find out.*	*Anywhere*	*Anytime*	*Customer reads the policies when interested in adoption.*	• *The adoption procedure can be displayed on the website.*
Refer to cat kennels or Refer to kennels D,E & F & puppy kennels	Depending on the customer's interest, Reception refers them to the cat or dog adoption kennels	• The cat kennels and puppy kennels are at different places from the dog kennels and are quite far away and perhaps a bit hidden. • Most customers are specifically looking for either a puppy, a dog or a cat.	Reception counter	Office hours, in response to a customer's animal specification.	Reception staff.	In person, verbally
	A1.1.4 If customer's interest is more specific (breed, colour, behaviour etc.), refer customer to specific kennels that contain animals matching their requirements.	• *This enhances customer service.* • *Customers will not miss a possible match to their needs because they know beforehand whether an animal that meets their requirements is up for adoption or not.*	*Reception counter*	*Office hours, in response to a customer's animal specification*	*Reception staff*	• *Computer* • *Database of animals kept in specific kennels (checking a database of adoptable animals for a match).*
Inform customer to memorize kennel numbers of desired animals	Reception tells an interested customer to take note of the kennel numbers of the kennels that contain the animals they would consider	• The customer must return to Reception and mention the kennel number so that the animal's admission form can be drawn and used to explain its history & behaviour & be at the ready when the customer	Reception counter	Office hours	Reception staff	• In person, verbally

	for adoption.	wants to apply to adopt it.				
	A1.1.5 Allow customers to recognize the animals they saw in the kennels using pictures in case they did not take note of, forgot or confused the kennel numbers.	• *The wrong kennel files will not be drawn and there will be less risk of accidentally applying for the wrong animal.* • *The customers will not have to return to the kennels to confirm the kennel number.*	*Reception counter*	*Office hours*	*Reception staff*	• *Pictures of animals* • *Database of animals in specific kennels* • *Computer*

1.2. Adoption Application

Current actions	**What (brief description)**	**Why**	**Where**	**When**	**Who**	**How (with what?)**
Draw admission form of desired animal(s) from kennel file and Explain history & behaviour of animal(s)	The kennel file for the kennel block that contains the desired animal is drawn & the admission form of the animal in the kennel mentioned by the customer is drawn. The behaviour & origins of the animal is then explained.	• The admission form is the only record kept by Reception to link animals to the kennels in which they are kept. • The admission form contains information that the customer may want to be aware of such as the animal's behaviour and origins.	Reception counter	During office hours upon customer's display of interest in an animal in a certain kennel.	Reception staff	Manually, absorbing the information of the kennel number or animal description and drawing the animal's admission form from the kennel file of the kennel it is currently kept in.
	A1.2.1 Let customers find out about the behaviour of the desired animals themselves - the disks on animals' kennels can display the animal's behaviour & characteristics.	• *Reception will not have to explain the animal's behaviour anymore* • *Reception will not have to draw an admission form of an animal that will not be adopted once the customer hears about the animal's behaviour & origins.*	*Kennels*	*Upon seeing an animal he is interested in, the customer reads the information about it.*	*Customer*	• *The customer views the disc on the kennel of the animal he is interested in to determine the animal's behaviour* • *A detailed kennel disc*

		• *The customer can confirm his choice at the kennel and simply apply for adoption when he returns to Reception.*				
	A1.2.2 Search for the animal & its information on a database containing the animals assigned to the kennels.	• *Reception will not have to work with the bulky files so much.* • *More rapid access to the animal's information will be possible.* • *More information on the animal that may be stored in other files could also be visible immediately if linked to that animal.*	*Reception counter*	*Upon mentioning the kennel nr of desired animal*	*Reception staff*	• *Use the kennel nr to search for the animal's information* • *Animal Database* • *Computer*
Add temporary reserve slip to animal admission form in kennel file	If a customer would like to apply for adoption, but not immediately, a "temporarily reserved" slip is filled in and added to the animal's admission form in the kennel file.	• When another customer would like to adopt the same animal in the meantime, it can be seen that someone else is interested in it but has not applied to adopt it yet. • This can prevent allowing someone to adopt an animal that is temporarily being kept for another customer.	Reception counter – kennel file	Upon confirming that a customer is interested in adopting the animal at a later stage.	Reception staff	• "Temporarily reserved" slip • Manually filled in
	A1.2.3 Indicate on a database that an animal is temporarily reserved	• *Less paperwork*	*Reception counter*	Upon confirming that a customer is interested in adopting the	*Reception staff*	• *Computer* • *Animal database*

				animal at a later stage.		
Contact customer who reserved	When another customer is interested in a temporarily reserved animal, Reception contacts original customer to find out if he still wants the animal.	• It is ensured that the original customer truly wants the animal so that another customer's opportunity to own the animal is not unnecessarily sacrificed.	Reception counter	Upon realizing that the desired animal is already temporarily reserved	Reception staff	• The original customer is telephoned.
	A1.2.4 Regularly remind customers of their temporary reservation of an animal and make customers aware that the animal will not be reserved for them if they have not responded after a certain period of time.	• *Original customers do not have to be contacted – a customer will immediately be informed that an animal is temporarily reserved and cannot be adopted.* • *An animal is not reserved for someone who made an empty promise.*	Reception counter	*At regular intervals after temporary reservation.*	Reception staff	• *Telephonically remind customers of their reservations or via e-mail.*
Apologize to new customer	The new customer is apologized to when his desired animal is temporarily reserved by the original customer who still wants the animal.	• The customer could not apply to adopt the animal he wanted.	Reception counter	Upon establishing that the original customer still wants to apply to adopt the animal.	Reception staff	• Apologize to the customer verbally in person.
	A1.2.5 Suggest alternative or similar animals to the customer who could not get the animal he wanted.	• *The customer may still be satisfied.* • *Another animal may still be adopted.*	*Reception counter*	*Upon establishing that the original customer still wants to apply to adopt the animal.*	*Reception staff*	• *Look up similar animals to the one requested in the files or on a database or recall them from memory and refer the customer to their*

						kennels.
	A1.2.6 Take the customer's details and the details of the animal they desired to contact them when a similar animal does become available for adoption.	• *The customer may still be satisfied.* • *Another animal may still be adopted at a later stage.* • *A good relationship with the customer is formed.*	*Reception counter*	*Upon establishing that the original customer still wants to apply to adopt the animal.*	*Reception staff*	• *Write the customer's details on paper (in a book or another form) and keep it in an obvious place for visibility* • *Or add the details to a database that can match the request with an animal that becomes eligible for adoption.*

1.3. Adoption Application Finalisation

Current actions	**What (brief description)**	**Why**	**Where**	**When**	**Who**	**How (with what?)**
Provide adopter with adoption application form	Reception provides the customer with an adoption application form	• The customer has seen an animal and decided to apply to adopt it immediately	Reception counter	After the customer has seen an animal he would like to adopt and confirmed that he would like to adopt immediately	Reception staff	• A paper form is handed to the customer manually
	A1.3.1 The customer can access an adoption application form and fill it in beforehand	• *This speeds up the process & makes the owner think if adopting an animal is suitable for him before he attempts it.*	*Customer location (anywhere)*	*After a customer has seen an animal he would like to adopt or if a customer knows he will*	*Customer*	• *The application form can be accessed from the website, completed & printed out* • *An online database containing animals up for adoption can help, even if it is compulsory*

				adopt.		*for owners to first see an animal in person before applying to adopt it.*
Make copy of adoption application And File adoption application copy in Inspectorate file And Write the new adoption in the adoption list in Inspectorate file	A copy is made of the adoption application completed by the customer & this is filed in the file viewed by the Inspectorate so they can perform the pre-adoption inspection. The new adoption is also listed in this file.	• The Inspectorate uses a copy of the adoption application to view the details of the customer and his application – this serves as background knowledge to the pre-adoption inspection • The application is listed to serve as a quick reference for Reception and the Inspectorate w.r.t. the status of an adoption application	Reception counter	When the payment and permission from lessor has been received	Reception staff	• The copy is made and inserted into the file manually using a photocopier • The entry is written manually in the list in the file
	A1.3.2 Have a central system where new adoption applications can be logged by Reception and viewed by the Inspecorate	• *Less data has to be duplicated* • *A file does not have to move around continuously between the two departments*	*Reception counter*	*When the payment and permission from lessor has been received*	*Reception staff*	• *A new application is logged by Reception on a database and viewed by the Inspectorate* • *Electronic alerts concerning the status of an application can also be sent between the two departments*
Attach animal admission form to adoption application	The admission form of the animal that is being adopted is removed from the kennel file of the kennel that contains the animal and attached to the	• This is done to reserve the animal at Reception and to relate the application to a specific animal	Reception counter	After the application has been logged and sent to the Inspectorate.	Reception staff	• The admission form is stapled to the application

	application					
	A1.3.3 Link a specific animal to an adoption application on a database without moving the admission form around	• *The admission form is kept in one place just for a record* • *All relevant information can be linked to an adoption*	*Reception counter*	*After the application has been logged and sent to the Inspectorate*	*Reception staff*	• *Electronic database*
Move adoption application to pending file And Move adoption application to cancellation file	A pending or cancelled adoption application is moved to the "pending" or "cancelled" application files respectively.	• These applications must be distinguished from the ones that have not been cancelled and the ones that are not held back by a lack of payment or a lack of permission from a lessor.	Reception counter	When an application is cancelled or when full payment and/or a letter of permission is not received immediately	Reception staff	• Application manually moved from adoption file or from counter and placed in relevant file
	A1.3.4 Indicate the status of an application on an electronic database	• *Forms do not have to be moved around and may be simplified or eliminated*	*Reception counter*	*When an application is cancelled or when full payment and/or a letter of permission is not received immediately*	*Reception staff*	• *Computer* • *Electronic database*
Update adoption application payment details	The payment and receipt details of the adoption application is filled in on the application form	• Record of the customer's payment must be kept and reference to the receipt issued to the customer must be made	Reception counter	When a customer has paid and a receipt has been issued	Reception staff	• The application is updated manually • The receipt is used to copy the receipt nr onto the applicaiton
	A1.3.5 Link a payment to a	• *The already completed form does not have to*	*Reception counter*	*When a customer has*	*Reception staff*	• *The payment details are completed electronically*

	specific adoption application or to the customer that paid for it or simply electronically update the adoption application	*be referred to (and in some cases drawn from a file) again and updated* • *The details of the payment does not have to be duplicated on the receipt because it is already linked to a specific customer or application*		*paid and a receipt has been issued*		*and the receipt nr can be generated automatically*
1.4.	**Adoption Finalisation**					
Current actions	**What (brief description)**	**Why**	**Where**	**When**	**Who**	**How (with what?)**
Telephonically inform Reception of application status And Update listed adoption application And Indicate application status on copy of adoption application	The status of the adoption application after the pre-adoption inspection is updated	• Reception must be informed of the adoption application status so that the adoption can be finalized if accepted	Inspectorate	After pre-adoption inspection	Inspectorate	• Manually, with a pen
	A1.4.1 Indicate the status of an application on an electronic database so that it can be viewed there by Reception. The database can have a list that summarizes the adoptions and their statuses so that Reception can have quick access without unnecessary information	• *Forms do not have to be moved around and may be simplified or eliminated* • *Reception may not have to update an application as well because it was done on a database that can be viewed by them too*	*Inspectorate*	*After pre-adoption inspection*	*Inspectorate*	• *Computer* • *Electronic database*
Update	Reception completes the	• The microchip	Reception	When an	Reception	• Using the

microchip data	details of the animal and its owner that is required for the microchip by filling in a form and an electronic record.	information must be given to the microchip company, Identipet, as well as to the owner • A copy of the microchip information must be kept by the SPCA • The microchip data must also be kept on an electronic database (MS Excel) to serve as a more secure record and for quick access	counter	animal has been microchipped	staff	electronic MS Excel database • The microchip form (as provided by Identipet) is filled in manually
	A1.4.2 The details of the adoptive animal and its new owner (which can be stored on an electronic database) can be used to create a microchip record	• *The microchip database can become redundant or the alternative database can simply communicate with it and export data to it* • *Data does not have to be duplicated*	*Reception counter*	*When an animal has been microchipped*	*Reception staff*	• *An electronic database* • *The microchip forms provided by the manufacturer must still be used and handed to the relevant parties*
Place microchip file in Hospital inbox	Reception transfers the microchip file to the Hospital inbox that serves as a "schedule" for animals to be readied for adoption	• The Hospital must be made aware of an animal that must be readied for adoption	Hospital	When an adoption has been approved	Reception staff	• Walking to the Hospital (short distance) • Manually placing file in inbox
	A1.4.3 Electronically communicate with the Hospital to schedule animals' adoption readying	• *Hospital is immediately aware of a new adoption and no files have to be transferred*	*Hospital*	*When an adoption has been approved*	*Reception staff*	• *Updating an adoption on an electronic database* • *Scheduling a*

						vaccination, sterilization and microchipping electronically
1.5.	**Animal Release**					
Current actions	**What (brief description)**	**Why**	**Where**	**When**	**Who**	**How (with what?)**
Transfer microchip file to adoptions cabinet by month	When an owner has picked up his animal for adoption, the animal's detailed microchip file is permanently stored in a cabinet according to the month of the adoption	• Record is kept of the adoption • The details of the adoption and everything it involved is stored out of the way of daily operations	Reception counter	After an owner has picked up his animal for adoption	Reception staff	• Manually filed in cabinet
	A1.5.1 Store the information on an electronic database	• *The cabinets may be removed if enough data can be stored electronically* • *Data for longer periods of time can be stored* • *Quicker access to data is possible*	*Reception counter*	*After an owner has picked up his animal for adoption*	*Reception staff*	• *Electronically, most of the information will already be attached to a certain animal or adoption* • *The files may, however, have to kept for a formal and more complete record*

Table 9 - Animal Adoptions process improvement recommendations.

2. Animal Boarding

2.1.	**Boarding Animal Booking**					
Current actions	**What (brief description)**	**Why**	**Where**	**When**	**Who**	**How (with what?)**
Request booking telephonica	A customer telephones/ sends an e-mail/ arrives at Reception to book a	• Customers must interact with the Reception staff to establish whether the	Reception counter/ customer	At the discretion of the	Customer	• Telephone • E-mail (computer) • In person, verbally

lly/ by e-mail/ in person	boarding kennel for his animal	booking will be possible • Customers want to secure their animal's care in advance.	location (anywhere)	customer.		
	A2.1.1 A customer makes the boarding booking himself using the website	• *No SPCA staff has to be involved to make the booking* • *Customers can make the bookings whenever and from wherever they choose*	*Customer location (anywhere)*	*At the discretion of the customer.*	*Customer*	• *Website (system that can be accessed from the website, containing all the bookings and saving new bookings)* • *Computer*
Assign boarding bookings to boarding kennels and Inform Reception of bookings to be cancelled	The boarding bookings are assigned to the available kennels for the relevant times and Reception is informed if there are any bookings that cannot be accommodated so that they can be cancelled & referred to other accommodations.	• The list of bookings by date must now be assigned to the available boarding kennels. • Owners that booked must be notified of the cancellation early enough to make other arrangements.	Kennel office	At regular intervals or after new bookings have been made	Kennel staff	• The boarding bookings by month are assigned to kennels in a book at the Kennel office.
	A2.1.2 Enable Reception to immediately see if there are kennels available for the requested boarding dates.	• *Kennels do not have to be involved in boarding bookings.* • *The SPCA does not have to cancel bookings & can immediately refer customers to other options.* • *No follow-up telephone call is required.*	*Reception counter*	*Immediately upon boarding request*	*Reception staff*	• *Reception can check the dates on an electronic booking system that takes dates & kennels into account.* • *The availability is checked while the customer is on the telephone and he can be informed immediately.*

2.2 Boarding Animal(s) Admission

Current actions	What (brief description)	Why	Where	When	Who	How (with what?)
State inability to admit animal	When the owner does not provide Reception with an up-to-date vaccination certificate for the animal, the SPCA cannot admit the animal	• The animal is refused due to health risks.	Reception counter	Immediately after a customer has failed to provide an up-to-date vaccination certificate.	Reception staff	• In person, verbally
	A2.2.1 Before the time the animal is due for boarding, the owner could be reminded that the animal must be accompanied by a vaccination certificate	• *The owner will have a reduced chance of arriving without the vaccination certificate and being denied admission of his animal.*	-	*A fixed period before boarding date.*	*Reception staff or a system*	• *Telephonically* • *Via e-mail* • *Using a booking system to automatically issue reminders.*
Provide owner with boarding form	Reception provides the customer with the boarding form that is to be filled in immediately by the customer	• In order to have a thorough record of the admitted boarding animal and its owner	Reception counter	After a customer has provided a valid vaccination certificate	Reception staff	• The boarding form is handed over manually
	A2.2.2 The boarding form could be accessed by the customer immediately after a booking has been made and completed beforehand.	• *To save time when the animal is admitted, since these owners are usually in a hurry.*	*Customer location (anywhere)*	*After boarding booking has been made.*	*Customer*	• *The boarding form must be available on the website, printed out and completed.*
Check which kennel animal has been assigned to	The Kennels check their books to determine to which kennel the animal has been assigned and indicates this	• The boarding form was inexistent before the physical arrival of the owner on the day of	Kennel office & Reception counter	After payment has been received and	Kennel staff	• The boarding book is consulted as well as the

and Obtain relevant boarding form from Reception and Indicate assigned kennel on boarding form	on the newly completed boarding form kept at Reception.	admission. • The Kennels are the only staff that know which boarders have been assigned to which kennels. • Reception must keep the boarding form because the owners will return there when they claim their animals after the boarding period is over.		the boarding form has been finalized		completed boarding form which is then updated in terms of the kennel.
and Return boarding form to Reception	*A2.2.3 Enable Reception to assign boarding animals to kennels upon booking and to indicate the assigned kennel on the boarding form.*	• *Kennels do not have to be involved in boarding bookings or assigning boarding animals to the right kennels.* • *The boarding form does not have to move around*	*Reception counter*	*After payment has been received and the boarding form has been finalized*	*Reception staff*	• *Reception can consult the electronic assignment of animals to boarding kennels & use it to modify the completed boarding form in terms of kennels details.*
Write & provide customer with receipt	Reception writes the payment details on a receipt & issues a copy to the customer.	• The customer & the SPCA must have a proof of payment • There is no electronic way to issue a receipt	Reception counter	After payment for the boarding has been received	Reception staff	• The receipt is filled in manually on paper and handed to the customer
	A2.2.4 A receipt could be filled out electronically and printed out for the customer	• *It creates a better impression for*	*Reception counter*	*After payment for the boarding*	*Reception staff*	• *The receipt is completed on a*

	(in which case a payment can also be linked to a certain customer and his history)	*customers* • *Legibility is increased* • *A more organized record can be kept of payments* • *Visibility is increased when payments are linked to specific customers*		*has been received*		*computer* • *A printer is used to print out the receipt*
Update boarding booking (full/outstanding payment) And Update boarding form (full/ outstanding payment)	Both the boarding booking and the boarding form are updated w.r.t. payment details	• These forms are viewed independently with the bookings as a quick reference and the boarding form filed as a record and only looked at when certain details are required.	Reception counter	After payment has been received and the receipt has been issued	Reception staff	• The two forms are updated manually on paper.
	A2.2.5 Have only a single record of a booking & its payment details viewed by Reception & keep the boarding form as a record edited only by the customer	• *Reception does not have to update two forms continuously*	*Reception counter*	*After payment has been received and the receipt has been issued*	*Reception staff*	• *A more comprehensive form for a booking that is updated continuously* • *Or an electronic booking on a database that contains all the necessary information on a booking.*
	A2.2.6 Enable the Kennels to handle payments for boarding as well (and update the booking accordingly) and to	• *The entire boarding function can be assigned to the Kennels*	*Kennel office*	*After payment has been received and*		• *A more comprehensive form for a booking that is*

	handle all boarding activities	• *The Kennels are more familiar with the kennels and their occupancy & would do well in handling bookings and payments*		*the receipt has been issued*		*updated continuously* • *Or an electronic booking on a database that contains all the necessary information on a booking*

2.3 Boarding Animal(s) Release						
Current actions	**What (brief description)**	**Why**	**Where**	**When**	**Who**	**How (with what?)**
Check adoption kennel files for animal And Check adoption files for animal	If an owner was very late in picking up his animal, Reception must check whether the animal has been transferred to adoption yet or whether it has actually been adopted yet	• The SPCA can only keep a boarding animal (whose owner was late in picking it up) in the boarding kennels for a limited time after which it must be transferred to adoption.	Reception counter	When an owner requests to pick up his boarding animal more than a month after the due date	Reception staff	• Manually searching the files
	A2.3.1 Keep a record of a boarding animal (that belongs to a specific owner) where all its movements throughout the facility as well as in and out of the facility can be tracked	• *Only a single form or file containing all the relevant information about the animal can be viewed when necessary.*	*Reception counter*	*When an owner requests to pick up his boarding animal more than a month after the due date*	*Reception staff*	• *Electronic form of an animal that can be updated*

Table 10 - Animal Adoptions process improvement recommendations.

3. Lost & Found Reports and Claims

3.1 Lost n Found Report & Reconciliation - Telephonic or E-mail						
Current action	**What (brief description)**	**Why**	**Where**	**When**	**Who**	**How (with what?)**
Complete lost n found form	The details of the lost or found animal	• Detailed records are	Lost n Found	In response to a person	Lost n Found	• The form is filled in manually and compared

And Search other lost/found forms for match	is written on a form and then compared with other lost and found animals to find a match	used to increase the chances of reuniting a lost animal with its owner		reporting a lost or found animal	staff	with other forms by searching the Lost and Found files
	A3.1.1 Keep electronic records of the lost and found animals and make use of the database to match lost animals to found animals	• *This is faster and easier* • *It reduces the chances of missing a possible match*	*Lost n Found*	*In response to a person reporting a lost or found animal*	*Lost n Found staff*	• *The details of the lost and found animals are captured on a database* • *The database is used to make connections between lost and found animals.*
Inform relevant claimants of match	The person who found the animal (if it was not brought to the SPCA) as well as the person who claimed to have lost the animal are notified about the match	• The animal must be reunited with its owner	Lost n Found	When a match to a claim for a lost animal has been found	Lost n Found staff	• The relevant persons are informed telephonically
	A3.1.2 Take special care in contacting the owner who lost the animal and inform them to notify the SPCA when they have been reunited with their animal	• *This can eliminate the follow-up function* • *It will be of great importance to the owner who lost the animal to get it back*	Lost n Found	When a match to a claim for a lost animal has been found	Lost n Found staff	• *Inform the owner telephonically and place emphasis on notifying the SPCA*
3.2	**Lost n Found Report & Reconciliation – In Person**					

Current actions	What (brief description)	Why	Where	When	Who	How (with what?)
Receive completed claim form	An owner who found his lost animal at the SPCA must fill in a formal claim to retrieve it	• This serves as a record of claimed animals and by whom they were claimed in case a follow-up is required	Lost n Found	When an owner has found his lost animal at the SPCA	Lost n Found staff	• The owner completes the claim form manually and hands it to the Lost n Found staff
	A3.2.1 The details of the claim can be stored on an electronic database	• *A claim can be linked to a lost form so that data is not duplicated*	*Lost n Found*	*When an owner has found his lost animal at the SPCA*	*Lost n Found staff*	• *The owner still completes the claim form manually the necessary data is linked to a lost animal on the database*
View animal's admission form to calculate pound fees	The Lost n Found staff establishes from the admission form how long the SPCA kept the animal and charges the owner accordingly	• The date of admission on the admission form will indicate for how many days of SCPA care the owner will be charged	Lost n Found	When an owner has found his lost animal at the SPCA	Lost n Found staff	• A calculator can be used • The admission form is viewed • Manual operation
	A3.2.2 Search an electronic database for the lost animal and let it calculate the pound fees	• *Mistakes are less likely* • *It is a more rapid process* • *A copy of the admission form does not have to made and kept by Lost n Found*	*Lost n Found*	*When an owner has found his lost animal at the SPCA*	*Lost n Found staff*	• *Electronic database with lost and stray animal information* • *Manual searching of the database* • *Automatic calculation of the pound fees*
Prompt kennels to release animal	Lost n Found must inform Kennels that the animal is to be released and	• Kennels work with the assignment of animals to kennels and also aid in	Lost n Found	When an owner has paid the pound fees for his animal that was lost and kept at the SPCA	Lost n Found staff	• Look for the Kennel staff and inform them in person or ask Reception to announce that they

	reunited with its owner so that Kennels can help with the release and/or update the kennel assignments of animals	handling animals				are needed
	A3.2.3 Lost n Found can update the removal of an animal from a kennel on an electronic database without involving Kennels	• *Kennels do not have to be involved in Lost n Found except when handling difficult animals*	*Lost n Found*	*When an owner has paid the pound fees for his animal that was lost and kept at the SPCA*	*Lost n Found staff*	• *Update an animal's movement on an electronic database*
Update claim data on claim spreadsheet	The claim information of an owner claiming a lost animal that is kept at the SPCA is added to an electronic document and printed out and pasted in a book later	• This is for statistical purposes	Lost n Found	After an owner has successfully claimed his animal (and filled in the claim form)	Lost n Found staff	• Manually typed into the computer • A spreadsheet is used
	A3.2.4 An electronic database can generate reports on claims	• *This will be faster* • *It will link animals, owners and lost and found claims to claim reports without duplicating data in a separate database*	*Lost n Found*	*After an owner has successfully claimed his animal (and filled in the claim form)*	*Lost n Found staff*	• *Lost n Found must input claim data into a more centralized database and prompt it to issue a report of claims*
Inform claimant to go to Reception to adopt animal	When an owner that lost an animal finds it in the SPCA adoption kennels, he	• The animal can be kept at Lost n Found for a limited period of time before it is put	Lost n Found	When an owner claims his animal is in the adoption kennels	Lost n Found staff	• Lost n Found must verbally refer the owner to Reception

	must apply to adopt it at Reception	up for adoption • Lost n Found does not handle adoptions.				
	A3.2.5 Allow Lost n Found to also handle adoptions of this kind	• *Lost n Found already handles money as well* • *Owners do not have to deal with different departments*	*Lost n Found*	*When an owner claims his animal is in the adoption kennels*	*Lost n Found staff*	• *Lost n Found deals with the adoption in the usual manner*

Table 11 - Lost & Found Reports & Claims process improvement recommendations.

4. Animal Admissions

4.1 Animal Admission						
Current actions	**What (brief description)**	**Why**	**Where**	**When**	**Who**	**How (with what?)**
Report to Reception & obtain admission form and Assign animal to kennel and update admission form	The Kennels must be notified of a new admission and has to obtain the admission form from Reception, assign the animal to a kennel and return an updated admission form to Reception	• It is the Kennels' responsibility to make changes to the kennel information of an admitted animal • An animal is admitted from Reception	Reception, Kennel office	After an animal has been admitted and its admission form completed	Kennel staff	• Manually updating and returning the form • Making a photocopy of the form with a photocopier
and Make copy of admission form	*A4.1.1 Allow kennels to edit kennel information and assign animals to kennels on an electronic database that can also be viewed by Reception*	• *Less paperwork and duplication of data* • *Less transfer of forms between departments*	*Kennel office*	*After an animal has been admitted and its admission form completed*	*Kennel staff*	• *Manually entering and changing kennel assignments on an electronic database*

Table 12 - Animal Admissions process improvement recommendations.

5.2.3 Information System Design

The PIECES framework suggested that there is an opportunity for an improved information system to be integrated into the Reception processes, since the current system (forms and files) exhibits problems regarding communication, delayed response times to customer and staff requests, excessive information, duplication and poor visibility. The need for an improved information system eg. an electronic information system, is confirmed by the process improvement recommendations suggested in Tables 9-12 above. Several of the suggested alternative actions involve an electronic information system integrated into the operations performed by Reception.

5.2.3.1 Functional Requirements

The functional requirements for the information system that is needed to achieve the process improvements can now be developed by translating the improvements into use cases – business events that the system must be able to support. Actors that interact with the system and initiate certain use cases can be defined by referring to the lanes and pools of the BPMN swimlane diagrams (representing the Reception processes). Actors will thus be defined according to roles (departments or sub-divisions of departments) instead of specific individuals, as preferred by Bittner & Spence (2003). The main requirements use case diagram, as defined by Cockburn (2001), will not contain receiver actors (these actors are, however, indicated on the use case narratives that accompany the use case diagram). However, even though Cockburn suggests that such a diagram must contain only 3-10 main use cases, the diagram developed from the process improvements also contains some abstract and extension use cases in order to give a more detailed view of the functional requirements, since these requirements will form the basis of a detailed operational feasibility analysis of ASM, the candidate information system.

The Requirements Level Use Case Diagram representing the functional requirements of the information system needed to facilitate the process improvements is slightly expanded, as mentioned previously, and is divided into the same functional divisions as Reception namely Adoptions, Boarding, Lost n Found and Admissions & Movements. Each of these divisions are represented separately in Figures 14-17 and followed by their respective use case narratives in Tables 13-25 below, describing them in more detail in terms of all stakeholders, actors, alternatives, constraints etc. The extension use case descriptions are included in the main use case narratives to show how they are embedded within them and the use cases involving the generation of reports and reminders do not have use case narratives for the sake of simplicity – they are very straightforward business events.

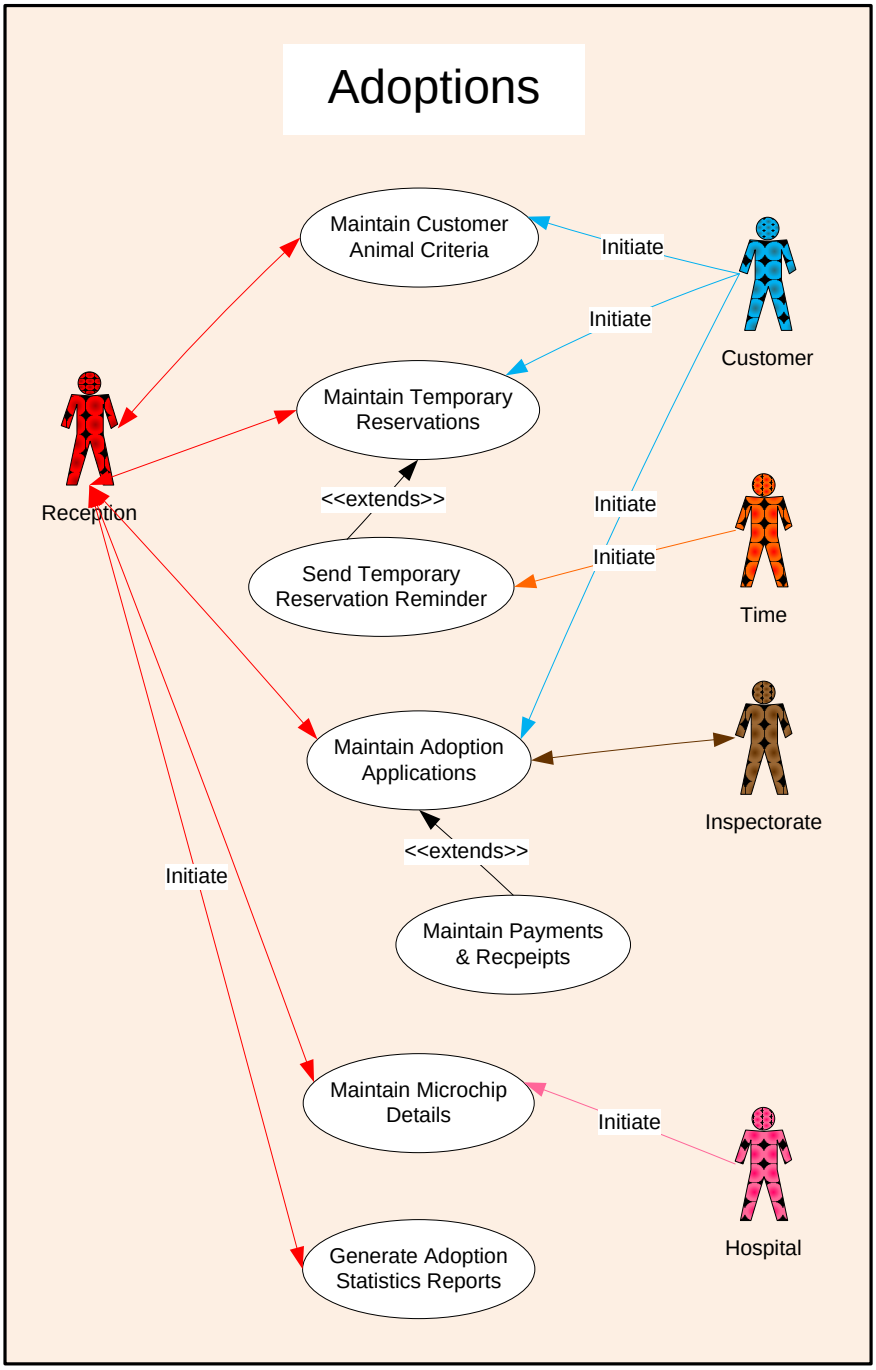

Figure 14 - The Requirements Level Use Case Diagram – Adoptions.

Use case name	Maintain Customer Animal Criteria
Primary business actor	Customer
Other participating actors	• Reception (primary system actor)
Description	This event involves the storing of a customer's preferences and criteria regarding a pet they would like to adopt, when such a pet is not at the SPCA at the time, so that Reception may notify them when such a pet does become available for adoption at the SPCA.
Precondition	• The customer must have checked the adoption kennels for an

	animal he would like to adopt or consulted Reception as to the presence of a certain type of animal, only to become aware that no such animal is currently available for adoption OR • The customer saw a certain animal in the adoption kennels that he would like to adopt, but the animal is temporarily reserved and the customer who temporarily reserved the animal has confirmed that he will be applying for adoption.	
Trigger	The customer states that he did not find the animal he was looking for in the adoption kennels or asks Reception whether a specific type of animal is currently up for adoption at the SPCA OR The customer requests to adopt an animal that is in the adoption kennels, but Reception finds that the animal is temporarily reserved by a customer who has confirmed that he will apply for adoption.	
Typical Course of Events	**Actor Action**	**System Response**
	Step 1: Reception searches the adoption kennels for similar animals to the customer's request. Step 3: Reception conveys the information of possible other animals that match the criteria to the customer. Step 4: The customer is not satisfied with the other options. Step 5: Reception obtains the customer's criteria for an animal as well as his details and enters it into the system.	Step 2: The system searches for animals with certain characteristics and displays the possible matches. Step 6: The system stores the customer's details and criteria for an animal.
Alternate courses	Alt-Step 2: If there are no possible matches for the system to display, the use case continues but Step 4 is omitted. Alt-Step 4: If the customer is satisfied with one of the other options, the Maintain Adoption Applications use case is initiated and Steps 5-6 are omitted.	
Conclusion	This use case is concluded when the system stores the customer and animal criteria details.	
Implementation constraints & specifications	• The system must have a search and match ability.	

Table 13 - Maintain Customer Animal Criteria Use Case Narrative

Use case name	**Maintain Temporary Reservations**	
Primary business actor	Customer	
Other participating actors	• Reception (primary system actor) • Time (primary system actor)	
Description	This event involves indicating that an animal has been temporarily reserved by a customer who is interested in applying to adopt the animal, but cannot do so immediately.	
Precondition	The owner must commit to formally applying for adoption at a later stage.	
Trigger	The customer informs Reception about an animal in one of the adoption kennels that he would like to adopt, but also indicates that he cannot do so immediately and will apply for adoption as soon as possible.	
Typical Course of Events	**Actor Action**	**System Response**
	Step 1: The customer informs	Step 3: The system retrieves

	Reception of a specific animal in a specific adoption kennel that he would like to adopt, but not immediately. Step 2: Reception enters the kennel number on the system. Step 4: Reception obtains the details of the owner and creates a new temporary reservation for the animal by the specific owner. Step 6: Time triggers the system to send a temporary reservation reminder to the customer and Reception 2 days after the reservation was made.	& displays the kennel information, along with that of the animal that occupies it. Step 5: The system updates the status of the animal and connects it to the specific owner details. This data is then stored by the system. Step 7: The system reminds both Reception (with a notification) and the customer (via e-mail), 2 days after the temporary reservation was created, about the customer's obligation to formally apply to adopt the animal or forfeit his right to a temporary reservation.
Alternate courses	Alt-Step 7: If another customer is interested in the animal before 2 days after the temporary reservation was created, Reception contacts the customer who temporarily reserved the animal in order to confirm his interest.	
Conclusion	The use case is concluded when the reminder of temporary reservation is sent.	
Postcondition	• After receiving the reminder, the customer should indicate to Reception that he is still interested in formally applying for adoption. • After receiving the reminder notification, Reception must contact the customer to confirm his interest in adoption.	
Business rules	• Exceptions are made as to how long an animal can be kept "temporarily reserved" – each case is different.	

Table 14 - Maintain Temporary Reservations Use Case Narrative

Use case name	Maintain Adoption Applications
Primary business actor	Customer
Other participating actors	• Reception (primary system actor) • Inspectorate (primary system actor)
Other interested stakeholders	• Kennel Manager – interested in the occupations of the adoption kennels (must know when an animal is moved out of the kennels to go to its new home). • Finance – interested in payment/donation details at the end of the month.
Description	This event involves storing information about a customer applying to adopt an animal through Reception, the Inspectorate indicating whether the adoption should be approved or not and Reception subsequently updating the adoption application information depending on whether the application is pending, accepted or declined.
Precondition	• The customer must indicate that he want to formally apply to adopt an animal. • The animal in question must be in the adoption kennels.
Trigger	The customer informs Reception of a certain animal in a specific

	adoption kennel that he would like to adopt.	
Typical Course of Events	**Actor Action**	**System Response**
	Step 1: Reception searches the system for the animal in the specific adoption kennel. Step 3: Reception provides the customer with an adoption application form. Step 4: The customer completes the adoption application form and hands it back to Reception. Step 5: Reception prompts the customer to pay the full adoption amount and to provide a letter of permission from the customer's lessor (if the customer rents a home). Step 6: Reception creates the adoption application for the specific animal on the system and copies the necessary details of the customer onto the system. Step 8: The customer provides the full payment and the letter of permission. Step 9: Reception updates the status and payment details of the application on the system (and requests a receipt) Step 11: Reception prompts the system to print the receipt. Step 13: Reception receives the receipt, hands it to the customer and informs the Inspectorate of the new application and provides it with the necessary documentation/information. Step 14: The Inspectorate prompts the system to display the adoption applications. Step 16: The Inspectorate performs the pre-adoption inspection and updates the status of the application to "accepted" on the system. They also inform Reception about the new status. Step 18: Reception informs hospital of the approved application and provides them with the necessary documentation/information.	Step 2: The system searches for the indicated adoption kennel and displays its details along with the details of the animal that occupies it. Step 7: The system creates the new adoption application for the specific animal and relates it to the owner whose details were provided. Step 10: The system stores the payment details of the application and issues a receipt. Step 12: The system interacts with the printer to print the receipt. Step 15: The system displays the adoption applications. Step 17: The system stores the updated information on the application.
Alternate courses	Alt-Step 8: If the customer does not pay the full amount or provide the letter of permission, the application status is updated to "pending" and stored by the system. Steps 9-18 are put on hold	

	until the payment and letter are provided. Alt-Step 16: If the Inspectorate declines the application or deems it "pending", the application is updated accordingly on the system. If declined, Reception partially refunds the customer and updates the application payment details accordingly as in Steps 9-12. If pending, Step 18 is put on hold until the application is accepted or declined.
Conclusion	This use case is concluded when the Hospital is informed of the new approved application.
Implementation constraints & specifications	• All relevant parties must have access to the adoption application information on the system. • No applications will be considered further (and no pre-adoption inspection performed) when the full payment and letter of permission have not been provided.

Table 15 - Maintain Adoption Applications Use Case Narrative.

Use case name	**Maintain Microchip Details**	
Primary business actor	Reception	
Other participating actors	• Hospital (primary system actor)	
Other interested stakeholders	Lost n Found – interested in animals that are microchipped in case animals get lost and end up at the SPCA in future.	
Description	This event involves creating microchip data (especially the contact data of the owner) for an animal that was microchipped by the Hospital.	
Precondition	The animal must have been microchipped by the Hospital to get it ready for collection by its new owner.	
Trigger	The Hospital performs the microchipping.	
Typical Course of Events	**Actor Action**	**System Response**
	Step 1: The Hospital informs Reception of the microchipping and updates the adoption application's microchip status on the system. Step 3: Reception updates the microchip details on the microchip forms and relates the owner's details to the microchip (on the system),	Step 2: The system stores the microchip information of the application. Step 4: The system stores the microchip details for the specific animal and owner.
Conclusion	The use case is concluded when the system stores the microchip information and relates it to the animal and owner.	
Postcondition		
Business rules	• The microchip information may not be deleted.	

Table 16 - Maintain Microchip Details Use Case Narrative.

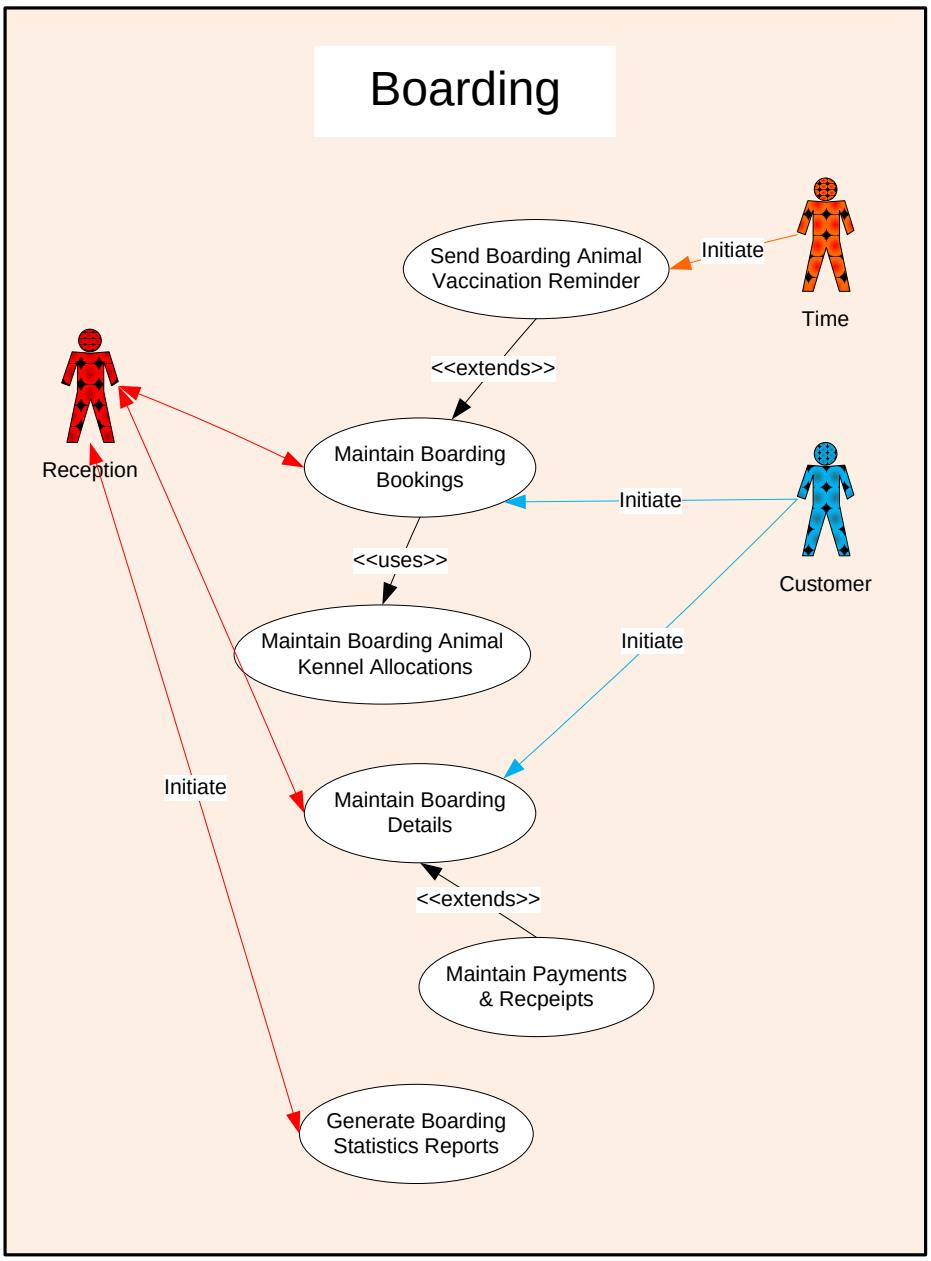

Figure 15 - The Requirements Level Use Case Diagram – Boarding.

Use case name	Maintain Boarding Bookings: Make Boarding Booking	
Primary business actor	Customer	
Other participating actors	• Reception (primary system actor) • Time (primary system actor)	
Other interested stakeholders	• Kennel Manager – interested in the kennel occupations	
Description	This event involves a customer making a boarding booking for his animal via the SPCA website or the Reception staff.	
Precondition	Customers must have accepted the boarding policies.	
Trigger	A customer requests a boarding booking.	
Typical Course of Events	**Actor Action**	**System Response**
	Step 1: The customer telephones	Step 3: The system verifies

	Reception, requests the boarding of his animal(s) and provides the booking dates OR The customer enters his booking dates and number of required kennels on the SPCA website. Step 2: Reception enters the dates and number of boarding kennels required into the system OR The SPCA website provides the system with the booking dates and kennel requirements Step 4: Reception OR The SPCA website allocates the booking to an available kennel(s), obtains the customer's contact details and enters it into the system. Step 7: Reception OR The SPCA website obtains the total boarding fees and conveys it to the customer. Step 8: Time triggers the system to send a vaccination certificate reminder to the customer and Reception a week before the boarding time.	the availability of the required number of kennels for the requested dates. Step 5: The system stores the booking. Step 6: The system calculates and displays the total boarding fees to the customer and/or Reception (who is logged onto the system) Step 9: The system reminds both Reception (with a notification) and the customer (via e-mail), a week before the booking "IN" date, about bringing a vaccination certificate with the boarding animal.
Alternate courses	Alt-Step 4: Reception OR the SPCA website notifies the customer about the unavailability of the required number of kennels for the requested dates and asks the customer to choose other dates. If the customer does not prefer this, Reception OR the SPCA website refers the customer to other boarding options.	
Conclusion	The use case is concluded when the vaccination reminder is issued a week before the boarding date.	
Business rules	• No bookings may be made for animals that will still be under the age of 6 months or that will still be pregnant by the time of boarding. • No bookings may be made for animals that are on medication.	
Implementation constraints & specifications	• The SPCA website must interact with the system and provide the customer with the necessary screen onto which he must enter the booking details • The vaccination notifications must be sent automatically, a week before the boarding date.	

Table 17 - Maintain Boarding Bookings: Make Boarding Booking Use Case Narrative.

Use case name	Maintain Boarding Bookings: Cancel Boarding Booking
Primary business actor	Customer
Other participating actors	• Reception (primary system actor) • SPCA Website (primary system actor)
Other interested stakeholders	• Kennel Manager – interested in the kennel occupations
Description	This event involves a customer cancelling a boarding booking that he made for his animal using the SPCA website or the Reception staff.
Trigger	A customer telephones to request a booking or ventures onto the

	Tshwane SPCA website and cancels his booking there.	
Typical Course of Events	**Actor Action**	**System Response**
	Step 1: The customer telephones Reception, requests the cancellation and provides the booking details OR The customer requests to cancel his booking on the SPCA website. Step 2: Reception enters the booking details into the system OR The SPCA website provides the system with the booking details Step 5: Reception OR The SPCA website informs the customer of his successful cancellation	Step 3: The system verifies that the booking was made and updates the status of the booking (cancelled) and the kennel allocation. Step 4: The system sends confirmation to the website/Reception that the booking was cancelled.
Alternate courses		
Conclusion	The use case is concluded when the cancellation confirmation is communicated to the customer.	
Implementation constraints & specifications	• The SPCA website must interact with the system and provide the customer with the necessary screen from which he can cancel a booking.	

Table 18 - Maintain Boarding Bookings: Cancel Boarding Booking Use Case Narrative.

Use case name	**Maintain Boarding Details: Admit Animal**	
Primary business actor	Customer	
Other participating actors	• Reception (primary system actor)	
Other interested stakeholders	• Hospital – interested in the animals that are currently boarding (their details and kennel allocations) in case medical treatment is required during their stay. • Kennel Manager – interested in the details of animals staying in boarding kennels (as well as the kennel allocations). • Finance – interested in payment/donation details at the end of the month.	
Description	This event involves updating the necessary details of a booking w.r.t. the animal and its owner as well as the status and details of the boarding, upon the arrival of the animal at the SPCA.	
Precondition	A booking for the animal(s) has already been made on the system via Reception or the website. The customer must also provide a valid vaccination certificate upon arrival.	
Trigger	The customer arrives with the boarding animal and requests to have it admitted.	
Typical Course of Events	**Actor Action**	**System Response**
	Step 1: The customer arrives with his animal and states the details of his boarding booking. Step 2: Reception searches for the booking on the system by date and/or contact details. Step 4: Reception determines	Step 3: The system verifies the that the booking was made and displays the booking details (dates, kennel allocations and fees). Step 7: The system stores the boarding vaccination

	whether the customer brought a valid vaccination certificate. Step 5: The customer displays his valid vaccination certificate. Step 6: Reception updates the boarding details (vaccination) on the system. Step 8: Reception provides the customer with a boarding form which he completes and hands back. Step 9: Reception then copies the necessary details from the boarding form unto the system and updates the boarding status. Step 11: Reception prompts the customer to pay the required fees, the customer pays and Reception updates the boarding's payment details on the system (and requests a receipt). Step 13: Reception prompts the system to print the receipt. Step 15: Reception receives the receipt, hands the customer and prompts the kennels to take the animal to its allocated kennel (as displayed on the screen).	details. Step 10: The system stores the necessary boarding animal, owner and status details. Step 12: The system stores the payment details of the booking, calculates & displays the outstanding payment and issues a receipt. Step 14: The system interacts with the printer to print the receipt.
Alternate courses	Alt-Step 5: If the customer does not provide a valid vaccination certificate, Reception indicates this on the system and omits Steps 8-15. Alt-Step 7: For an outstanding payment that is paid off the premises using EFT, Steps 1-10 are omitted. The customer pays an outstanding amount off the SPCA premises (after the animal was admitted) using an EFT. Reception obtains the proof of payment and updates the payment details of the boarding. Steps 12 is repeated. Alt-Step 13: For an outstanding payment that was paid using EFT, Reception prompts the system to e-mail the receipt. Alt-Step 14: For an outstanding payment that was paid using EFT, the system e-mails the receipt to the owner of the boarding animal.	
Conclusion	The use case is concluded when the customer receives the receipt and the kennel allocation of the animal is viewed and communicated to Kennels.	
Business rules	• An animal that is not accompanied by a valid vaccination certificate may not be admitted to boarding.	
Implementation constraints & specifications	• The system must interact with a printer • The system must interact with the e-mails of the boarding animals' owners who pay via EFT.	

Table 19 - Maintain Boarding Details: Admit Animal Use Case Narrative.

Use case name	Maintain Boarding Details: Release Animal	
Primary business actor	Customer	
Other participating actors	• Reception (primary system actor)	
Other interested stakeholders	Finance – interested in payment/donation details at the end of the month.	
Description	This event involves updating the necessary details of a boarding w.r.t. the its status and details, upon the collection of the animal from the SPCA by its owner.	
Precondition	The animal must be in the boarding kennels. The owner must pay the full amount before an animal can be released from boarding, including all outstanding fees from the original booking as well as late fees.	
Trigger	The customer arrives (usually with a receipt) and requests to collect his animal from boarding.	
Typical Course of Events	**Actor Action**	**System Response**
	Step 1: The customer arrives (usually with a receipt) and states the details of his boarding booking and that he wishes to collect his animal. Step 2: Reception searches for the booking on the system by date and/or contact details. Step 4: Reception enters the date of the owner's request to pick up boarding animal. Step 6: Reception prompts the customer to pay outstanding amounts (if any), the customer pays and Reception updates the boarding's payment details on the system (and requests a receipt). Step 8: Reception prompts the system to print the receipt. Step 10: Reception updates the status of the boarding on the system. Step 12: Reception prompts the Kennels to release the animal from its allocated kennel (as displayed on the system).	Step 3: The system verifies the that the animal was admitted and is in the boarding kennels and displays all the boarding details it stored. Step 5: The system determines whether the owner is late in picking up his animal and calculates & displays the additional fees payable. Step 7: The system stores the payment details of the booking, calculates & displays the outstanding payment (which must now be zero) and issues a receipt. Step 9: The system interacts with the printer to print the receipt. Step 11: The system stores the boarding information.
Alternate courses	Alt-Step 3: When an owner is more than a month late in picking up his animal, the animal is not in the boarding kennels anymore and Reception prompts the owner to adopt the animal. The Adoption Application use case is then initiated. Steps 4-12 are then omitted. Alt-Step 6: For an outstanding payment, if a customer cannot pay, Steps 7-12 are omitted and the customer cannot receive his animal.	
Conclusion	The use case is concluded when the kennel allocation is viewed and Kennels informed to release the animal from its boarding kennel.	
Business rules	• Boarding animals whose owners have not paid all outstanding fees in full may not be released to the owners.	

Implementation constraints & specifications	• The system must interact with a printer
Assumptions	Customers do not pick up their animals before the booked “OUT” date.

Table 20 - Maintain Boarding Details: Release Animal Use Case Narrative.

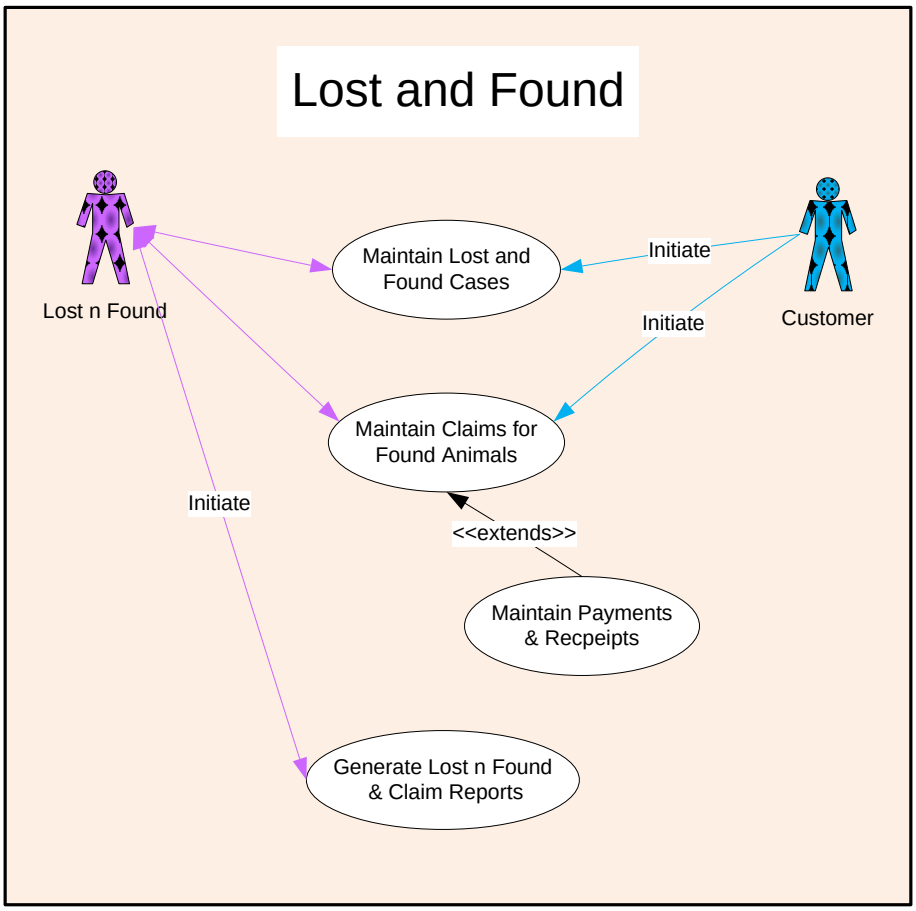

Figure 16 - The Requirements Level Use Case Diagram – Lost n Found.

Use case name	**Maintain Lost and Found Cases**	
Primary business actor	Customer	
Other participating actors	• Lost n Found (primary system actor)	
Description	This event stores the necessary information of a case where a customer informs the SPCA of an animal that he lost or a stray animal that he found.	
Trigger	The customer informs the SPCA in person about the lost or found animal (and for some found animals, the customer also brings the animal along to be admitted to the SPCA).	
Typical Course of Events	**Actor Action**	**System Response**
	Step 1: The customer informs Lost n Found of the lost or found animal and states his details as well as the	Step 3: The system stores the details of the lost or found case.

	details of the animal. Step 2: Lost n Found enters the details into the system. Step 4: Lost n Found commands the system to search for a lost/found case that matches the found/lost case just added. Step 5: Reception examines the possible matches and informs both parties of the match.	Step 5: The system conducts a search of the details of the animals that have been lost/found and displays cases that possibly match the newly added case.
Alternate courses	Alt-Step 2: In the case of a found stray animal that was admitted from Reception, some of the found case details are copied or drawn from the admitted animal details or simply used as they are.	
Conclusion	This use case is concluded when the system displays the possible matches to the newly added lost/found case.	
Implementation constraints & specifications	• The system must have a search and match ability.	
Open issues	Still determining how to use the information from an admitted stray for a found stray case.	

Table 21 - Maintain Lost and Found Cases Use Case Narrative

Use case name	Maintain Claims for Found Animals	
Primary business actor	Customer	
Other participating actors	• Lost n Found (primary system actor) • Managing Director (external receiver actor)	
Other interested stakeholders	Finance – interested in payment/donation details at the end of the month.	
Description	This event involves recording the details of claims made by original owners for animals that were kept in the SPCA's Lost n Found kennels.	
Precondition	The owner must have searched the Lost n Found kennels.	
Trigger	The customer has seen his animal in the Lost n Found kennels and requests to collect it.	
Typical Course of Events	**Actor Action**	**System Response**
	Step 1: The customer informs Lost n Found that he has seen his animal in their kennels and that he would like to retrieve it. Step 2: Lost n Found provides the customer with a claim form and the customer completes it. Step 3: Lost n Found retrieves the stray animal's found case from the system. Step 5: Lost n Found creates a new claim for the found stray animal and copies the required claim details from the form to the system. Step 7: Lost n Found prompts the customer to pay the required fees, the customer pays and Lost n Found updates the claim's payment details on the system (and requests	Step 4: The system retrieves the correct found case and displays its details. Step 6: The system creates a new claim record for the found stray, stores the claim details and calculates & displays the pound fees payable to the SPCA for taking care of the animal. Step 8: The system stores the payment details of the claim, and issues a receipt. Step 10: The system interacts with the printer to print the receipt.

	a receipt). Step 9: Lost n Found prompts the system to print the receipt. Step 11: Lost n Found receives the receipt, hands it to the customer and prompts the kennels to release the animal and update the kennel allocations.	
Alternate courses	Alt-Step 1: If the customer has seen has lost animal in the adoption kennels, Lost n Found refers him to Reception to adopt the animal after completing Steps 2-and Steps 2-11 are omitted. Alt-Step 7: If the customer cannot pay the pound fees, the animal cannot be released and Steps 8-11 are omitted.	
Conclusion	The use case is concluded when the receipt is issued and the Kennels have been informed.	
Business rules	• The customer must pay the pound fees to obtain his found animal. • Strays that were kept at the SPCA for more than 7 days are transferred to adoption and the owner must also apply to adopt the animal (he may not only pay the pound fees to obtain the animal).	

Table 22 - Maintain Claims for Found Animals Use Case Narrative.

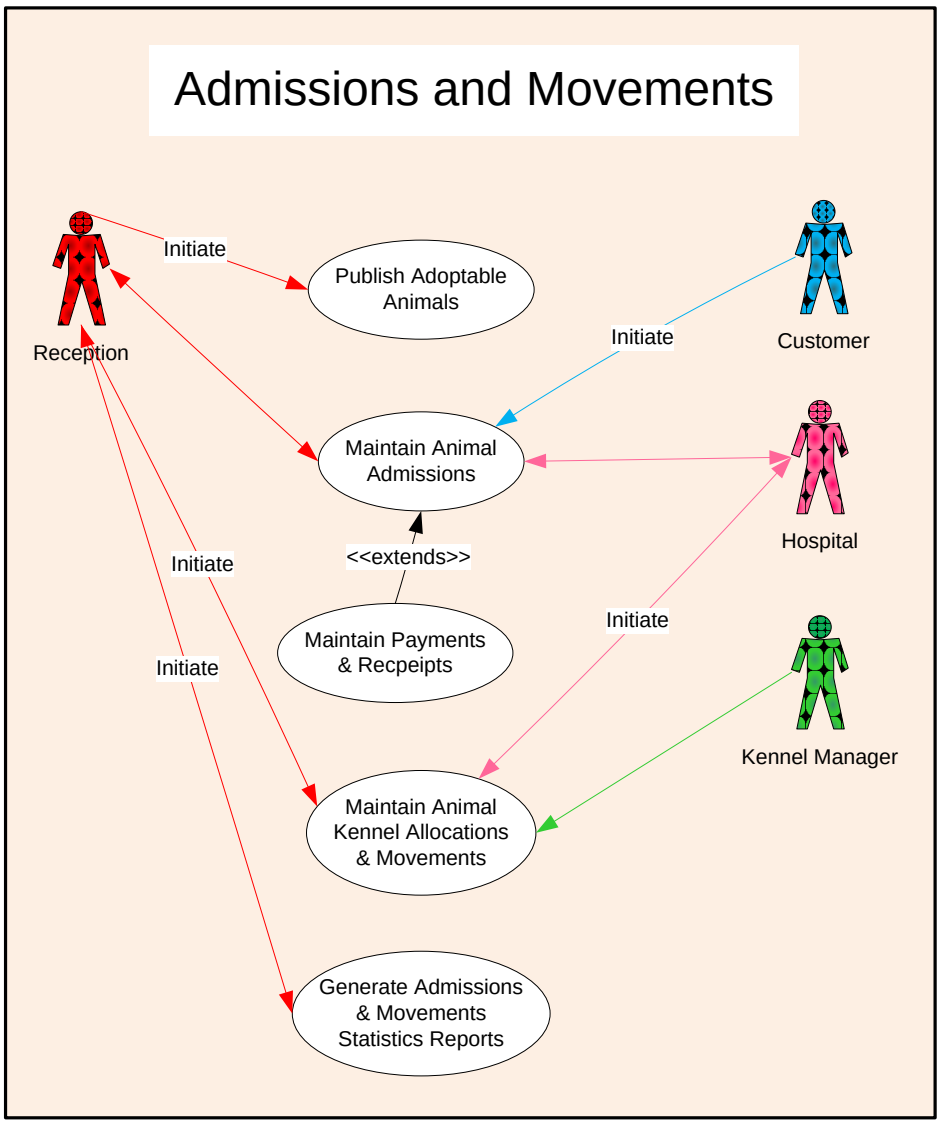

Figure 17 - The Requirements Level Use Case Diagram – Admissions and Movements.

Use case name	Maintain Animal Admissions	
Primary business actor	Customer	
Other participating actors	• Reception (primary system actor) • Hospital (primary system actor)	
Other interested stakeholders	• Kennel Manager – interested in all animals that are admitted to the SPCA. • Finance – interested in payment/donation details at the end of the month.	
Description	This event involves a customer bringing an animal to be admitted to the SPCA and Reception admitting the animal by creating it on the system as well as informing the Kennels to physically admit it.	
Trigger	The customer informs Reception that he would like to have the animal he brought along admitted to the SPCA.	
Typical Course of Events	**Actor Action**	**System Response**
	Step 1: The customer states that he would like to have the animal admitted. Step 2: Reception provides the	Step 6: The system creates the new admission and stores the owner's and animal's information.

	customer with an admission form. Step 3: The customer completes the admission form. Step 4: The customer provides a donation towards the animal's upkeep. Step 5: Reception creates the admission on the system, copying the owner's and animal's details from the form. Step 7: Reception updates the donation details of the admission on the system (and requests a receipt) Step 9: Reception prompts the system to print the receipt. Step 11: Reception receives the receipt and hands it to the customer. Step 12: Reception informs the Kennels of the new admission.	Step 8: The system stores the donation details of the admission and issues a receipt. Step 10: The system interacts with the printer to print the receipt.
Alternate courses	Alt-Step 4: If the customer does not provide a donation, Steps 7-11 are omitted.	
Conclusion	This use case is concluded when Reception has informed the kennels of the new admission.	

Table 23 - Maintain Animal Admissions Use Case Narrative.

Use case name	**Maintain Animal Kennel Allocations & Movements**	
Primary business actor	Kennel Manager	
Other participating actors	• Hospital (external server actor) • Time (external server actor)	
Other interested stakeholders	Lost n Found and Reception – interested in which kennels certain animals are currently occupying.	
Description	This event involves the Kennel Manager assigning an animal to a specific kennel upon admission or moving the animal to a different kennel(s) thereafter.	
Trigger	An animal is admitted at Reception OR An animal must be moved around due to health or time issues.	
Typical Course of Events	**Actor Action**	**System Response**
	Step 1: Upon receiving confirmation from the Hospital that an admitted animal may be moved or assigned to a certain kennel, the Kennel Manager prompts the system to display the animal details. Step 3: The Kennel Manager creates a new kennel allocation for the animal. Step 5: The Kennel Manager chooses a kennel for the animal to be allocated to. Step 7: The Kennel Manager physically moves the animal to the	Step 2: The system retrieves the information stored on the animal and displays it. Step 4: The system creates a new kennel allocation record and displays the possible kennels the animal can be assigned to. Step 6: The system stores the kennel allocation details for the specific animal.

	assigned kennel.	
Alternate courses	Alt-Step 6: When the animal is assigned to an adoption kennel, the system must run a search of the customer animal criteria to check whether the adoptable animal matches the requirements of a customer who is interested in adoption, but could not find the specific type of animal he was looking for.	
Conclusion	This use case is concluded when the Kennel Manager has physically moved the animal to the assigned kennel.	
Business rules	• Only one animal per kennel can be assigned, except for some cats and dogs that were admitted together and get along.	
Implementation constraints & specifications	• The system must allow the allocation of more than one animal to a kennel, but only when it receives confirmation from the Kennel Manager that this is what is required.	

Table 24 - Maintain Animal Kennel Allocations & Movements Use Case Narrative

Use case name	**Publish Adoptable Animals**	
Primary business actor	Reception	
Description	This event involves Reception publishing the animals that are available for adoption on the SPCA Website (on a daily basis).	
Trigger	This should be done at the end of each day.	
Typical Course of Events	**Actor Action**	**System Response**
	Step 1: At the end of a working day, Reception should command the system to publish the adoptable animals on the website. Step 4: The website receives the information and displays it as required.	Step 2: The system retrieves the information of all the animals that are up for adoption (excluding the ones that are temporarily reserved or in the process of being adopted). Step 3: The system transfers the information to the website.
Conclusion	This use case is concluded when the website displays the adoptable animals.	
Business rules	• Animals that are in the middle of being adopted (their adoption application is still in the process of being approved) should not be published. • Animals that are temporarily reserved should not be published.	
Implementation constraints & specifications	• The system must be able to interact with the SPCA website.	
Open issues	The frequency of the publishing should be established.	

Table 25 - Publish Adoptable Animals Use Case Narrative.

5.2.3.2 ASM Feasibility Analysis

Now that functional requirements have been developed for an information system that is to facilitate the suggested process improvements, the candidate information system named ASM can be evaluated in terms of how well it meets these functional requirements. The extent to which it meets these requirements will determine its operational feasibility.

5.2.3.2.1 Operational Feasibility of ASM

The functionalities that ASM are capable of must first be defined so that it can be compared to the functional requirements of the information system. The ASM functionalities were defined using the menu commands and forms on the database. These functionalities are displayed next to the functional requirements in Figure 18.

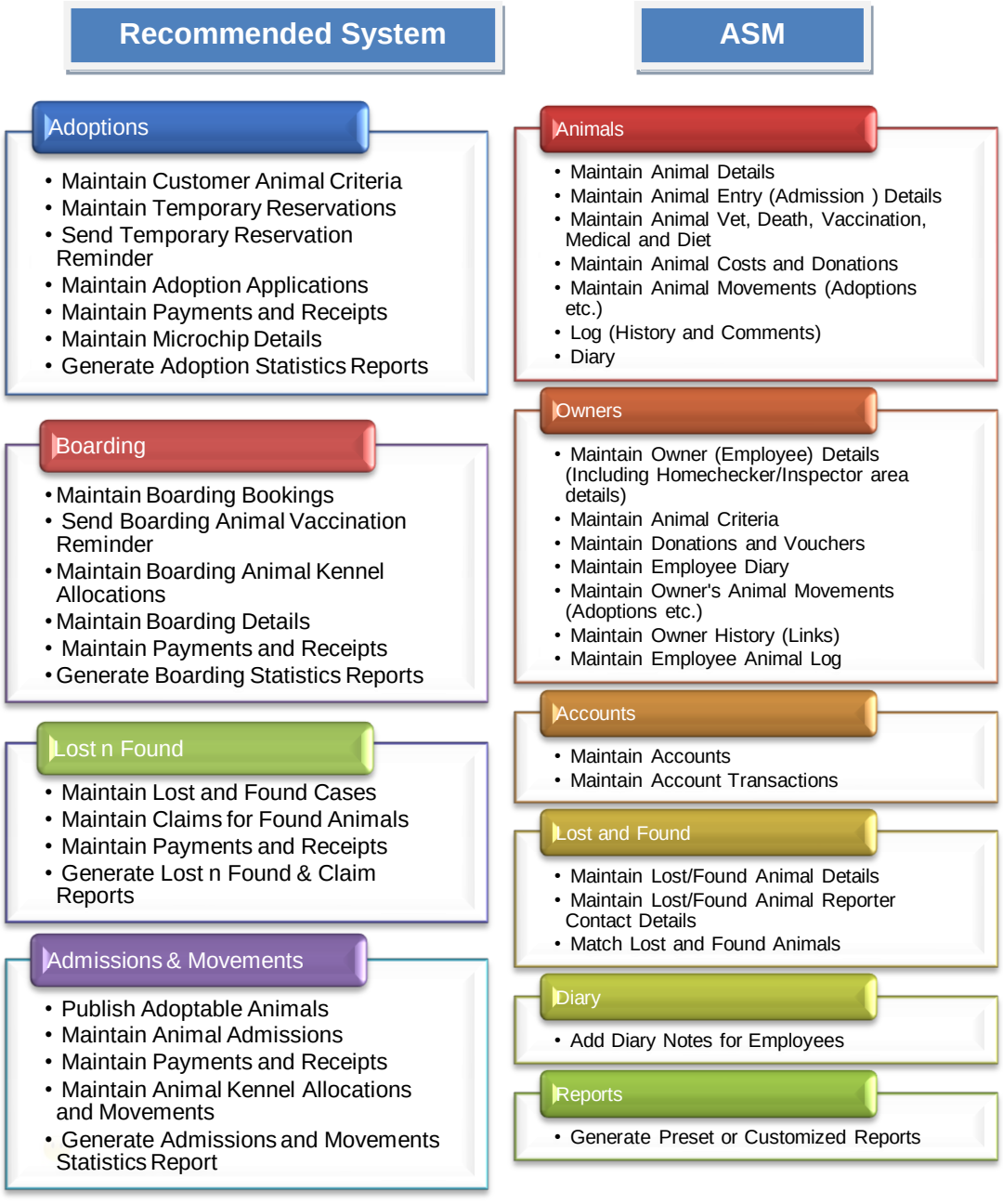

Figure 18 - The functional requirements of the recommended information system vs. ASM's functionalities.

The functionalities of ASM must be evaluated to determine whether the functional requirements are satisfactorily met. The method used to evaluate the operational feasibility rating of ASM was a simple

comparison – the functional requirement is stated and a corresponding ASM functionality that can meet that requirement is found, the extent to which the requirement is met by the functionality indicated by a rating on a scale of 0 to 100. ASM's average rating should then be a fair indication of its operational feasibility. This is demonstrated in Table 26 below.

Legend

- ✖ ASM does not meet requirement
- 😐 ASM partially meets requirement
- ✓ ASM fully meets requirement

Functional Requirement (Use Case)	ASM Functionality	Match?	Description	Rating
• Maintain Boarding Bookings • Maintain Boarding Animal Kennel Allocations	-	✖	There is no function in ASM that can display kennels available for requested dates and assign boarding animals to those kennels. ASM cannot assign "non-shelter animals" to internal locations such as kennels. It can, however, create diary entries for such animals. It can also create animals that are "not for adoption" and assign these animals to kennels, but there is no proper booking system where bookings instead of animals can be created before admitting the animal.	0
• Send Boarding Animal Vaccination Reminder	-	✖	There is no such function in ASM, however, there is an option to manually e-mail an owner.	
• Maintain Boarding Details	• Maintain Animal Details • Maintain Animal Entry (Admission) Details • Maintain Owner Details • Maintain Animal Vet, Death, Vaccination, Medical and Diet	😐	ASM can edit a boarding animal's details upon admission as well as link it with the owner and his details. The details of the specific admission can also be added. However, this will admit a boarding animal in the same way as admitting an animal belonging to the shelter. The costs for the animal's stay can be added, but not calculated automatically and payments must be added as a separate transaction and then linked to a specific owner. The payment information is not in the right format to readily print as a	60

			receipt.	
• Generate Boarding Statistics Reports • Generate Lost n Found & Claim Reports • Generate Adoption Statistics Reports • Generate Admissions and Movements Statistics Report	• Generate Preset or Customized Reports		ASM can generate several reports from the information in the database. The developers can also create specific customized reports for a fee.	100
• Maintain Lost and Found Cases	• Maintain Lost/Found Animal Details		ASM can create lost and found animals and store all their details as well as link them to the details of the owners that reported them.	100
• Maintain Claims for Found Animals	-		There is no function in ASM that can create claims for found animals (that were admitted to the shelter as strays) by their original owners.	0
• Maintain Payments and Receipts	• Maintain Animal Costs and Donations • Maintain Account Transactions		The costs relating to an animal can be added, but not calculated automatically and payments must be added as a separate transaction and then linked to a specific owner. The payment information is not in the right format to readily print as a receipt.	50
• Maintain Customer Animal Criteria	• Maintain Animal Criteria		ASM can save a customer's preferences w.r.t. an animal so that he may be notified when such an animal becomes available.	100
• Maintain Temporary Reservations • Send Temporary Reservation Reminder	-		ASM cannot temporarily reserve an animal for a specific customer and can thus not remind a customer that he has temporarily reserved an animal and must formally apply for adoption.	0
• Maintain Adoption Applications	• Maintain Animal Movements (Adoptions etc.) • Maintain		An adoption can be created for an animal via the animal or via the owner who wishes to adopt the animal. However, the information pertaining to the adoption application (reservation) and	40

	Owner (Employee) Details (Including Homechecker/Inspector area details) • Maintain Owner's Animal Movements (Adoptions etc.)		actual adoption is very limited. Information regarding the pre-adoption inspection can also be saved to a customer's record.	
• Maintain Microchip Details	• Maintain Animal Details		ASM can indicate whether the animal is microchipped or not, the date of the microchipping procedure and the microchip number. It does not, however, store a separate record for the animal's microchip information and does not link such a record to the information of the owner as it is saved on the microchip.	40
• Maintain Animal Admissions	• Maintain Animal Details • Maintain Animal Entry (Admission) Details • Maintain Animal Vet, Death, Vaccination, Medical and Diet • Log (History and Comments)		ASM can store a wide range of details of an admitted animal, including the medical details needed to approve kennel movements or adoptions.	100
• Maintain Animal Kennel Allocations and Movements	• Maintain Animal Details • Maintain Animal Movements (Adoptions etc.)		ASM can allocate an animal to a kennel (as an internal location), but since a kennel is not a separate entity, kennel details and their contained animals cannot be displayed. An animal can also not be moved between internal locations, only in and out of the shelter.	30
Average Operational Feasibility Rating				**47.7**

Table 26 - Operational Feasibility Analysis of ASM

ASM's average operational feasibility is found to be 47.7 out of 100. There are, however, still a few qualitative factors that must be taken into account when assessing operational feasibility such as political factors, ease of use etc. These factors will now be considered in the full feasibility analysis where not only operational but also technical, economic, schedule and support feasibility can be taken into account in the determination of the overall feasibility of implementing ASM as Reception's new information system.

5.2.3.2.2 Feasibility Analysis Matrix

The importance of each feasibility category was determined by SPCA Reception staff with the input of the Managing Director. The feasibility analysis was then done using a Feasibility Analysis Matrix that rates ASM in each feasibility category and multiplies this rating with the feasibility category's weight of importance, as suggested by Bentley & Whitten (2007). The weighted ratings were then added to obtain the overall feasibility rating of ASM (as a score out of 100). These calculations are shown in Table 27 below.

Feasibility Category	Weight	Animal Shelter Manager	Rating (out of 100)
Operational feasibility	30%	+ The system will be well received in a political sense by the entire organization because all employees find the lack of visibility and communication problematic and is willing to change to a more advanced system. Management also desires an electronic information system and has a very good relationship with employees. + The system has an attractive user interface. - Although the system is mostly easy to use, the numerous fields, forms and tabs may be confusing to inexperienced users. - ASM uses different terminology than what the Reception staff is used to. + The system allows simultaneous access by several users connected to a local area network. + Secure access is possible through the use of user names and passwords. + The system can limit any users' access to certain functionalities. + Additional customized fields can be added to the system. + The "Diary" function is a communication tool that allows all users to instantly communicate with one another and refer back to past communications. - The system does not fully meet the functional requirements of the recommended information system to facilitate Reception's process improvements.	55
Technical Feasibility	19%	+ The system technology is mature – updated versions are published continually and there are numerous users worldwide (it is also translated into various different languages). + The system is freely available – it can be downloaded from the internet.	90

		✚ It can run on any computer with a Microsoft Windows operating system - it does not take specialized technology or high-powered hardware to operate. ✚ The system is updated continuously to eliminate errors and to improve its capabilities ✚ Access to the source code of the system is also granted so that developers can make alterations if they desire. ✚ The users of the system only require basic typing and computer skills – no specialized programs or languages have to be mastered.	
Economic Feasibility	18%	✚ The system and its updates can be downloaded free of charge. ✚ System support is also free of charge when accessing help from the user and industry community. ▬ However, more professional support is charged at £20/consultation.	80
Schedule Feasibility	15%	✚ The system is available immediately. ▬ Time to alter the business processes for making use of the system will delay the time to implementation. ▬ A further delay to implementation will be training the staff to use the new system. ▬ Some further developments or alterations to the system will be required to ensure that it meets the needs of Reception's operations. ▬ Changing to a new system may result in longer than usual delays of normal operations while staff familiarize themselves.	55
Support/ Maintenance Feasibility	18%	▬ There is no physical support or maintenance available for the system. ✚ However, there is an extensive online community that responds rapidly and efficiently to questions from users and aims to solve their problems. ✚ The authors of the software also offer professional support at £20/consultation (a donation to help them to constantly improve the software). ✚ The system comes with access to a detailed user manual. • Because the support is not physical, takes communication effort to attain and is not completely free of charge, Reception will most likely ignore problems instead of reporting them and this may damage the effectiveness of the system as a whole.	60
Total Feasibility Rating			**67.1**

Table 27 - Feasibility Analysis Matrix for ASM

In the Feasibility Analysis Matrix in Table 30 above, the operational feasibility of ASM was rated to be slightly higher than determined (55 instead of 47.7) because of qualitative factors that contribute constructively to the operational feasibility such as that it will be well received in a political sense, has a good user interface, allows several users to work on it simultaneously etc. ASM rated very well in the economic and technical feasibility categories, but poorly i.t.o. schedule and support feasibility, which brought its total feasibility rating down to 67.1 out of 100. This rating is fair, but not good enough for management who set a minimum criteria of 70% total feasibility. Since the system was found to be infeasible it is necessary to design a new system that will meet the process requirements

(functional requirements determined from the process improvements) as well as the specific data requirements of the processes. Such a system may not or may not be rated well in terms of schedule and cost feasibility, but the designer(s) and builder(s) will have control over the operational, technical and support feasibility (and can also limit the costs and development time of the system).

5.2.3.3 Data Model

The data model was developed from the requirements use cases and the forms and files that form Reception's current information system. The data model is represented as an ERD with entity attributes deduced from the fields in the paper forms used by Reception. The ERD with its entities, entity attributes and relationships between entities is displayed in Figure 19.

The ERD forms the blueprint of the information system and since the notation used is universally accepted, a system builder can use it to create the physical design of the database and to build the system. The advantages that the creation of this system will offer is that it will remedy the problems with the current information system discovered with the PIECES framework in Appendix A as well as adhere enable the process improvements. These advantages include:

- Enhanced customer service through more rapid access to data
- Customer records that allow for actions like preventing customers with bad record to apply for adoption, rewarding loyal customers etc.
- Greater visibility of information
- More complete account of information (that can also be packaged into reports)
- Better communication between departments with multiple-user access
- The elimination of the duplication of data (even some data may be duplicated by appearing on the database as well as the paper forms, returning customers and animals can have maintained records)
- Reduction in administrative actions such as copying, delivering forms by hand, filing etc.
- Time savings that can be used to perform more valuable actions
- Cost savings (paper, telephone calls)
- Eventual reduction in the space occupied by files and forms and thus space at the Reception area (if the system can eventually become the main means for of storing information)

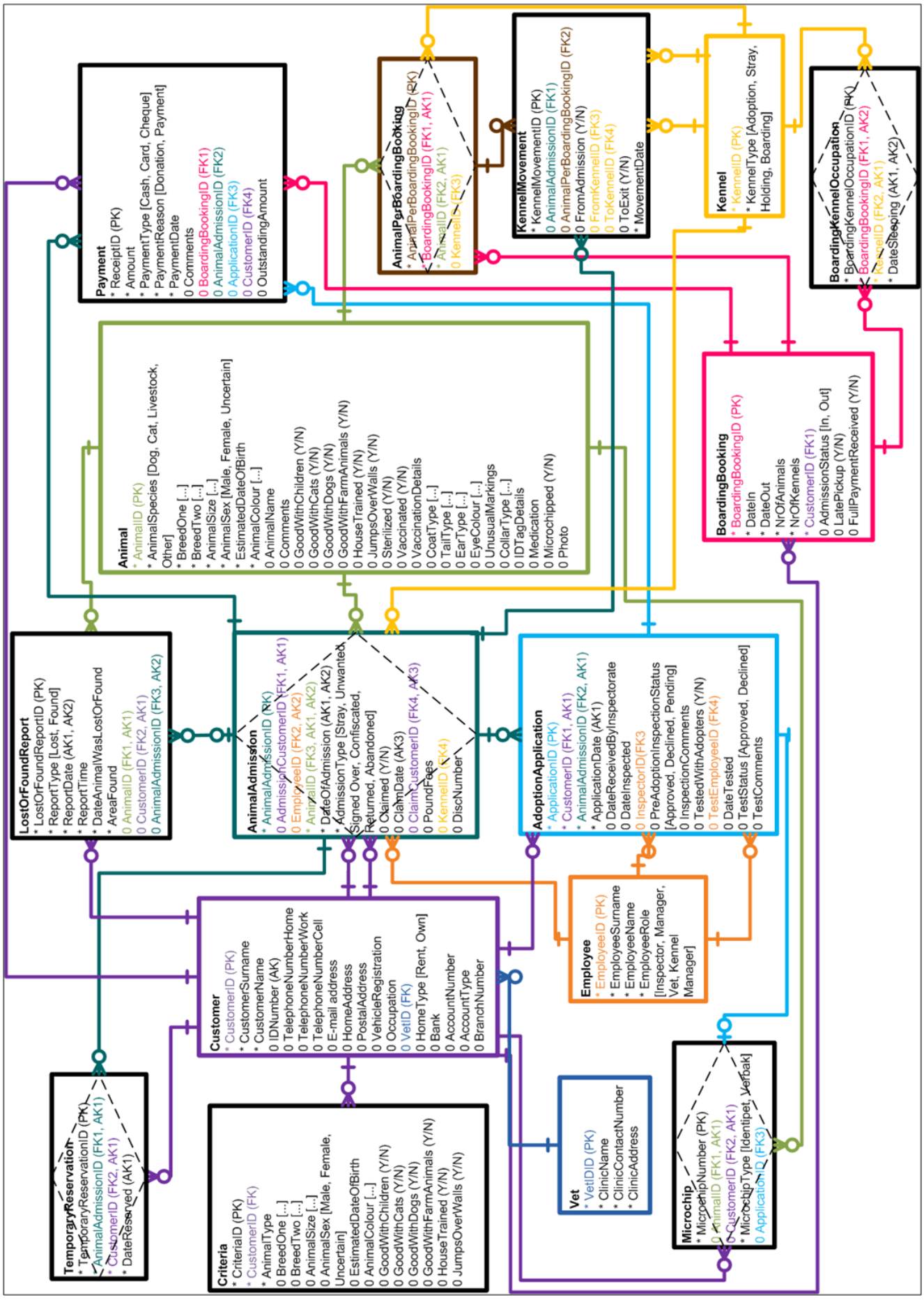

Figure 19- The ERD of the recommended Reception information system.

5.3 Reduced Congestion at Holding Kennels

The simulation model to experiment with changes to the kennel system that can reduce the queue or congestion at the holding kennels must now be developed.

5.3.1 Kennel System Simulation Model

The simulation model can be developed by first defining the kennel system and the processes it consists of in Arena and analysing the most recent (April 2010 to March 2011) admission, adoption and euthanasia data to specify the process rules.

5.3.1.1 System & Process Definition

The simulation model was designed to accurately represent the operation of the kennel system over time, even if at a more simplified level. The model thus resembles the actual system and flow of animals. For this reason, the flow of animals will be described here in detail (according to animal type and status) and not the Arena model logic (it can be viewed on the CD-ROM as the file **"Kennel System Simulation Model.doe"** along with its animation, which is also available in video format as the file **"Kennel System Simulation Model Animation.avi"**).

When an animal is brought in by the Inspectorate or a person outside the SPCA and it is clearly severely injured or sick, a vet will immediately attend to the animal and put it to sleep if required (if it is a stray and has the Parvo virus or an injury that cannot be healed) or admit it to the hospital kennels to recover. An animal that is not severely injured or sick must wait in a holding kennel until it can be attended to. Figure 20 below illustrates the flow of a severely injured or sick animal.

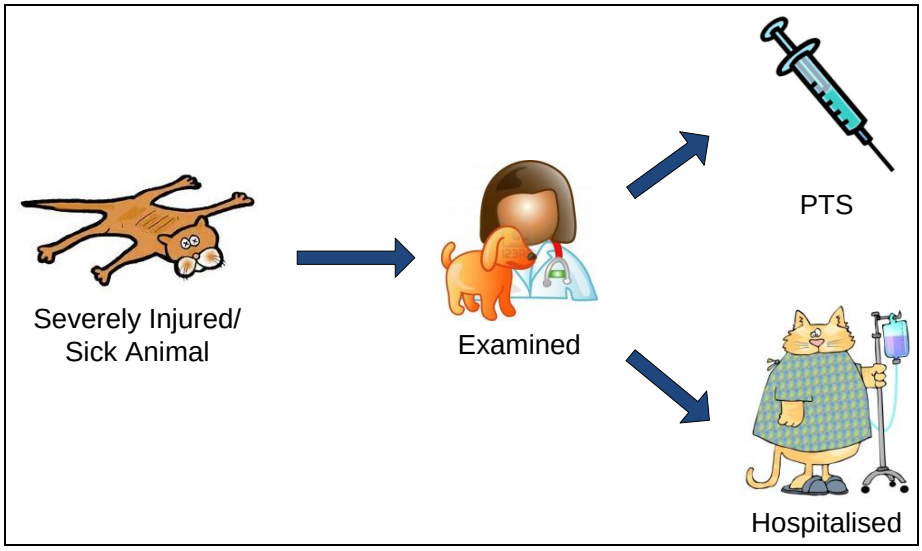

Figure 20 - The flow of a severely sick or injured animal.

If the arriving animal is a puppy and there is no space in the holding kennels, the puppy can be admitted to the puppy saloon kennels until a vet can examine it or until there is an open space in the holding kennels. If it is a dog it can alternatively go to the stray kennels or the adoption kennels, but can only stay there until an actual stray animal or adoptable dog needs the space after which it must "queue" for the holding kennels once more. Lastly, if it is a cat, it can alternatively go to the cat kennels but also only until an adoptable cat needs space. Figures 21-23 below illustrate the flow of puppies, dogs and cats respectively, in the case of full holding kennels.

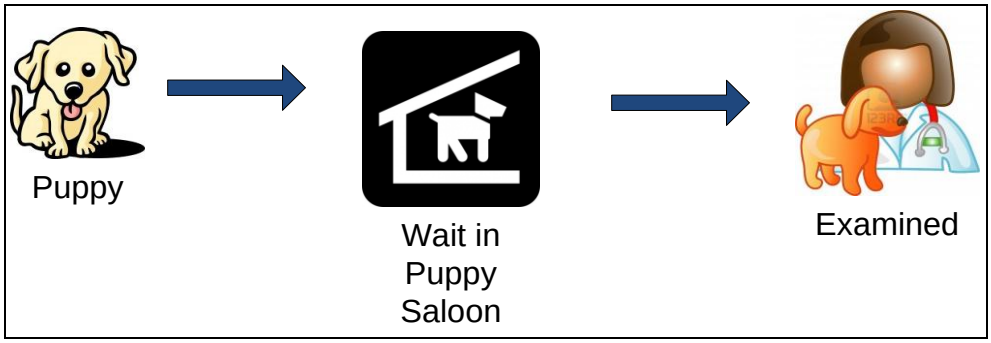

Figure 21 - The flow of an incoming puppy in the case of fully occupied holding kennels.

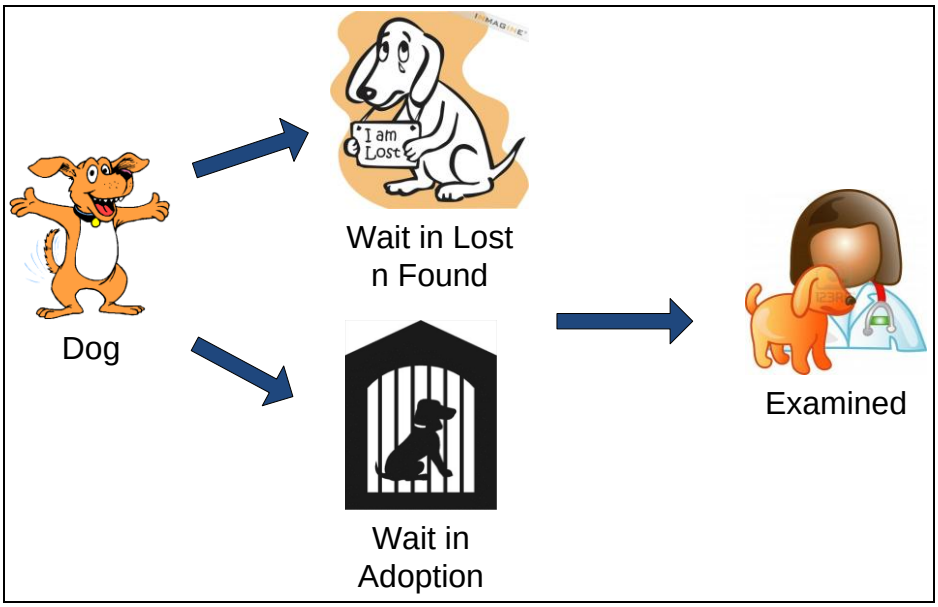

Figure 22 - The flow of an incoming dog in the case of fully occupied holding kennels.

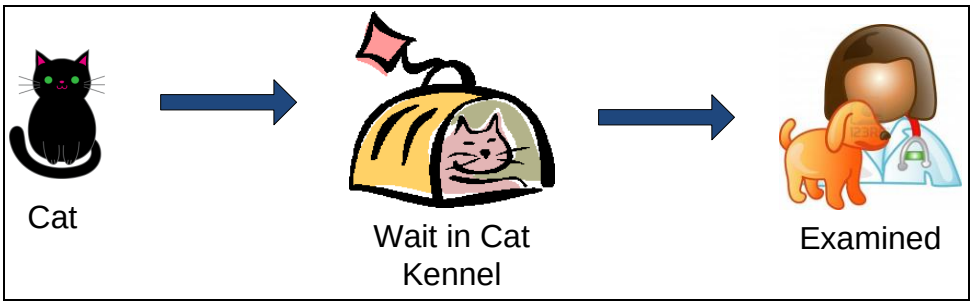

Figure 23 - The flow of an incoming cat in the case of fully occupied holding kennels.

When the vet has examined an incoming animal the animal is either sent to the hospital to be treated for an injury or disease or to the quarantine kennels where it is treated to recover from the Parvo virus. When in hospital or quarantine, the animal can either pass away, be put to sleep or recover. Figure 24 below shows these movements.

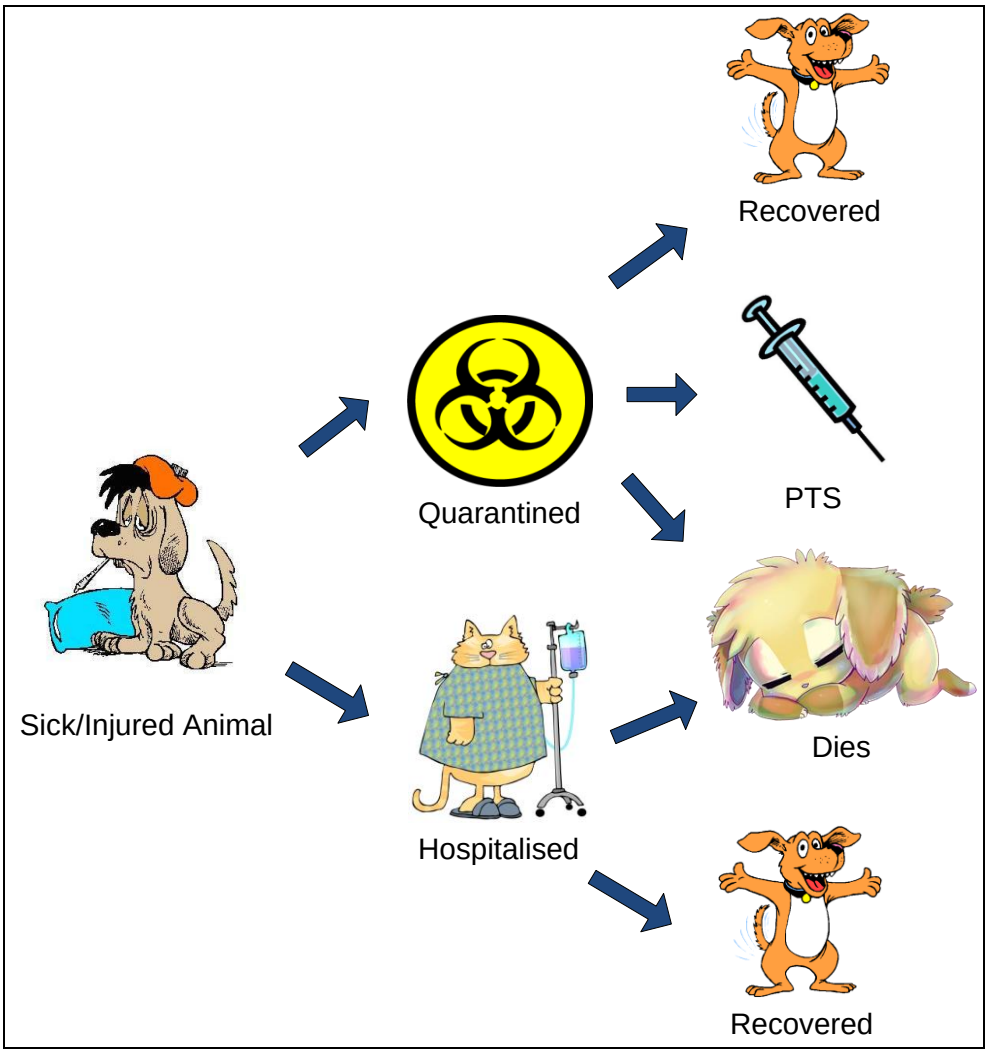

Figure 24 - The flow of injured or sick animals.

Strays that have been found healthy are sent to the stray kennels where they are kept for a week. If not claimed by their owners during the week, they are sent to the adoption kennels (adoption kennels for dogs, puppy kennels for puppies and cat kennels for cats). Strays often fall ill with the Parvo virus during their stay and are then sent to the quarantine kennels. Figure 25 displays the flow of a stray through the system.

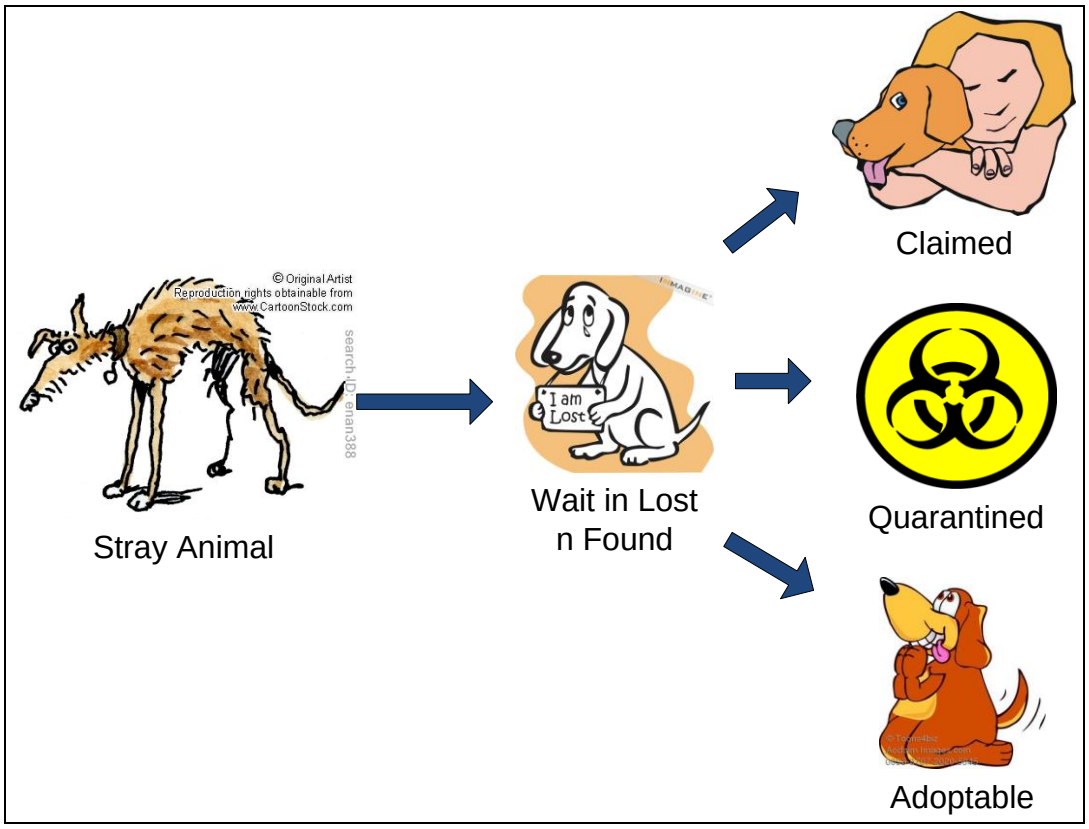

Figure 25 - The flow of a stray animal.

Recovered animals as well as animals that have been examined and found healthy are also adoptable and are sent directly to the adoption kennels. Adoptable animals are either adopted by new owners or are put to sleep to make space for new adoptable animals. A negligible amount of animals fall ill or die within the adoption kennels. If there is not enough space in the respective adoption kennels, dogs can be sent to the boarding kennels while puppies and cats can share kennels. Figure 26 shows these movements.

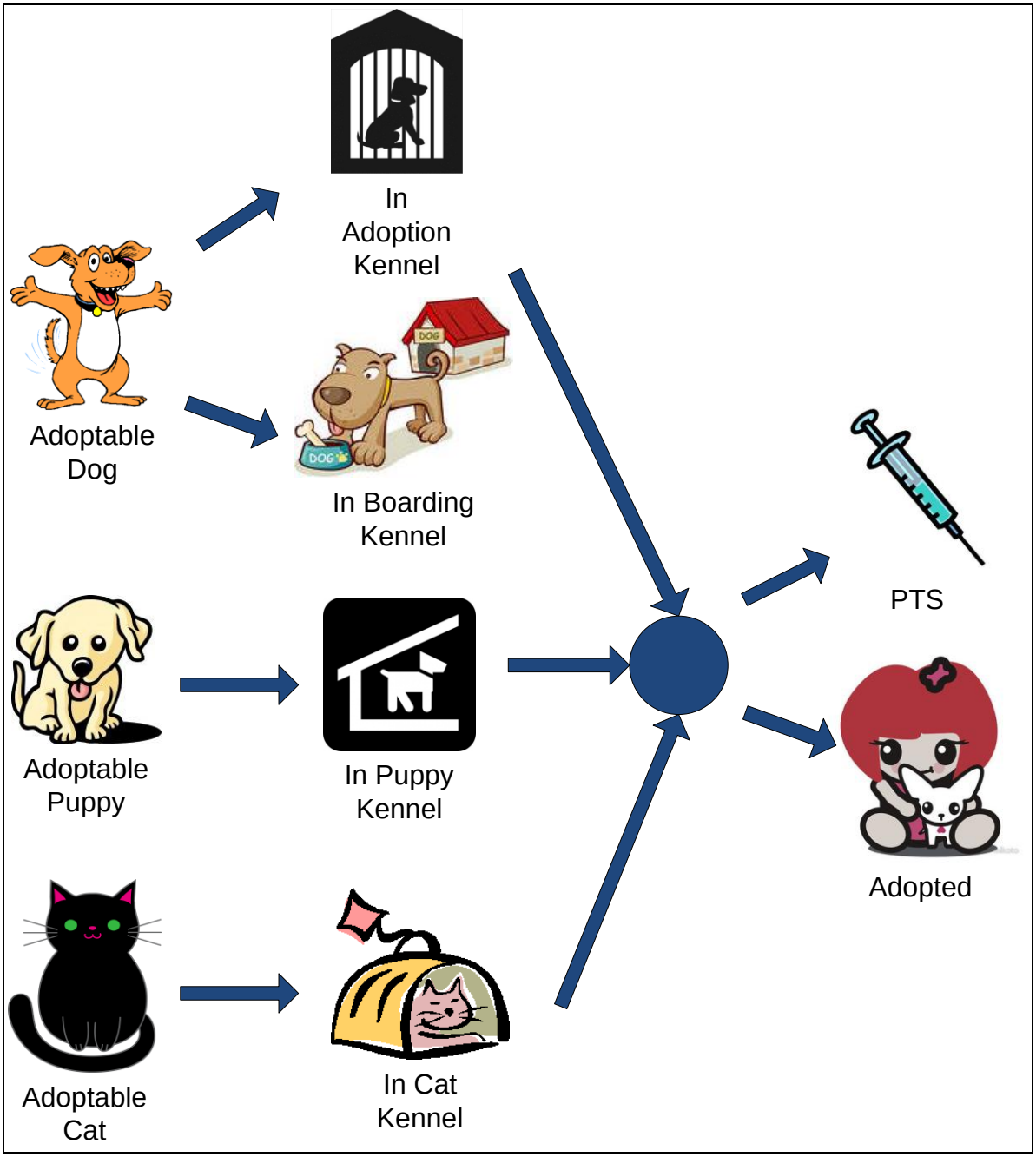

Figure 26 - The flow of adoptable animals.

5.3.1.2 Data Analysis & Process Specification

Now that the system and the flow of animals through the system or entities through the model has been defined, the rules of flow must be specified based on the analysis of the kennel data from April 2010 to March 2011. Several calculations were performed to obtain the necessary input data for the model to accurately represent the kennel system. These calculations and the Arena modules (blocks) for which they were required are shown in Appendix F.

5.3.1.3 KPI Definition

In order to validate the simulation model, several statistics and KPI's need to be defined. The most important KPI is, of course, the average length of the queue (average number of animals queuing) at the holding kennels. Other KPI's to measure the performance of the kennel system and statistics to compare the real-world system outputs with the model's outputs can be also be defined. These statistics or KPI's are displayed in Table 28 below. **(Please note that data concerning euthanasia is highly confidential)**

KPI	Units of Measurement
Average length of holding kennel queue	Nr of animals
Total number of animals adopted per year	Nr of animals/yr
Total number of animals put to sleep per year	Nr of animals/yr
Total number of strays claimed per year	Nr of animals/yr
Average time an adopted animal spends in the kennel system	Days

Table 28 - Kennel system KPI's for simulation model validation and improvement evaluation.

5.3.1.4 Model Results & Validation

The results or outputs of the simulation model must now be validated using the KPI's to ensure that it accurately represents the real-world system. The model was run for five replications to simulate the kennel system behaviour over a period of a year and the results in Table 29, as compared to the actual historical data, were obtained (the results and model animation from Arena are also shown in Figures 27 & 28).

KPI	Model Output	Real-world System Performance	Difference
Total number of animals adopted per year	945	997	5.2%
Total number of animals put to sleep per year			2.8%
Total number of strays claimed per year	584	555	5.2%

Table 29 - The difference between the simulation model output and the real-world system performance.

Since the model outputs differ less than 10% from the real-world system performance, the model can be deemed valid and accurately representative of the actual system. It can thus be used to test various changes to the system. The model also delivered values for the two other very important KPI's, as can be seen in Table 30. It is clear that there is a large amount of animals "queuing" for the holding kennels – an average of 23.22 animals at any point in time will be waiting for a space in the holding

kennels to open up. Also, animals that do get adopted stay in the kennel system for an average of 8.23 days.

KPI	Model Output
Average length of holding kennel queue	23.22
Average time an adopted animal spends in the kennel system	8.23

Table 30 - Simulation model results w.r.t. important KPI's.

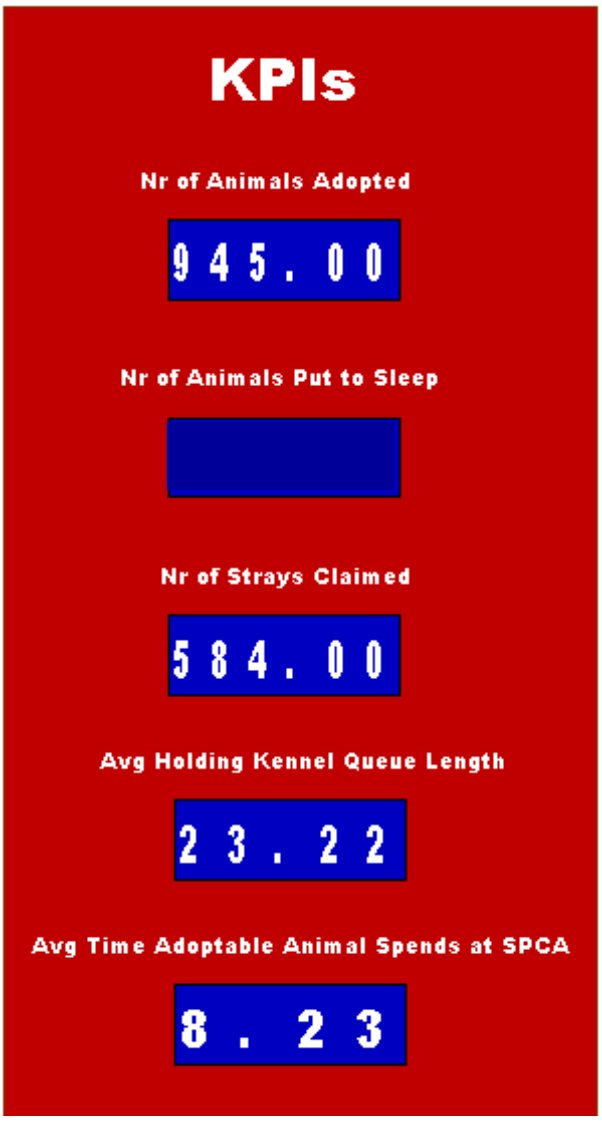

Figure 27 - The dashboard showing the Arena model's KPI results.

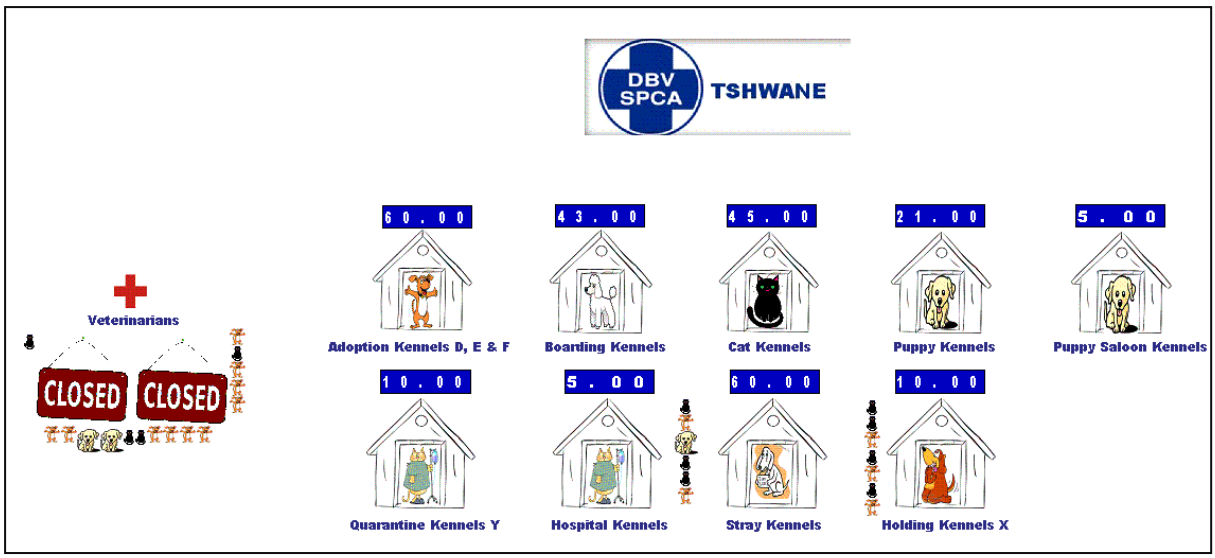

Figure 28 - The animation of the kennel system simulation model.

5.3.1.5 Improvement Recommendations

To improve on these KPI's, important changes to the model can be made. The changes to the system must be financially feasible and must take qualitative factors such as the SPCA's mission to protect and help as many animals as possible. The following changes were decided upon:

- Currently, the SPCA keeps adoptable animals for very long periods of time which means that animals that do not get adopted soon enough take up the space of other animals that may get adopted sooner. Reducing the time that animals spend in the adoption kennels by putting animals to sleep if new animals require space in the adoption kennels may actually increase the number of animals that do get adopted because more animals have a chance and because animals will move through the system faster, there may be less congestion at the holding kennels.
- With the Inspectorate being able to plan and deploy their resources better (through the solutions suggested in this document), the time it takes from when a customer applies for adoption to when his adoption is approved can be reduced because of more efficient pre-adoption inspections. The current average time it takes to finalise an adoption is between 7 and 11 days (with up to two weekends included in the process). Reducing this to a realistic time of 4 to 6 days will help to get animals through the kennel system faster so that new ones may be helped as well.

These changes may seem small and insignificant, but can make a big difference to several of the KPI's. The changes to the model were made (reducing the Adoption Finalisation delay times and creating a rule that forces animals in the adoption kennels to be put to sleep when another requires the space) and it was run for five more replications of the system behaviour over a period of a year. This improved model is available on the CD-ROM as the file "**Kennel System Improvement Simulation**

Model.doe". The results in Table 31 were obtained, a significant improvement on the current situation. The KPI results animation is also shown in Figure 29.

KPI	Current System	Improved System	% Improvement
Total number of animals adopted per year	945	2041	**116%**
Total number of animals put to sleep per year			**6.1%**
Total number of strays claimed per year	584	582	**-0.3%**
Average length of holding kennel queue	23.22	0.97	**95.8%**
Average time an adopted animal spends in the kennel system	8.23	3.74	**54.6%**

Table 31 - Improvements resulting from changes to the kennel system.

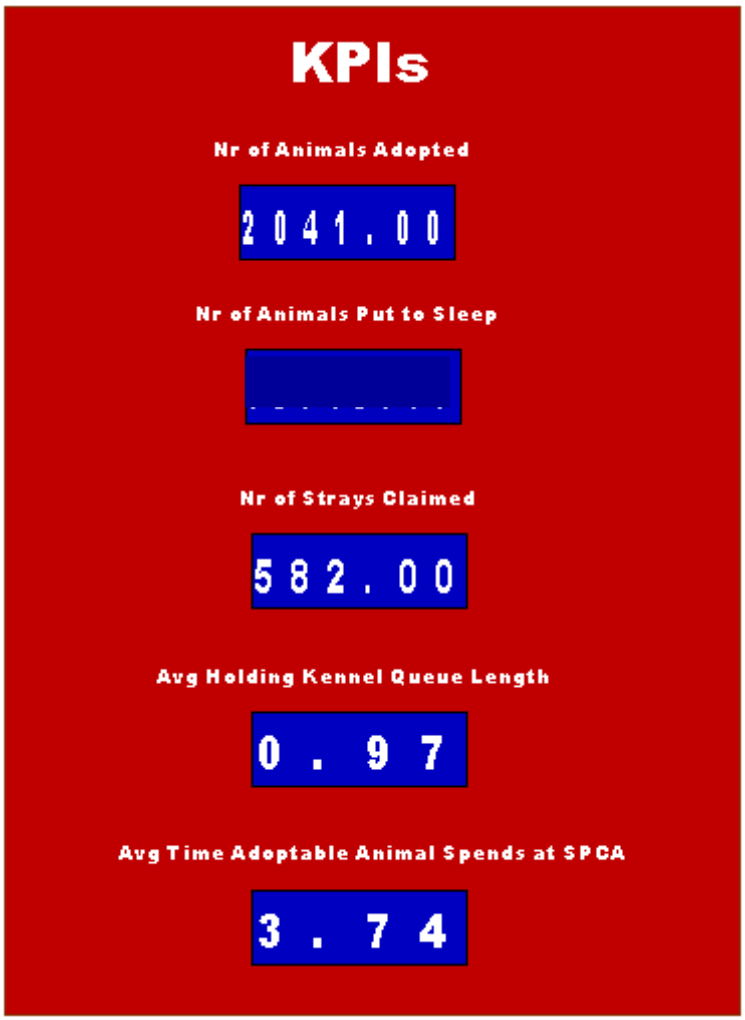

Figure 29 - The dashboard showing the Arena model's KPI results for an improved kennel system.

According to the results generated by the model that incorporates an improved kennel system, the holding kennel problem will be solved by these changes. Not only will it reduce the congestion at the holding kennels and the time an animal waits before it is homed, but it will also result in a significant increase in the number of animals adopted, a reduction in the number of animals put to sleep and an increase in the number of strays that are claimed by their owners.

5.4. Corporate Social Investment Proposal

The sample proposal to acquire a corporate partner or investor will now be developed. A possible project relating to using the SPCA's unused land for a petting farm (including the SPCA's puppies), a dog walk area and an area where children can be educated was used for the sample proposal and includes the following (as suggested by the literature):

- ✓ The demographics of the SPCA (data on the customers that can participate in the project, their locations, income and loyalty)
- ✓ Testimonials from previous corporate sponsors about the value of the SPCA
- ✓ Proof of a positive NPV (expenses and potential returns must be budgeted and other qualitative benefits described)
- ✓ Data about the SPCA's assets and what they have to offer

The data used for this proposal is merely sample data. The actual data to be used must be based on research (estimates and forecasts) and the SPCA must collaborate with an interested company to obtain the correct forecasts of the company's sales increases and other data. Figures 30 & 31 below display the sample corporate social investment proposal.

Figure 30 - Part of the corporate social investment proposal describing the SPCA and its general cause.

Figure 31 - Part of the corporate social investment proposal describing the specific project and its benefits.

6. Validation

The solutions that have been developed must now be validated and/or tested.

6.1 Risk Assessment

Since qualitative risk assessment is based on expert judgement and estimations, it is not possible to validate the results. It is, however, necessary to continually re-assess the risks so that priorities remain relevant. This should be done by re-assessing the importance of inspection types w.r.t. how well they contribute to the objectives of the Inspectorate. Furthermore, the probability that a certain type of inspection will be required should be re-calculated at regular intervals, the historical data updated to remain relevant. This will be possible through the Inspectorate Report that enables the generation of inspection data on a monthly basis.

The importance weights of inspection types can be validated further by allowing other experts or relevant parties to make judgements as well, thus receiving a more carefully considered rating. The probabilities calculated from historical data can also be validated further by comparing it with the proportion of each inspection type as it occurred during the most recent month.

6.2 Data Recording & Analysis

The effectiveness of the simple MS Excel system, Inspectorate Report, was tested using fictional data to ensure that the functionalities and formulas perform as planned. All problems and errors were fixed and the system now has all the capabilities, can perform all the calculations and can generate all the reports it was intended to. Since the system developer was given the freedom to design solutions as seen fit, no formal validation or user sign-off is required at this stage. The user or critic can "play around" with the system and view its physical design to test whether it is truly working, since an editable version of the system (named **"Inspectorate Report Edit.xlsx"**) is available on the CD-ROM included in this document.

The inspector allocation functionality (which assigns inspectors to suburbs) indicates the portion of each high-priority inspection type that will probably be completed by each inspector (according to the suburbs he has been assigned to). The effectiveness of this functionality can be validated (like the probabilities mentioned in the section above) by comparing its forecast to the actual portion of each high-priority inspection that was, in a recent period of time, performed by the inspectors in the suburbs they were assigned to. If the proportions are similar, the historical data is accurate and the system's functionality is working.

6.3 Information System Design

The information system that has been created in the form of functional requirements and a data model (ERD) was validated i.t.o. whether it can satisfy the process improvements suggested for Reception. Each functional requirement (use case) was traced back to a process improvement alternative(s) that relates to the use of an electronic database (the alternatives are numbered from A1.1.1-A4.1.1 in Tables 9-12) and the entities and relationships in the data model were studied to confirm their ability to enable the system to perform the use cases. It was found that not all use cases will be enabled by entities and the relationships between them, but that some use cases will be enabled by specific elements in the physical design of the system (not included in this project).

All report-generating use cases facilitate no specific process improvements, but they are new additions to the process and are enabled by various entities and the physical design of the system. The best way to validate whether the information system truly solves the problem and can enable the recommended process improvements is to build it, integrate it into newly modelled processes and have Reception staff familiarise themselves with its functionalities – a development phase that was not completed for the purposes of this project. An experienced third-party software developer looking for a corporate social investment to enhance its credentials and public image will be the best candidate to further develop the system.

6.4 Kennel System Simulation Model

The simulation model was validated and found to be accurately representative of the kennel system since the model outputs differ, on average, less than 10% from the actual historical data (refer to Section 5.3.1.4).

6.5. Corporate Social Investment Proposal

The proposal has been compared with the SPCA's current communications with potential corporate sponsors (which only contains the SPCA's general cause and donation requirements) and the cause-related marketing checklist to test whether it is truly a better means to acquire a corporate partner to invest in the SPCA. It was found that the proposal contains the information the SPCA currently uses when asking for donations or sponsors (such as the general cause of the SPCA and the required donations or contributions) but also other critical information about the benefits of providing these donations or contributions (as an investment). It is thus a more complete approach that is more likely to attract the attention of potential corporate partners.

In order to validate the financial information of the proposal, however, the help of an interested corporate investor will be required because sales forecasts and discount rates are dependent on the specific company and the SPCA can only make generic estimates of such data.

7. Conclusion & Recommendations

The objective of creating a means to aid the Inspectorate in improving its resource utilization and that will enable it to record and analyse data better has been achieved through the design of a simple Excel system, the Inspectorate Report. This system enables the Inspectorate to rapidly and easily record the data it requires on a monthly basis. The system also analyses the data and delivers a monthly report that summarises the month's data in a visually appealing form and presents graphs. The Inspectorate's inspection types have also been prioritised through qualitative risk assessment to allow them to plan better and deploy their resources according to the plan. The high-priority inspections were "predicted" to occur more frequently in certain suburbs through a hotspot analysis (based on historical inspection data) using ArcGIS. This visual representation of the frequency that high-priority inspections will be required in certain suburbs, along with the Inspectorate Report's capability to assign suburbs to inspectors (and then view the portion of high-priority inspections the inspector is anticipated to perform), aids the Inspectorate in distributing the workload more equally. It also contributes to the ability to plan and control its inspections better. It is recommended that the Inspectorate Report is tested for a trial period and that it then replaces the current (very outdated) resource deployment database. It is also recommended that the historical inspection data is updated regularly through using the data recorded and that the priorities of the Inspectorate are revised.

The objective of optimising the processing that occurs at Reception to allow for better control and efficiency has been achieved through a series of process improvements determined using the Questioning Technique. Since several of these improvement suggestions related to an electronic information system, they were translated into functional requirements and the feasibility of a candidate system was investigated. The system was, however, found infeasible so that the objective of designing a system that will reduce the large amount of time Reception spends on recording, keeping track of and transferring information was achieved by creating a data model for a system that would meet Reception's operational requirements to a greater extent. It is recommended that the system's physical designing and building occurs through a third-party software developer looking for a corporate social investment. The existing system, ASM, was found to be 67% feasible which varies minimally from the required 70%. Since the developers of ASM can be approached to make system alterations, it is recommended that these developers are first provided with the blueprint of the

required system and asked to determine whether they can alter their system to fit the SPCA's requirements. If this development is financially feasible, it is definitely a viable option. It is also recommended that the models of the Reception processes be introduced to the SPCA staff so that they are able to view their processes in a structured way. Accordingly they can generate more improvement suggestions themselves since they have more knowledge of the processes.

The objective of developing a means to enable animals to exit the system sooner so that more animals can be accommodated and the holding kennels do not overflow has been achieved through the creation of a simulation model that accurately represents the real-world kennel system. Changes to the model represents changes to the actual system and a few small changes resulted in significant increases in the number of animals adopted per year as well as reductions in the holding kennel queue length, the time an animal spends in the kennel system and the number of animals put to sleep per year. It is recommended that SPCA staff be trained in the basic concepts of simulation so that they may use the model to understand their system better. Additionally, an MS Excel data input system could be created so that the SPCA may "play around" with the model themselves.

The objective of designing a possible means with which to enter companies into a profitable business agreement through desirable products/services has been achieved through the creation of a sample corporate social investment proposal that demonstrates how a project that more efficiently utilises the SPCA's unused assets can be budgeted for. The proposal then uses the budgeted (estimated or forecast) positive and negative cash flows to demonstrate the financial returns for the company in the form of an NPV. It also describes other benefits the company can potentially enjoy when investing in the SPCA project. Such a template or sample thus provides a new means for the Fundraising department through which it can more effectively attract sponsors and long-term investors. It is recommended, however, that several drafts of the proposal be compiled as more information becomes available after potential investors have shown interest in the project (because more detailed financial information must be obtained from investors to create a more accurate budget). It is also recommended that the template or sample not be used simply as it is, but that it is customised to meet the requirements of each project.

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9. Appendices

Appendix A – PIECES framework

The current information system used by the Tshwane SPCA is a filing system – customers or staff fill in forms that are filed and exchanged between staff members (with the exception of the computerized Microchip Information System). Problems with this information system can be identified using the PIECES framework's checklist:

Problem Type		Comments
Performance		
A. Throughput	x	All work involving customers is initiated at Reception and requires information exchanges between Reception & customers as well as other departments.
B. Response Time	x	Delayed responses to customer and staff requests because information between staff must be exchanged telephonically or searched for in files containing forms with extensive information on them.
Information (and Data)		
A. Outputs		
1. Lack of any information		
2. Lack of necessary information		
3. Lack of relevant information	x	The departments that work with customers do not have the information captured by other departments but also relevant to their operations and their interface with customers & other departments.
4. Too much information – information overload	x	The forms customers and staff must fill in are quite extensive and may capture too much information
5. Information that is not in a useful format	x	All the information is captured on paper & stored in files. All the information is in the form of words – there is no visual data available.
6. Information that is not accurate		
7. Information that is difficult to produce	x	It takes customers & personnel a long time to fill in the information.
8. Information that is not timely to its subsequent use	x	Much of the information captured may not be used at all or may only be used in the very distant future. Adoption applications become known to the Inspectorate only after the file is sent to them on foot at a later stage and the medical history of an admitted animal is not known to Hospital unless requested.
B. Inputs		
1. Data is not captured		
2. Data is not captured in time to be useful		
3. Data is not accurately captured – contains errors	x	When transferring data from one form to another or from a form to a computer (such as an e-mail or the Microchip System), an error could easily be made due to legibility issues.
4. Data is difficult to capture	x	It is difficult and time-consuming to fill in so much information about animals, owners, inspections, medical treatments etc.
5. Data is captured redundantly – same data is captured more than once	x	Adoption application, boarding bookings, animal medical history etc. is captured more than once.
6. Too much data is captured	x	Some forms are more than 5 pages long, containing data that is never read again.
7. Illegal data is captured		
C. Stored Data		
1. Data is stored redundantly in multiple files and/or databases	x	A copy of an adoption application is exchanged between Reception & Inspectorate and aspects of the adoption application are also replicated in a book at Reception. The
2. Stored data is not accurate		
3. Data is not secure from accident or vandalism	x	The physical files or susceptible to damage and loss.
4. Data is not well organized	x	Even though the forms & files are neat, there is no time for specific filing techniques and forms are filed as they are filled in.

5. Data is not flexible – not easy to meet new information needs from stored data	x	The forms filled in by customers & staff are fixed.
6. Data is not accessible	x	Only Reception, Hospital, Inspectorate & Lost n Found keep their relevant files at their workstations – other departments that require access to these files must request the data telephonically or in person.
Economics		
A. Costs		
1. Costs are unknown	x	It is difficult to know the cost of lost sales and customers due to the tedious administrative procedures and delayed responses.
2. Costs are untraceable to the source		
3. Costs are too high	x	The paper and stationary costs due to all the filing and telephonic information exchange is quite high.
B. Profits		
1. New markets can be explored		
2. Current marketing can be improved	x	Better response times and interface in itself can improve marketing.
3. Orders can be increased	x	Customers will be more willing to make use of the services of the SPCA if it is made easier, faster and more user-friendly for them.
Control (and Security)		
A. Too little security or control		
1. Input data is not adequately edited		
2. Crimes (e.g. fraud, embezzlement) are (or can be) committed against the data	x	The information can be stolen – it is in physical form and not physically secured.
3. Ethics are breached on data or information – refers to data or information getting to unauthorized people		
4. Redundantly stored data is inconsistent in different files or databases		
5. Data privacy regulations or guidelines are being (or can be) violated		
6. Processing errors are occurring (either by people, machines, or software)	x	People may make mistakes when delving into the mass of forms or communication errors may occur.
7. Decision- making errors are occurring		
B. Too much control or security		
1. Bureaucratic red tape slows the system	x	Having to fill in all the fields in the forms slows the system.
2. Controls inconvenience customers or employees	x	It is inconvenient for customers if they have to fill in several forms and wait for long periods of time while the forms are being processed.
3. Excessive controls cause processing delays	x	
Efficiency		
A. People, machines, or computers waste time		
1. Data is redundantly input or copied	x	
2. Data is redundantly processed	x	Staff must go search through data they will not use to get to the relevant data.
3. Information is redundantly generated	x	Even though the information may be necessary for the record or to adhere to policies & regulations, some data is never used.
B. People, machines, or computers waste materials and suppliers	x	Paper can be wasted.
C. Effort required for tasks is excessive	x	It takes extensive effort to complete, file, search for, request & exchange forms.
D. Materials required for tasks is excessive	x	A lot of paper.
Service		
A. The system produces inaccurate results		
B. The system produces inconsistent results		
C. The system produces unreliable results		
D. The system is not easy to learn		
E. The system is not easy to use	x	It is difficult to search for a certain piece of information between all the fields filled in on the forms.
F. The system is awkward to use	x	Dealing only with paper and files is awkward.
G. The system is inflexible to new or exceptional situations		
H. The system is inflexible to change		
I. The system is incompatible with other systems		
J. The system is not coordinated with other systems	x	The files are not co-ordinated with any computer systems.

Table 32 - The PIECES problem discovery for the current SPCA information system

Appendix B – Reception Forms

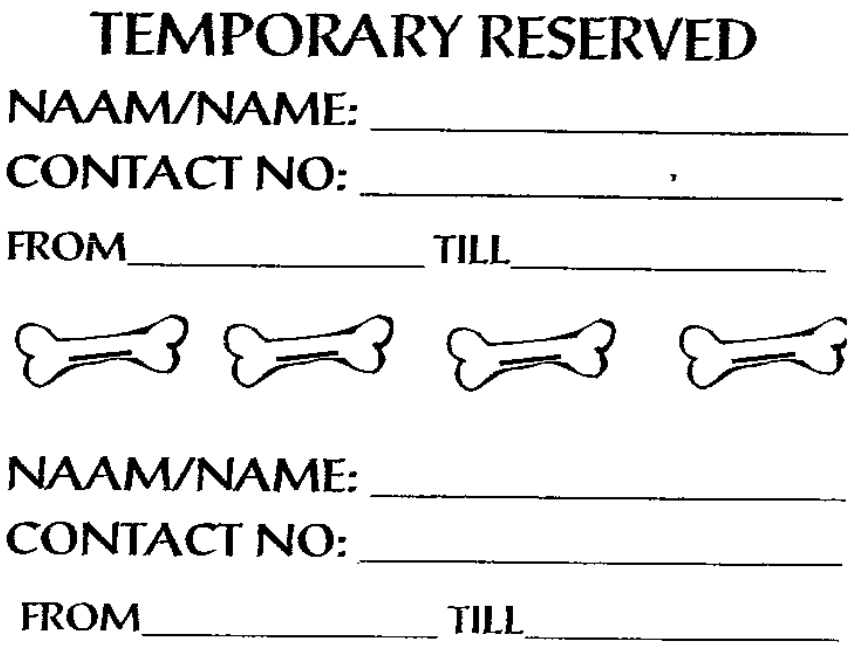

Figure 32 - Temporary Reservation Slip

TOELATING REKORD

DISC NO. _____

STRAY RONDLOPER	UNWANTED ONGEWENS	SIGNED OVER OORGETEKEN	CONFISCATED GEKONFISKEER	RETURNED TERUGGEBRING	ABANDONED AGTERGELAAT

DATE IN/ DATUM IN: _____ TIME IN/ TYD IN: _____

DOG / HOND	CAT / KAT	OTHER / ANDER	MICROSKYFIE / MICROCHIP	
BREED/ RAS		AGE/ OUDERDOM	SEX/ GESLAG	STERILISED/ GESTERILISEER
NAME/NAAM		COLOUR AND MARKINGS		COLLAR/HALSBAND
TEMPERAMENT		CONDITION/TOESTAND		SIZE/GROOTTE
COAT/HARE		TAIL/STERT		EARS/ORE

AREA FOUND / COLLECTED FROM :
AREA GEVIND / GEHAAL VAN : _____

DATE:
DATUM: _____

REASON FOR SURRENDER / REDE VIR OORGAWE: _____

POINTS ABOUT ANIMAL	YES	NO	OTHER GOOD POINTS
ood with children / Goed met kinders			
Good with cats / Goed met katte			
Good with other dogs / Goed met ander honde			
Good with farm animals / Goed met plaas diere			
Does dog jump over walls / Spring die hond oor mure			Moogle height
Is animal house trained / Is dier huis gemanierd			

DONATED / FOUND BY / GESKENK / GEVIND DEUR:

NAME / NAAM _____ EMAIL _____
ADRESS /
ADRES _____

TEL NO (H) _____ (W) _____ (C) _____
DONATION TOWARDS UPKEEP _____ **CASH / CARD/CHEQUE : RECEIPT NO:** _____

STATEMENT OF SURRENDER

I hereby declare that I DO/DO NOT own the animal described above, that IT IS/ IT IS NOT a stray and I DO/ DO NOT know where it comes from, and that in signing this form, the animal no longer belongs to me. I freely surrender all my interest, if any, therein to the SPCA, and I request that the animal be dealt with as deemed advisable in the discretion of the SPCA. I understand that if in the opinion of the SPCA the animal is not suitable for adoption, it will be humanely euthanased. It is expressly agreed that neither the SPCA or its officers and employees will incur any obligation to me on account of such disposition of said animal. I confirm that I am over eighteen (18) years of age.
SIGNATURE
HANDTEKENING

VERKLARING VAN OORHANDIGING

Hiermee verklaar ek dat ek bogenoemde dier BESIT/NIE BESIT NIE, dat dit 'n RONDLOPER/NIE RONDLOPER IS NIE, en dat ek WEET/NIE WEET waar dit vandaan kom nie. Ek doen ook vrywillig afstand van enige belange daarin, indien enige, aan die DBV en ek versoek dat met die dier gehandel word soos goed geag deur die DBV. Ek verstaan dat die dier genadedood sal ontvang as dit volgens die DBV nie geskik is vir aanneming nie. Daar word uitdruklik ooreenkekom dat nog die DBV nog sy amptenare en werknemers enige verpligtinge het teenoor my ten opsigte van die dier se beskikking. Ek bevestig dat ek ouer as agtien (18) jaar is.

WITNESS FOR SOCIETY
GETUIE VIR VERENIGING

DATE/ DATUM	REMARKS \ OPMERKINGS

Figure 33 - Animal Admission Form

TSHWANE SPCA

APPLICATION TO ADOPT A DOG

PET ADOPTION

Neem asb kennis dat R60.00 van die aannemingsgeld verbeur gaan word as aansoek afgekeur word. Indien 'in inspekteur u eiendom vir 'n tweede maal moet besoek, gaan 'n verdere R60.00 betaalbaar wees.
Indien u in 'n kompleks, woonstel of huur huis bly moet u 'n toestemmingsbrief van die beheerliggaam / eienaar BINNE 24 UUR aan die DBV faks. Indien u versuim om dit te doen, sal die aansoek gekansselleer word.

Please note that R60.00 from the adoption fee will be forfeited if application is declined. If an inspector needs to inspect your premises for a second time, a further R60.00 will be payable. If you stay in a complex, a flat or rent a property, a permission letter from the body corporate / owner must be faxed to the SPCA within 24 HOURS. Failure to do so will result in the cancellation of your application.

PLEASE NOTE : WE RETAIN THE RIGHT TO TURN DOWN THIS APPLICATION.
NEEM ASB KENNIS: ONS BEHOU DIE REG VOOR OM HIERDIE AANSOEK AF TE KEUR.

Name and Surname (including initials)
Naam en Van (insluitend voorletters) _____

Home address / Huisadres: _____

Postal address / Posadres: _____

Tel No (H) _____ (W) _____

(Cell 1) : _____ (Cell 2) _____

Email : _____ ID no : _____

Occupation: _____ Address: _____
Address where animal will be kept;
Adres waar dier gehou gaan word: _____

What breed of dog are you interested in?
In watter soort hond stel u belang?
_____

Reason for wanting an animal?
Rede vir aanneem van 'n dier? _____

Is the animal for yourself? Is die dier vir u self? Yes / Ja No / Nee

Can you afford private veterinary fees?
Kan u private veearts tariewe bekostig? Yes \ Ja No / Nee

INSPECTORATE USE ONLY

Date received _____ Date inspected _____

Inspector : _____ Approved: ☐ Declined: ☐

Comments:) _____

Figure 34 - Adoption Application Form p1

How many dogs\ cats do you own? Hoeveel honde / katte het u tans?

Breed Ras	Age Ouderdom	Sex Geslag	Sterilised ? Gesteriliseer	Name Naam	Vaccinated Inge-ent
Other pets:					

How many dogs/ cats have you owned over the past 5 years? Honde : Katte:
Hoeveel honde/ katte het u die afgelope 5 jaar in u besit gehad? Dogs : _____ Cats : _____

What happened to the others?
Wat het met die ander gebeur? _____

Do you : RENT / HUUR or OWN / BESIT your current residence. How long have you stayed there?
of u die eiendom. Hoe lank woon u daar? _____
Have you ever adopted an animal before? When?
Het u al voorheen 'n dier aangeneem? _____ Wanneer? _____

Full description of your fencing and gates (Height & type)
Besryf u tipe omheining en hek _____

Is your yard open plan or divided (.i.e. Back and front)?
Is u erf oop plan of verdeel (bv Voor en agter) ? _____

Will you chain a dog? Sal u 'n hond vasketting? Yes / Ja No / Nee

Will you keep a dog in a cage? Sal u 'n hond in 'n hok aanhou? Yes / Ja No / Nee

Is there adequate shelter for your pet? Is daar voldoende beskutting? Yes / Ja No / Nee

What are the ages of the children in your household?
Wat is die ouderdomme van die kinders in u huis? _____

DECLARATION / VERKLARING

I the undersigned hereby declare that the above information is correct and agree to pay the full adoption fee to the SPCA. I understand that if the property check is declined, R60.00 will be deducted from the money refunded to me. If I cancel the adoption after the sterilisation has been done, the adoption fee will not be refunded to me. All refunds must be requested within (7) seven days (inclusive of weekends). **I understand that emergencies take preference over the conducting of a property check.**

Ek, die ondergetekende verklaar hiermee dat bogenoemde inligting korrek is en stem in om die volle bedrag van die aannemingskoste aan die DBV te betaal. Ek verstaan dat indien die aansoek afgekeur word, R60.00 verbeur sal word. As ek die aanneming kansselleer nadat die sterilisasie uitgevoer is, sal die aannemingsfooi nie aan my terug-betaal word nie. Alle terugbetalings moet binne (7) sewe dae (insluitend naweke) geskied. Ek verstaan dat noodge-valle voorkeur bo die uitvoer van erfondersoeke kry.

SIGNATURE / HANDTEKENING _____ DATE / DATUM _____

WITNESS FOR SPCA / GETUIE VIR DBV: _____

AMOUNT : _____ RECEIPT NO: _____

Figure 35 - Adoption Application Form p2

ADOPTION POLICY

- Please read this adoption policy carefully as it is an agreement between the SPCA and the undersigned.
- I declare that I am over 18 years of age.
- I will not chain / cage the animal and understand that if it's found chained / caged it will be removed from my care immediately.
- I take note that it's against the SPCA policy to dispose of an animal adopted from the SPCA by either selling it or giving it away as a gift to a third party. If for any reason I'm unable to keep the animal, I will return it to the SPCA.
- I will ensure that all vaccinations and deworming are kept up to date, that rabies vaccinations are done annually, and in case of injury or illnes provide qualified veterinary treatment. After adoption the costs of vaccination and deworming becomes my responsibility.
- I understand that in the case of illness (not injury) occurring within two weeks of adoption, I may take the animal to the SPCA for treatment a extra cost to myself, if no Veterinarian is available at the SPCA, I must take the animal to my own Veterinarian at my own costs.
- I will notify the Society within 48 hours should the pet die (in writing and the reason) or go missing.
- I will NOT use or allow the dog to be used as a guard dog on any industrial or commercial premises.
- I will notify the Society of any changes of address and telephone numbers within 7 days.
- I consent to the compulsory sterilisation of the pet.
- I shall ensure that the pet is properly and adequately fed and housed as well as to make boarding arrangements for the pet when I go on vacati
- I will permit an official of the SPCA to visit my premises to perform checks on the pet and the condition in which it is kept.
- I will allow the SPCA to reposess the pet/s without any refund if in the opinion of the SPCA, the terms of this agreement have not been adher to in spirit and in deed.
- My property is adequately enclosed and at no time shall I knowingly allow my dog to roam in the streets.
- If the animal is not collected within two days after it has been sterilized, I will be liable for the necessary fees (R30.00 per day), for a maximu of 3 days, after which the pet will be placed back to adoption and the application will be cancelled (unless an arrangement has been made). Al money will be forfeited to cover the expenses made by the SPCA.
- I reserve the right to discuss the content of this agreement with an authorized officer to the SPCA should there be any unclarity.
- I hereby declare that I accept and understand the adoption policy.

AANEMINGSBELEID

- Lees asseblief die aanemingsbeleid sorgvuldig deur aangesien hierdie dokument as 'n ooreenkoms tussen u die ondergetekende en die DBV beskou sal word.
- Ek verklaar dat ek ouer is as 18 jaar.
- Ek sal die dier 'n redelike kans gee om aan sy nuwe tuiste gewoond te raak.
- Ek sal nie die hond vasketting / in 'n hok aanhou nie en verstaan dat indien die dier so gevind gaan word, dit dadelik verwyder sal word.
- Ek neem kennis dat dit teen die DBV se beleid is om van die aangenome dier ontslae te raak hetsy die dier te verkoop of weg te gee as 'n geskenk aan 'n derde party. Indien ek om een of ander rede nie die dier kan hou nie, sal ek die dier aan die DBV terug besorg.
- Ek onderneem om die dier se inentings en onwurmings op datum te hou as ook die jaarlikse hondsdolheid inentings. In die geval van 'n besering of siekte sal ek die dier na 'n gekwalifiseerde veearts neem vir behandeling. Alle inentings en ontwurmings onkostes na die aanneeming is my verantwoordelikheid.
- In die geval van siekte (nie besering nie) wat in die eerste twee weke na aanneming voorkom mag ek die dier na die DBV neem vir behandeling teen geen kostes nie. Indien die DBV nie 'n veearts beskikbaar het nie moet ek die dier na 'n privaat veearts neem op my eie koste.
- Ek sal die DBV binne 48 uur in kennis stel sou die aangenome dier doodgaan (skriftelik en rede) of vermis word.
- Ek sal NIE die aangenome dier gebruik of toelaat dat die dier vir sekuriteits doeleindes by kommersiele of industriele persele gebruik word nie.
- Ek sal binne 7 dae die DBV in kennis stel van enige verandering van adres of kontak nommers.
- Ek sal myself onderhewig stel aan die verpligte sterilisaie van die dier.
- Ek sal ten alle tye sorg dat die dier goed versorg is met toegang tot kos, water en beskutting, sowel as omreelingste tref vir wanneer ek op vakansie gaan.
- Ek sal toelaat dat 'n beampte van die DBV my perseel besoek om na te gaan of die toestande waaronder die troeteldier aangehou word bevredigend is.
- Ek sal toelaat dat die DBV die aangenome dier terugneem sonder vergoeding as die vereistes van die beleid nie nagekom is nie.
- My erf is behoorlik omhein en ek sal nie toelaat dat my hond in die straat rondloop nie.
- Sou die aangenome dier nie binne 2 dae na sterilisasie afgehaal word nie, sal ek verantwoordelik gehou word vir kostes (R30.00 per dag) vir 'n maksimum van 3 dae, waarna die aanneming gekanselleer sal word en die dier vir heraanneming geplaas word (tensy ander reelings getref word Alle gelde wat vooraf betaal was sal verbeur word ten gunste van die DBV om kostes wat aangegaan is te dek.
- Ek behou die reg om die inhoud van die onderneming met 'n gemagtigde beampte van die DBV te bespreek mits daar enige onduidelikheid is.
- Ek verklaar hiermee dat ek die aannemingsbeleid aanvaar en verstaan.

Name & Surname
Naam & Van : _____

Signature
Handtekening: _____

SPCA Witness
DBV Getuie : _____

Date
Datum : _____

BREED	SEX	AGE	DISC / KNL NO	M/CHIP

Figure 36 - Adoption Application Form p3

REQUIREMENT PROFILE FOR DOGS

Please mark the questions below to assist us in ensuring that the most suitable dog possible is placed in your home.

NEW OWNERS REQUIREMENTS				OFFICE USE
What will you do with a very naughty dog i.e. Digging, Chewing etc.	Return to SPCA	Will train dog	Give dog away	
Every day there is a friend or family member at home	No	Half day	Yes	
I want a dog that is aggressive	No	With Strangers	Yes	
I want a dog with good manners	No	Basic manners	Yes	
I want a dog that is playful	No	Moderately	Yes	
I want a dog that is active	No	Moderately	Yes	
I want a dog that is noisy	No	Moderately	Yes	
I want a dog to live inside the house	No	Sleep Inside	Yes	
I want a dog that likes to be alone	No		Yes	
I want a dog that can stay in the -	Back Yard	Full run of the property	Cage	
I want an affectionate / loving dog	No	Moderately	Yes	
I know how to formally train a dog	No	Some experience	Yes	
I will take a dog that needs training	No	Basic training	Yes	
I want a dog that I can train to do special things	No	Some basic things	Yes	
The dog will live with children under 10 years old	No	Only Visiting	Yes	
There are elderly people in my home	No	Only visiting	Yes	
The dog will live with cats	No		Yes	
The dog will live with farm animals	No		Yes	

PLEASE ANSWER THE QUESTIONS BELOW...

GENERAL QUESTIONS	OWNERS COMMENTS	OFFICE USE
How often are pets vaccinated		
What will you feed the pets		
Will the dog walk on a lead		
Do you live in a dangerous area		

Figure 37 - Adoption Application Form p4

RECEPTION (FOR OFFICE USE ONLY)

PROCESS CHECKLIST

PLEASE CHECK AND MARK IN THE BLOCKS PROVIDED

1.	Did you explain the adoption policy?	**Yes**	**No**
2.	Did the adoptee read and understand the adoption policy?	**Yes**	**No**
3.	Did the adoptee sign the adoption policy?	**Yes**	**No**
4.	Did you ask the adoptee if they are renting or if they stay in a complex?	**Yes**	**No**
5.	Did you reserve the dog on the kennel form?	**Yes**	**No**
6.	Did you complete all the paperwork, including the owner profile?	**Yes**	**No**
7.	Was the correct dog's form used - did it correspond with the dog in the kennel?	**Yes**	**No**
8.	Is there less than 3 dogs on the property?	**Yes**	**No**
9.	Did you get clearance from the inspectorate for more than 3 dogs?	**Yes**	**No**
10.	Was the adoptee interviewed by the Kennel Manager / HOD?	**Yes**	**No**
11.	Has the Kennel Manager / HOD confirmed the adoption?	**Yes**	**No**
12.	Did the adoptee pay and receive a receipt?	**Yes**	**No**

Checked by : _____ **Date :** _____

KENNEL USE ONLY

Kennel Manager / HOD : _____ Date : _____

Did the dogs get along with : 1. Adopters : _____

2. Children : _____

3. Adopters dogs : _____

Adopted dog tested by : _____

Approved : _____ Declined : _____

Comments :

_____

_____

Kennel Manager / HOD signature : _____

Figure 38 - Adoption Application Form p5

SPCA Tshwane
SOCIETY FOR THE PREVENTION OF CRUELTY TO ANIMALS.
DBV
DIEREBESKERMINGSVERENIGING

BRANCHES:
PRETORIA (Head Office)
CENTURION
KUNGWINI

Affiliated to National Council of SPCAs // Geaffilieer aan Nasionale Raad van DBVs

TELEPHONE / TELEFOON: 012 803 5219
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OFFICE AND CLINIC /
KANTOOR EN KLINIEK
316 PETROLEUM STR 316
WALTLOO, PRETORIA

001-429 NPO
BTW / VAT Reg. No: 4370120406
Incorporated Association not for gain - Ingelyfde Vereniging sonder winsoogmerk
Reg. No: 1949/033797/08

PET OWNERSHIP APPLICATION

DETAILS OF APPLICANT:

I, _____, owner\ tenant of _____ herewith apply for permission to keep the following pet\s on the premises adopted from Tshwane SPCA:

ANIMAL	BREED	AGE	SEX

I hereby agree that my pet\s will be kept in a responsible manner and proper care will be provided as set in the rules and regulations.

All animals adopted from the Tshwane SPCA will be sterilized, micro-chipped, vaccinated, de-wormed and a property check will be conducted by an inspector of the SPCA.

_____ _____
SIGNATURE OF APPLICANT DATE

CHAIR PERSON \ OWNER DETAILS

APPLICATION APPROVED: YES \ NO

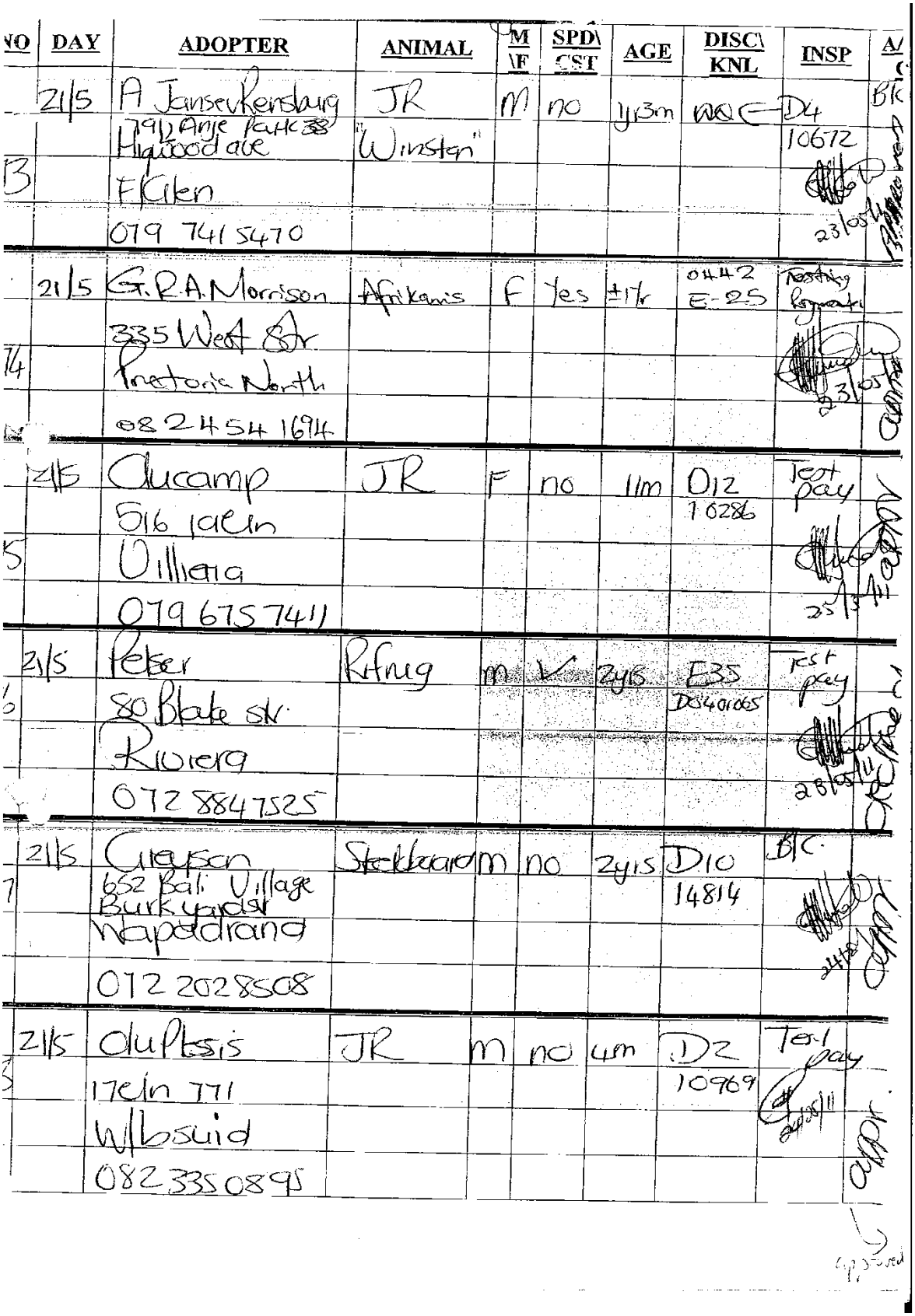
CHAIR PERSON\OWNER: _____

CONTACT NUMBER: _____

SIGNATURE: _____ DATE: _____

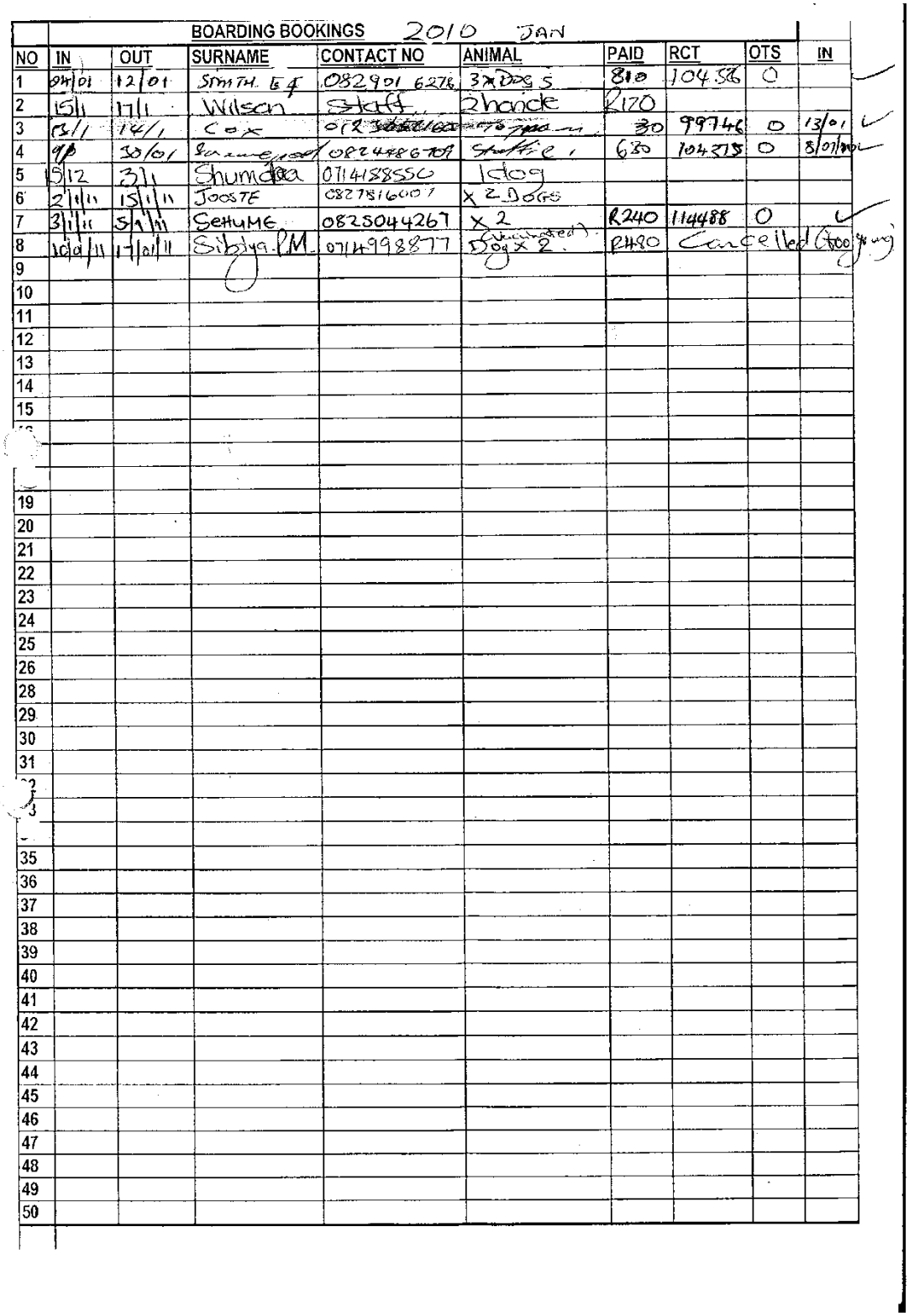
STAMP \ STEMPEL:

Figure 39 - Adoption Application Form p6



NO	DAY	ADOPTER	ANIMAL	M/F	SPD/CST	AGE	DISC/KNL	INSP	A/C
	21/5	A Janserkerstburg 19½ Anje Park 38 Highwood ave F Glen 079 741 5470	JR "Winston"	M	no	1yr3m	WAC	D4 10672 23/05	B/C
	21/5	G.R.A. Morrison 335 West Str Pretoria North 082 454 1694	Afrikanis	F	Yes	±1yr	0442 E-25	Neutering 23/05	
	21/5	Ducamp 516 Jacin Villieria 079 675 7411	JR	F	no	11m	D12 10286	Test pay 25/5	
	21/5	Peter 80 Blake str. Riviera 072 884 7525	Rhino	m	✓	2yrs	E35 D04/0165	Test pay 28/5	
	21/5	Greyson 652 Bali Village Burkyndar Hapeddrand 072 202 8508	Stickbaard	m	no	2yrs	D10 14814	B/C. 24/5	
	21/5	duPlessis 17 Jin 771 Wilbsuid 082 335 0895	JR	m	no	4m	D2 10969	Test pay 24/05/11	

Figure 40 - Adoption List



BOARDING BOOKINGS 2010 JAN

NO	IN	OUT	SURNAME	CONTACT NO	ANIMAL	PAID	RCT	OTS	IN
1	04/01	12/01	SMITH. L & J	082901 6276	3 x Dogs	810	10456	0	
2	15/1	17/1	Wilson	Staff	2 hands	R170			
3	13/1	14/1	Cox	082 [illegible]	[illegible]	30	99746	0	13/01
4	4/1	30/01	Summerpool	0824486709	Staffie	630	104375	0	8/01/2011
5	15/12	3/1	Shumdaa	0711458550	1 dog				
6	2/1/11	15/1/11	JOOSTE	0827816007	x 2 DOGS				
7	31/1/11	5/2/11	SETHUME	0823044267	x 2	R240	114488	0	
8	10/2/11	17/2/11	Sibiya PM	0714998877	Sheltered Dog x 2	R480	Cancelled (too young)		
9									
10									
11									
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49									
50									

Figure 41 - Boarding Bookings List

BOARDING/LOSEERDERS

Kennel no				
Disc				

Breed/ Ras	Age/ Ouderdom	Sex/ Geslag	Sterilized/ Gesteriliseer	Colour/ Kleur	Vacc/ Inenting	Name/ Naam

Details of owner

VAN EN VOORLETTERS/SURNAME AND INITIALS

WOONADRES/RESIDENTIAL ADDRESS _____

_____

POSADRES/POSTAL ADDRESS _____

KODE/CODE _____

TEL: (W) TEL: (H)

CELL OR OTHER CONTACT

Vet /Veearts _____ *Tel* _____

Address/Adres _____

Booking from _____ To _____

Tariff per dog per day _____ Number of days_____

Total Cost _____ Paid /Betaal:_____

Receipt No/Kwitansie Nr:_____ Outstanding: _____

I the undersigned take note of and accept the conditions as stipulated.
Ek, die ondergetekende neem kennis en aanvaar die voorwaardes, soos uiteengesit.

Signature/Handtekening _____ Date/Datum_____

Society witness _____

Figure 42 - Boarding Form

REPORT TYPE

LOST ☐ **FOUND** ☐

DATE OF CALL:_____ TIME OF CALL:_____

NAME & INITIALS:_____

ADDRESS:_____

EMAIL:_____ TEL (H):_____

CELL 1:_____ TEL (W):_____

ID NR:_____ VEHICLE REG:_____

SUBURB WHERE ANIMAL GOT LOST \ FOUND:_____

DATE ANIMAL WAS LOST \ FOUND: _____

	DESCRIPTION 1	DESCRIPTION 2
TYPE OF ANIMAL (dog, cat, horse etc.)		
BREED (Rottweiler\Persian\Shetland pony etc)		
SIZE (small \ medium \ large \ extra large)		
SEX		
AGE		
NAME		
SPAYED \ NEUTERED		
COAT TYPE (short\ long \ medium \ wire haired \ groomed \ curly)		
TAIL TYPE (short \ long \ curly \ bushy)		
EAR TYPE (pricked \ floppy \ half down)		
COLOUR (e.g. Black & Tan)		
EYE COLOUR		
UNUSUAL MARKINGS | PECULIARITIES		
COLLAR TYPE (leather \ elasticides \ choke chain)		
ID TAG DETAILS		
MICROCHIP DETAILS (if implanted)		
IF ON MEDICATION, PLEASE GIVE DETAILS		
OTHER COMMENTS		

PLEASE NOTE

- It remains the responsibility of the owner to come to the SPCA as often as possible to look for the animal.
- If you have a picture of the lost\found pet please attach it to this form.
- Contact all the local Veterinarians in the area and also report the animal as lost \ found.
- Place adverts on Shopping Centre's in the area of the lost \ found animal.
- Contact other Welfare Organisations in the area to report the lost \ found animal.
- Place an advert in the LOST column of daily newspapers in Afrikaans and English.

Figure 43 - Lost/Found Form

TSHWANE SPCA

TSHWANE DBV

CLAIMANT \ EISER

Species Spesie	Breed Ras	Age Ouderdom	Sex Geslag	Knl no Hok	Disc Plaaitjie

Name - Prof/Dr /Mr /Mrs / Ms
Naam – Prof/Dr /Mnr / Mev/ Mej _____

Residential Address
Woonadres _____

_____

Postal address
Pos adres _____

Home tel nr
Huis tel nr _____

Work nr
Werk nr _____

Cell 1
Selfoon 1 _____

Cell 2
Selfoon 2 _____

Identity nr
Identiteits nr _____

Vehicle/Voertuig
Reg Nr _____

Pound fees for animal/s
Skutgeld vir dier/e _____

Receipt No
Kwitansie Nr _____

Signature
Handtekening _____

Witness for Society
DBV Verteenwoordiger _____

Date
Datum _____

Figure 44 - Claim Form

Appendix C – AHP Calculations

Criteria	Animal Health & Welfare	Income	Public Image/ Customer Service	Sustainability/ Empowerment/ Promotion
Animal Health & Welfare	1.0000	3.0000	7.0000	3.0000
Income	0.3333	1.0000	7.0000	3.0000
Public Image/Customer Service	0.1429	0.1429	1.0000	0.3333
Sustainability/Empowerment/Promotion	0.3333	0.3333	3.0000	1.0000
Sum	**1.8095**	**4.4762**	**18.0000**	**7.3333**

Table 33 - Pairwise comparison of criteria.

Intermediate Matrix: Criteria				Average Weight	Criteria
0.5526	0.670213	0.3889	0.4091	**0.5052**	**Animal Health & Welfare**
0.1842	0.223404	0.3889	0.4091	**0.3014**	**Income**
0.0789	0.031915	0.0556	0.0455	**0.0530**	**Public Image/Customer Service**
0.1842	0.074468	0.1667	0.1364	**0.1404**	**Sustainability/Empowerment/Promotion**

Table 34 - The intermediate matrix to obtain the weight of each criterion w.r.t. the main objective

Pairwise Comparison Matrix w.r.t. Animal Health & Welfare										
	PLANNED	**ANIMAL CRUELTY**	**OWNER/NEIGHBOUR ISSUES**	**ANIMALS ABANDONED**	**EMERGENCY RESCUE**	**ANIMAL REMOVAL REQUEST**	**PICK-UPS ON ROUTE**	**PRO-ACTIVE**	**INSTITUTIONAL CRUELTY**	**BREEDING/ SELLING**
PLANNED	1.0000	0.3333	5.0000	0.2000	0.2000	0.2000	0.2000	7.0000	0.1429	5.0000
ANIMAL CRUELTY	3.0000	1.0000	7.0000	1.0000	0.3333	3.0000	3.0000	7.0000	0.2000	7.0000
OWNER/NEIGHBOUR ISSUES	0.2000	0.1429	1.0000	0.1429	0.1429	0.1429	0.1429	1.0000	0.1111	0.3333
ANIMALS ABANDONED	5.0000	1.0000	7.0000	1.0000	0.1429	3.0000	3.0000	7.0000	0.2000	7.0000
EMERGENCY RESCUE	5.0000	3.0000	7.0000	7.0000	1.0000	5.0000	5.0000	7.0000	5.0000	7.0000
ANIMAL REMOVAL REQUEST	5.0000	0.3333	7.0000	0.3333	0.2000	1.0000	1.0000	5.0000	0.1429	5.0000
PICK-UPS ON ROUTE	5.0000	0.3333	7.0000	0.3333	0.2000	1.0000	1.0000	5.0000	0.1429	5.0000
PRO-ACTIVE	0.1429	0.1429	1.0000	0.1429	0.1429	0.2000	0.2000	1.0000	0.1429	1.0000
INSTITUTIONAL CRUELTY	7.0000	5.0000	9.0000	5.0000	0.2000	7.0000	7.0000	7.0000	1.0000	7.0000
BREEDING/SELLING	0.2000	0.1429	3.0000	0.1429	0.1429	0.2000	0.2000	1.0000	0.1429	1.0000
Sum	**31.5429**	**11.4286**	**54.0000**	**15.2952**	**2.7048**	**20.7429**	**20.7429**	**48.0000**	**7.2254**	**45.3333**

Table 35 - Pairwise Comparison Matrix w.r.t. Animal Health & Welfare

Intermediate Matrix: Animal Health & Welfare										Average Weight	Inspection Type
0.0317	0.0292	0.0926	0.0131	0.0739	0.0096	0.0096	0.1458	0.0198	0.1103	0.0536	**PLANNED**
0.0951	0.0875	0.1296	0.0654	0.1232	0.1446	0.1446	0.1458	0.0277	0.1544	0.1118	**ANIMAL CRUELTY**
0.0063	0.0125	0.0185	0.0093	0.0528	0.0069	0.0069	0.0208	0.0154	0.0074	0.0157	**OWNER/NEIGHBOUR ISSUES**
0.1585	0.0875	0.1296	0.0654	0.0528	0.1446	0.1446	0.1458	0.0277	0.1544	0.1111	**ANIMALS ABANDONED**
0.1585	0.2625	0.1296	0.4577	0.3697	0.2410	0.2410	0.1458	0.6920	0.1544	0.2852	**EMERGENCY RESCUE**
0.1585	0.0292	0.1296	0.0218	0.0739	0.0482	0.0482	0.1042	0.0198	0.1103	0.0744	**ANIMAL REMOVAL REQUEST**
0.1585	0.0292	0.1296	0.0218	0.0739	0.0482	0.0482	0.1042	0.0198	0.1103	0.0744	**PICK-UPS ON ROUTE**
0.0045	0.0125	0.0185	0.0093	0.0528	0.0096	0.0096	0.0208	0.0198	0.0221	0.0180	**PRO-ACTIVE**
0.2219	0.4375	0.1667	0.3269	0.0739	0.3375	0.3375	0.1458	0.1384	0.1544	0.2341	**INSTITUTIONAL CRUELTY**
0.0063	0.0125	0.0556	0.0093	0.0528	0.0096	0.0096	0.0208	0.0198	0.0221	0.0219	**BREEDING/SELLING**

Table 36 - Intermediate Matrix: Animal Health & Welfare

Pairwise Comparison Matrix w.r.t. Income										
	PLANNED	**ANIMAL CRUELTY**	**OWNER/NEIGHBOUR ISSUES**	**ANIMALS ABANDONED**	**EMERGENCY RESCUE**	**ANIMAL REMOVAL REQUEST**	**PICK-UPS ON ROUTE**	**PRO-ACTIVE**	**INSTITUTIONAL CRUELTY**	**BREEDING/ SELLING**
PLANNED	1.0000	7.0000	9.0000	5.0000	7.0000	5.0000	5.0000	3.0000	7.0000	3.0000
ANIMAL CRUELTY	0.1429	1.0000	5.0000	0.2000	1.0000	5.0000	5.0000	0.3333	1.0000	0.3333
OWNER/NEIGHBOUR ISSUES	0.1111	0.2000	1.0000	0.2000	0.2000	0.1429	0.1429	0.1429	0.1429	0.2000
ANIMALS ABANDONED	0.2000	5.0000	5.0000	1.0000	3.0000	1.0000	1.0000	0.3333	5.0000	0.3333
EMERGENCY RESCUE	0.1429	1.0000	5.0000	0.3333	1.0000	0.3333	0.3333	0.2000	1.0000	0.2000
ANIMAL REMOVAL REQUEST	0.2000	0.2000	7.0000	1.0000	3.0000	1.0000	1.0000	0.3333	0.2000	0.3333
PICK-UPS ON ROUTE	0.2000	0.2000	7.0000	1.0000	3.0000	1.0000	1.0000	0.3333	0.2000	0.3333
PRO-ACTIVE	0.3333	3.0000	7.0000	3.0000	5.0000	3.0000	3.0000	1.0000	3.0000	1.0000
INSTITUTIONAL CRUELTY	0.1429	1.0000	7.0000	0.2000	1.0000	5.0000	5.0000	0.3333	1.0000	0.3333
BREEDING/SELLING	0.3333	3.0000	5.0000	3.0000	5.0000	3.0000	3.0000	1.0000	3.0000	1.0000
Sum	**2.8063**	**21.6000**	**58.0000**	**14.9333**	**29.2000**	**24.4762**	**24.4762**	**7.0095**	**21.5429**	**7.0667**

Table 37 - Pairwise Comparison Matrix w.r.t. Income

Intermediate Matrix: Income										Average Weight	Inspection Type
0.3563	0.3241	0.1552	0.3348	0.2397	0.2043	0.2043	0.4280	0.3249	0.4245	0.2996	**PLANNED**
0.0509	0.0463	0.0862	0.0134	0.0342	0.2043	0.2043	0.0476	0.0464	0.0472	0.0781	**ANIMAL CRUELTY**
0.0396	0.0093	0.0172	0.0134	0.0068	0.0058	0.0058	0.0204	0.0066	0.0283	0.0153	**OWNER/NEIGHBOUR ISSUES**
0.0713	0.2315	0.0862	0.0670	0.1027	0.0409	0.0409	0.0476	0.2321	0.0472	0.0967	**ANIMALS ABANDONED**
0.0509	0.0463	0.0862	0.0223	0.0342	0.0136	0.0136	0.0285	0.0464	0.0283	0.0370	**EMERGENCY RESCUE**
0.0713	0.0093	0.1207	0.0670	0.1027	0.0409	0.0409	0.0476	0.0093	0.0472	0.0557	**ANIMAL REMOVAL REQUEST**
0.0713	0.0093	0.1207	0.0670	0.1027	0.0409	0.0409	0.0476	0.0093	0.0472	0.0557	**PICK-UPS ON ROUTE**
0.1188	0.1389	0.1207	0.2009	0.1712	0.1226	0.1226	0.1427	0.1393	0.1415	0.1419	**PRO-ACTIVE**
0.0509	0.0463	0.1207	0.0134	0.0342	0.2043	0.2043	0.0476	0.0464	0.0472	0.0815	**INSTITUTIONAL CRUELTY**
0.1188	0.1389	0.0862	0.2009	0.1712	0.1226	0.1226	0.1427	0.1393	0.1415	0.1385	**BREEDING/SELLING**

Table 38 - Intermediate Matrix: Income

Pairwise Comparison Matrix w.r.t. Public Image/Customer service										
	PLANNED	**ANIMAL CRUELTY**	**OWNER/NEIGHBOUR ISSUES**	**ANIMALS ABANDONED**	**EMERGENCY RESCUE**	**ANIMAL REMOVAL REQUEST**	**PICK-UPS ON ROUTE**	**PRO-ACTIVE**	**INSTITUTIONAL CRUELTY**	**BREEDING/ SELLING**
PLANNED	1.0000	0.3333	3.0000	0.3333	0.2000	0.2000	0.3333	1.0000	0.2000	1.0000
ANIMAL CRUELTY	3.0000	1.0000	5.0000	1.0000	0.3333	3.0000	3.0000	5.0000	7.0000	3.0000
OWNER/NEIGHBOUR ISSUES	0.3333	0.2000	1.0000	0.3333	0.1429	5.0000	5.0000	1.0000	0.1429	0.3333
ANIMALS ABANDONED	3.0000	1.0000	3.0000	1.0000	0.2000	3.0000	3.0000	5.0000	0.2000	3.0000
EMERGENCY RESCUE	5.0000	3.0000	7.0000	5.0000	1.0000	5.0000	5.0000	7.0000	3.0000	7.0000
ANIMAL REMOVAL REQUEST	5.0000	0.3333	0.2000	0.3333	0.2000	1.0000	1.0000	3.0000	0.2000	1.0000
PICK-UPS ON ROUTE	3.0000	0.3333	0.2000	0.3333	0.2000	1.0000	1.0000	1.0000	0.2000	1.0000
PRO-ACTIVE	1.0000	0.2000	1.0000	0.2000	0.1429	0.3333	1.0000	1.0000	0.3333	3.0000
INSTITUTIONAL CRUELTY	5.0000	0.1429	7.0000	5.0000	0.3333	5.0000	5.0000	3.0000	1.0000	5.0000
BREEDING/SELLING	1.0000	0.3333	3.0000	0.3333	0.1429	1.0000	1.0000	0.3333	0.2000	1.0000
Sum	**27.3333**	**6.8762**	**30.4000**	**13.8667**	**2.8952**	**24.5333**	**25.3333**	**27.3333**	**12.4762**	**25.3333**

Table 39 - Pairwise Comparison Matrix w.r.t. Public Image/Customer service

Intermediate Matrix: Public Image/Customer Service										Average Weight	Inspection Type
0.0366	0.0485	0.0987	0.0240	0.0691	0.0082	0.0132	0.0366	0.0160	0.0395	0.0390	**PLANNED**
0.1098	0.1454	0.1645	0.0721	0.1151	0.1223	0.1184	0.1829	0.5611	0.1184	0.1710	**ANIMAL CRUELTY**
0.0122	0.0291	0.0329	0.0240	0.0493	0.2038	0.1974	0.0366	0.0115	0.0132	0.0610	**OWNER/NEIGHBOUR ISSUES**
0.1098	0.1454	0.0987	0.0721	0.0691	0.1223	0.1184	0.1829	0.0160	0.1184	0.1053	**ANIMALS ABANDONED**
0.1829	0.4363	0.2303	0.3606	0.3454	0.2038	0.1974	0.2561	0.2405	0.2763	0.2729	**EMERGENCY RESCUE**
0.1829	0.0485	0.0066	0.0240	0.0691	0.0408	0.0395	0.1098	0.0160	0.0395	0.0577	**ANIMAL REMOVAL REQUEST**
0.1098	0.0485	0.0066	0.0240	0.0691	0.0408	0.0395	0.0366	0.0160	0.0395	0.0430	**PICK-UPS ON ROUTE**
0.0366	0.0291	0.0329	0.0144	0.0493	0.0136	0.0395	0.0366	0.0267	0.1184	0.0397	**PRO-ACTIVE**
0.1829	0.0208	0.2303	0.3606	0.1151	0.2038	0.1974	0.1098	0.0802	0.1974	0.1698	**INSTITUTIONAL CRUELTY**
0.0366	0.0485	0.0987	0.0240	0.0493	0.0408	0.0395	0.0122	0.0160	0.0395	0.0405	**BREEDING/SELLING**

Table 40 - Intermediate Matrix: Public Image/Customer Service

Pairwise Comparison Matrix w.r.t. Sustainability/Empowerment/Promotion										
	PLANNED	**ANIMAL CRUELTY**	**OWNER/NEIGHBOUR ISSUES**	**ANIMALS ABANDONED**	**EMERGENCY RESCUE**	**ANIMAL REMOVAL REQUEST**	**PICK-UPS ON ROUTE**	**PRO-ACTIVE**	**INSTITUTIONAL CRUELTY**	**BREEDING/ SELLING**
PLANNED	1.0000	5.0000	7.0000	5.0000	7.0000	3.0000	3.0000	1.0000	3.0000	1.0000
ANIMAL CRUELTY	0.2000	1.0000	3.0000	1.0000	5.0000	1.0000	1.0000	0.2000	0.3333	0.3333
OWNER/NEIGHBOUR ISSUES	0.1429	0.3333	1.0000	0.3333	3.0000	0.2000	0.2000	0.1429	0.2000	0.3333
ANIMALS ABANDONED	0.2000	1.0000	3.0000	1.0000	5.0000	1.0000	1.0000	0.2000	3.0000	0.3333
EMERGENCY RESCUE	0.1429	0.2000	0.3333	0.2000	1.0000	0.3333	0.3333	0.1429	0.2000	0.2000
ANIMAL REMOVAL REQUEST	0.3333	1.0000	5.0000	1.0000	3.0000	1.0000	1.0000	0.2000	3.0000	1.0000
PICK-UPS ON ROUTE	0.3333	1.0000	5.0000	1.0000	3.0000	1.0000	1.0000	0.2000	3.0000	1.0000
PRO-ACTIVE	1.0000	5.0000	7.0000	5.0000	7.0000	5.0000	5.0000	1.0000	3.0000	5.0000
INSTITUTIONAL CRUELTY	0.3333	3.0000	5.0000	0.3333	5.0000	0.3333	0.3333	0.3333	1.0000	3.0000
BREEDING/SELLING	1.0000	3.0000	3.0000	3.0000	5.0000	1.0000	1.0000	0.2000	0.3333	1.0000
Sum	**4.6857**	**20.5333**	**39.3333**	**17.8667**	**44.0000**	**13.8667**	**13.8667**	**3.6190**	**17.0667**	**13.2000**

Table 41 - Pairwise Comparison Matrix w.r.t. Sustainability/Empowerment/Promotion

Intermediate Matrix: Sustainability/Empowerment/Promotion										Average Weight	Inspection Type
0.2134	0.2435	0.1780	0.2799	0.1591	0.2163	0.2163	0.2763	0.1758	0.0758	0.2034	**PLANNED**
0.0427	0.0487	0.0763	0.0560	0.1136	0.0721	0.0721	0.0553	0.0195	0.0253	0.0582	**ANIMAL CRUELTY**
0.0305	0.0162	0.0254	0.0187	0.0682	0.0144	0.0144	0.0395	0.0117	0.0253	0.0264	**OWNER/NEIGHBOUR ISSUES**
0.0427	0.0487	0.0763	0.0560	0.1136	0.0721	0.0721	0.0553	0.1758	0.0253	0.0738	**ANIMALS ABANDONED**
0.0305	0.0097	0.0085	0.0112	0.0227	0.0240	0.0240	0.0395	0.0117	0.0152	0.0197	**EMERGENCY RESCUE**
0.0711	0.0487	0.1271	0.0560	0.0682	0.0721	0.0721	0.0553	0.1758	0.0758	0.0822	**ANIMAL REMOVAL REQUEST**
0.0711	0.0487	0.1271	0.0560	0.0682	0.0721	0.0721	0.0553	0.1758	0.0758	0.0822	**PICK-UPS ON ROUTE**
0.2134	0.2435	0.1780	0.2799	0.1591	0.3606	0.3606	0.2763	0.1758	0.3788	0.2626	**PRO-ACTIVE**
0.0711	0.1461	0.1271	0.0187	0.1136	0.0240	0.0240	0.0921	0.0586	0.2273	0.0903	**INSTITUTIONAL CRUELTY**
0.2134	0.1461	0.0763	0.1679	0.1136	0.0721	0.0721	0.0553	0.0195	0.0758	0.1012	**BREEDING/SELLING**

Table 42 - Intermediate Matrix: Sustainability/Empowerment/Promotion

	Weights																
	Inspection Type w.r.t Criteria		Criteria		Inspection Type w.r.t Criteria		Criteria		Inspection Type w.r.t Criteria		Criteria		Inspection Type w.r.t Criteria		Criteria		
Inspection Type	**Animal Health & Welfare**				**Income**				**Public Image/Customer Service**				**Sustainability/Empowerment/Promotion**				**Final Weight**
PLANNED	0.0536	x	0.5052	+	0.2996	x	0.3014	+	0.0390	x	0.0530	+	0.2034	x	0.1404	=	**0.15**
ANIMAL CRUELTY	0.1118				0.0781				0.1710				0.0582				**0.10**
OWNER/NEIGHBOUR ISSUES	0.0157				0.0153				0.0610				0.0264				**0.02**
ANIMALS ABANDONED	0.1111				0.0967				0.1053				0.0738				**0.10**
EMERGENCY RESCUE	0.2852				0.0370				0.2729				0.0197				**0.17**
ANIMAL REMOVAL REQUEST	0.0744				0.0557				0.0577				0.0822				**0.07**
PICK-UPS ON ROUTE	0.0744				0.0557				0.0430				0.0822				**0.07**
PRO-ACTIVE	0.0180				0.1419				0.0397				0.2626				**0.09**
INSTITUTIONAL CRUELTY	0.2341				0.0815				0.1698				0.0903				**0.16**
BREEDING/SELLING	0.0219				0.1385				0.0405				0.1012				**0.07**

Table 43 – Calculation of the final weight of importance per inspection type.

Appendix D – Hotspot Analysis

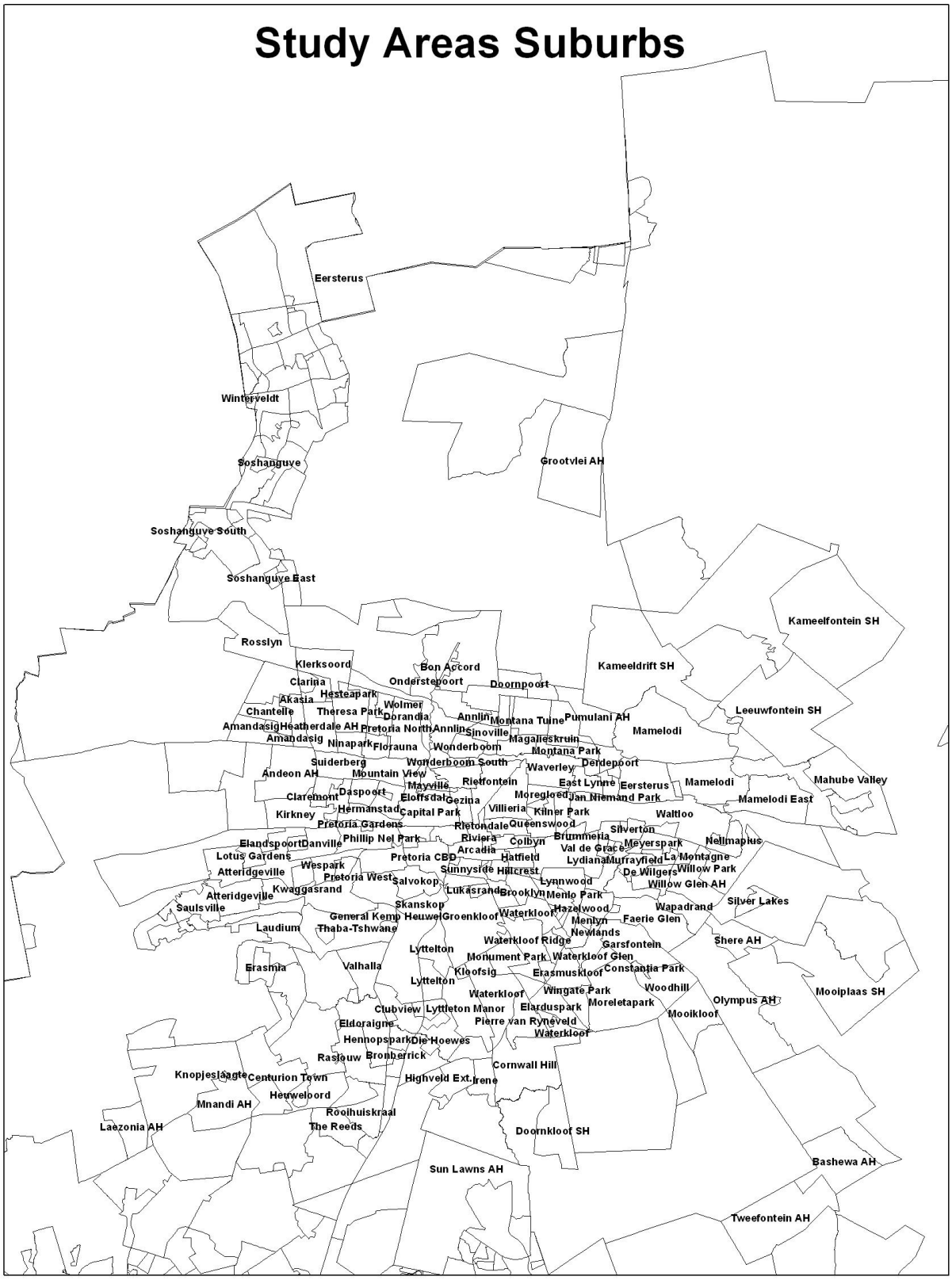


Figure 45 - The map showing the names of the areas or suburbs of Gauteng that are under study.

Figure 46 - The "hotspots" for planned inspections.

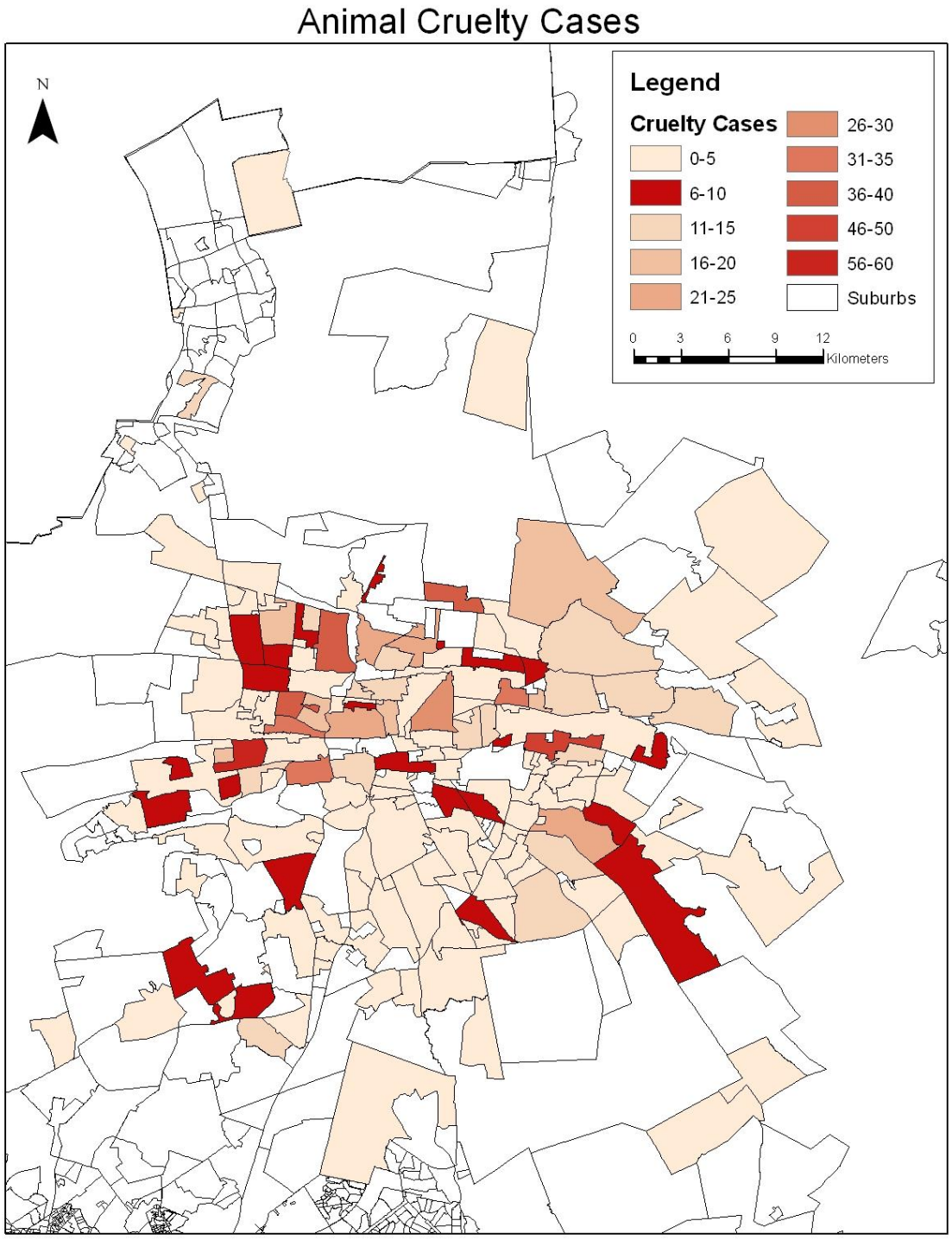


Figure 47 - The "hotspots" for animal cruelty inspections.

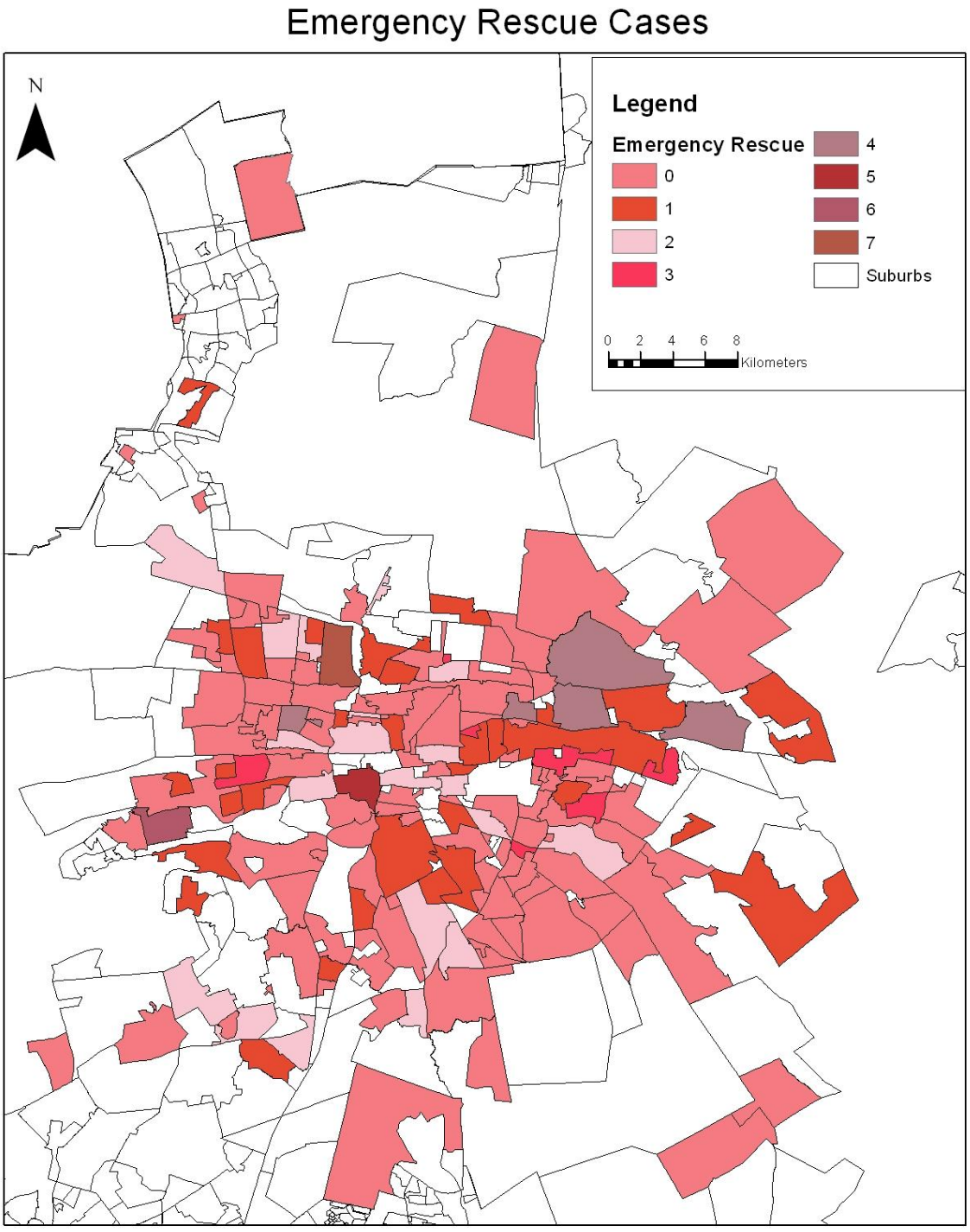
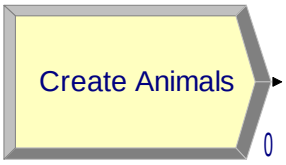


Figure 48 - The "hotspots" for emergency rescues.

Appendix E – Inspectorate Report User Manual & CD-ROM

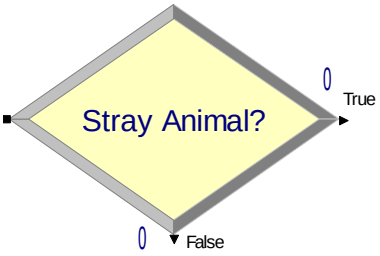
Appendix F – Simulation Model Specification Calculations

Animal Arrival or Admission Rate (assume constant)



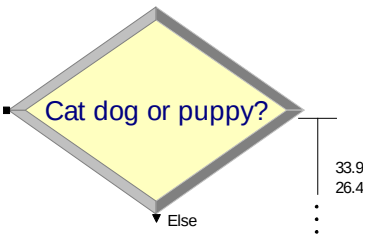
Animal Arrival (Admission) Rate		
Days	**Saturdays**	**Weekdays**
Nr of Hrs Worked per Day	4	8.2
Nr of Days per Yr	52	248
Working Hrs per Yr	208	2033.6
Total Working Hrs per Yr	2241.6	
Total Animals Admitted per Yr	14311	
Arrival Rate (animals/hr)	6.4	
Time between arrivals (assume exponential arrival) (min)	9.4	
Total Boarding Animals Admitted per Yr	72	
Boarding Animal Arrival Rate (animals/hr)	0.03212	
Time between arrivals (assume exponential arrival) (hrs)	31.13	

Probability that Arriving Animal is a Stray



Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar.	Average/Total per Yr
Total Animals Admitted per Month												**Total**
1308	1251	1025	1072	960	917	926	1044	1705	1701	1319	1083	14311
Total Strays Admitted per Month												**Total**
559	506	434	376	381	358	425	468	713	795	527	464	6006
% Strays of Total Animals Admitted												**AVG**
43%	40%	42%	35%	40%	39%	46%	45%	42%	47%	40%	43%	42%

Probability that Arriving Animal is a Cat, Dog or Puppy



Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar.	Average/Total per Yr
Total Animals Admitted per Month												Total
1308	1251	1025	1072	960	917	926	1044	1705	1701	1319	1083	14311
Total Dogs and Puppies Admitted per Month												Total
844	857	693	848	736	649	624	633	1012	986	849	612	9343
Estimated % Puppies of Total Dogs Admitted												
40%												
Total Puppies Admitted per Month												Total
338	343	277	339	294	260	250	253	405	394	340	245	3737
% Puppies of Total Animals Admitted												AVG
25.8%	27.4%	27.0%	31.6%	30.7%	28.3%	27.0%	24.3%	23.7%	23.2%	25.7%	22.6%	26.4%
Total Dogs Admitted per Month												Total
506	514	416	509	442	389	374	380	607	592	509	367	5606
% Dogs of Total Animals Admitted												AVG
38.7%	41.1%	40.6%	47.5%	46.0%	42.5%	40.4%	36.4%	35.6%	34.8%	38.6%	33.9%	39.7%
Total Cats Admitted per Month												Total
464	394	332	224	224	268	302	411	693	715	470	471	4968
% Cats of Total Animals Admitted												AVG
35.5%	31.5%	32.4%	20.9%	23.3%	29.2%	32.6%	39.4%	40.6%	42.0%	35.6%	43.5%	33.9%

Probability that Stray is Severely Injured or Sick

Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar.	Average/Total per Yr
Total Animals Admitted per Month												Total
1308	1251	1025	1072	960	917	926	1044	1705	1701	1319	1083	14311
Estimated % Severely Injured or Sick of Total Animals Admitted												
15%												
Total Severely Injured or Sick Animals Admitted per Month												SUM
196	188	154	161	144	138	139	157	256	255	198	162	2147
Estimated % Strays of Total Severely Injured or Sick Animals Admitted per Month												
90%												
Total Severely Injured or Sick Strays Admitted per Month												
177	169	138	145	130	124	125	141	230	230	178	146	
Total Strays Admitted per Month												Total
559	506	434	376	381	358	425	468	713	795	527	464	6006
% Severely Injured or Sick of Total Strays												AVG
31.6%	33.4%	31.9%	38.5%	34.0%	34.6%	29.4%	30.1%	32.3%	28.9%	33.8%	31.5%	32.5%

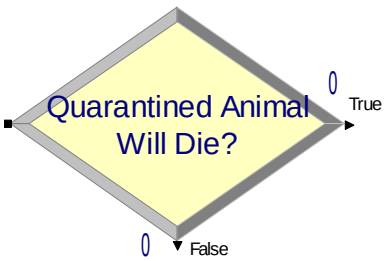
Probability that Non-Stray is Severely Injured or Sick

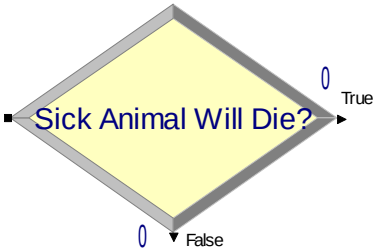
Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar.	Average/ Total per Yr
Total Animals Admitted per Month												Total
1308	1251	1025	1072	960	917	926	1044	1705	1701	1319	1083	14311
Total Strays Admitted per Month												Total
559	506	434	376	381	358	425	468	713	795	527	464	6006
Total Non-Strays Admitted per Month												Total
749	745	591	696	579	559	501	576	992	906	792	619	8305
Estimated % Non-Strays of Total Severely Injured or Sick Animals Admitted												
10%												
Total Severely Injured or Sick Animals Admitted per Month												Total
196	188	154	161	144	138	139	157	256	255	198	162	2147
Total everely Injured or Sick Non-Strays Admitted per Month												Total
20	19	15	16	14	14	14	16	26	26	20	16	215
% Severely Injured or Sick Non-Strays Admitted per Month												AVG
2.6%	2.5%	2.6%	2.3%	2.5%	2.5%	2.8%	2.7%	2.6%	2.8%	2.5%	2.6%	2.6%

Probability that Severely Injured or Sick Animal Must be Put to Sleep

Estimated % Severely Injured or Sick Animals with Parvo Virus	70%
% of Severely Injured or Sick Animals with Parvo Virus Put to Sleep	
Estimated % Severely Injured or Sick Animals with Injuries	30%
% of Severely Injured or Sick Animals with Injuries Put to Sleep	
% of Severely Injured or Sick Animals Put to Sleep	

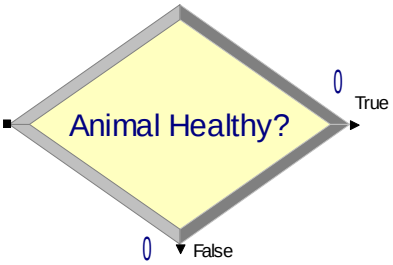
Probability that Animal in Quarantine/Hospital will Die





Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar.	Average/ Total per Yr
Total Animals Died per Month												Total
8	6	6	4	5	5	6	4	11	4	8	9	76
Parvo (Quarantine) responsible for estimated % of total deaths												
70%												
Total Animals Died in Quarantine												Total
6	4	4	3	4	4	4	3	8	3	6	6	53
Total Animals Died in Hospital												Total
2	2	2	1	2	2	2	1	3	1	2	3	
Estimated % of Non-Healthy (but not critical) Animals Needing Quarantine												
10%												
Total Animals Treated per Month												Total
125	100	119	115	118	155	90	50	47	73	23	41	1056
Total Animals Treated in Quarantine per Month												Total
13	10	12	12	12	16	9	5	5	7	2	4	106
% Quarantine Animals that Die												AVG
44.8%	42.0%	35.3%	24.3%	29.7%	22.6%	46.7%	56.0%	163.8%	38.4%	243.5%	153.7%	75.1%
Total Animals Treated in Hospital per Month												Total
113	90	107	104	106	140	81	45	42	66	21	37	950
% Died of Treated in Hospital												AVG
2.1%	2.0%	1.7%	1.2%	1.4%	1.1%	2.2%	2.7%	7.8%	1.8%	11.6%	7.3%	3.6%

Probability that Non-Critical Animal Needs Treatment



Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar.	Average/ Total per Yr
Total Animals Admitted per Month												Total
1308	1251	1025	1072	960	917	926	1044	1705	1701	1319	1083	14311
Total Severely Injured or Sick Animals Admitted per Month												Total
196	188	154	161	144	138	139	157	256	255	198	162	2147
% of Severely Injured or Sick Animals Put to Sleep												
Total Severely Injured or Sick Animals Put to Sleep per Month												Total
Estimated % of Admitted Animals Sick but Not Critically												
5%												
Total Admitted Animals Sick but Not Critically												Total
65	63	51	54	48	46	46	52	85	85	66	54	
Total Admitted Animals Not Critically Sick												Total
1112	1063	871	911	816	779	787	887	1449	1446	1121	921	
% Sick animals of animals remaining after critical examined												AVG
5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%

Probability that Non-Healthy (but not critical) Animal Needs Quarantine

Estimated % of Non-Healthy (but not critical) Animals Needing Quarantine	10%

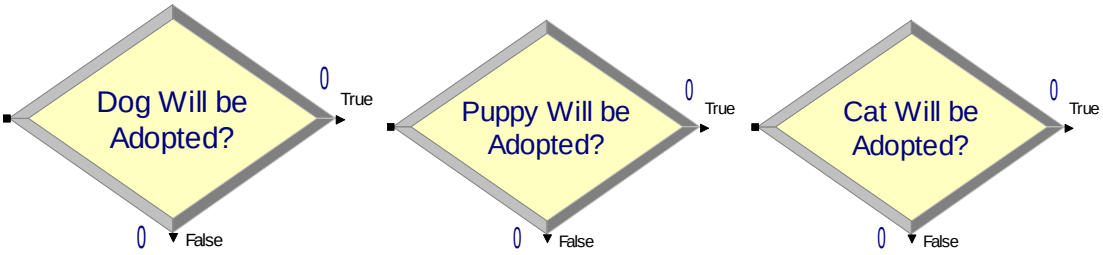
Probability that Stray will be Claimed

Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar.	Average/ Total per Yr
Total Animals Died per Month												Total
8	6	6	4	5	5	6	4	11	4	8	9	76
Animals Remaining After Sick/Quarantined Animals Died												Total
1110	1063	870	912	815	779	785	888	1446	1450	1119	916	12153
% Strays of Total Animals Admitted												AVG
43%	40%	42%	35%	40%	39%	46%	45%	42%	47%	40%	43%	42%
Estimated % Strays Become Sick in Stray Kennels												
25%												
Total Strays Remaining to be Claimed from Stray Kennels per Month												Total
356	322	276	240	243	228	270	299	453	508	335	294	3825
Total Strays Claimed per Month												Total
56	47	31	49	38	27	40	39	56	80	47	47	557
% Strays Claimed of Total Strays to be Claimed												AVG
15.7%	14.6%	11.2%	20.4%	15.7%	11.8%	14.8%	13.1%	12.3%	15.7%	14.0%	16.0%	14.6%

Probability that Stray will Become Sick in Stray Kennels

Estimated % of Strays Become Sick in Stray Kennels	25%

Probability that a Cat/Dog/Puppy will be Adopted



Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar.	Average/ Total per Yr
Total Strays Claimed per Month												Total
56	47	31	49	38	27	40	39	56	80	47	47	557
Animals Remaining After Sick/Quarantined Animals Died												Total
1110	1063	870	912	815	779	785	888	1446	1450	1119	916	12153
Total Animals Up for Adoption per Month												Total
1054	1016	839	863	777	752	745	849	1390	1370	1072	869	11596
% Puppies of Total up for Adoption												
26.4%												
Total Puppies up for Adoption per Month												Total
279	269	222	228	206	199	197	225	368	362	284	230	3067
Total Puppies Adopted per Month												Total
20	21	20	29	29	6	18	0	28	30	18	18	237
% Puppies Adopted												AVG
7.2%	7.8%	9.0%	12.7%	14.1%	3.0%	9.1%	0.0%	7.6%	8.3%	6.3%	7.8%	7.8%
% Dogs of Total up for Adoption												
39.7%												
Total Dogs up for Adoption per Month												Total
418	403	333	342	308	298	296	337	551	543	425	345	4600
Total Dogs Adopted												Total
36	45	42	53	46	41	30	40	41	53	50	50	527
% Dogs adopted												AVG
8.6%	11.2%	12.6%	15.5%	14.9%	13.8%	10.1%	11.9%	7.4%	9.8%	11.8%	14.5%	11.8%
% Cats of Total up for Adoption												
33.9%												
Cats up for Adoption per Month												Total
357	344	284	292	263	255	253	288	471	464	363	295	3929
Total Cats & Kittens Adopted per Month												Total
19	30	25	28	22	18	14	14	22	19	14	8	233
% Cats Adopted												AVG
5.3%	8.7%	8.8%	9.6%	8.4%	7.1%	5.5%	4.9%	4.7%	4.1%	3.9%	2.7%	6.1%

Resource Capacity

Resource	Capacity	Equivalent Capacity due to Batching
Vet 1	1	-
Vet 2	1	-
Holding Kennels	10	-
Quarantine Kennels	10	-
Hospital Kennels	38	-
Boarding Kennels	45	-
Puppy Saloon	5	-
Adoption Kennels DEF	60	-
Stray Kennels ABC	60	-
Cat Kennels	15	45
Puppy Kennels	15	21

Resource Availability

Resource	Availability
Vet 1	SPCA trading hours (08:00-16:30 on weekdays and 08:00-12:00 on Saturdays)
Vet 2	
Holding Kennels	Permanently available to hold animals, even with no staff at SPCA.
Quarantine Kennels	
Hospital Kennels	
Boarding Kennels	
Puppy Saloon	
Adoption Kennels DEF	
Stray Kennels ABC	
Cat Kennels	
Puppy Kennels	