Evaluation of Green Spaces in Lewisham

An Interactive Qualifying Project Report submitted to the

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Abstract

The award-winning network of parks in the London Borough of Lewisham faces budget reallocations. Our study supplements previous objective analyses of the health and economic value of parks by measuring the perceptions of parks and green space by Lewisham residents. The comparative analysis of our observational studies and surveys indicates that local citizens overwhelmingly support these public treasures, a finding that should be taken into consideration for the future of the parks.

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1. Introduction

The connection between people and green spaces has been a central theme among writers and scientists for centuries. Winston Churchill noted in 1944 during a speech at the House of Commons, “First we shape our dwellings; thereafter, they shape us” (Oxford University Press, 2012), with the implication that we shape the world around where we live and it has a counter-effect on us. Today, our choices regarding living spaces, and consequently lifestyles, have a greater bearing on our future surroundings than ever before. According to the Department of Economic and Social Affairs of the United Nations, 85.9% of the developed countries’ populations will reside in urban areas by 2050 (United Nations Department of Economic and Social Affairs - Population Division, 2011). As a consequence, demand for housing and businesses increases. While urbanization increases, green spaces shrink, creating the need to better understand our relationship with nature and how to best maintain green spaces in urban environments.

Research has shown that improved health, social, environmental, and economic benefits are related to conserved green space (Sherer, 2003). Specifically, people who have access to green space experience improvement in health, both physically and psychologically (Sherer, 2003). People exercise more when they have access to parks and other green spaces designated for public recreation and this tends to reduce their risk of disease. In addition, engagement with natural spaces also decreases anxiety and depression, improving mood and well-being (Sherer, 2003;Ulrich, 1984). Plant growth in green spaces improves the surrounding environment through oxygen generation, the control of air pollution and soil erosion, and the recycling of water. Trees and soil also act to filter pollutants from the air and groundwater (Sherer, 2003). Finally, green spaces benefit communities by providing opportunities for recreational activities, a sense of community, and also providing a safe environment for youth to interact with peers, which in turn reduces crime rates (Sherer, 2003).

Many studies have demonstrated the effects of greenery in urban spaces on the quality of residents' lives. However, in the London Borough of Lewisham, these previous studies placed little emphasis on the community's relationship with the spaces. The 2010 Lewisham Leisure and Open Space Study did not contain the qualitative aspects that are essential to understanding the residents' perception of their locality's green spaces and rather focused on the maintenance aspects of the park (London Borough of Lewisham, 2010).

Furthermore, the 2010 study received only 170 responses from its online survey, which does not make the findings a good representation of the entire population. These two shortcomings limit the study's applicability. This can be improved by a study involving more residents and their perceived value of the spaces. Any decision regarding the management, expansion, or modification of such spaces must consider how people value and use them.

In Lewisham, understanding the community's relationship with green spaces is a necessity. High costs of maintenance and limited budgets are causing the council to investigate budgets for the parks system. The goal of this project is to develop a set of comprehensive criteria for measuring the value of green spaces as perceived by the borough's residents. These criteria will be used to guide data collection through surveys and observational studies. Such a study will capture the public's perspective towards the tangible and intangible elements of parks and green spaces, and potentially aid the Council to allocate resources and justify expenditure of the parks.

2. Background

The Borough of Lewisham, situated in southeast London, is one of the greenest areas in the metropolis, with parks and green spaces constituting over 20% of the borough's area. The 51 public parks in Lewisham are owned by the borough, with Glendale Grounds Management contracted to manage the park facilities (London Borough of Lewisham, 2013, Local Parks). Figure 1 shows the location of all of these public parks. According to the Lewisham Open Space Survey done in 2011, these parks are well used by Lewisham residents with almost half of the residents reporting visiting the parks daily during the summer.

FIGURE 1: MAP OF PARKS AND OPEN SPACES IN LEWISHAM

(GEOGRAPHIC INFORMATION & RESEARCH, 2002)

Lewisham has a population of 275,900 (London Borough of Lewisham: Web team, 2011) and is the 15th most ethnically diverse local authority in England, with 40% of residents belonging to a black or other minority ethnic background (Lewisham's Joint Strategic Needs Assessment, 2010, Ethnicity). The borough has a very even age distribution with approximately each quarter of the population falling between ages 0-19, 20-34, 35-49, and above 50 years, respectively (United Nations Department of Economic and Social Affairs - Population Division, 2011). Thus, when considering issues that concern the entire borough, it is essential to bear in mind the age diversity due to the variation in priorities and the needs of each group. Age was taken into consideration for this project so that trends could potentially be found across the different age groups. A person's age is easily determined and can be clearly classified and connected to usage of parks and green spaces through observational studies and surveys.

Parks in Lewisham are highly used and therefore they need to be maintained. However, maintenance of the parks is expensive. This has evoked the Council to re-evaluate the proportion of public monies spent on the maintenance of such spaces, requiring the conduction of a more comprehensive study. The results of the study may be able to aid the council in determining what the best course of action is for the parks as well as their residents.

2.1 Benefits and Costs of Green Spaces

While the costs of maintaining green spaces can be quantified in monetary terms, the benefits of green spaces are less easily defined and measured. Green spaces are aesthetically pleasing, offer opportunities for residents to improve and maintain their health, improve the climate, and add economic value to the area (see Table 1). In addition, benefits of green spaces may be unique across different communities within Lewisham, as well as individuals within those communities. As such, our evaluation of green spaces weighed the costs and benefits beyond a quantitative analysis.

TABLE 1: SUMMARY OF COSTS AND BENEFITS OF PARKS AND GREEN SPACES

Factors	**Benefits**	**Costs**
Environmental	● Vegetation acts as natural air filter ● Mitigates "Heat Island Effect"	
Health and Recreation	● Easy access to physical activity ● Reduces risks of certain diseases	
Aesthetics	● Restorative effects on resident's mental health ● Provides serene atmosphere for relaxation	
Social	● Contributes to social inclusion ● Leads to feeling of neighborhood	
Economic (Financial)	● Attracts financial investment ● Enhances tourism	● Costly for the government ● Maintenance required
Land Allocation		● Underutilization of land which may be fit for more productive purposes.
Safety		● Spread of pathogens ● Concern with criminality

Access to green spaces can prove beneficial for the health of residents. Recreation centers play a key role in maintaining the community's health by providing facilities for sporting events and exercise. In the UK alone, 3 out of every 10 children between the ages of 2 and 15 are either overweight or obese. Obesity causes numerous health problems, which in turn costs the local government more money. It was reported that the estimated annual cost, due to diseases related to being overweight or obese, for the Lewisham National Health Service was £79.1 million in 2010 (Lewisham Strategic Partnership, 2011, Childhood Obesity: Facts and Figures).

Physical activity makes an essential contribution to the health and overall well-being of residents. Obesity, currently an increasing health concern in Britain, is attributed to sedentary lifestyles, which can be countered by convenient access to physical activity centers and playgrounds provided by the parks (Pretty, 2003). Investigating the relationship between physical activity and the presence of green spaces is necessary to determine how these spaces influence the overall health of nearby residents. Each age group requires different amounts of physical activity across a range of intensity levels (UK Department of Health, 2011). Green spaces provide opportunities to incorporate physical activity into everyday life and alternative activities make exercise more appealing to a wide range of people. The UK Department of Health has identified specific recommendations for the amount of physical activity people should participate in weekly. Table 2 shows the relationship between daily activities and health benefits.

TABLE 2: RECOMMENDED PHYSICAL ACTIVITY AND RESULTING BENEFITS ACCORDING TO AGE

(UK DEPARTMENT OF HEALTH, 2011).

Age Group	**Recommended Activity**	**Benefits**
Children & Teens	● At least 1 but up to multiple hours of moderate or vigorous intensity activity every day. ● Vigorous intensity activities and activities that strengthen muscle and bone should be included at least 3 times a week.	● Improves cardiovascular health ● Maintains healthy weight ● Improves bone health ● Increases self-confidence ● Develops new social skills
Adults	● Weekly total of 150 minutes of moderate intensity activity. ● Alternatively, 75 minutes of vigorous intensity activity each week. ● Physical activity to increase muscle strength at least 2 days a week.	● Reduce risk of diseases such as heart disease, stroke, diabetes, and others ● Maintain healthy weight ● Maintain ability to perform everyday tasks with ease ● Improve self-esteem ● Reduce symptoms of depression and anxiety
Seniors	● 150 minutes of moderate activity or 75 minutes of vigorous activity each week. ● Those at risk of falls should incorporate activity that improves balance and coordination twice a week.	● Maintain cognitive function ● Reduce cardiovascular risk ● Maintain ability to carry out activities of daily life ● Improve mood and self-esteem ● Reduce risk of falls

Green spaces can increase the overall quality of the air as the flora provided by green spaces filters the air and assists in carbon sequestration. The increase in number of buildings and roads, together with reduction of green spaces in urban areas, has led to higher temperatures in cities compared to the countryside; a phenomenon known as the 'heat island effect.' This effect can lead to increased energy demand, air conditioning costs, and air pollution. Green spaces can help address this issue (Woolley, 2003).

Another benefit from green spaces is improved aesthetics, which supports the emerging concept of 'eco-health', a field that explores the relationship between changes in ecosystems and their impact on people's wellbeing. Green spaces can contribute to the mental health of the residents due to their inherent need for contact with nature (Forestry Commission, 2006). Gretchen Reynolds, a writer on health and fitness, wrote in her *New York Times* article 'Easing Brain Fatigue with a Walk Through the Park' about the positive link between human psychology and green spaces (Reynolds, 2013). These benefits were found to be important in cases of park preservation.

Social benefits of green spaces are manifold. The spaces offer welcoming locations for the borough's diverse residents to gather and become involved with the community. One example of involvement in the parks is the Park and Conservation User Groups, (See Table 3). They support the daily management of the park by helping in the development of specialist areas, reporting defects, organizing events within and associated with the park, litter clearance, and promotion of the park. It is an excellent way to get involved because membership is open to all individuals (London Borough of Lewisham, 2010). These and other casual interactions make people more comfortable with one another and increase a feeling of neighborhood (Quayle, 1997). When in local parks, children are more likely to be exposed to other adults and people they are unfamiliar with, aiding their development of interpersonal skills (Taylor,1998). Residents who spend more time in the parks feel more connected with the area and are thus inclined to ensuring the spaces are well maintained and preserved (Quayle, 1997). Measuring the social effects due to green spaces is central to a comprehensive study of the parks.

TABLE 3: PARK USER GROUPS *(LONDON BOROUGH OF LEWISHAM, 2010).*

Lewisham Park Groups	
Beckenham Place Park	Forster Memorial Park
Beckenham Place	Hilly Fields
Blackheath	Home Park
Brookmill Park	Ladywell Fields
Blythe Hill Fields	Luxmore Gardens
Broadway Fields	Manor House Gardens
Burnt Ash Pond	Manor Park
Chinbrook Meadows	Mayow Park
Dacres Wood	Mountsfield Park
Devonshire Road	Northbrook Park
Downham Woodland Walk	Sydenham Wells Park
Eckington Gardens	Telegraph Hill Park

Green spaces provide various economic benefits to the local economy. With healthy lifestyles made possible by a healthy environment, more people would prefer to live and work in areas with more accessible green spaces thereby increasing real estate value (Parks and Greenspaces Business Unit of the Liverpool City Council, 2010). This improves the image of the area, making it an attractive investment zone for corporations while also generating revenue from enhanced tourism (Parks and Greenspaces Business Unit of the Liverpool City Council, 2010). However, certain standards of fire protection and accessibility must be met. In addition to this, meeting required provisions generate recurring costs that might reduce the economic benefits of parks. Green spaces also influence the local economy through events held in the parks, and stimulate nearby businesses.

Although there are many benefits to open space, there are also some costs that need to be accounted for. The large areas required for open spaces, particularly in heavily populated areas, raise questions regarding the optimal use of the spaces and the associated costs of their maintenance. Land designated as open space may be unfit for vegetation and better suited to support industry or commerce. Constant urban growth may require that some of the open spaces be converted into residential spaces. Finally, if parks and green spaces are underutilized and their provision is not a statutory service that the local authorities are obliged to provide, it may be argued that expenditure on maintenance of open spaces is not justified in the face of more pressing needs for public infrastructure, such as schools and hospitals.

Keeping in mind that there are many potential uses for the space, all aspects must be considered when deciding which would be best for the community. This requires the inclusion of all the less apparent benefits that green spaces offer, and how they contribute to the community's overall wellbeing. Decisions involving green spaces are particularly important because unlike other land developments, they usually carry historical significance and are places that residents connect with. Once these spaces are destroyed they cannot be easily replaced or replicated in the future.

Safety is an important concern in public spaces. Health safety cannot be guaranteed since open spaces bring together many different people and facilitate their interactions. Women have expressed a particular concern for their outdoor safety, and this has to be accounted for when planning for open spaces (Rubinstein, 1997). Lewisham has been actively addressing these concerns through the reintroduction of park keepers as sentinels in its parks. Their presence encourages usage of the parks while reducing vandalism (Sustainable Cities, 2012).

Given the impact parks have on the environment, the health and social wellbeing of residents, and the local economy, it is important to investigate how residents value green spaces. Consequently, we investigated not only how parks are used, but the residents' attitudes towards them as well.

2.2 Evaluating Green Space

Previous studies have had different approaches when evaluating green spaces but were usually limited as they only evaluated the green space itself rather than the perceived value offered by the parks. For example, the Lewisham Leisure and Open Space Study (2010) focused on evaluating the various green spaces based on provision, accessibility, and other such criteria without the intent to focus on residents' opinions. In contrast, the Merton Open Space Strategy (MOSS) (2005) focused on creating an action plan for improving the public open spaces of the borough of Merton, after consulting park users and studying their habits.

In a study conducted in Worcester, Massachusetts, United States, a team from Worcester Polytechnic Institute examined the 'ecological value' of the open spaces. By analyzing projected costs and profits originating from open spaces, treating it as a purely commercial entity, the team concluded that the open spaces were being undervalued. Although the methods used were thorough, the study focused exclusively on evaluating the monetary value of the space. The narrow scope of the study limits its applicability in guiding resource allocation decisions. Our study diverged from the previous Worcester study in that the focus is on the residents' relationships with the green spaces instead of solely quantifiable economics.

A study was done in West Island, Montreal, Canada in order to design and develop a valid and reliable instrument to aid in the measurement of the citizens' attitudes toward urban parks and green spaces (Balram, 2003). Their study involved classifying attitudes according to political, economic, biophysical and social dimensions and possessed both qualitative and quantitative aspects. The qualitative stage involved an approach that combined geographic information system (GIS) along with informal interviews to achieve insights into the different factors that affect how people value urban parks and green spaces. The product of the qualitative stage was a self-administered mail-back survey that was distributed to over 300 households. The quantitative stage applied two different types of analyses to the questions in order to create a valid scale of nine questions. The analysis showed that there are two dimensions of the quantitative phase: behavior and usefulness. This suggests similar expected outcomes of our study in Lewisham with regard to what affects the data and how it may be attributed to the various costs and benefits.

A study done in Los Angeles, California, United States aimed to determine the value of public parks according to their usage statistics (McKenzie, 2006). Systematic observations and surveys were made of park users and households near the parks. The focus of this study was the physical activity provided by the parks, and how beneficial it was to the health and well-being of people in the community. Researchers conducting this study developed an observation tool called Systematic Observation of Play and Recreation in Communities (SOPARC) that allowed them to consistently collect the desired data on physical activity in parks in relation to the age, gender, and ethnicity of residents participating in them. An important conclusion derived from comparing data collected from observation and surveys was that residents reported using the parks more frequently than they were observed using them, revealing a bias. The study found that men use the parks more frequently than women and young people more frequently than adults and seniors. The SOPARC tool was used as a basic model that was then adapted to fit the needs of the observational portion of the project in Lewisham.

The City of Liverpool, Merseyside, conducted a study to examine the relationships between the local environment, economy, health, people and the green spaces of the city. Liverpool has one of the highest numbers of parks of any city in England. Figure 2 depicts the dynamic and interwoven relationships that residents have with local green spaces as observed by the study. Although the specific questions of this survey are not available, this study offers a good indication of the primary factors that should be investigated, which include: environment, health, economy, and society.

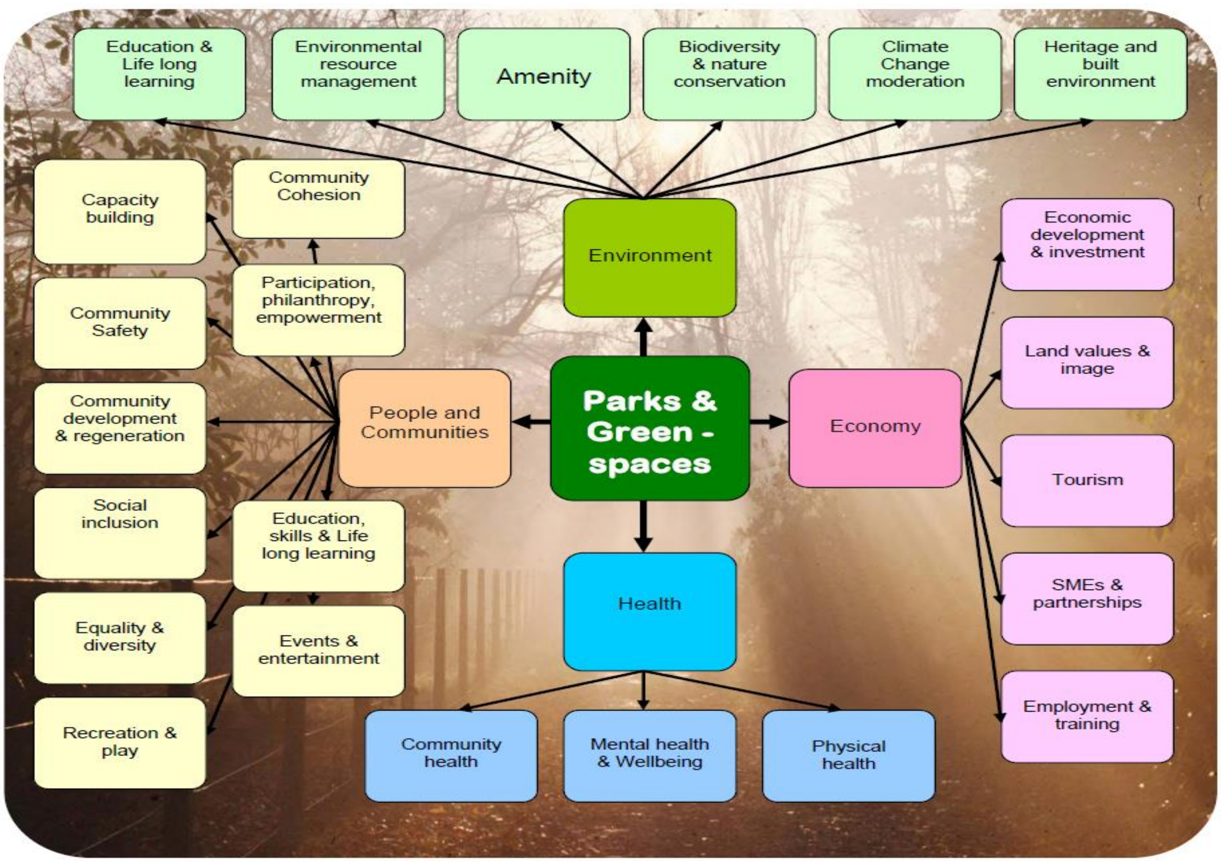

FIGURE 2: LIVERPOOL STUDY ON EFFECT OF PARKS ON SEVERAL FACTORS OF THE COMMUNITY *(PARKS AND GREENSPACES BUSINESS UNIT OF THE LIVERPOOL CITY COUNCIL, 2010).*

The Merton Open Space Strategy (MOSS) was developed to outline the vision, desired outcomes, and principles for developing and improving the Merton Open Space Network to meet community expectations (London Borough of Merton, 2005). Merton is comparable to Lewisham in many ways. Eighteen percent of the Merton land area is green space, as compared to 20% of Lewisham's land area, and the residents are similarly diverse. The study revisited the definition of what constitutes an open space based on levels of access and its ownership. In addition, researchers recognized that the various stakeholders and partnerships, such as sports clubs and wildlife trusts that would make the MOSS successful, needed to coordinate with each other in a tightly integrated fashion for green spaces to be used to their maximum potential. As indicated by the MOSS study, these relationships require further investigation. As Lewisham is comparable to Merton in terms of green space distribution and demographics, identification of residents as the primary stakeholders in the community's green spaces is key to understanding the interaction between the residents and the parks.

The Lewisham Leisure and Open Space Study was conducted in accordance with the 2002 Planning Policy Guidelines (PPG) (London Borough of Lewisham, 2010). The aims of the study included identifying accessible open spaces, sports and recreation areas in Lewisham for existing and future needs. Open spaces were classified into seven categories and usage statistics were gathered for these, as summarized in Table 4. The data was obtained via an online survey, where usage of green spaces was self-reported by 170 residents, only 0.06% of the total Lewisham population. Actual use of green spaces was not observed, and only residents with access to and ability to use the Internet were surveyed. Additional data on the various population groups that use these spaces, and the activities that were being conducted in each, were not gathered. These two limitations created a wide bias within the data. While this study offers useful standard criteria for defining types of green spaces, a deeper understanding of residents' needs and perceptions in relation to these spaces can be obtained through the inclusion of qualitative elements through interviews of residents, which leads into the project objective.

TABLE 4: RESULTS FROM SURVEYS CONDUCTED THROUGH THE LEISURE AND OPEN SPACE STUDY *(LEWISHAM COUNCIL, 2010)*

Type of Green Space	Daily	Weekly	Monthly	Occasionally	Never
Parks and Gardens	34%	37%	9.5%	17%	1%
Natural and semi natural green space	8.6%	22.6%	20%	40.6%	8%
Outdoor Sports Facilities	2%	8.1%	8.8%	35.8%	45%
Amenity Green Space	11.7%	8.2%	6.2%	33.8%	40%
Provision for Children and Young People	10%	15.3%	6%	26%	42.6%
Allotments	0.6%	3.3%	0%	8%	83.3%
Cemeteries and Church yards	1.4%	6%	10.8%	47%	35%

Overall, these studies reveal that the relationship between the green spaces of a locality and its residents is among the most important factors contributing to the value of the spaces. To understand how residents value green space, it was necessary to weigh the benefits of the spaces in terms of what they have to offer to the community and the costs incurred, which include the potential issues that had to be dealt with in the course of maintaining the spaces for public use. Assessment criteria were established to measure the public's attitude towards green spaces, in line with the Lewisham Council's vision. A detailed correlation between the expectations of the residents and the usage statistics, if established, can provide a sound starting point for decisions regarding the expansion or modification of open spaces in Lewisham.

3. Methodology

3.1 Mission Statement

This project aims to assist the council of the Borough of Lewisham in assessing the public value of parks and green spaces in order to guide resource allocation decisions by developing a set of comprehensive assessment criteria and collecting corresponding data.

3.2 The Process

Based on the literature review and consultation with council officers, the team selected a methodology consisting of two separate mechanisms for achieving the objective of determining the usage and people’s perceptions of the parks and open spaces of Lewisham: the survey-interview pair and direct observational studies. The interviews were used briefly in order to evaluate the effectiveness of certain questions on the survey. These were then used to construct a complete survey which was administered on a larger scale. The direct observations were intended to collect information that could be correlated with survey data as well as directly measure the usage of parks. These tools have been fully implemented with interesting results.

3.2.1 Gathering Usage Statistics

Usage statistics for the parks and green spaces of Lewisham were gathered through direct observation. These observations were informed by the System for Observing Physical Activity and Recreation in Communities (SOPARC) (McKenzie, 2006), a tool designed to determine the number of green space users and approximate their level of physical activity by placing users within the categories of sedentary, walking and vigorous. It also classifies park users according to four different age groups as well as by gender.

Direct observation was chosen since it is a straightforward and non-intrusive means of gathering information about park usage. It also eliminates biases that arise from interaction with subjects such as exaggerated expression of usage. By eliminating these biases, a clear picture of how the park is used on any given day can be seen. Furthermore, direct observation shows quantitative correlation between specific park conditions, residents' perceived value of the park, and the usage frequency encountered in such locations. According to previous studies done in the area, there is a significant increase in park usage during the summer months as compared to the rest of the year (London Borough of Lewisham, 2010). This information was kept in mind, because the Lewisham study was conducted during the summer, possibly resulting in an overestimation of usage for the entire year.

Park observations were conducted in three sessions: morning, midday and evening. The parks selected for observation were the same as those chosen for distributing surveys (Appendix A). The park's accessibility, facilities, and weather conditions were documented before starting observation session. The parks were sectioned into target areas of appropriate sizes as per the SOPARC recommendations. Maps of the park sections are available in appendix B. When observing each target area, a total count of people and pets was recorded; a count of the males and females in each of four age groups was completed and finally, predominant activities were recorded and users classified into one of three physical activities levels (sedentary, walking or vigorous). All information was recorded in a custom form adapted from the SOPARC (Appendix C). As each section was completed, the observers moved to the next designated location within the same park recording the time observation was started on the target area as well as target specific information. This strategy enabled collection of data at multiple locations in the same park as well as at different parks in each of three sessions per day.

3.2.2 Perceived Value of Green Spaces

In order to ascertain the value of parks and green spaces in the London Borough of Lewisham an interview-survey pair was chosen as the starting point. A set of semi-structured interviews passed through iterations of deployment, analysis, and alterations until the team determined that the selected pool of questions was sufficient to gauge the people's opinions on the value of the parks in an objective fashion. These questions were then formatted into a survey, which was deployed online and in paper format across the borough.

3.2.3 Interview Phase

The first two weeks of the project were allotted to conducting and refining questions through deployment of semi-structured interviews. Questions were selected on the basis of their categories to form short interviews which were deployed in different parks. Responses were recorded and trends were detected in order to fine tune the selection of questions.

This phase began with a set of over 50 questions (see Appendix D) that spanned the four themes of health, economy, society, and environment - in relation to the local resident's and their parks. Due to the impracticality of conducting such a lengthy interview, the questions were divided across three different versions of the interview (Appendix E), each containing a different variety of questions and designed to last approximately five to ten minutes. After a couple of interviews were conducted, a new, improved version was made until the team deemed that the answers to the questions provided enough information to achieve the goals of measuring the people's perceptions of their local parks and open spaces. This process was completed by the end of the third week of the project.

The main processes for eliminating or keeping questions included looking for variation and precision of responses. Questions were eliminated when all subjects responded similarly as such questions would not lead to any useful findings. Questions were also eliminated if we noticed the interviewees required further clarifications or if ambiguities arose.

3.2.4 Surveys

Surveys were chosen as the primary tool for gathering information on the resident's relationship with the parks. This selection was made because multiple surveys could be administered simultaneously, which was not possible with interviews. Furthermore, surveys allow for a more impersonal experience, which may help remove biases due to overexpression of one's opinion when answering questions under observation by the interviewer.

Using the set of questions established in the interview phase, we created a short one-page survey (Appendix F). The survey was attractively designed so that residents would be more willing to complete it. An online version of the survey was also created containing the same set of questions. This was deployed via email to all park user groups whose information could be obtained and was publicized through social networks to reach a wider public.

The surveys were administered simultaneously by two teams, each of which went to a predetermined location in the borough. Each day the teams changed the place where they conducted surveys, enabling collection of surveys from a total of 11 parks, accounting for parks that varied in size, provision, and prominence of activities. We attempted to survey locations outside parks but due to a limited time budget, focus was shifted to exploring more efficient methods.

There were three different types of questions in the final version of the survey: Likert scales, open responses, and tick boxes. The Likert scales were used to measure the resident's agreement levels with certain statements such as "The parks are clean and well maintained".

These questions were used mainly to gauge the current state of maintenance and opinion on the parks. The open responses were processed using word counting software yielding interesting results. Furthermore, the response to the open questions will be presented to the council for internal use. Finally, the tick boxes were used to measure usage and can be cross-checked with the observational studies.

The survey also included a series of questions on general demographics of subjects including their gender, age, ethnicity, postal code, religion, and sexual orientation. These are standard demographics that accompany all studies and surveys sent out by the Council to keep research consistent. These demographics were used to yield more precise patterns of usage.

4. Analysis and Results

A major part of the analysis has focused on identifying meaningful relationships between observed variables. In many ways, it is these relationships collectively considered that convey a sense of value of the green spaces. Since no standard evaluation methods exist to measure the perceived value of green spaces in a locality, various techniques are presented here in an exploratory fashion. Simple models have been constructed and populated with the data that was collected. Some trends have been identified and others predicted, subject to the type and size of the dataset. Limitations to the method are recognized and future directions are presented in the form of recommendations.

Observational studies gathered park usage information along with demographics such as age and gender. In addition, auxiliary information such as weather conditions, space availability and usability, and presence of supervisors was noted to explain possible drastic changes in usage patterns. For example, one observation session witnessed far fewer visitors to the park due to inclement weather. Park users' activities were classified into three categories based on how physically demanding the activities were. This information may be compared with the levels and duration of physical activity required for various age groups and genders as per the recommendations of the British Heart Foundation to ascertain whether or not the community as a whole is getting sufficient exercise.

Data gathered from the surveys and observational studies was digitized using Microsoft Excel and processed with the computational software MATLAB running custom code (Appendix G). The final spreadsheet of responses from paper and online surveys was processed and plotted in various ways to bring out potential relationships between certain variables such as dominant activities versus age groups of park visitors, frequency of usage versus reasons of attendance, among others. A total of 300 surveys were conducted, which is 130 more than the previous Lewisham Leisure and Open Space study.

First, we were interested in studying the relationship between the most prominent activities at the parks and the frequency and duration of the residents' visits to these spaces. The aim was to identify which activities were being engaged in on a more regular basis or for longer hours. The data was varied for each park and patterns were local in nature. The following were the most popular reasons people came to the park: to relax, walk, meet friends, visit playground, and picnic/lunch break. These are quantified in the figure below:

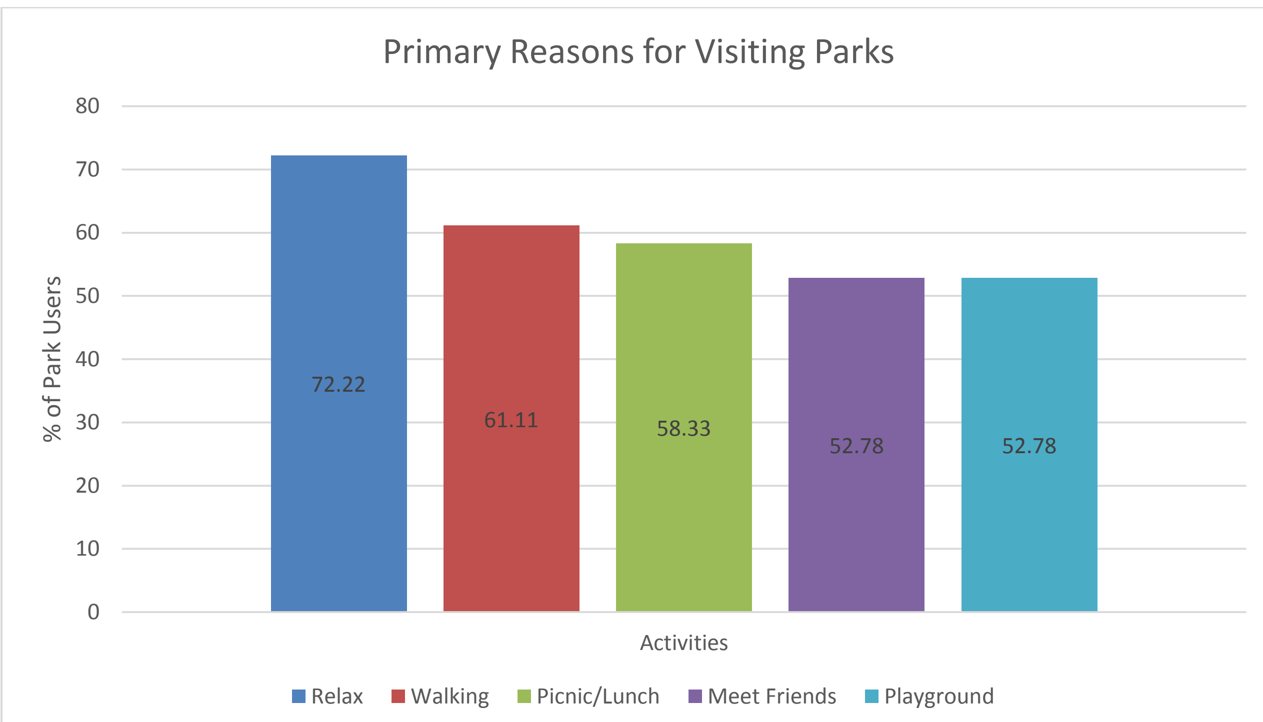

FIGURE 3: MAIN REASONS FOR VISITING THE PARKS

Frequency of park usage may serve as a good indicator of how much residents value green spaces. The data from our surveys was compared with the London average park usage obtained from a different study by CABE Space (CABE Space). This comparison is represented by Figure 4.

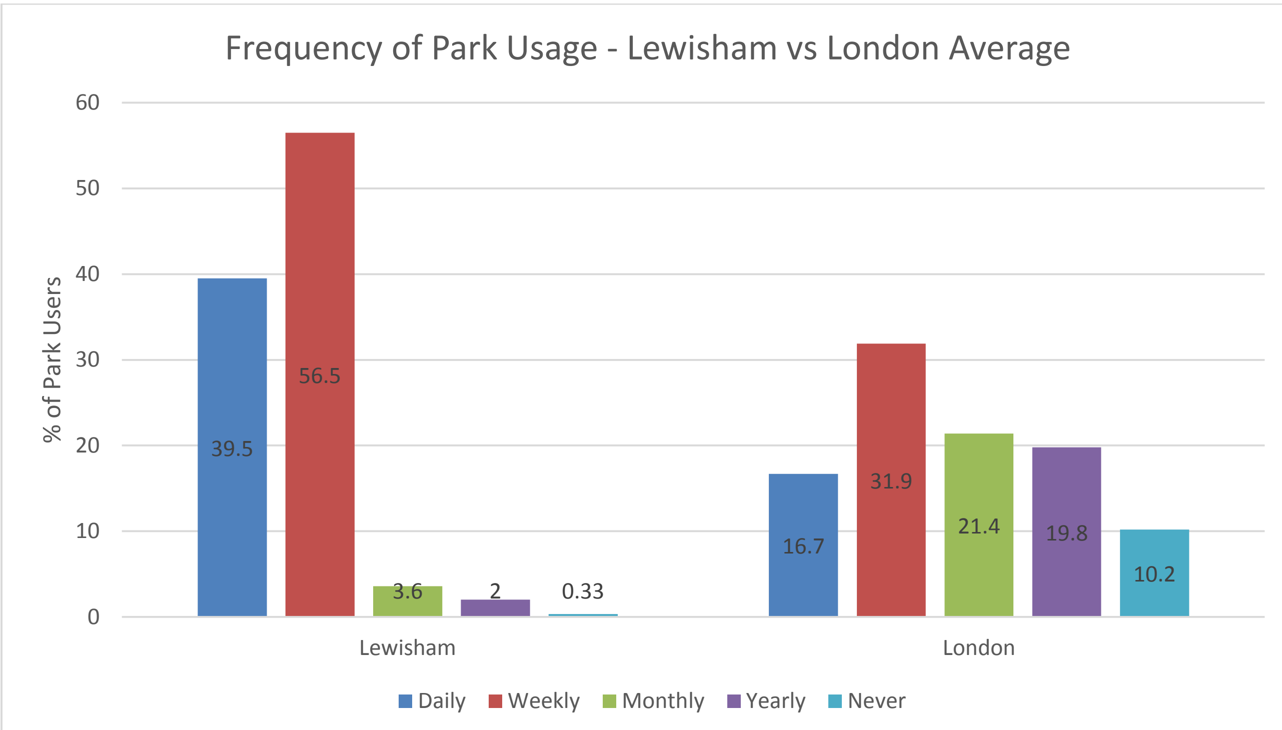

FIGURE 4: GRAPH OF PERCENTAGE OF PARK USERS VERSUS FREQUENCY OF THEIR VISITS TO GREEN SPACE

The graph shows that Lewisham residents visit their local parks and green spaces on a daily to weekly basis twice as often as those in other parts of London. In other words, a majority of the visitors to the open spaces visit them with a higher frequency, i.e., daily or weekly, than the visitors to similar spaces in the rest of London. This exemplifies how important green spaces are to Lewisham's residents.

The analysis also helped to understand the impact that parks and green spaces have on the society and wellbeing of the community. It was found from the surveys that 92% of residents feel more connected to their community, and this confirms the idea that public green spaces provide a welcoming place for people throughout the community to come together. The spaces are effective places to bond with family and close friends, with 69% of the survey respondents reporting visiting parks with friends and family. These results are summarized in Figure 5.

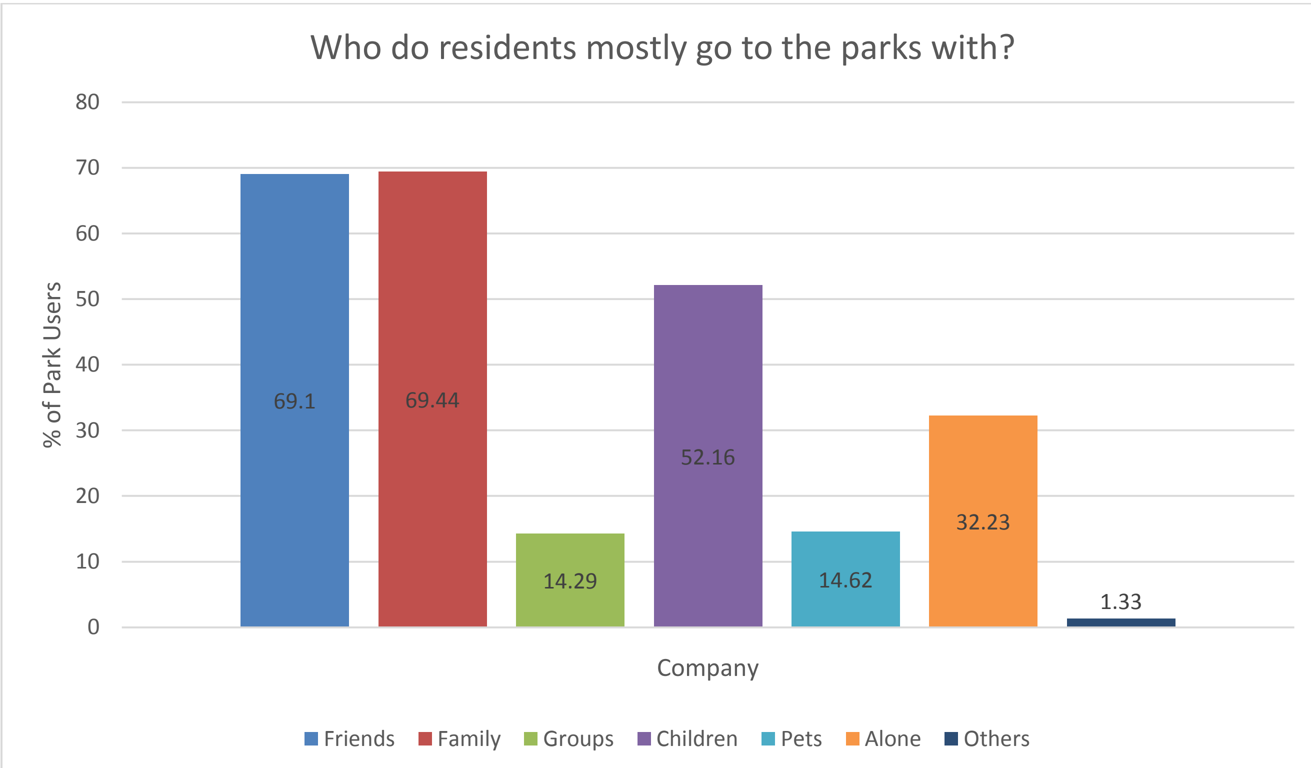

FIGURE 5: GRAPH OF PERCENTAGE OF PARK USERS WHO GO TO PARKS WITH VARIOUS CATEGORIES OF COMPANY

Among the most notable advantages of green spaces is their tendency to lower crime rates, and with Lewisham's high reported crime rates this is a point of much interest. Contrary to popular notions that more green spaces increase crime by offering hiding places for criminals, well maintained green spaces actually reduce crime by attracting more people to use them and consequently increasing public surveillance. This makes neighborhoods with ample green spaces less likely targets for criminals.

Our analysis showed that 83% of the respondents felt very safe or safe in the parks. It has been found that access to parks and green spaces are linked to a reduction in crime rates, especially cases of juvenile crime. The facilities at the park engage children and promote interactions between them in a safe public setting. Without such spaces, children are more likely to absorb unhealthy behavior from the existing anti-social groups such as gangs .

Another way of visualizing the effect of green spaces on criminal activities is by representing the various crimes on a map of the locality and studying their change over time with respect to presence of green spaces. A quick glance at many such maps obtained from the Metropolitan Police website seems to indicate fewer reported crimes in the immediate vicinity of green spaces. Two such maps are presented in figures 6 and 7 for comparison.

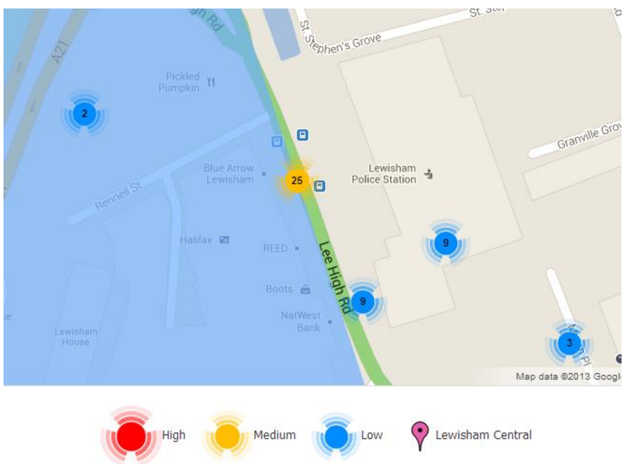

FIGURE 6: HIGHER CRIME RATE IN AN AREA WITH NO GREEN SPACE

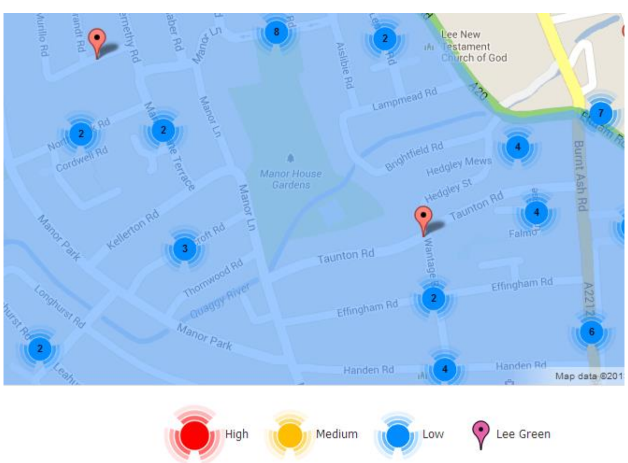

FIGURE 7: LOWER CRIME RATE IN AN AREA SURROUNDING A PARK

This method of studying the impact of green spaces on crime seemed to be very intuitive and is a recommended technique for further development.

Green spaces offer a place to enjoy the environment and connect with nature. This is intimately connected to the concept of eco-health, an emerging field exploring the relationship between ecology and human wellbeing. According to this, green spaces cater to the inherent need in humans to be in contact with nature and can have calming effects on the mind by reducing levels of the stress hormone cortisol. They have also been shown to have restorative physiological effects, helping reduce recovery time of patients from common illnesses. These factors contribute to a significant overall mental and bodily wellbeing, thus strengthening the case for the protection and expansion of green spaces. This is especially true in urban environments where access to such spaces is limited due to increasing numbers of commercial projects such as shopping malls, theatres and large office buildings that encroach upon green spaces. The new wing at the University Hospital in Ladywell offers patients better views of green spaces out of their windows and has made the spaces accessible. This has helped many a patient at the hospital and serves as a good example for other health care centers to model after. The survey results showed that 82% of respondents prefer green space over commercial developments. It also revealed that 91% of respondents enjoy the presence of wildlife, and 44% of them identified wildlife as the reason they visit the park. These results are not surprising because many people, especially those living in urban areas, have limited access to nature and greatly value the little that they do have.

In connection with health, facilitation of physical activity is one of the most important roles of parks and green spaces. As noted earlier, encouraging more people out of sedentary lifestyles into more active ones can have a significant benefit for public health and expenditure. A lot of this depends on public attitude and preference for lifestyle and this was one of the things that this study tested. The survey revealed that 60% of the residents prefer to exercise outdoors and that the most common activities people participated in for exercise were: walking, bicycle riding, jogging, playing games, and visiting the playground. The data collected through observations supported this with considerable detail, categorizing the various activities as being sedentary, walking or vigorous at each of the parks. These results are depicted in Figure 8.

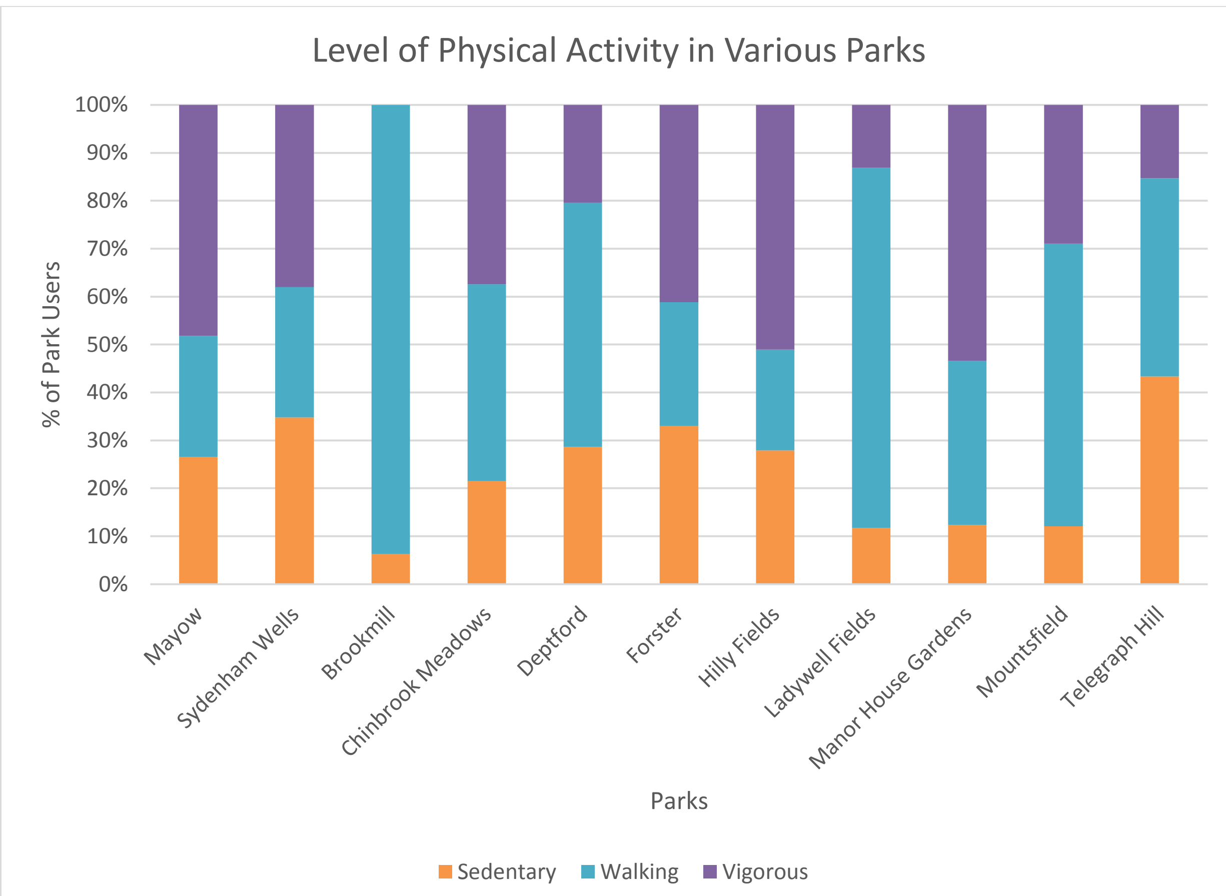

FIGURE 8: LEVEL OF PHYSICAL ACTIVITY IN THE 11 PARKS

The figure above contains some important trends observed. While the graph above is for both males and females, data was individually gathered for each of the genders. A higher percentage of men seemed to be engaged in vigorous activity, while women tend to walk more than men. This data is available in Appendix H. It is apparent that certain parks such as Ladywell Fields, Mounstfield, and Manor House Gardens encourage vigorous activities and walking much more than the others. This is a good way to measure which parks have greater physical health benefits.

Data was geographically sorted based on where it was collected. This gave a sense of which parks had higher usage and which activities the parks encouraged the most. An extended version of such a study might be very effective to measure how popular a particular park is with some activities. More specifically, visitors to each park can be color-coded on the map based on where they reside. This will provide information regarding how far they travel to get to the park and can be used to classify people as locals or commuters. Figure 9 shows some of the residents who were surveyed.

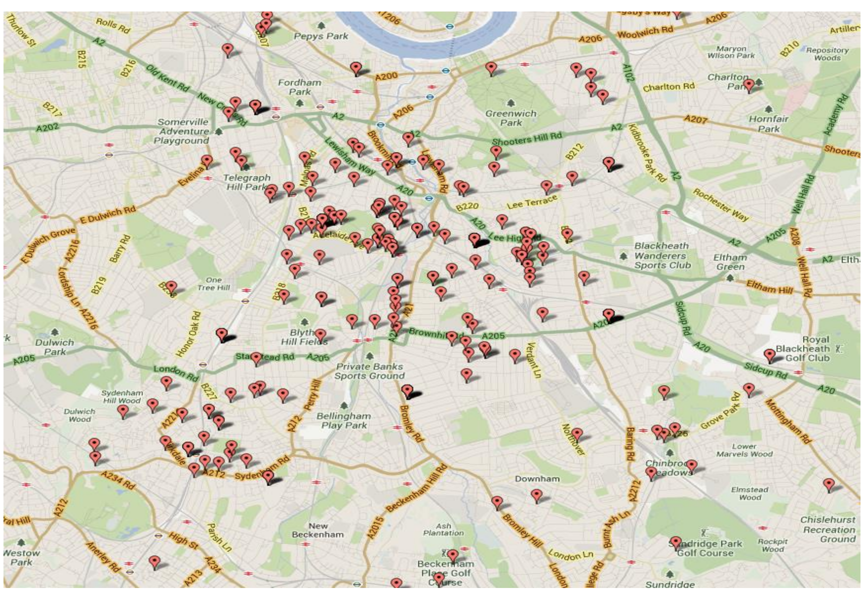

FIGURE 9: POSTAL CODES OF SURVEYED RESIDENTS PLOTTED ON A MAP OF THE BOROUGH

5. Recommendations

Part of a successful study involving the evaluation of green spaces with such a large scope and scale is the ability to recognize its robust methods and limitations that may be used as valuable reference for future studies in the field. To this end, we offer a list of recommendations and rationale for consideration by follow-up studies:

TABLE 5: TABLE OF RECOMMENDATIONS

No.	Recommendations	Motivation
1	Usage of tablet computers for field data collection	Stacks of paper forms for collecting field data, especially for observational studies, was unwieldy and prone to damage due to unfavorable weather conditions. Digitizing the data was very time consuming and prone to human error. Using inexpensive internet-enabled tablets with waterproof cases is a slicker solution that can also reduce several reams of paper.
2	Continue with paper surveys	Paper-based surveys handed out with clipboards and pencils were extremely effective in the collection of vast amounts of data fairly quickly. Multiple surveys can be simultaneously self-administered. This, in combination with online surveys is a sound approach.
3	Earlier deployment of survey	Deploying online surveys well ahead of time is prudent since online data collection doesn’t have to wait for manual surveys. The size of the dataset can also be significantly larger with early deployment which affords a longer time frame.
4	Arrange an understanding with park café managers	Making café managers aware of the study and feel like they are an essential part of its success can be useful. They may offer to help hand out surveys along with menu cards to various tables and collect them, expediting data collection.

5	Explore more time-efficient modes of transport for data collection	Bicycles were found to be the most efficient mode of transport around the borough, constantly faster than using public transportation. However, an alternative to bicycles would be very useful on days that might be more physically demanding or exhibit unfavorable weather conditions.
6	Tablet kiosks / feedback mechanisms at parks	A lightweight tablet solution along with feedback forms at cafes or park keepers' offices where present for feedback regarding park conditions and maintenance would be very useful and maintain a constant stream of data for the council.
7	Larger dataset for surveys and observational studies	It was noted that deploying several clipboards at a time containing surveys was very efficient to quickly gather lots of data, on the order of 30 surveys per hour during late afternoons. A target of at least 1000 surveys is a reasonable one in a time frame of about 2-3 weeks.
8	Reach out to more people in the borough through print and social media	Online social media as well as popular local newspapers were identified as powerful means to reach a wide group of people. Park user groups, clubs and associations in the parks and other organizations that rely on or use the green spaces for events can be intimated about the study and requested to forward surveys to their members.
9	Geographical Information Systems (GIS) as aids	Using GIS is useful for providing location-based intelligence for the surveys. Plotting the postal codes on a map of the borough was an interesting exploration of where residents come from and how far they might have travelled. This can be studied in more detail.

The above recommendations were thoughtfully considered in light of improving the quality of our data and expanding the scope of our study. Besides these, a dedicated study to measure the health benefits due to green spaces would be useful since it seems to be the single most important contribution of green spaces to public wellbeing.

6. Conclusion

The overall attitude of residents towards the parks and green spaces of Lewisham is extremely positive. A clear majority of residents feel safe in the parks, enjoy the atmosphere and especially value the social aspect of parks since many of them have found friends and partners in these spaces. Health benefits of parks cannot be sufficiently emphasized as is evident from a wide range of published research and findings of our own study. Sufficient provision that will address the needs of all age groups is required to ensure the benefits touch everyone. Most residents have reported consistently high levels of satisfaction with the parks on various parameters. These findings are not entirely surprising given the efforts of the Council to constantly outdo itself and develop a respectable relationship with the public, continuously listening for feedback. All of these efforts collectively point towards the importance and even necessity of maintaining green spaces with adequate provision and facilities. We trust the recommendations made above would serve to be a sound guide for further study of green spaces in Lewisham.

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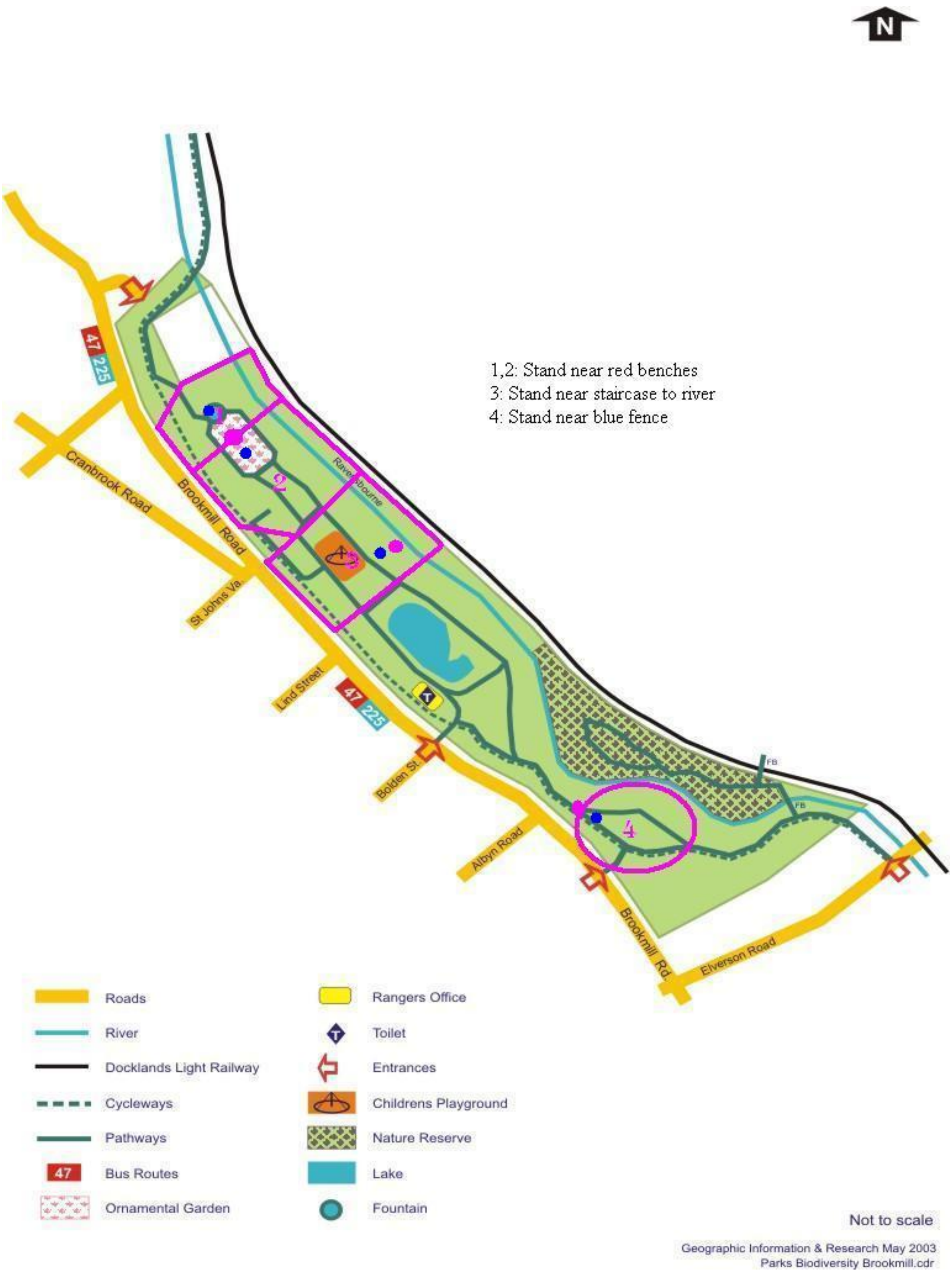
8. Appendices

Appendix A: List of Parks

Park Names	
Brookmill Park	Manor House Gardens
Chinbrook Meadows	Mayow Park
Deptford Park	Mountsfield Park
Forster Memorial Park	Sydenham Wells Park
Hilly Fields	Telegraph Hill
Ladywell Fields	

Appendix B: Sectioned Park Maps

Brookmill Park



Chinbrook Meadows

Deptford Park

Forster Memorial Park

Hilly Fields

1: Stand at intersection near lamp poles
3: Stand near benches
4: Observe up to the decline
5,6: Uses same standing point
6: Count inside the cafe
8: Special attention with slope
9: Observe entire field of view
10: Observe low line area, stand in front of bench

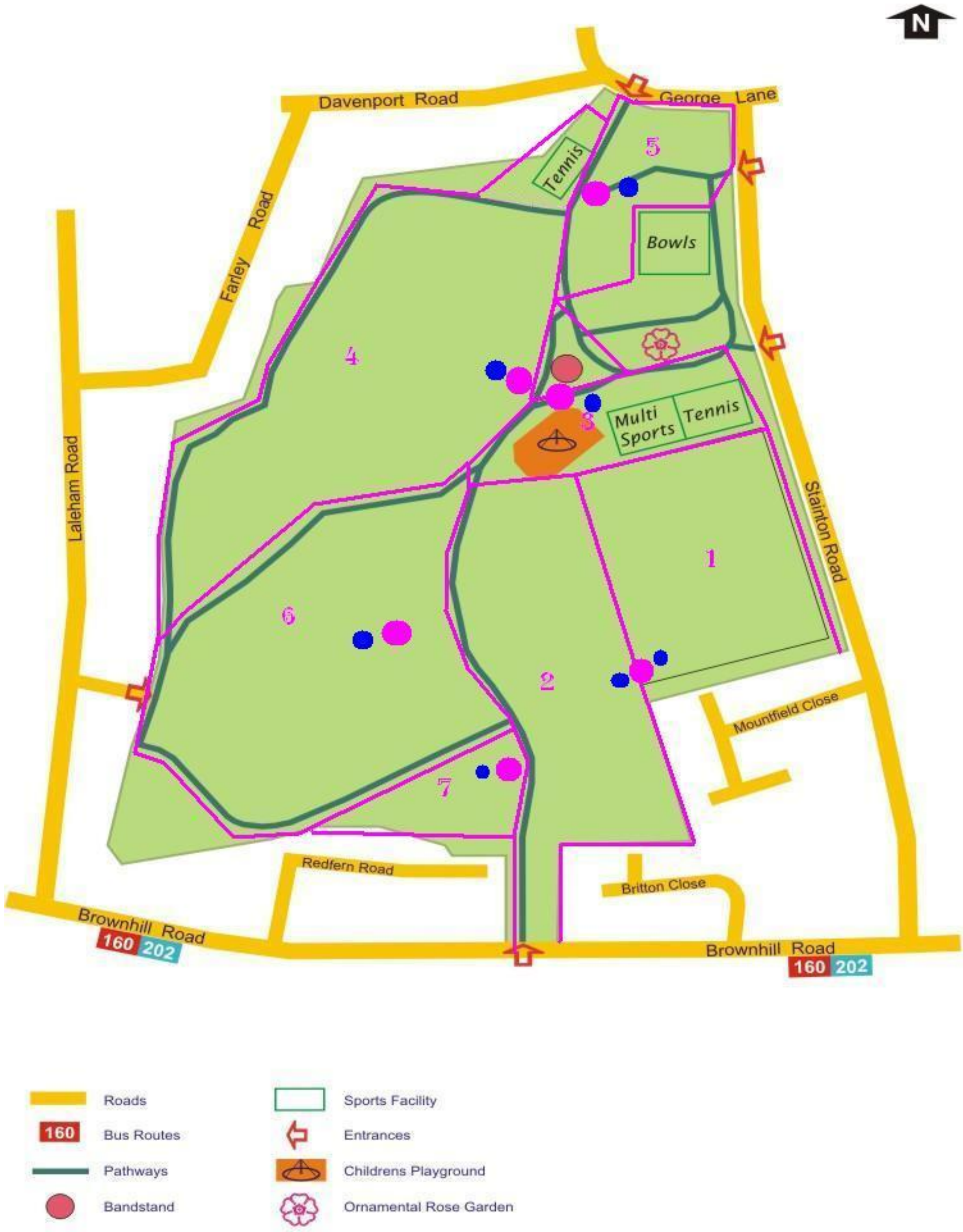
Ladywell Fields

Manor House Gardens

Mayow Park

Dacres Road
Silverdale
Mayow Road
Bishopsthorpe Road
N
N75
75
356
1
2
3
4
5
6
Tennis Courts
Bowling Green
The Lodge
Roads
75
Bus Routes
Entrances
Pathways
Sports Facilities
Childrens Playground
Meadow Area
Not to scale
Geographic Information & Research May 2003
Parks Biodiversity Mayow.cdr

Mountsfield Park



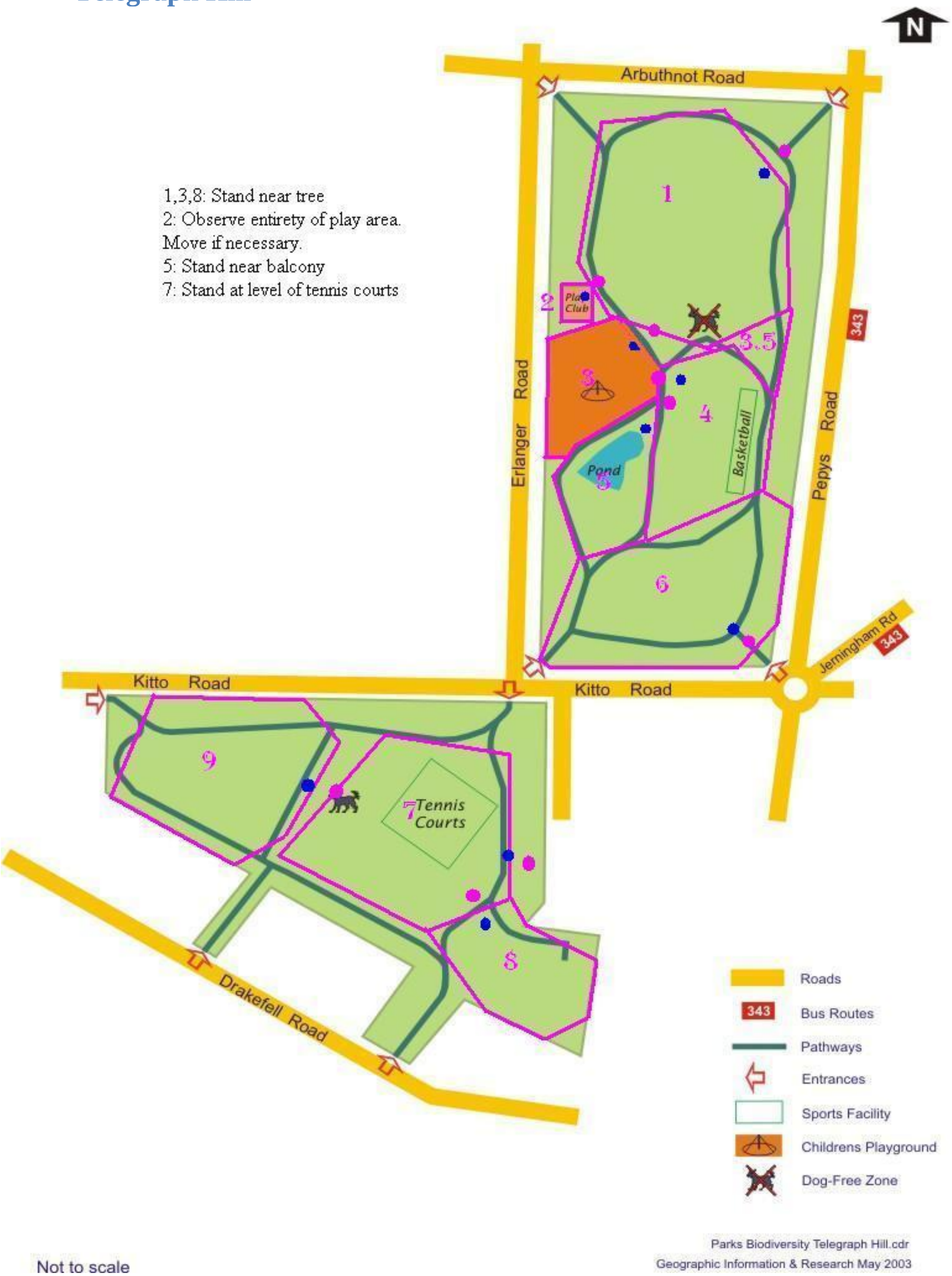
Not to scale

Geographic Information & Research May 2003
Parks Biodiversity Mountsfield.cdr

Sydenham Wells Park

Telegraph Hill

1,3,8: Stand near tree
2: Observe entirety of play area. Move if necessary.
5: Stand near balcony
7: Stand at level of tennis courts



Appendix C: Data collection table for usage statistics

SOPARC Field Data Collection Form　　　　Form Number ______-____________-___

SOPARC Field Data Collection Form

Date:	Day: M / T / W / R / F / S / Su	Park:	Session: M / N / E

Park Conditions:

Supervised (Park Keeper or Coach present)? Y / N	Usable (Not excessively windy or wet)? Y / N	Equipped (Removable balls available etc)? Y / N
Weather: Sunny / Partly Cloudy / Cloudy / Drizzle / Rain		

Comments (Reference the Target Area # here):

Number of target areas in this park: ______

Map attached overleaf. Scope orientation is defined by a vector from pink to blue markers.

Page ___ of ___

SOPARC Field Data Collection Form   Form Number _______-_____________-___

Target Area # ___ observed by ____________ starting at _____________

Target Area Conditions:

Accessible? Y / N	Organized? Y / N	Empty? Y / N

Demographics:

Total number of people in the target area:_____   Total number of pets in the target area:_____

People	Activity		Age Group				Activity Level		
	Primary	Secondary	Child	Teen	Adult	Senior	Sedentary	Walking	Vigorous
Male									
Female									

Target Area # ___ observed by ____________ starting at _____________

Target Area Conditions:

Accessible? Y / N	Organized? Y / N	Empty? Y / N

Demographics:

Total number of people in the target area:_____   Total number of pets in the target area:_____

People	Activity		Age Group				Activity Level		
	Primary	Secondary	Child	Teen	Adult	Senior	Sedentary	Walking	Vigorous
Male									
Female									

Target Area # ___ observed by ____________ starting at _____________

Target Area Conditions:

Accessible? Y / N	Organized? Y / N	Empty? Y / N

Demographics:

Total number of people in the target area:_____   Total number of pets in the target area:_____

People	Activity		Age Group				Activity Level		
	Primary	Secondary	Child	Teen	Adult	Senior	Sedentary	Walking	Vigorous
Male									
Female									

Target Area # ___ observed by ____________ starting at _____________

Target Area Conditions:

Accessible? Y / N	Organized? Y / N	Empty? Y / N

Demographics:

Total number of people in the target area:_____   Total number of pets in the target area:_____

People	Activity		Age Group				Activity Level		
	Primary	Secondary	Child	Teen	Adult	Senior	Sedentary	Walking	Vigorous
Male									
Female									

Page ___ of ___

SOPARC Field Data Collection Form　　　　Form Number ______-____________-__

Target Area # ___ observed by ____________ starting at _____________

Target Area Conditions:

Accessible? Y / N	Organized? Y / N	Empty? Y / N

Demographics:

Total number of people in the target area:_____　　Total number of pets in the target area:_____

People	Activity		Age Group				Activity Level		
	Primary	Secondary	Child	Teen	Adult	Senior	Sedentary	Walking	Vigorous
Male									
Female									

Target Area # ___ observed by ____________ starting at _____________

Target Area Conditions:

Accessible? Y / N	Organized? Y / N	Empty? Y / N

Demographics:

Total number of people in the target area:_____　　Total number of pets in the target area:_____

People	Activity		Age Group				Activity Level		
	Primary	Secondary	Child	Teen	Adult	Senior	Sedentary	Walking	Vigorous
Male									
Female									

Target Area # ___ observed by ____________ starting at _____________

Target Area Conditions:

Accessible? Y / N	Organized? Y / N	Empty? Y / N

Demographics:

Total number of people in the target area:_____　　Total number of pets in the target area:_____

People	Activity		Age Group				Activity Level		
	Primary	Secondary	Child	Teen	Adult	Senior	Sedentary	Walking	Vigorous
Male									
Female									

Target Area # ___ observed by ____________ starting at _____________

Target Area Conditions:

Accessible? Y / N	Organized? Y / N	Empty? Y / N

Demographics:

Total number of people in the target area:_____　　Total number of pets in the target area:_____

People	Activity		Age Group				Activity Level		
	Primary	Secondary	Child	Teen	Adult	Senior	Sedentary	Walking	Vigorous
Male									
Female									

Page ___ of ___

Appendix D: Interview Questions

Interview Collection Form

Name of Green Space:________________ Date:_________ Time of day:____________

Demographics:

Male ☐ Female ☐ Age:______ Ethnicity: ________________

Postal code:____________ Type of housing:____________*(list options)*

Usage

- How frequently do you visit green spaces? Daily ☐ Weekly ☐ Monthly ☐
- How long do you usually spend each time you visit?

  Less than 30 mins ☐ 30 mins – 1 hour ☐ 1-2hours ☐ over 2 hours ☐

- What time of day are you most likely to visit? Morning ☐ Afternoon ☐ Evening ☐
- What do you use green spaces for most?

  Exercise or improving health ☐ Spending time with friends and family ☐

  Enjoying nature/observing wildlife ☐

- What particular activities do you participate in while visiting green spaces? ☐

Health

- Do you use your local green spaces to relax? Yes ☐ No ☐
- Do you use your local green spaces for recreation? Yes ☐ No ☐
- In your opinion, are the parks beneficial to your health? Yes ☐ No ☐
- In your opinion, are the parks beneficial to the community's general health? Yes ☐ No ☐
- Are you aware of fitness oriented groups and programs that take place in your local green space?

    - Yes ☐ No ☐

- Are you a part of any of these groups? Yes ☐ No ☐
- Do green spaces encourage you to spend more time outdoors? Yes ☐ No ☐
- Are you more likely to use green spaces for exercise or an indoor gym or other facility?
    - Yes ☐ No ☐
- Do you feel the park helps alleviate stress? Yes ☐ No ☐
- Do you use the parks for the fitness facilities available to you? Yes ☐ No ☐
- Do you think there are enough facilities available to you? Yes ☐ No ☐

Social

- Do you interact with new people while at the parks? Yes ☐ No ☐
- Do you believe people from different backgrounds get along well together in public green spaces?
    - Yes ☐ No ☐
- Does your local green space make you feel more connected to others in the community?
    - Yes ☐ No ☐
- Do you typically visit green spaces by yourself or with others? Yes ☐ No ☐
- What sorts of social activities do you engage in when in the park? Yes ☐ No ☐
- Do you spectate events in the park that you are not directly participating in? Yes ☐ No ☐
- Have you ever volunteered at your local park? Yes ☐ No ☐
- How often do you meet friends/family in the park? Yes ☐ No ☐
- How safe do you feel in the parks? Yes ☐ No ☐
- Do you perceive antisocial behavior as a problem within the parks? Yes ☐ No ☐

- Do you think the Lewisham council and local enforcement appropriately address concerns about anti-social behavior and crime? Yes ☐ No ☐
- Do you think parents do a sufficient job taking responsibility for the behavior of their children in the park? Yes ☐ No ☐
- Do you perceive other park users treat one another with respect and consideration?
  - Yes ☐ No ☐
- Do you find drunk and rowdy behavior to be a problem? Yes ☐ No ☐
- Do you find drug use or drug dealing to be a problem? Yes ☐ No ☐
- How do the following factors influence your experience at the parks? (positive, neutral, negative)
  - Friendliness and manners of others:

    Extremely Positive ☐ Positive ☐ Neutral ☐ Negative ☐ Extremely Negative ☐
  - Compliance with regulations by other visitors: :

    Extremely Positive ☐ Positive ☐ Neutral ☐ Negative ☐ Extremely Negative ☐
  - Interaction with other visitors:

    Extremely Positive ☐ Positive ☐ Neutral ☐ Negative ☐ Extremely Negative ☐
  - Presence of other visitors:

    Extremely Positive ☐ Positive ☐ Neutral ☐ Negative ☐ Extremely Negative ☐
- Are you part of any groups or organizations that regularly meet in the parks? Yes ☐ No ☐
- Are you satisfied with the activities available to people of your age? Yes ☐ No ☐
- Do you attend events held within the park? Yes ☐ No ☐

Environment

- Did you travel to the park today using a motorized vehicle? Yes ☐ No ☐
- Do you use parks to commute to work or other places you visit regularly? Yes ☐ No ☐

- If yes, do you do this because they are conveniently placed? Yes ☐ No ☐
- Does the presence of green spaces reduce your use of public transportation or motor vehicles?
  - Yes ☐ No ▬
- Does the presence of wildlife in the parks influence your visit? Positively or Negatively?

Yes, Extremely Positive ☐ Yes, Positively ☐ No ☐ Yes, Negatively ☐ Yes, Extremely Negative ☐

- Does wildlife draw you to the parks? Yes ☐ No ☐
- Would you support a local nature conservation drive in the park closest to you?
  - Yes ☐ No ☐
- Would you prefer green space over a more commercial development? Yes ☐ No ☐
- What do you think might add to the aesthetic value of the park? Yes ☐ No ☐

Economics

- For statistical purposes only: What would be the maximum value you would pay for use of green space areas and facilities (like a membership)? Yes ☐ No ☐
- Would you support protecting green spaces in your neighborhood as they would increase your property value? Yes ☐ No ☐
- Would you be willing to pay more in taxes to ensure existing green spaces are protected?
  - Yes ☐ No ☐
- Did you ever spend money in the park? Yes ☐ No ☐
- Are you more likely to visit business or markets situated near the parks rather than similar businesses located elsewhere? Yes ☐ No ☐
- Do you tend to combine your visits to the parks with other activities (like shopping or dropping your kids somewhere or visiting relatives/friends)? Yes ☐ No ☐
- Is the presence of green spaces a deciding factor in where you live? Yes ☐ No ☐

Appendix E: Semi-Structured Interviews Versions 1-3

Structured Interview Collection Form BETA (Version 1)

Location of Interview: ____

Date and Time of Day: ____

Male / Female   Age: _______   Ethnicity: ____________

Zip Code: _____________

Usage

1. How frequently do you visit green spaces: Daily / Weekly / Monthly / Never
2. What do you use green spaces for most?

Health

3. In your opinion, are the parks beneficial to the community's general health?
4. Do green spaces encourage you to spend more time outdoor exercising or relaxing?

Social

5. Does your local green space make you feel more connected to others in the community?
6. How safe do you feel in the parks?
7. Are you satisfied with the activities available to people of your age?

Environment

8. Does the presence of wildlife affect your visit? Positively / Negatively
9. Would you prefer green space over a more commercial development?

Economic

10. For statistical purposes only: What would be the maximum value you would consider paying for the use of parks and green spaces? __________ pounds/month
11. Given two similar properties one of which is situated close to a green space, which house are you more likely to choose?

Structured Interview Collection Form BETA (Version 2)

Location of Interview: ____

Date and Time of Day: ____

Male / Female Age: _______

Zip Code: ______________

Usage

1. How frequently do you visit green spaces: Daily / Weekly / Monthly / Never
2. What do you use green spaces for most?

Health

3. In your opinion, are the parks beneficial to your general health?
4. Do you prefer to exercise indoors or outdoors?

Social

5. Does your local green space make you feel more connected to others in the community?
6. How safe do you feel in the parks? Very safe / safe / neutral / unsafe / very unsafe
7. Are you satisfied with the activities available at the parks?
8. Who do you usually visit the park with?

Environment

9. Does the presence of wildlife affect your visit? Positively / Negatively / Indifferent
10. Would you prefer green space over a more commercial development?
11. Do you use parks to commute to work or other places you visit?

Economic

12. For statistical purposes only: What would be the maximum value you would consider paying for the use of parks and green spaces? ___________ pounds/month
13. Given two similar properties one of which is situated close to a green space and the other close to a shopping centre, which house are you more likely to choose?

Structured Interview Collection Form BETA (Version 3)

Location of Interview: ____

Date and Time of Day: ____

Male / Female   Age: _______

Zip Code: _____________

Usage

1. How frequently do you visit green spaces: Daily / Weekly / Monthly / Never
2. How long do your visits to the parks usually last?

Health

3. Do you think the parks promote healthy habits?
4. How would you rate the health and hygiene of the parks?

Social

5. Have you ever volunteered at your local park?
6. How safe do you feel in the parks? Very safe / safe / neutral / unsafe / very unsafe
7. Is antisocial behaviour and crime in the parks properly addressed by the Lewisham Council and local law enforcement?

Environment

8. How likely are you to support a nature conservation drive in your local park?
9. Do you use parks to commute to work or other places you visit?
10. What do you think might add to the aesthetic value of the parks?

Economic

11. How frequently do you spend money at the parks?
12. Do you combine visits to the parks with other activities (ex. Shopping, dropping off kids)?

Appendix F: Survey

Lewisham

Help improve your local parks!

What are your reasons for visiting the park or open space? (Tick all that apply)

□ See birds and wildlife	□ To relax	□ Picnic/lunch break
□ Look at the flowers	□ Peace and quiet	□ Attend events
□ Dog walking	□ Walking	□ Meet friends
□ Ride a bike	□ Watch games	□ Go jogging
□ Sunbathe	□ Play games	□ Sports
□ Visit playground	□ Take a shortcut	□ Other:__________________

How frequently do you visit the green spaces?

Daily Weekly Monthly Few times a year Never

How long do your visits usually last?

Half an hour 1 hour 2 hours 3 hours 4 hours or more

Do you prefer to exercise: Indoors Outdoors Doesn't matter

Do you visit parks with: Friends Family Groups Children Pets Alone Other

Do you spend money at the parks: Daily Weekly Monthly Few times a year Never

What do you think would make the parks more appealing?

What do you value most about your local parks?

What is your level of agreement with the following statements:

	Strongly disagree	Disagree	Neither	Agree	Strongly Agree
Parks are clean and maintained	1	2	3	4	5
I feel safe in the parks	1	2	3	4	5
I'm satisfied with activities available	1	2	3	4	5
I enjoy the presence of wildlife	1	2	3	4	5
Parks make me feel connected to my community	1	2	3	4	5
I prefer green space over commercial development	1	2	3	4	5

Please Turn Over

The information that is provided on this form will remain strictly confidential in accordance with the Data Protection Act. If you are unhappy about answering a particular question you do not have to.

Gender : ☐ Male ☐ Female **Postal Code:** ___________

Age: ☐ Under 18 ☐ 18-24 ☐ 25-29 ☐ 30-34 ☐ 35-39 ☐ 40-44 ☐ 45-49 ☐ 50-54 ☐ 55-59 ☐ 60-64 ☐ 65+

Ethnicity:	
White	☐ English/Welsh/Scottish/Northern Irish/British ☐ Irish ☐ Gypsy or Irish Traveller ☐ Any other White background, write in
Mixed/ multiple ethnic groups	☐ White and Black Caribbean ☐ White and Black African ☐ White and Asian ☐ Any other mixed/ multiple ethnic background, write in
Asian/ Asian British	☐ Indian ☐ Pakistani ☐ Bangladeshi ☐ Chinese ☐ Any other Asian background, write in
Black/ African/ Caribbean/ Black British	☐ Caribbean ☐ African ☐ Any other Black/ African/ Caribbean background, write in
Other ethnic group	☐ Arab ☐ Any other ethnic group, write in

Religion/belief

☐ None	☐ Christian (all denominations)
☐ Buddhist	☐ Hindu
☐ Jewish	☐ Muslim
☐ Sikh	☐ Any other religion/belief, write in

Disability:

Do you consider yourself to be a disabled person? ☐ No ☐ Yes

Please state the type of impairment that applies to you.

☐ Physical impairment, such as difficulty using your arms or mobility issues which means using a wheelchair or crutches

☐ Sensory impairment, such as being blind/ having a serious visual impairment or being deaf/ having a serious hearing impairment

☐ Mental health condition, such as depression or schizophrenia

☐ Learning disability/difficulty, such as Down's Syndrome or dyslexia or cognitive impairment, such as autistic spectrum disorder

☐ Long-standing illness or health condition such as cancer, HIV, diabetes, chronic heart disease or epilepsy

☐ Other (please specify)

Sexual orientation

☐ Straight/heterosexual	☐ Gay/lesbian
☐ Bisexual	☐ Other (write in)

Form #

Appendix G: Custom MATLAB code for SOPARC and Surveys

SOPARC

```
% Imports SOPARC Data and processes to obtain usefull results.
```

Import SOPARC Spreadsheets

```
% Specify Range of Sections that Should be Read
minSec = 1;
maxSec = 10;

% Create Structures for Storing Data
Raw = struct();
TotalPeople = struct();
TotalPets = struct();
General = struct();
ProportionAct = struct();

% Import Raw Numeric Data into Structures
Raw.Mayow = xlsread('C:/Users/The Paulo/Desktop/Workspace/SOPARC/SOPARC_Mayow.xls');
Raw.Sydenham = xlsread('C:/Users/The Paulo/Desktop/Workspace/SOPARC/SOPARC_Sydenham.xls');
Raw.Brookmill = xlsread('C:/Users/The Paulo/Desktop/Workspace/SOPARC/SOPARC_Brookmill.xls');
Raw.Chinbrook = xlsread('C:/Users/The Paulo/Desktop/Workspace/SOPARC/SOPARC_Chinbrook.xls');
Raw.MountsField = xlsread('C:/Users/The Paulo/Desktop/Workspace/SOPARC/SOPARC_Mountsfield.xls');
Raw.Forster = xlsread('C:/Users/The Paulo/Desktop/Workspace/SOPARC/SOPARC_Forster.xls');
Raw.Deptford = xlsread('C:/Users/The Paulo/Desktop/Workspace/SOPARC/SOPARC_Deptford.xls');
Raw.HillyFields = xlsread('C:/Users/The Paulo/Desktop/Workspace/SOPARC/SOPARC_HillyFields.xls');
Raw.Ladywell = xlsread('C:/Users/The Paulo/Desktop/Workspace/SOPARC/SOPARC_Ladywell.xls');
Raw.ManorHouse = xlsread('C:/Users/The Paulo/Desktop/Workspace/SOPARC/SOPARC_ManorHouse.xls');
Raw.TelegraphHill = xlsread('C:/Users/The
Paulo/Desktop/Workspace/SOPARC/SOPARC_TelegraphHill.xls');
```

Parse Data

```
% Parse Data and Sum By Section MAYOW
TotalPeople.Mayow = [];
TotalPets.Mayow = [];
General.Mayow = zeros(2,7);
ProportionAct.Mayow = zeros(3,3);
numTarg = 1;
try
    for i = minSec:maxSec
        firstRow = (i-1)*(numTarg*5+2)+1; % Row Containing number of target in each section
        numTarg = Raw.Mayow(firstRow,7);
        tempPeople = 0;
        tempPets = 0;
        tempMale = zeros(1,7);
        tempFem = zeros(1,7);
        for j = 1:numTarg % Loop Through all Targets
            rowToRead = firstRow+2+5*(j-1);
```

```
            tempPeople = tempPeople + Raw.Mayow(rowToRead,7); % Total People
            tempPets = tempPets + Raw.Mayow(rowToRead,8); % Total Pets
            tempMale = tempMale + Raw.Mayow(rowToRead+2,3:9);
            tempFem = tempFem + Raw.Mayow(rowToRead+3,3:9);
        end
        TotalPeople.Mayow = [TotalPeople.Mayow tempPeople];
        TotalPets.Mayow = [TotalPets.Mayow tempPets];
        General.Mayow = General.Mayow + [tempMale;tempFem];

    end
catch
    % Do Nothing
end

% Calculate Proportions
temp = (General.Mayow(:,5)+General.Mayow(:,6)+General.Mayow(:,7));
ProportionAct.Mayow(1,:) = General.Mayow(1,[5,6,7])./temp(1).*100;
ProportionAct.Mayow(2,:) = General.Mayow(2,[5,6,7])./temp(2).*100;
ProportionAct.Mayow(3,:) = mean(ProportionAct.Mayow(1:2,:));

% Parse Data and Sum By Section SYDENHAM
TotalPeople.Sydenham = [];
TotalPets.Sydenham = [];
General.Sydenham = zeros(2,7);
numTarg = 1;
try
    for i = minSec:maxSec
        firstRow = (i-1)*(numTarg*5+2)+1; % Row Containing number of target in each section
        numTarg = Raw.Sydenham(firstRow,7);
        tempPeople = 0;
        tempPets = 0;
        tempMale = zeros(1,7);
        tempFem = zeros(1,7);
        for j = 1:numTarg % Loop Through all Targets
            rowToRead = firstRow+2+5*(j-1);
            tempPeople = tempPeople + Raw.Sydenham(rowToRead,7);
            tempPets = tempPets + Raw.Sydenham(rowToRead,8);
            tempMale = tempMale + Raw.Sydenham(rowToRead+2,3:9);
            tempFem = tempFem + Raw.Sydenham(rowToRead+3,3:9);
        end
        TotalPeople.Sydenham = [TotalPeople.Sydenham tempPeople];
        TotalPets.Sydenham = [TotalPets.Sydenham tempPets];
        General.Sydenham = General.Sydenham + [tempMale;tempFem];
    end
catch
    % Do Nothing
end

% Calculate Proportions
temp = (General.Sydenham(:,5)+General.Sydenham(:,6)+General.Sydenham(:,7));
ProportionAct.Sydenham(1,:) = General.Sydenham(1,[5,6,7])./temp(1).*100;
ProportionAct.Sydenham(2,:) = General.Sydenham(2,[5,6,7])./temp(2).*100;
ProportionAct.Sydenham(3,:) = mean(ProportionAct.Sydenham(1:2,:));
```

```
% Parse Data and Sum By Section BROOKMILL
TotalPeople.Brookmill = [];
TotalPets.Brookmill = [];
General.Brookmill = zeros(2,7);
numTarg = 1;
try
    for i = minSec:maxSec
        firstRow = (i-1)*(numTarg*5+2)+1; % Row Containing number of target in each section
        numTarg = Raw.Brookmill(firstRow,7);
        tempPeople = 0;
        tempPets = 0;
        tempMale = zeros(1,7);
        tempFem = zeros(1,7);
        for j = 1:numTarg % Loop Through all Targets
            rowToRead = firstRow+2+5*(j-1);
            tempPeople = tempPeople + Raw.Brookmill(rowToRead,7);
            tempPets = tempPets + Raw.Brookmill(rowToRead,8);
            tempMale = tempMale + Raw.Brookmill(rowToRead+2,3:9);
            tempFem = tempFem + Raw.Brookmill(rowToRead+3,3:9);
        end
        TotalPeople.Brookmill = [TotalPeople.Brookmill tempPeople];
        TotalPets.Brookmill = [TotalPets.Brookmill tempPets];
        General.Brookmill = General.Brookmill + [tempMale;tempFem];
    end
catch
    % Do Nothing
end

% Calculate Proportions
temp = (General.Brookmill(:,5)+General.Brookmill(:,6)+General.Brookmill(:,7));
ProportionAct.Brookmill(1,:) = General.Brookmill(1,[5,6,7])./temp(1).*100;
ProportionAct.Brookmill(2,:) = General.Brookmill(2,[5,6,7])./temp(2).*100;
ProportionAct.Brookmill(3,:) = mean(ProportionAct.Brookmill(1:2,:));

% Parse Data and Sum By Section CHINBROOK
TotalPeople.Chinbrook = [];
TotalPets.Chinbrook = [];
General.Chinbrook = zeros(2,7);
numTarg = 1;
try
    for i = minSec:maxSec
        firstRow = (i-1)*(numTarg*5+2)+1; % Row Containing number of target in each section
        numTarg = Raw.Chinbrook(firstRow,7);
        tempPeople = 0;
        tempPets = 0;
        tempMale = zeros(1,7);
        tempFem = zeros(1,7);
        for j = 1:numTarg % Loop Through all Targets
            rowToRead = firstRow+2+5*(j-1);
            tempPeople = tempPeople + Raw.Chinbrook(rowToRead,7);
            tempPets = tempPets + Raw.Chinbrook(rowToRead,8);
            tempMale = tempMale + Raw.Chinbrook(rowToRead+2,3:9);
```

```
            tempFem = tempFem + Raw.Chinbrook(rowToRead+3,3:9);
        end
        TotalPeople.Chinbrook = [TotalPeople.Chinbrook tempPeople];
        TotalPets.Chinbrook = [TotalPets.Chinbrook tempPets];
        General.Chinbrook = General.Chinbrook + [tempMale;tempFem];
    end
catch
    % Do Nothing
end

% Calculate Proportions
temp = (General.Chinbrook(:,5)+General.Chinbrook(:,6)+General.Chinbrook(:,7));
ProportionAct.Chinbrook(1,:) = General.Chinbrook(1,[5,6,7])./temp(1).*100;
ProportionAct.Chinbrook(2,:) = General.Chinbrook(2,[5,6,7])./temp(2).*100;
ProportionAct.Chinbrook(3,:) = mean(ProportionAct.Chinbrook(1:2,:));

% Parse Data and Sum By Section DEPTFORD
TotalPeople.Deptford = [];
TotalPets.Deptford = [];
General.Deptford = zeros(2,7);
numTarg = 1;
try
    for i = minSec:maxSec
        firstRow = (i-1)*(numTarg*5+2)+1; % Row Containing number of target in each section
        numTarg = Raw.Deptford(firstRow,7);
        tempPeople = 0;
        tempPets = 0;
        tempMale = zeros(1,7);
        tempFem = zeros(1,7);
        for j = 1:numTarg % Loop Through all Targets
            rowToRead = firstRow+2+5*(j-1);
            tempPeople = tempPeople + Raw.Deptford(rowToRead,7);
            tempPets = tempPets + Raw.Deptford(rowToRead,8);
            tempMale = tempMale + Raw.Deptford(rowToRead+2,3:9);
            tempFem = tempFem + Raw.Deptford(rowToRead+3,3:9);
        end
        TotalPeople.Deptford = [TotalPeople.Deptford tempPeople];
        TotalPets.Deptford = [TotalPets.Deptford tempPets];
        General.Deptford = General.Deptford + [tempMale;tempFem];
    end
catch
    % Do Nothing
end

% Calculate Proportions
temp = (General.Deptford(:,5)+General.Deptford(:,6)+General.Deptford(:,7));
ProportionAct.Deptford(1,:) = General.Deptford(1,[5,6,7])./temp(1).*100;
ProportionAct.Deptford(2,:) = General.Deptford(2,[5,6,7])./temp(2).*100;
ProportionAct.Deptford(3,:) = mean(ProportionAct.Deptford(1:2,:));

% Parse Data and Sum By Section FORSTER
TotalPeople.Forster = [];
TotalPets.Forster = [];
```

```
General.Forster = zeros(2,7);
numTarg = 1;
try
    for i = minSec:maxSec
        firstRow = (i-1)*(numTarg*5+2)+1; % Row Containing number of target in each section
        numTarg = Raw.Forster(firstRow,7);
        tempPeople = 0;
        tempPets = 0;
        tempMale = zeros(1,7);
        tempFem = zeros(1,7);
        for j = 1:numTarg % Loop Through all Targets
            rowToRead = firstRow+2+5*(j-1);
            tempPeople = tempPeople + Raw.Forster(rowToRead,7);
            tempPets = tempPets + Raw.Forster(rowToRead,8);
            tempMale = tempMale + Raw.Forster(rowToRead+2,3:9);
            tempFem = tempFem + Raw.Forster(rowToRead+3,3:9);
        end
        TotalPeople.Forster = [TotalPeople.Forster tempPeople];
        TotalPets.Forster = [TotalPets.Forster tempPets];
        General.Forster = General.Forster + [tempMale;tempFem];
    end
catch
    % Do Nothing
end

% Calculate Proportions
temp = (General.Forster(:,5)+General.Forster(:,6)+General.Forster(:,7));
ProportionAct.Forster(1,:) = General.Forster(1,[5,6,7])./temp(1).*100;
ProportionAct.Forster(2,:) = General.Forster(2,[5,6,7])./temp(2).*100;
ProportionAct.Forster(3,:) = mean(ProportionAct.Forster(1:2,:));

% Parse Data and Sum By Section HILLYFIELDS
TotalPeople.HillyFields = [];
TotalPets.HillyFields = [];
General.HillyFields = zeros(2,7);
numTarg = 1;
try
    for i = minSec:maxSec
        firstRow = (i-1)*(numTarg*5+2)+1; % Row Containing number of target in each section
        numTarg = Raw.HillyFields(firstRow,7);
        tempPeople = 0;
        tempPets = 0;
        tempMale = zeros(1,7);
        tempFem = zeros(1,7);
        for j = 1:numTarg % Loop Through all Targets
            rowToRead = firstRow+2+5*(j-1);
            tempPeople = tempPeople + Raw.HillyFields(rowToRead,7);
            tempPets = tempPets + Raw.HillyFields(rowToRead,8);
            tempMale = tempMale + Raw.HillyFields(rowToRead+2,3:9);
            tempFem = tempFem + Raw.HillyFields(rowToRead+3,3:9);
        end
        TotalPeople.HillyFields = [TotalPeople.HillyFields tempPeople];
        TotalPets.HillyFields = [TotalPets.HillyFields tempPets];
```

```
        General.HillyFields = General.HillyFields + [tempMale;tempFem];
    end
catch
    % Do Nothing
end

% Calculate Proportions
temp = (General.HillyFields(:,5)+General.HillyFields(:,6)+General.HillyFields(:,7));
ProportionAct.HillyFields(1,:) = General.HillyFields(1,[5,6,7])./temp(1).*100;
ProportionAct.HillyFields(2,:) = General.HillyFields(2,[5,6,7])./temp(2).*100;
ProportionAct.HillyFields(3,:) = mean(ProportionAct.HillyFields(1:2,:));

% Parse Data and Sum By Section LADYWELL
TotalPeople.LadyWell = [];
TotalPets.LadyWell = [];
General.LadyWell = zeros(2,7);
numTarg = 1;
try
    for i = minSec:maxSec
        firstRow = (i-1)*(numTarg*5+2)+1; % Row Containing number of target in each section
        numTarg = Raw.LadyWell(firstRow,7);
        tempPeople = 0;
        tempPets = 0;
        tempMale = zeros(1,7);
        tempFem = zeros(1,7);
        for j = 1:numTarg % Loop Through all Targets
            rowToRead = firstRow+2+5*(j-1);
            tempPeople = tempPeople + Raw.LadyWell(rowToRead,7);
            tempPets = tempPets + Raw.LadyWell(rowToRead,8);
            tempMale = tempMale + Raw.LadyWell(rowToRead+2,3:9);
            tempFem = tempFem + Raw.LadyWell(rowToRead+3,3:9);
        end
        TotalPeople.LadyWell = [TotalPeople.LadyWell tempPeople];
        TotalPets.LadyWell = [TotalPets.LadyWell tempPets];
        General.LadyWell = General.LadyWell + [tempMale;tempFem];
    end
catch
    % Do Nothing
end

% Calculate Proportions
temp = (General.LadyWell(:,5)+General.LadyWell(:,6)+General.LadyWell(:,7));
ProportionAct.LadyWell(1,:) = General.LadyWell(1,[5,6,7])./temp(1).*100;
ProportionAct.LadyWell(2,:) = General.LadyWell(2,[5,6,7])./temp(2).*100;
ProportionAct.LadyWell(3,:) = mean(ProportionAct.LadyWell(1:2,:));

% Parse Data and Sum By Section MANORHOUSE
TotalPeople.ManorHouse = [];
TotalPets.ManorHouse = [];
General.ManorHouse = zeros(2,7);
numTarg = 1;
try
    for i = minSec:maxSec
```

```
        firstRow = (i-1)*(numTarg*5+2)+1; % Row Containing number of target in each section
        numTarg = Raw.ManorHouse(firstRow,7);
        tempPeople = 0;
        tempPets = 0;
        tempMale = zeros(1,7);
        tempFem = zeros(1,7);
        for j = 1:numTarg % Loop Through all Targets
            rowToRead = firstRow+2+5*(j-1);
            tempPeople = tempPeople + Raw.ManorHouse(rowToRead,7);
            tempPets = tempPets + Raw.ManorHouse(rowToRead,8);
            tempMale = tempMale + Raw.ManorHouse(rowToRead+2,3:9);
            tempFem = tempFem + Raw.ManorHouse(rowToRead+3,3:9);
        end
        TotalPeople.ManorHouse = [TotalPeople.ManorHouse tempPeople];
        TotalPets.ManorHouse = [TotalPets.ManorHouse tempPets];
        General.ManorHouse = General.ManorHouse + [tempMale;tempFem];
    end
catch
    % Do Nothing
end

% Calculate Proportions
temp = (General.ManorHouse(:,5)+General.ManorHouse(:,6)+General.ManorHouse(:,7));
ProportionAct.ManorHouse(1,:) = General.ManorHouse(1,[5,6,7])./temp(1).*100;
ProportionAct.ManorHouse(2,:) = General.ManorHouse(2,[5,6,7])./temp(2).*100;
ProportionAct.ManorHouse(3,:) = mean(ProportionAct.ManorHouse(1:2,:));

% Parse Data and Sum By Section MOUNTSFIELD
TotalPeople.MountsField = [];
TotalPets.MountsField = [];
General.MountsField = zeros(2,7);
numTarg = 1;
try
    for i = minSec:maxSec
        firstRow = (i-1)*(numTarg*5+2)+1; % Row Containing number of target in each section
        numTarg = Raw.MountsField(firstRow,7);
        tempPeople = 0;
        tempPets = 0;
        tempMale = zeros(1,7);
        tempFem = zeros(1,7);
        for j = 1:numTarg % Loop Through all Targets
            rowToRead = firstRow+2+5*(j-1);
            tempPeople = tempPeople + Raw.MountsField(rowToRead,7);
            tempPets = tempPets + Raw.MountsField(rowToRead,8);
            tempMale = tempMale + Raw.MountsField(rowToRead+2,3:9);
            tempFem = tempFem + Raw.MountsField(rowToRead+3,3:9);
        end
        TotalPeople.MountsField = [TotalPeople.MountsField tempPeople];
        TotalPets.MountsField = [TotalPets.MountsField tempPets];
        General.MountsField = General.MountsField + [tempMale;tempFem];
    end
catch
    % Do Nothing
```

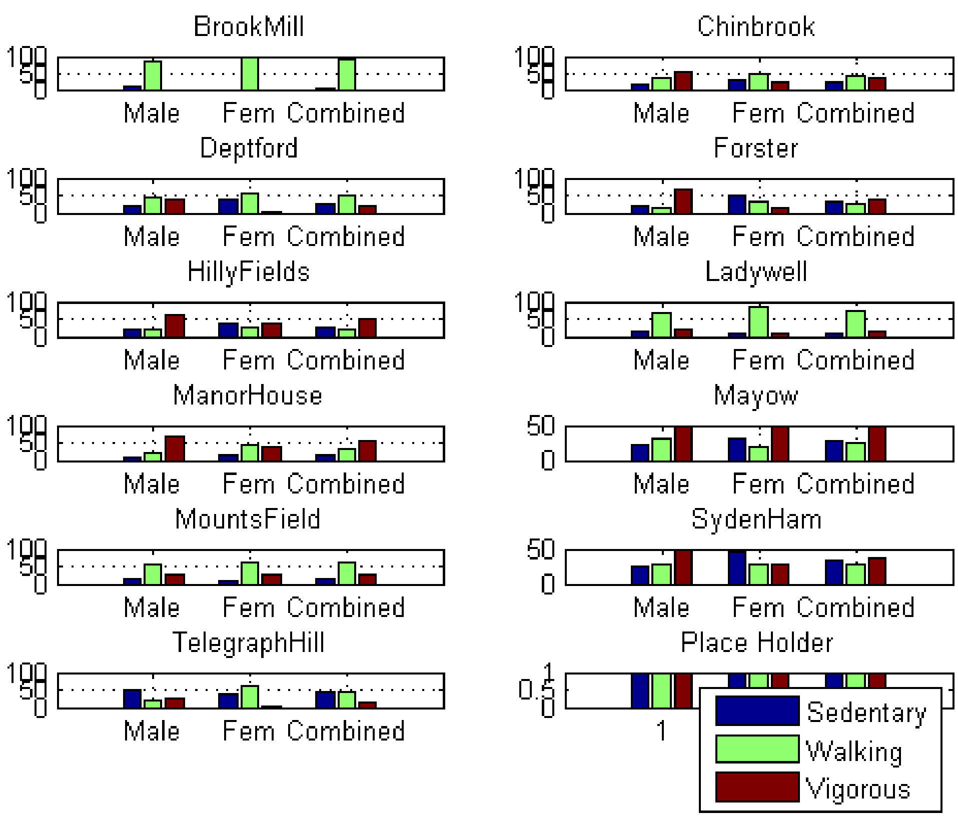
```
end

% Calculate Proportions
temp = (General.MountsField(:,5)+General.MountsField(:,6)+General.MountsField(:,7));
ProportionAct.MountsField(1,:) = General.MountsField(1,[5,6,7])./temp(1).*100;
ProportionAct.MountsField(2,:) = General.MountsField(2,[5,6,7])./temp(2).*100;
ProportionAct.MountsField(3,:) = mean(ProportionAct.MountsField(1:2,:));

% Parse Data and Sum By Section TELEGRAPHHILL
TotalPeople.TelegraphHill = [];
TotalPets.TelegraphHill = [];
General.TelegraphHill = zeros(2,7);
numTarg = 1;
try
    for i = minSec:maxSec
        firstRow = (i-1)*(numTarg*5+2)+1; % Row Containing number of target in each section
        numTarg = Raw.TelegraphHill(firstRow,7);
        tempPeople = 0;
        tempPets = 0;
        tempMale = zeros(1,7);
        tempFem = zeros(1,7);
        for j = 1:numTarg % Loop Through all Targets
            rowToRead = firstRow+2+5*(j-1);
            tempPeople = tempPeople + Raw.TelegraphHill(rowToRead,7);
            tempPets = tempPets + Raw.TelegraphHill(rowToRead,8);
            tempMale = tempMale + Raw.TelegraphHill(rowToRead+2,3:9);
            tempFem = tempFem + Raw.TelegraphHill(rowToRead+3,3:9);
        end
        TotalPeople.TelegraphHill = [TotalPeople.TelegraphHill tempPeople];
        TotalPets.TelegraphHill = [TotalPets.TelegraphHill tempPets];
        General.TelegraphHill = General.TelegraphHill + [tempMale;tempFem];
    end
catch
    % Do Nothing
end

% Calculate Proportions
temp = (General.TelegraphHill(:,5)+General.TelegraphHill(:,6)+General.TelegraphHill(:,7));
ProportionAct.TelegraphHill(1,:) = General.TelegraphHill(1,[5,6,7])./temp(1).*100;
ProportionAct.TelegraphHill(2,:) = General.TelegraphHill(2,[5,6,7])./temp(2).*100;
ProportionAct.TelegraphHill(3,:) = mean(ProportionAct.TelegraphHill(1:2,:));
```

Create Plots

```
% Aspect ratio variables
x = 6;
y = 2;

% Graph of Physical Activity per Gender and Park
subplot(x,y,1) %Brookmill
bar(ProportionAct.Brookmill)
set(gca,'XTickLabel',{'Male' 'Fem' 'Combined'})
```

```
title('BrookMill')
grid on

subplot(x,y,2) %Chinbrook
bar(ProportionAct.Chinbrook)
set(gca,'XTickLabel',{'Male' 'Fem' 'Combined'})
title('Chinbrook')
grid on

subplot(x,y,3) %Deptford
bar(ProportionAct.Deptford)
set(gca,'XTickLabel',{'Male' 'Fem' 'Combined'})
title('Deptford')
grid on

subplot(x,y,4) %Forster
bar(ProportionAct.Forster)
set(gca,'XTickLabel',{'Male' 'Fem' 'Combined'})
title('Forster')
grid on

subplot(x,y,5) %HillyFields
bar(ProportionAct.HillyFields)
set(gca,'XTickLabel',{'Male' 'Fem' 'Combined'})
title('HillyFields')
grid on

subplot(x,y,6) %Ladywell
bar(ProportionAct.Ladywell)
set(gca,'XTickLabel',{'Male' 'Fem' 'Combined'})
title('Ladywell')
grid on

subplot(x,y,7) %ManorHouse
bar(ProportionAct.ManorHouse)
set(gca,'XTickLabel',{'Male' 'Fem' 'Combined'})
title('ManorHouse')
grid on

subplot(x,y,8) %Mayow
bar(ProportionAct.Mayow)
set(gca,'XTickLabel',{'Male' 'Fem' 'Combined'})
title('Mayow')
grid on

subplot(x,y,9) %MountsField
bar(ProportionAct.MountsField)
set(gca,'XTickLabel',{'Male' 'Fem' 'Combined'})
title('MountsField')
grid on

subplot(x,y,10) %SydenHam
bar(ProportionAct.Sydenham)
```

```
set(gca,'XTickLabel',{'Male' 'Fem' 'Combined'})
title('SydenHam')
grid on

subplot(x,y,11) %TelegraphHill
bar(ProportionAct.TelegraphHill)
set(gca,'XTickLabel',{'Male' 'Fem' 'Combined'})
title('TelegraphHill')
grid on

subplot(x,y,12) % Place Holder
bar([1 1 1;1 1 1;1 1 1])
legend('Sedentary','Walking','Vigorous')
title('Place Holder')
```



The graphs about show the activity level for each park by gender and combined. The 12th box serves as a place holder and a legend. The park names are above the boxes. For each box, the first group of columns is male followed by female and then combined. Please refer to the main graph on the last page in Appendix H.

Blue	Sedentary
Green	Walking
Red	Vigorous

Surveys

```
% Each cell parses a question of the survey and adds information to
% structure. Run cells in order to achieve reliable results.
```

Question 1: Reasons to Attend Parks

```
% Clear Memory
clc;

% Create Structure to Store Data
Surveys = struct('ReasonsClosed', zeros(length(array),18));

% Loops Through All Rows
for i = [2:length(array)]
    temp = array{i,2};
    % If Cell Contains a Number Read Directly
    if isnumeric(temp)
        Surveys.ReasonsClosed(i,temp) = 1;
    % If Cell contains a string either convert directly or, in case not all
    % characters are numbers, read only numeric portion.
    elseif ischar(temp)
        temp2 = str2num(temp);
        if temp2
            Surveys.ReasonsClosed(i,temp2) = 1;
        else
            for t = length(temp):-1:1
                if temp(t) == ','
                    Surveys.ReasonsClosed(i,str2num(temp(1:t))) = 1;
                    break
                end
            end
        end
    end
end

% Expose output to world
Surveys.ReasonsClosed;
```

Question 2: How Frequently Green Spaces do you Visit?

```
% Create Storage Location
Surveys.Frequency = zeros(length(array),6);

% Loop through all rows
for i = 2:length(array)
    temp = char(array{i,3});
    tempLine = [];
    % If string is empty
    if ~length(temp)
        tempLine = 1;
    end
```

```
    % Convert all characters in string to their corresponding numbers
    for j = 1:length(temp)
        switch temp(j)
            case 'D'
                tempLine = [tempLine 1];
            case 'W'
                tempLine = [tempLine 2];
            case 'M'
                tempLine = [tempLine 3];
            case 'F'
                tempLine = [tempLine 4];
            case 'N'
                tempLine = [tempLine 5];
            otherwise
                tempLine = [tempLine 6];
        end
    end
    Surveys.Frequency(i,tempLine) = 1;
end

% Expose Results
Surveys.Frequency;
```

Question 3: Duration of Visits

```
% Create Storage Location
Surveys.Duration = zeros(length(array),5);

% Loop Through all Rows
for i = 2:length(array)
    % Temporary Variable
    tempLine = [];
    % If only one answer was entered in survey
    if isnumeric(array{i,4})
        temp = array{i,4};
    % If more than one answer was recorded loop through else (no answer),
    % leave empty
    elseif ischar(array{i,4})
        % If cell contains entries
        temp = str2num(array{i,4});
        if length(temp)
            for j = 1:length(temp)
                if temp(j) == 0.5
                    tempLine = [tempLine 5];
                else
                    tempLine = [tempLine temp(j)];
                end
            end
        end
    end

    % Save Line to Structure
```

```
    Surveys.Duration(i,tempLine) = 1;
end

% Reveal The Truth
Surveys.Duration;
```

Question 4: Location of Exercise

```
% Create Storage Location
Surveys.Exercise = zeros(length(array),4);

% Loop through all rows
for i = 2:length(array)
    temp = char(array{i,5});
    tempLine = [];
    % If string is empty
    if ~length(temp)
        tempLine = 1;
    end
    % Convert all characters in string to their corresponding numbers
    for j = 1:length(temp)
        switch temp(j)
            case 'I'
                tempLine = [tempLine 1];
            case 'O'
                tempLine = [tempLine 2];
            case 'D'
                tempLine = [tempLine 3];
            otherwise
                tempLine = [tempLine 4];
        end
    end
    Surveys.Exercise(i,tempLine) = 1;
end

% Expose Results
Surveys.Exercise;
```

Question 5: Come to Park With?

```
% Create Storage Location
Surveys.Company = zeros(length(array),8);

% Loop through all rows
for i = 2:length(array)
    % Create array
    temp = strsplit(char(array{i,6}),',');
    % If string is empty
    if ~length(temp)
        tempLine = 8;
    end
    tempLine = [];
```

```
    % Convert all characters in string to their corresponding numbers
    for j = 1:length(temp)
        if strcmp('FR', temp(j))
            tempLine = [tempLine 1];
        elseif strcmp('FA', temp(j))
            tempLine = [tempLine 2];
        elseif strcmp('GR', temp(j))
            tempLine = [tempLine 3];
        elseif strcmp('CH', temp(j))
            tempLine = [tempLine 4];
        elseif strcmp('PE', temp(j))
            tempLine = [tempLine 5];
        elseif strcmp('AL', temp(j))
            tempLine = [tempLine 6];
        elseif strcmp('OT', temp(j))
            tempLine = [tempLine 7];
        else
            tempLine = [tempLine 8];
        end
    end
    Surveys.Company(i,tempLine) = 1;
end

% Expose Results
Surveys.Company;
```

Question 6: Spending

```
% Create Storage Location
Surveys.Spending = zeros(length(array),6);

% Loop through all rows
for i = 2:length(array)
    temp = char(array{i,3});
    tempLine = [];
    % If string is empty
    if ~length(temp)
        tempLine = 1;
    end
    % Convert all characters in string to their corresponding numbers
    for j = 1:length(temp)
        switch temp(j)
            case 'D'
                tempLine = [tempLine 1];
            case 'W'
                tempLine = [tempLine 2];
            case 'M'
                tempLine = [tempLine 3];
            case 'F'
                tempLine = [tempLine 4];
            case 'N'
                tempLine = [tempLine 5];
```

```
            otherwise
                tempLine = [tempLine 6];
        end
    end
    Surveys.Spending(i,tempLine) = 1;
end

% Expose Output
Surveys.Spending;
```

Question 7: Scales

```
% Create Element of Structure
Surveys.Scales = zeros(length(array),6);

% Loop through all surveys
for i = 2:length(array)
    for j = 1:6 % Read Column 10 to 15
        temp = array{i,j+9};
        if isnumeric(temp)
            Surveys.Scales(i,j) = temp;
        end
    end
end

% Expose Results
Surveys.Scales;
```

Demographics

Question 8: Import Gender

```
% Create New Element in Structure
Surveys.Gender = zeros(length(array),1);

% Loop through entire array
for i = 2:length(array)
    temp = char(array{i,16});
    if 'M' == temp
        Surveys.Gender(i) = 1;
    elseif 'F' == temp
        Surveys.Gender(i) = 2;
    else
        Surveys.Gender(i) = 3;
    end
end

% Reveal Results
Surveys.Gender;
```

Question 9: Import Age

```
% Create Element in Structure
Surveys.Age = zeros(length(array),1);

% Loop Through the Entire Array
for i = 2:length(array)
    temp = array{i,18};
    if strcmp(temp,'<18')
        Surveys.Age(i) = 1;
    elseif strcmp(temp,'18-24')
        Surveys.Age(i) = 2;
    elseif strcmp(temp,'25-29')
        Surveys.Age(i) = 3;
    elseif strcmp(temp,'30-34')
        Surveys.Age(i) = 4;
    elseif strcmp(temp,'35-39')
        Surveys.Age(i) = 5;
    elseif strcmp(temp,'40-44')
        Surveys.Age(i) = 6;
    elseif strcmp(temp,'45-49')
        Surveys.Age(i) = 7;
    elseif strcmp(temp,'50-54')
        Surveys.Age(i) = 8;
    elseif strcmp(temp,'55-59')
        Surveys.Age(i) = 9;
    elseif strcmp(temp,'60-64')
        Surveys.Age(i) = 10;
    elseif strcmp(temp,'65+')
        Surveys.Age(i) = 11;
    else
        Surveys.Age(i) = 0;
    end
end

% Show Results
Surveys.Age;
```

Question 10: Ethnicity

```
% Create Storage Location
Surveys.Ethnicity = zeros(length(array),1);

% Loop Through The Survey
for i = [2:length(array)]
    temp = array{i,19};
    % If Cell Contains a Number Read Directly
    if isnumeric(temp)
        Surveys.Ethnicity(i) = temp;
    % If Cell contains a string either convert directly or, in case not all
    % characters are numbers, read only first numeric portion.
    elseif ischar(temp)
```

```
        if length(temp)
            Surveys.Ethnicity(i) = str2num(temp(1));
        end
    end
end

% Expose Results
Surveys.Ethnicity;
```

Question 11: Disability

```
% Create New Dimension for Data Storage
Surveys.Disability = zeros(length(array),1);

% Loop Through Location
for i = [2:length(array)]
    temp = array{i,21};
    % If Cell Contains a Number Read Directly
    if isnumeric(temp)
        Surveys.Disability(i) = temp;
    % If Cell contains a string either convert directly or, in case not all
    % characters are numbers, read only first numeric portion.
    elseif ischar(temp)
        if length(temp)
            Surveys.Disability(i) = str2num(temp(1));
        end
    end
end

% Expose Results
Surveys.Disability;
```

Question 12: Religion

```
% Create New Dimension for Data Storage
Surveys.Religion = zeros(length(array),1);

% Loop Through Location
for i = [2:length(array)]
    temp = array{i,20};
    % If Cell Contains a Number Read Directly
    if isnumeric(temp)
        Surveys.Religion(i) = temp;
    % If Cell contains a string either convert directly or, in case not all
    % characters are numbers, read only first numeric portion.
    elseif ischar(temp)
        if length(temp)
            Surveys.Religion(i) = str2num(temp(1));
        end
    end
end
```

```
% Expose Results
Surveys.Religion;
```

Questions 13: Sex?

```
% Create Data Storage Place
Surveys.Sex = zeros(length(array),1);

% Loop Through Entire Array
for i = 2:length(array)
    temp = array{i,22};
    if strcmp('S',temp)
        Surveys.Sex(i) = 1;
    elseif strcmp('G',temp)
        Surveys.Sex(i) = 2;
    elseif strcmp('B',temp)
        Surveys.Sex(i) = 3;
    elseif strcmp('O',temp)
        Surveys.Sex(i) = 4;
    else
        % Do Nothing, Keep Zero
    end
end
```

Location of Survey

Create Data Storage Place

```
Surveys.Location = zeros(length(array),1);

% Loop Through Entire Array
for i = 2:length(array)
    temp = array{i,1};
    if strcmp('MAN',temp)
        Surveys.Location(i) = 1;
    elseif strcmp('LAD',temp)
        Surveys.Location(i) = 2;
    elseif strcmp('HF',temp)
        Surveys.Location(i) = 3;
    elseif strcmp('MOU',temp)
        Surveys.Location(i) = 4;
    elseif strcmp('DEP',temp)
        Surveys.Location(i) = 5;
    elseif strcmp('TEL',temp)
        Surveys.Location(i) = 6;
    elseif strcmp('SYD',temp)
        Surveys.Location(i) = 7;
    elseif strcmp('MAY',temp)
        Surveys.Location(i) = 8;
    elseif strcmp('ONL',temp)
        Surveys.Location(i) = 9;
    else
```

```
        Surveys.Location(i) = 10;
    end
end
```

Represent Results

```
% Expose Structure
Surveys

% Create Structure for Pre-Results ans Results
ResultsTemp = struct();
Results = struct();

% ************************************************************
% Create Percentage For Park Reason Per Frequency of Usage
ResultsTemp.ReasonByFrequency = zeros([length(array),6,18]);
Results.ReasonsByFrequency = zeros(6,18);

for i = 2:length(array)
    for j = 1:6 % Loop Through six possible options
        if Surveys.Frequency(i,j)
            ResultsTemp.ReasonsByFrequency(i,j,:) = Surveys.ReasonsClosed(i,:);
        end
    end
end

% Results From Frequency Alone
tempFreq = histc(Surveys.Frequency,1);

% Calculate Percentages
% Daily
temp = histc(ResultsTemp.ReasonsByFrequency(:,1,:),1);

% Allocate Space for Temporary Result Matrix
temp2 = zeros(18,1);

% Loop Through Reasons
for i = 1:18
    temp2(i) = temp(1,1,i);
end

% Calculate Percentage From Totals
Results.ReasonsByFrequency(1,:) = temp2 ./ tempFreq(1) .* 100;

% Weekly ******************
temp = histc(ResultsTemp.ReasonsByFrequency(:,2,:),1);

% Allocate Space for Temporary Result Matrix
temp2 = zeros(18,1);

% Loop Through Reasons
for i = 1:18
```

```
    temp2(i) = temp(1,1,i);
end

% Calculate Percentage From Totals
Results.ReasonsByFrequency(2,:) = temp2 ./ tempFreq(2) .* 100;

% Monthly ******************
temp = histc(ResultsTemp.ReasonsByFrequency(:,3,:),1);

% Allocate Space for Temporary Result Matrix
temp2 = zeros(18,1);

% Loop Through Reasons
for i = 1:18
    temp2(i) = temp(1,1,i);
end

% Calculate Percentage From Totals
Results.ReasonsByFrequency(3,:) = temp2 ./ tempFreq(3) .* 100;

% Few Times ******************
temp = histc(ResultsTemp.ReasonsByFrequency(:,4,:),1);

% Allocate Space for Temporary Result Matrix
temp2 = zeros(18,1);

% Loop Through Reasons
for i = 1:18
    temp2(i) = temp(1,1,i);
end

% Calculate Percentage From Totals
Results.ReasonsByFrequency(4,:) = temp2 ./ tempFreq(4) .* 100;

% Never ******************
temp = histc(ResultsTemp.ReasonsByFrequency(:,5,:),1);

% Allocate Space for Temporary Result Matrix
temp2 = zeros(18,1);

% Loop Through Reasons
for i = 1:18
    temp2(i) = temp(1,1,i);
end

% Calculate Percentage From Totals
Results.ReasonsByFrequency(5,:) = temp2 ./ tempFreq(5) .* 100;

% ****************************************************************
% Reasons by Gender

% Create Space on the Sheld
ResultsTemp.ReasonByGender = zeros([length(array),2,18]);
```

```
Results.ReasonsByGender = zeros(2,18);

for i = 2:length(array)
    j = Surveys.Gender(i);
    if j
        ResultsTemp.ReasonsByGender(i,j,:) = Surveys.ReasonsClosed(i,:);
    end
end

% Male ******************

% Number of Resposes as Male
tempFreq = histc(Surveys.Gender,1);

temp = histc(ResultsTemp.ReasonsByGender(:,1,:),1);

% Allocate Space for Temporary Result Matrix
temp2 = zeros(18,1);

% Loop Through Reasons
for i = 1:18
    temp2(i) = temp(1,1,i);
end

% Calculate Percentage From Totals
Results.ReasonsByGender(1,:) = temp2 ./ tempFreq .* 100;

% Female ******************

% Number of Responses as Female
tempFreq = histc(Surveys.Gender,2);

temp = histc(ResultsTemp.ReasonsByGender(:,2,:),1);

% Allocate Space for Temporary Result Matrix
temp2 = zeros(18,1);

% Loop Through Reasons
for i = 1:18
    temp2(i) = temp(1,1,i);
end

% Calculate Percentage From Totals
Results.ReasonsByGender(2,:) = temp2 ./ tempFreq .* 100;

% Other/Empty ******************

% Number of Responses as Female
tempFreq = histc(Surveys.Gender,3);

temp = histc(ResultsTemp.ReasonsByGender(:,3,:),1);

% Allocate Space for Temporary Result Matrix
```

```
temp2 = zeros(18,1);

% Loop Through Reasons
for i = 1:18
    temp2(i) = temp(1,1,i);
end

% Calculate Percentage From Totals
Results.ReasonsByGender(3,:) = temp2 ./ tempFreq .* 100;


% ****************************************************************
% Frequency by Scale of Cleanness

% Create Space on the Shelf
ResultsTemp.FrequencyByAge = zeros([length(array),12,6]);
Results.FrequencyByAge = zeros(12,6);

% Save information in 3d Array
for i = 2:length(array)
    j = floor(Surveys.Age(i));
    if j
        ResultsTemp.FrequencyByAge(i,j,:) = Surveys.Frequency(i,:);
    end
end

% Loop Though all Age groups
for i = 1:11

    % Count Number of People in Age Group
    tempAge = histc(Surveys.Age,i);

    % Simplify Array
    Results.FrequencyByAge(i,:) = histc(ResultsTemp.FrequencyByAge(:,i,:),1) ...
        ./ tempAge .* 100;
end

% *****************************************************************
% Company by Gender

% Create Space on the Sheld
ResultsTemp.CompanyByGender = zeros([length(array),3,8]);
Results.CompanyByGender = zeros(3,8);

for i = 2:length(array)
    j = Surveys.Gender(i);
    if j
        ResultsTemp.CompanyByGender(i,j,:) = Surveys.Company(i,:);
    end
end

% Male ******************
```

```
% Number of Resposes as Male
tempFreq = histc(Surveys.Gender,1);

temp = histc(ResultsTemp.CompanyByGender(:,1,:),1);

% Allocate Space for Temporary Result Matrix
temp2 = zeros(8,1);

% Loop Through Reasons
for i = 1:8
    temp2(i) = temp(1,1,i);
end

% Calculate Percentage From Totals
Results.CompanyByGender(1,:) = temp2 ./ tempFreq .* 100;

% Female ******************

% Number of Resposes as Male
tempFreq = histc(Surveys.Gender,2);

temp = histc(ResultsTemp.CompanyByGender(:,2,:),1);

% Allocate Space for Temporary Result Matrix
temp2 = zeros(8,1);

% Loop Through Reasons
for i = 1:8
    temp2(i) = temp(1,1,i);
end

% Calculate Percentage From Totals
Results.CompanyByGender(2,:) = temp2 ./ tempFreq .* 100;

% Blank ******************

% Number of Resposes as Male
tempFreq = histc(Surveys.Gender,3);

temp = histc(ResultsTemp.CompanyByGender(:,3,:),1);

% Allocate Space for Temporary Result Matrix
temp2 = zeros(8,1);

% Loop Through Reasons
for i = 1:8
    temp2(i) = temp(1,1,i);
end

% Calculate Percentage From Totals
Results.CompanyByGender(3,:) = temp2 ./ tempFreq .* 100;

% ****************************************************************
```

```
% Exercise by Gender

% Create Space on the Sheld
ResultsTemp.ExerciseByGender = zeros([length(array),3,4]);
Results.ExerciseByGender = zeros(3,4);

for i = 2:length(array)
    j = Surveys.Gender(i);
    if j
        ResultsTemp.ExerciseByGender(i,j,:) = Surveys.Exercise(i,:);
    end
end

% Male ******************

% Number of Resposes as Male
tempFreq = histc(Surveys.Gender,1);

temp = histc(ResultsTemp.ExerciseByGender(:,1,:),1);

% Allocate Space for Temporary Result Matrix
temp2 = zeros(4,1);

% Loop Through Reasons
for i = 1:4
    temp2(i) = temp(1,1,i);
end

% Calculate Percentage From Totals
Results.ExerciseByGender(1,:) = temp2 ./ tempFreq .* 100;

% Female ******************

% Number of Resposes as Male
tempFreq = histc(Surveys.Gender,2);

temp = histc(ResultsTemp.ExerciseByGender(:,2,:),1);

% Allocate Space for Temporary Result Matrix
temp2 = zeros(4,1);

% Loop Through Reasons
for i = 1:4
    temp2(i) = temp(1,1,i);
end

% Calculate Percentage From Totals
Results.ExerciseByGender(2,:) = temp2 ./ tempFreq .* 100;

% Blank ******************

% Number of Resposes as Male
tempFreq = histc(Surveys.Gender,3);
```

```
temp = histc(ResultsTemp.ExerciseByGender(:,3,:),1);

% Allocate Space for Temporary Result Matrix
temp2 = zeros(4,1);

% Loop Through Reasons
for i = 1:4
    temp2(i) = temp(1,1,i);
end

% Calculate Percentage From Totals
Results.ExerciseByGender(3,:) = temp2 ./ tempFreq .* 100;

% ******************************************************************
% Reasons By Park
```

```
Surveys =

    ReasonsClosed: [301x18 double]
        Frequency: [301x6 double]
         Duration: [301x5 double]
         Exercise: [301x4 double]
          Company: [301x8 double]
         Spending: [301x6 double]
           Scales: [301x6 double]
           Gender: [301x1 double]
              Age: [301x1 double]
        Ethnicity: [301x1 double]
       Disability: [301x1 double]
         Religion: [301x1 double]
              Sex: [301x1 double]
         Location: [301x1 double]
```

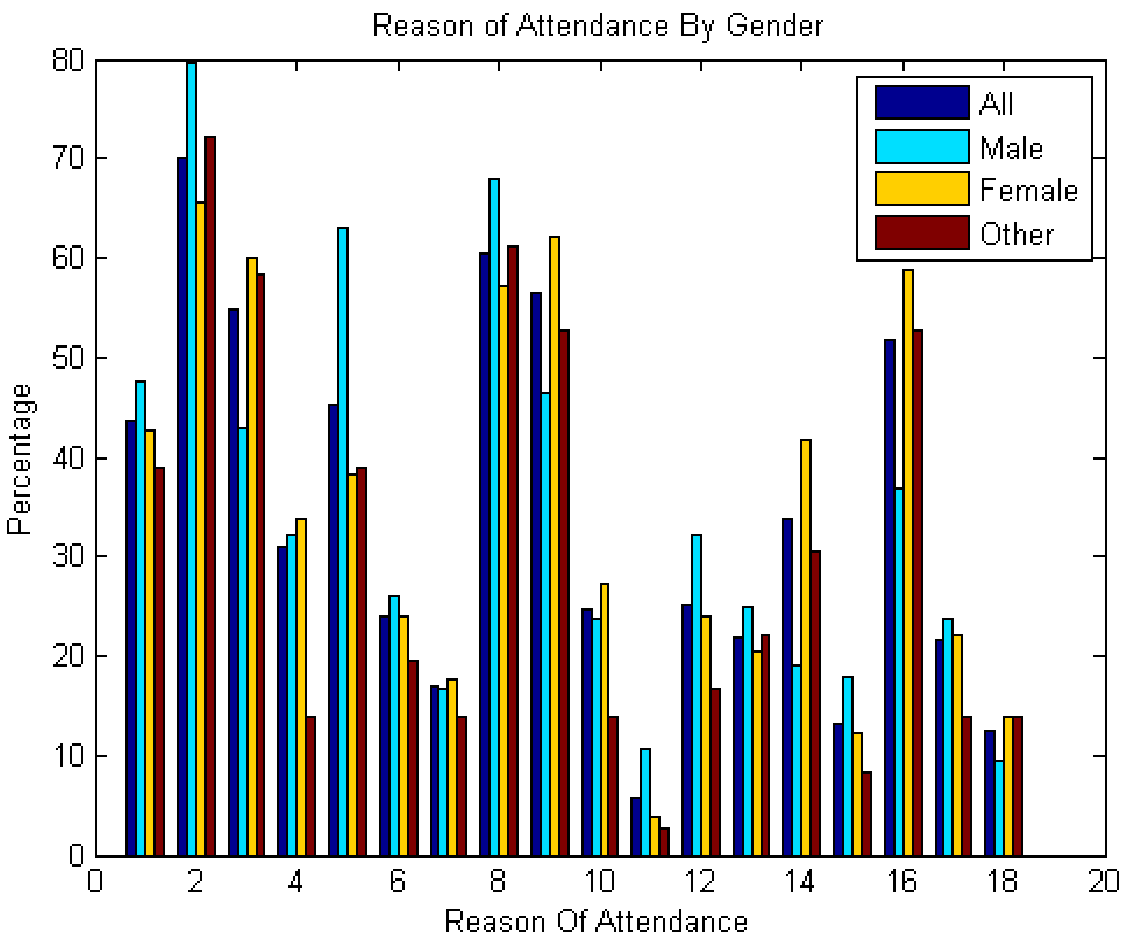
Create Graphs

```
% Graph of Reasons By Gender
figure(1) % New Figure
tempGeneral = histc(Surveys.ReasonsClosed,1) ./ length(array) .* 100;
bar([1:18],[tempGeneral;Results.ReasonsByGender]',1) % Make Bar Chart
legend('All','Male','Female','Other')
ylabel('Percentage')
xlabel('Reason Of Attendance')
title('Reason of Attendance By Gender')

% Graph of Scales
figure(2) % New Figure
% First Scale Question
subplot(2,3,1)
pie3(histc(Surveys.Scales(:,1),[1:5]))
title('Cleanliness')
```

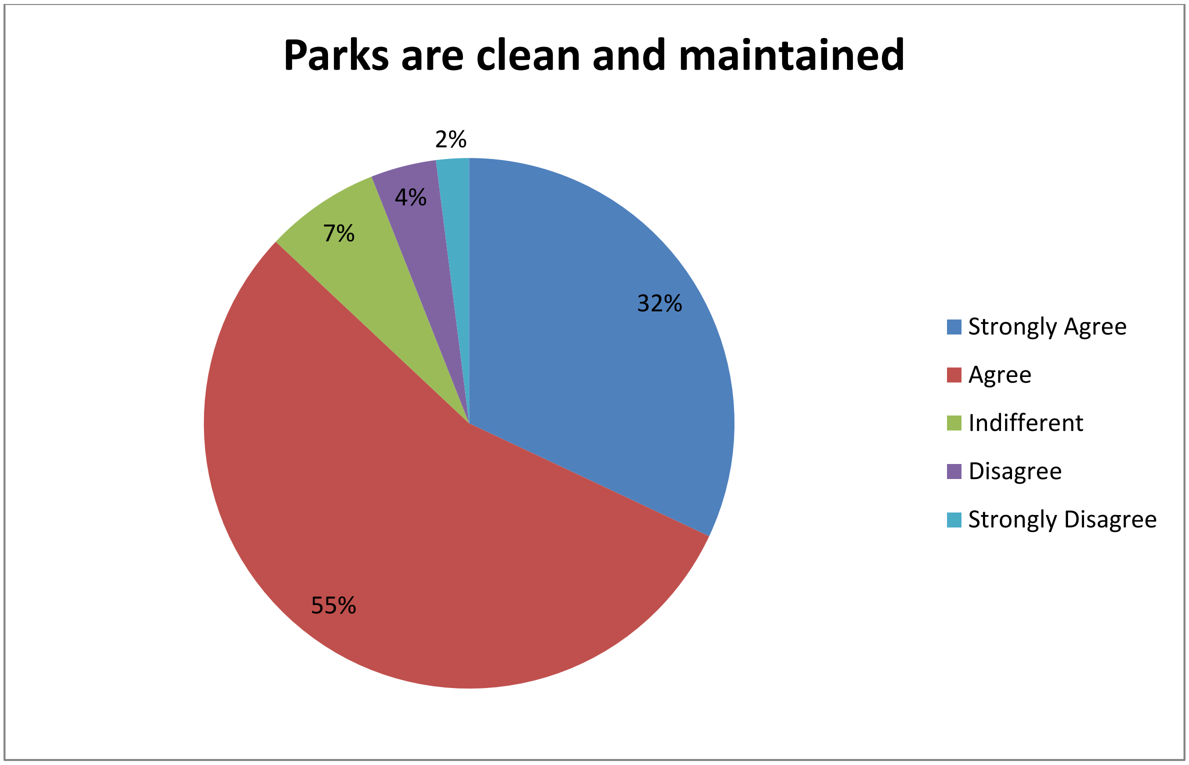
```
% Second Scale Question
subplot(2,3,2)
pie3(histc(Surveys.Scales(:,2),[1:5]))
title('Safety')
% Third Scale Question
subplot(2,3,3)
pie3(histc(Surveys.Scales(:,3),[1:5]))
title('Satisfied')
% Fourth Scale Question
subplot(2,3,4)
pie3(histc(Surveys.Scales(:,4),[1:5]))
title('Wildlife')
% Fifth Scale Question
subplot(2,3,5)
pie3(histc(Surveys.Scales(:,5),[1:5]))
title('Community')
% Sixth Scale Question
subplot(2,3,6)
pie3(histc(Surveys.Scales(:,6),[1:5]))
title('Commercial Development')

% Reasons of Attendance by Frequency of Attendance
figure(3) % new Figure
bar([1:18],[median(Results.ReasonsByFrequency(1:5,:));Results.ReasonsByFrequency(1:5,:)]')
title('Reason of Attendance By Frequency of Usage')
legend('Combined','Daily','Weekly','Monthly','Few Times','Never')
xlabel('Reasons of Attendance')
ylabel('Percentage')

% Companions By Gender and General
figure(4) % New FigureRes
tempGeneral = histc(Surveys.Company,1) ./ length(array) .* 100; % General
bar([tempGeneral;Results.CompanyByGender]')
legend('All','Male','Female','Blank')
title('All Surveys Company')
xlabel('Company')
ylabel('Percentage')

% Exercise By Gender and General
% Companions By Gender and General
figure(5) % New Figure
tempGeneral = histc(Surveys.Exercise,1) ./ length(array) .* 100; % General
bar([tempGeneral;Results.ExerciseByGender]')
legend('All','Male','Female','Blank')
title('Exercise By Gender')
xlabel('Location of Exercise')
ylabel('Percentage')
set(gca, 'XTick', 1:4, 'XTickLabel', {'Indoors', 'Outdoors', 'Either', 'Blank'})

% Location of Survey
figure(6) % New Figure
pie(histc(Surveys.Location,[1:11]))
```

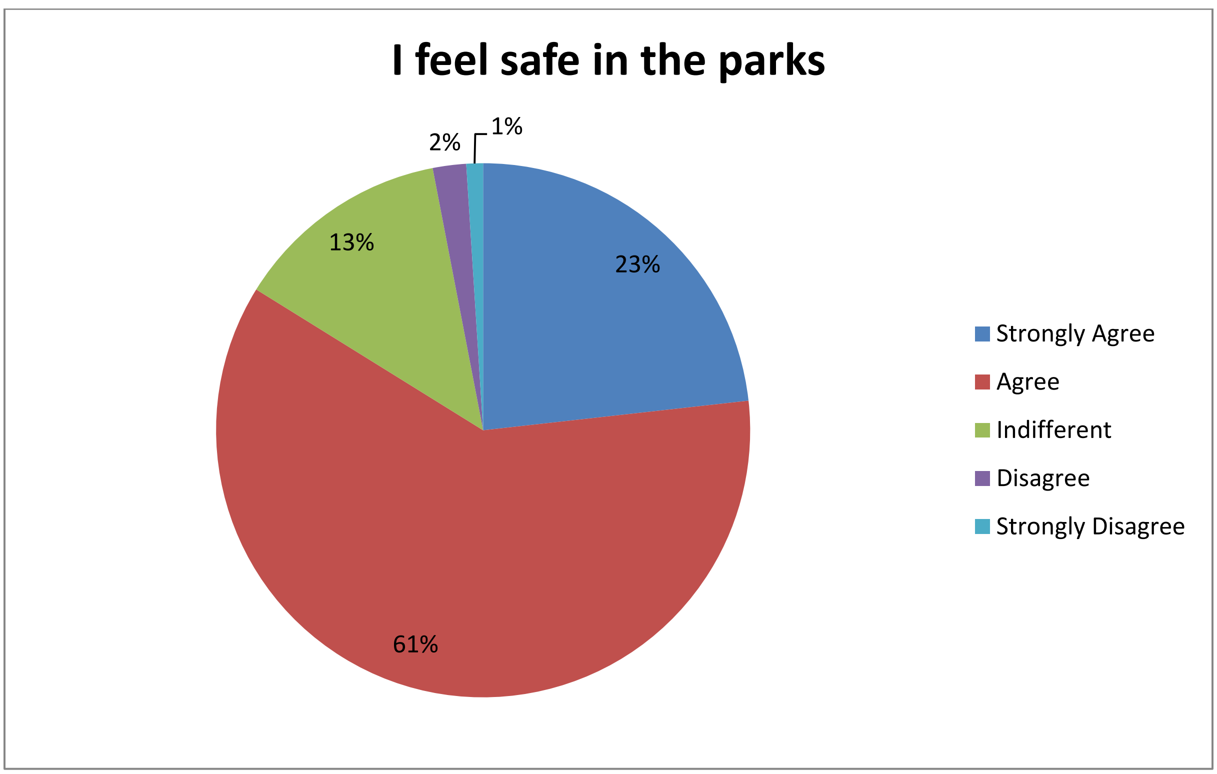
```
title('Location of Survey')
legend('MAN','LAD','HF','MOU','DEP','TEL','SYD','MAY','ONL')
```

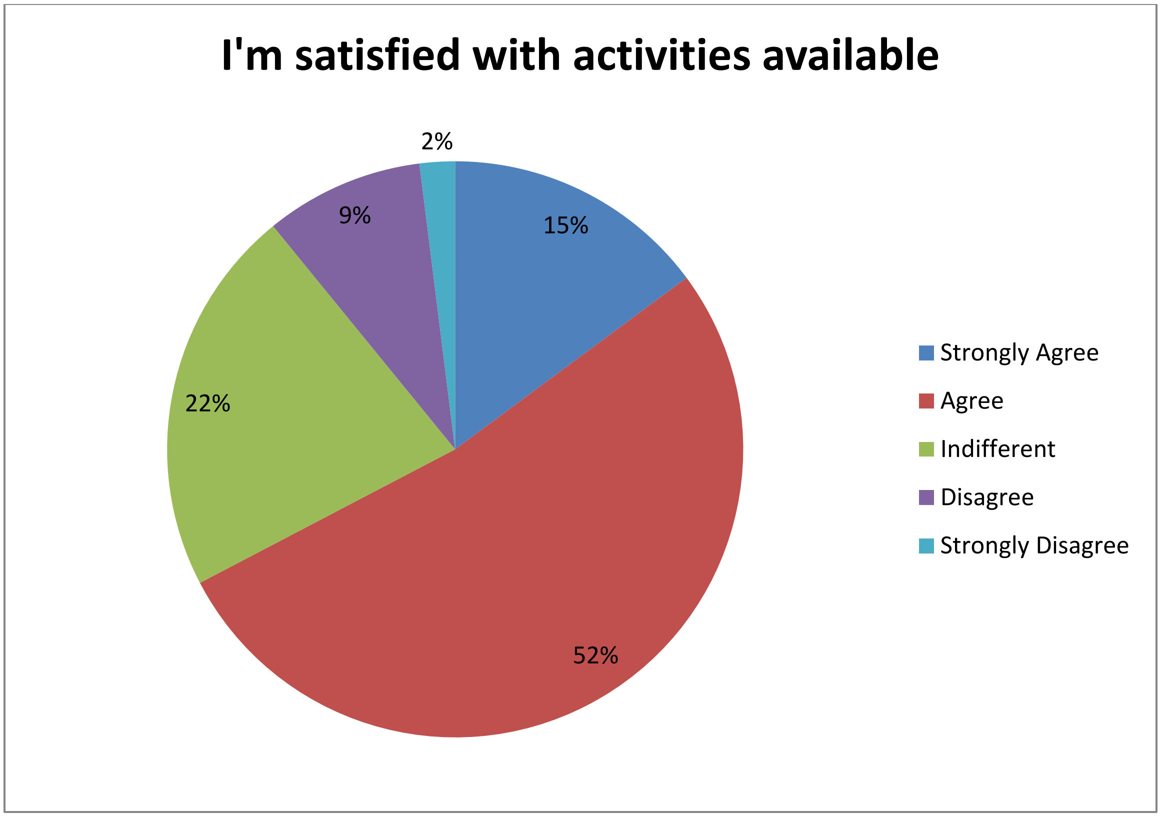
```
Warning: Ignoring non-positive data in pie chart.
```

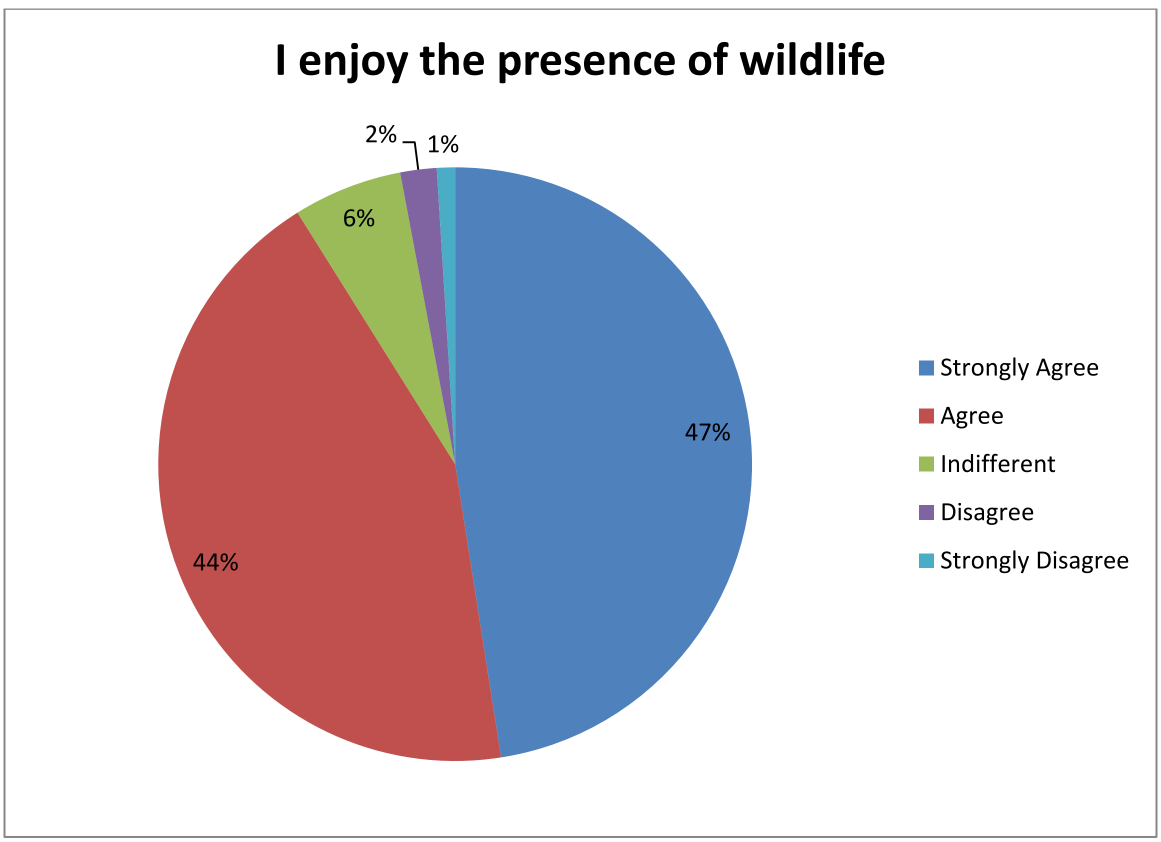


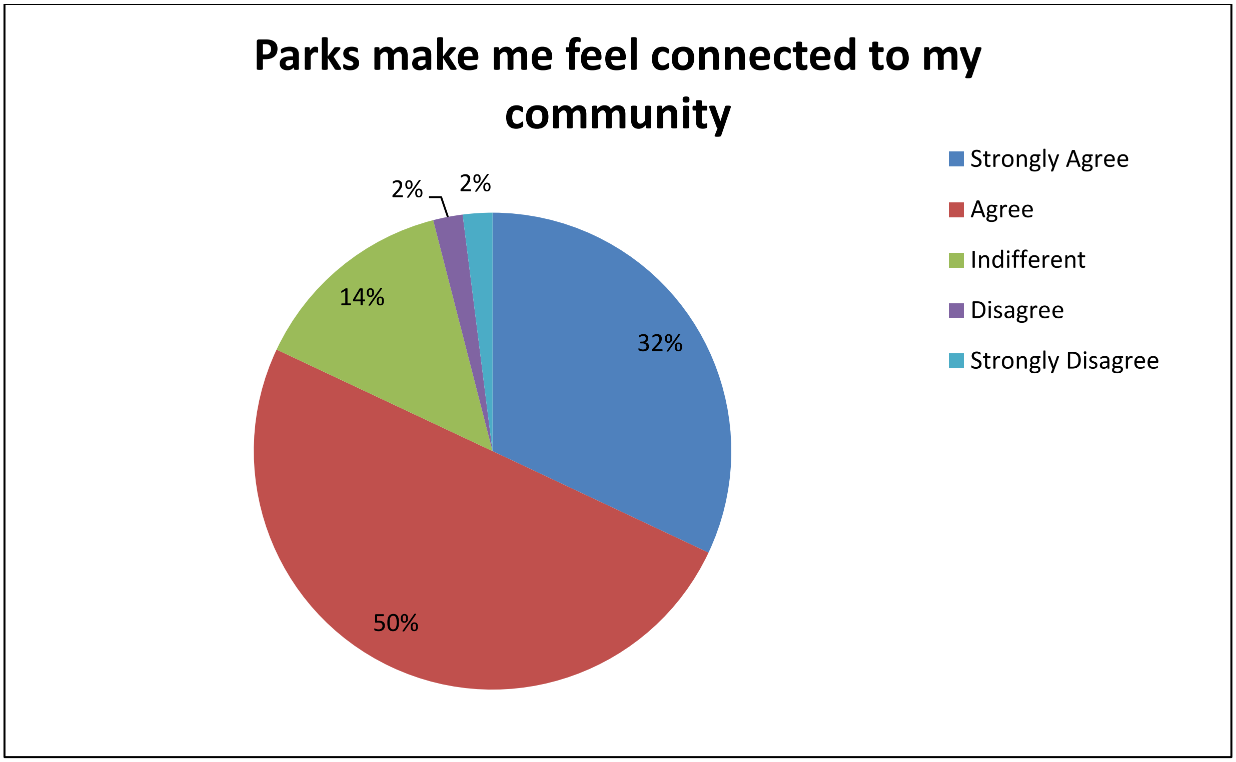
The bar chart above shows the percentages for reason of attendance by gender.

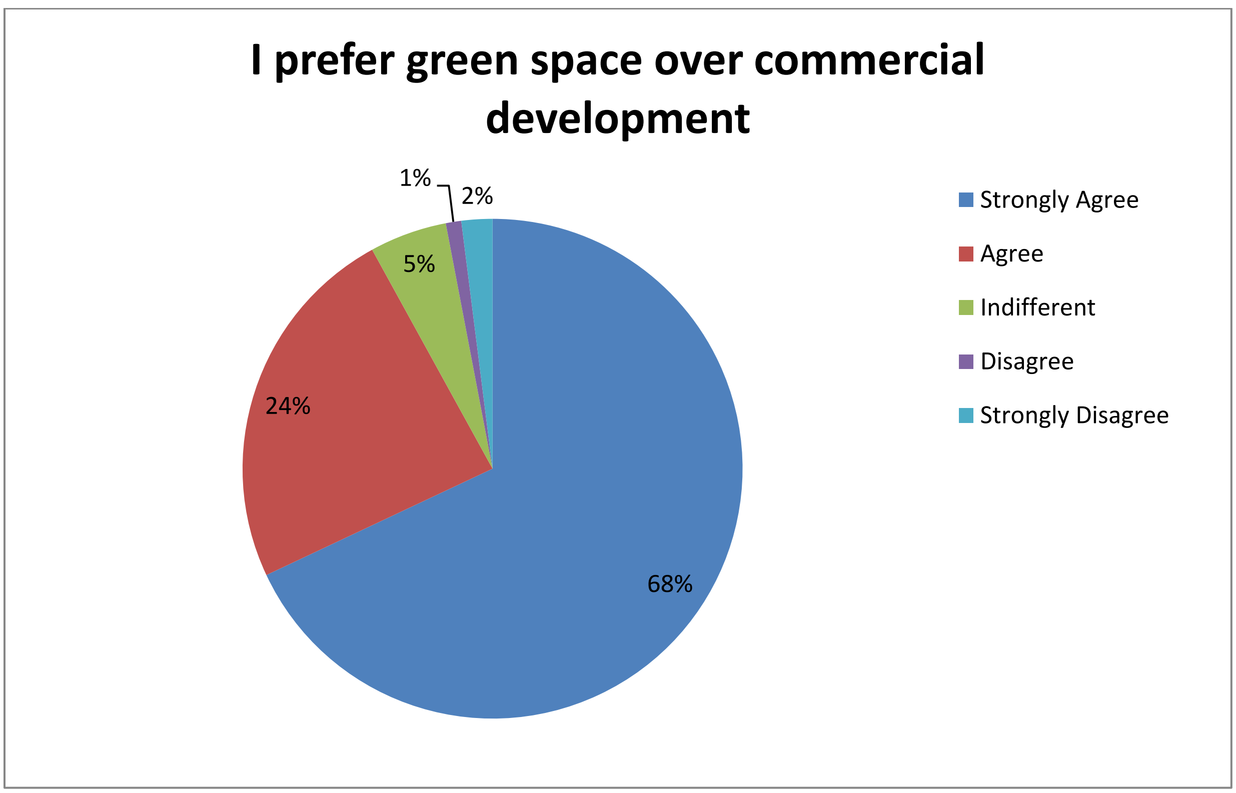

Parks are clean and maintained
2%
4%
7%
32%
55%
Strongly Agree
Agree
Indifferent
Disagree
Strongly Disagree


I feel safe in the parks
2%
1%
13%
23%
61%
Strongly Agree
Agree
Indifferent
Disagree
Strongly Disagree

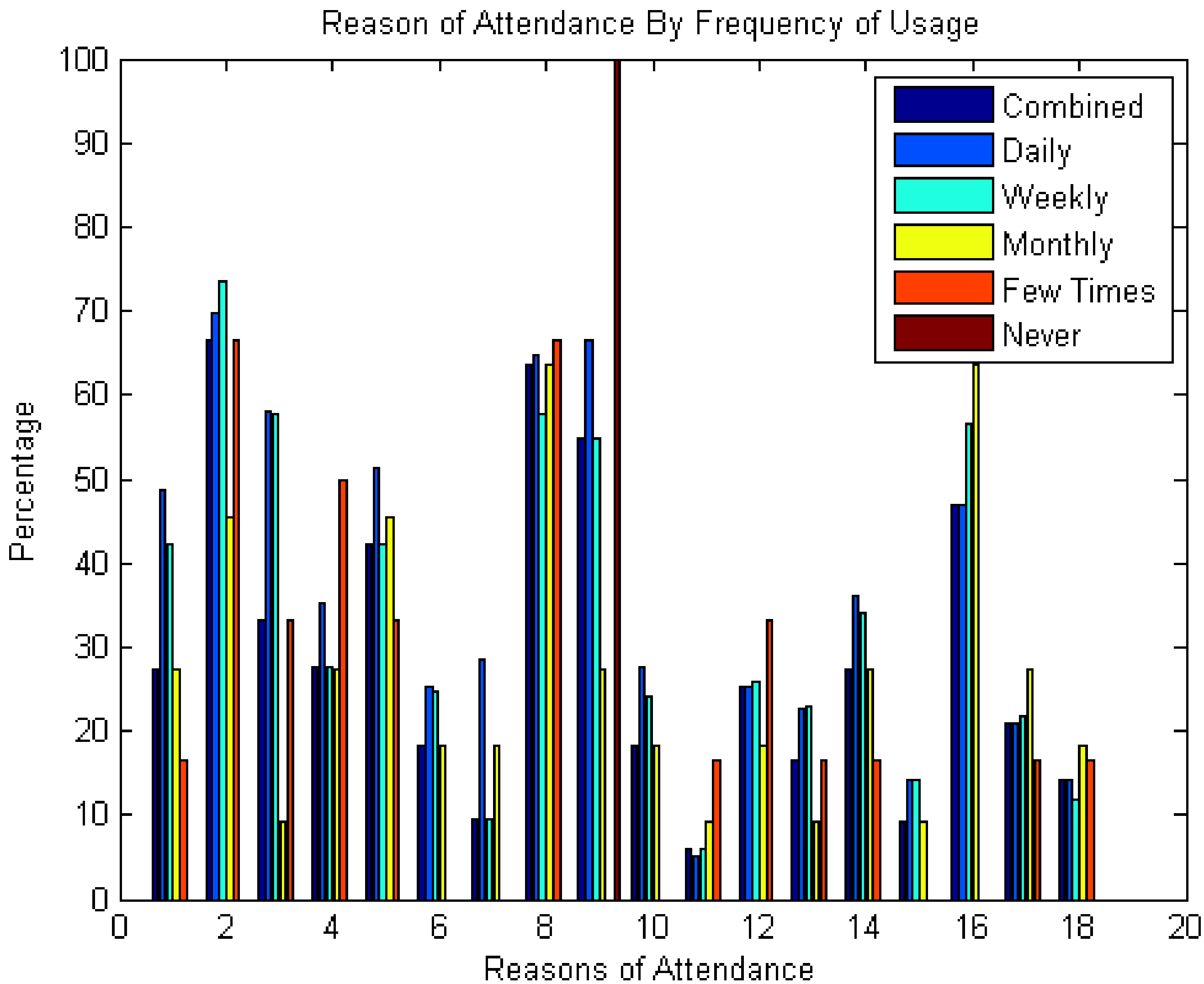

I'm satisfied with activities available
2%
9%
15%
22%
52%
Strongly Agree
Agree
Indifferent
Disagree
Strongly Disagree


I enjoy the presence of wildlife
2%
1%
6%
47%
44%
Strongly Agree
Agree
Indifferent
Disagree
Strongly Disagree

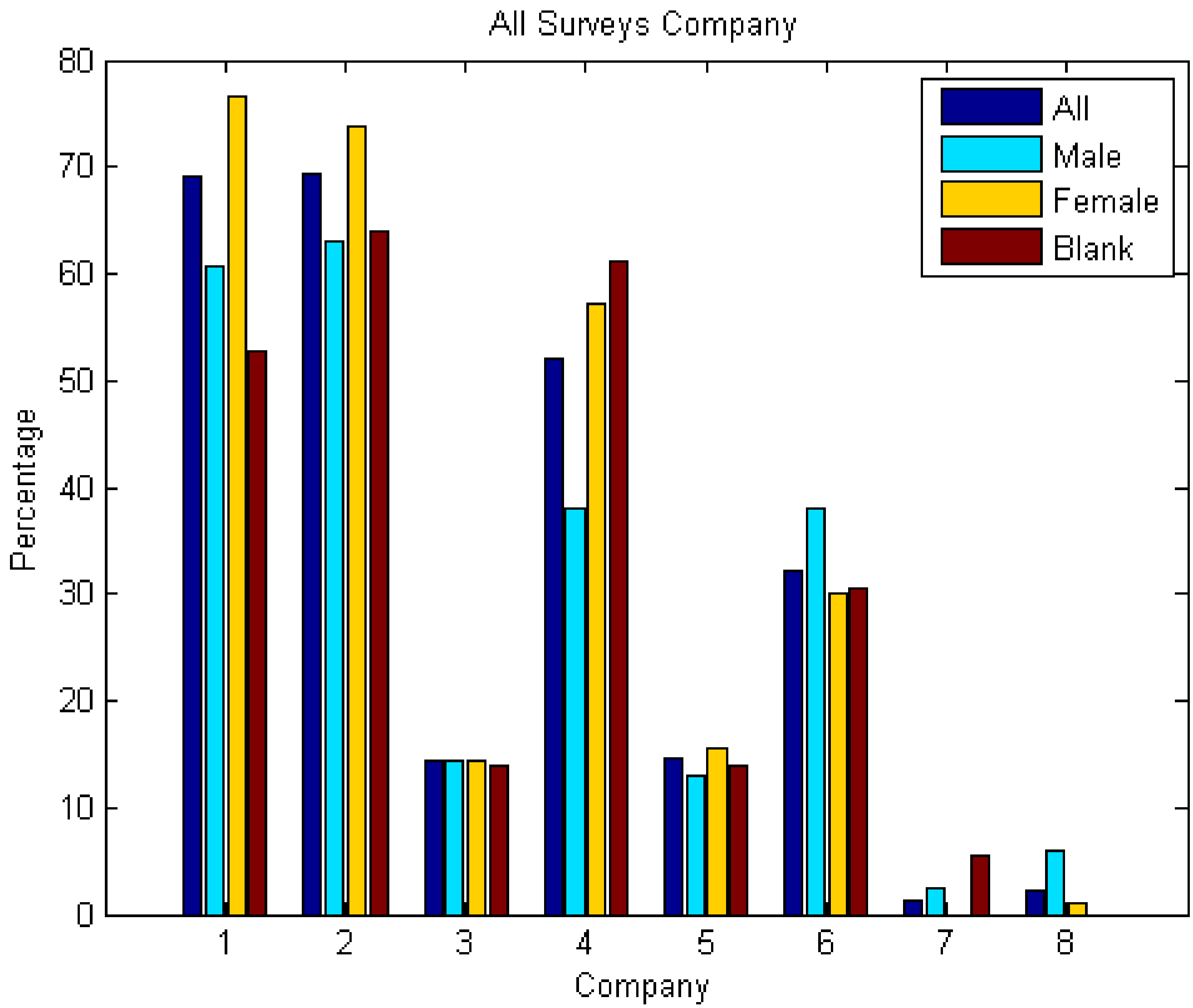




The pie charts above are the percentages of level of agreement to the statements above them. They were the scales at the bottom of the survey sheet. They were made using the data found from the MATLAB code.

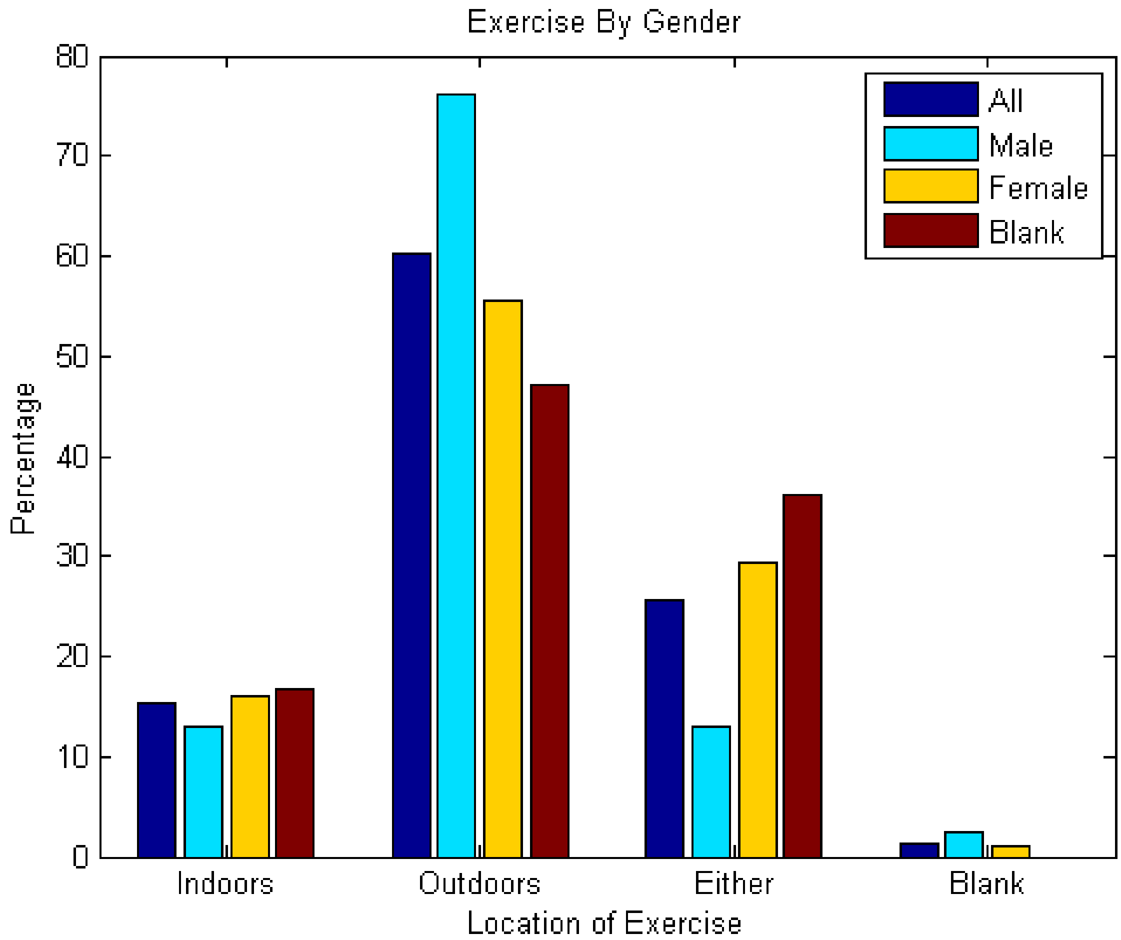


The graph above is the reason of attendance by frequency of usage. Each reason has a percentage that correlates to how often a park user visited for that reason. This is ideal to see what activities draw park users to the parks more often.



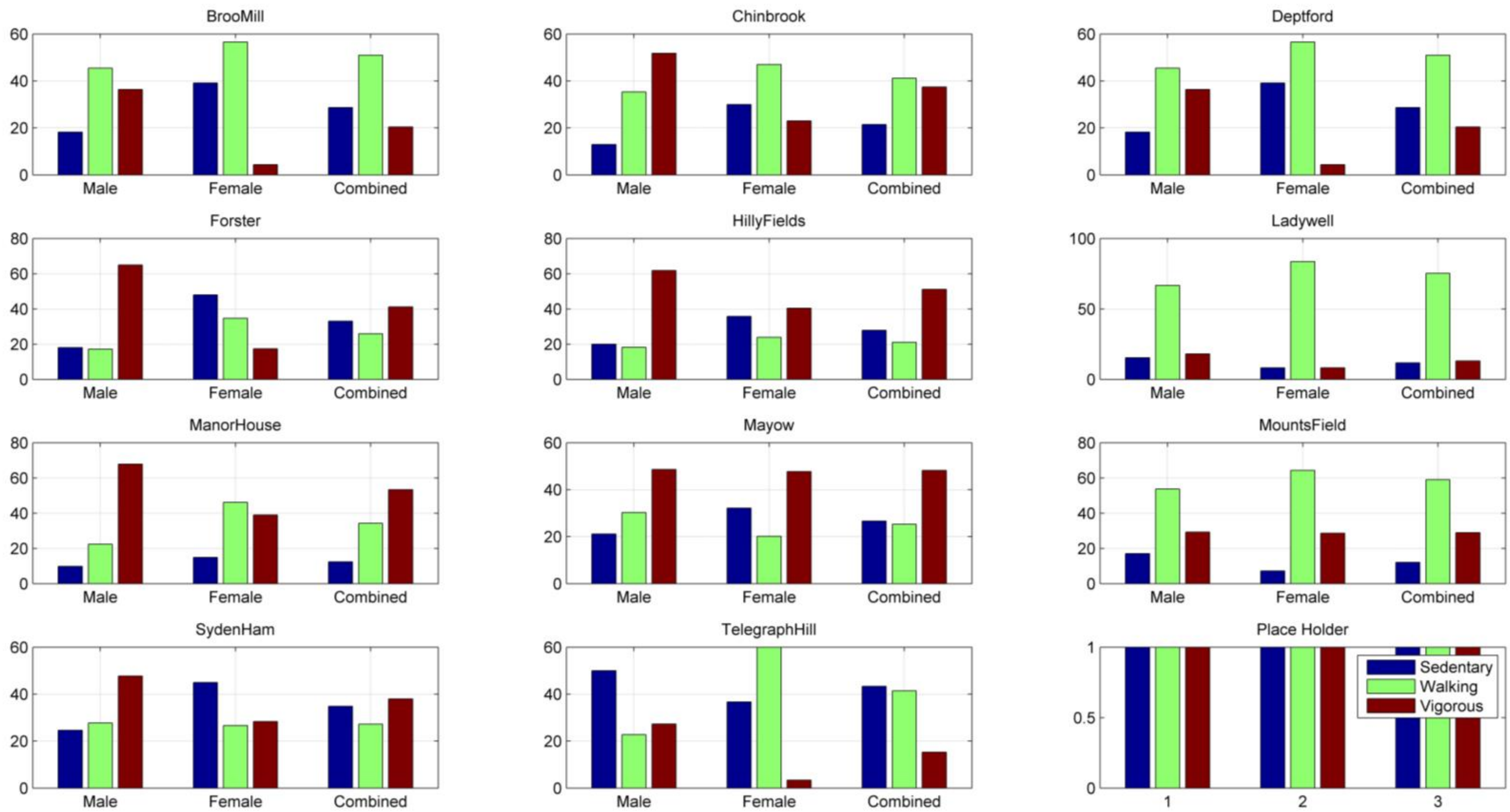
1	Friends
2	Family
3	Groups
4	Children
5	Pets
6	Alone
7	Other
8	Blank

The graph above shows the percent of people that selected the various options for company based on Gender, All, and Blank.



The graph above shows where people prefer to exercise by gender, as well as those who left it blank.

Appendix H: Intensity Level of Activity by Gender per Park



The graphs about show the activity level for each park by gender and combined. The 12th box serves as a place holder and a legend. The park names are above the boxes. For each box, the first group of columns is male followed by female and then combined.

Blue	Sedentary
Green	Walking
Red	Vigorous