Urban Trees and Residential Yard Use in the City of Mississauga

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Introduction

Urban tree cover varies throughout cities and as a result residents experience inequality in the benefits from trees. The City of Mississauga is no different in this regard, as the tree canopy cover fluctuates throughout it. With an increasing urban population worldwide, the issues of inequality in land distribution within cities is becoming a greater concern, as often those of lower income or "disadvantaged people are exposed to environmental hazards" and do not share in the environmental benefits equally (Alberti, 2008). There are many benefits associated with having trees present in an urban setting for residents, the economic benefits range from a reduction in energy consumption for houses by the shade created, to increasing the property value. As well, there are many environmental benefits that trees offer, from improving air quality to reducing water runoff. As discussed in the ethics review, urban tree cover is influenced by various factors such as: the environment, governmental policies, socioeconomic conditions, and the individual. Traditionally it is believed that both the age of a neighborhood and the wealth of its residents are the major influences on tree cover; however, the purpose of this research is to focus on the individual resident's influence on tree canopy cover within the City of Mississauga.

This study takes a bottom-up approach, focusing on the impacts of the decisions made by residents regarding trees on their property and in their neighbourhoods. Two specific ideas are explored in this study; the relationship between household characteristics and peoples preferences for neighbourhood trees, as well resident's preferences towards what is grown on their property. It is expected that residents positive or negative views towards trees will influence decisions they make towards maintaining trees on their property. Some variables that are expected to influence an individual's attitude towards trees would be: esthetics, environmental benefits, safety concerns, as well as the shade created by trees. The study included four neighborhoods within Mississauga: Mineola, Meadowvale, Lakeview, and Rathwood, each varied in the age, average income, and property values. The inclusion of the four neighborhoods allows for a better representation of the municipality of Mississauga and to enable a general application of the data and concepts discovered from this study.

Background

Over time human and natural systems have coexisted, which has resulted in their present day interdependency. Resilience and change are key features of this interdependent system. Changes in one system will affect the other and will cause each system to adapt to one another (Alberti 2008). However, changes are not infinite and there is resilience, which is how much change the system can tolerate before it completely reorganizes itself. This resilience exists in the coupled human-natural system, which has become more apparent in various urban regions. The presence of this system has led to an increasing awareness of urban forest and vegetation growth. It is suspected that these patterns of urban forest and vegetation are direct reflections of various neighbourhoods and the residents that reside in them.

Previous studies have explored the factors and limitations present in residents' yard choices. In the study conducted by Landry et al (2009) on the spatial distribution of urban trees in Tampa, Florida, the inequity hypothesis was found to be true. The inequity hypothesis states that neighbourhoods that have a lower socioeconomic status and are dominated by racial and ethnic minorities will have a lower percentage of tree cover (Landry et al. 2009). Thus, these neighbourhoods do not receive the same environmental benefits as neighbourhoods with a higher socioeconomic status and are dominated by Caucasians.

In an urban setting, there are many subconscious social expectations which take on physical forms as vegetation and landscape choices. According to Larson et al (2010), the prestige effect is an unspoken expectation between members of a neighbourhood to uphold the status of the neighbourhood through the presentation of their front yard. A domino effect occurs between residents of a common neighbourhood, where they mimic each other. The vegetation and landscape choices of one resident in an urban neighbourhood impact the actions of other residents and soon an image is built around the community.

In Marco et al's (2010) study in Lauris, France, a social network, aesthetics, and existing plants were popular factors regarding the acquisition of plants. A social network allowed for the exchange of plants and usually these plants multiply easily. Aesthetics were often taken into consideration and this included colour, shape, and smell. It was found that the presence of existing plants and landscape

decisions showed new homeowners what was best in terms of land management within the particular neighbourhood, and was often kept.

These particular factors and theories in the literature also pertain to this study involving the City of Mississauga and its concern on what is influencing residential yard choices in an urban setting. What can be seen on the ground is a combination of individual choices, socioeconomic status, environmental pressures, and social expectations.

Study Area Description

The four neighbourhoods included in this study are located in Mississauga. Each one is defined by two dissemination areas, representing between 200 and 500 households per neighbourhood. The neighbourhoods were selected to include two representing the 80 percentile of household income and two representing the 20% of household income. Within each income pair, one neighourhood is dominated by houses built prior to 1970, while the other is dominated by newer houses. The following sections describe each neighborhood.

Lakeview Neighbourhood

The neighborhood Lakeview is located South of the Queen Elizabeth Way, in between Cawthra Rd and Dixie Rd. Lakeview is an older neighbourhood consisting of mainly low income households. The average household income of this neighbourhood is $66,447 and the average household value is $350,364, which is one of the lowest average household values compared to the other four neighbourhoods. Forty-four percent of the total population was 30 to 59 years old, while 23% was 60 to 85 years old and over. Out of all of the households in this area, 94% are owned by the residents. A report written in June 2006 by The Social Planning Council of Peel reported that Lakeview was one of the three slowest growing neighborhoods in the Peel region. This shows that the neighbourhood mainly consists of residents who have chosen to settle in the area. It was calculated that 66% of the total population, 15 years and over, in private households were employed while 34% were unemployed. In terms of education, 15% of the neighbourhood had some sort of university level education. Furthermore, of residents between 25 to 64 years of age, 30% possessed a University level education and of that 30%, 20% obtained a Bachelor's degree. In the 65 years and over age group, apprenticeship certificates and

diplomas dominated. Out of the total population in Lakeview, 65% are non-immigrants and 92% of primary surveyors speak English.

When the neighborhood was explored, it was evident that there was an industrial influence along Lakeshore Road east and significant commercial development (City of Mississauga 2011). In the residential area, houses were older and varied in size. Census data shows that 88% of these houses were built prior to 1970 and that the majority of houses are single detached. The sizes of the front yards also ranged, but for the most part were medium size when compared to the other four neighborhoods. An abundant amount of trees and shrubs were observed on properties within the area. The trees were mature and varied between deciduous to coniferous types. An interesting characteristic to note is that the majority of households chose to plant trees and shrubs rather than flower beds, it was rare to see both groups existing in one yard; it was either one or the other.

Meadowvale Neighbourhood

Meadowvale is a neighborhood in the northwestern part of Mississauga bordered by highway 401, Mississauga road, Ninth Line and Britannia road. The average income level of its residents is $153,000 with 33% of the population, 15 years or older, having some form of university level education. The largest age group is between 30-49 years, which represents 43% of the population in this neighborhood followed by the second largest age group of 0-9 years at 21%, indicating that most of the population in this area is made up of young families. The employment rate of Meadowvale is 77%, which is attributed to education level of the population and the presence of significant employment opportunities discussed below. Meadowvale is a newer community in comparison to the others neighborhoods in the City as 97% of the homes were constructed after 1970, and the majority of these houses are semi-detached (56%). The neighborhood consists of residential properties with average property values of $433,000. The population breakdown shows that 49% of people are non-immigrants, with a majority of visible minorities of South Asian descent (24% of total).

The Meadowvale community was initially a village which was first settled by Irish immigrants from New York City, USA on early 1800s. The village became famous for wood, wool and saw mills. Settlers and mill owners constructed brick houses and some of which are recognized today for their architectural

significance (Hicks 2004; Meadowvale Village 2009). The Credit River runs through the eastern part of Meadowvale and mature coniferous and deciduous forests make up the central part of the community. The Credit Valley Conservation protects the ecological and historical well being of local natural spaces. The Ontario Heritage Act has designated Meadowvale as Ontario's first Heritage and Conservation district for its ecological, architectural and historical significance (Meadowvale Village 2009). This community is also home to one of the largest business parks in the City, consisting of head offices of various corporations and banks such as Royal Bank of Canada, Daimler Chrysler, Wal-Mart Canada and Microsoft. Given the above economical, ecological and social characteristics, Meadowvale is considered a wealthier community. These variables as well as the younger age of the neighborhood were also considered when surveys were analyzed.

Mineola Neighborhood

Mineola is located south of Queen Elizabeth Way in between Cawthra Rd and Missisauga Rd. This neighborhood is classified as an old, high-income neighborhood, which has a large number of mature trees located in it. Mineola is primarily an upper middle class to wealthy area with an average house value of $581,000. The average household income is approximately $138,000. This high average household income could be a reflection of dual incomes of its residents. The high level of employment further supports the high-income levels, with the majority of those over the age of fifteen in Mineola being employed. At the time of the 2006 census, 67% of the population in Mineola was employed. The high employment rates could also relate to the high level of post secondary education, with an average of 54% of the residents having completed a certificate diploma or degree (age group of 25 to 64 years old). This suggests that there may be a correlation between the amount of trees on one's property and higher levels of education coupled with employment   Typically wealthier neighborhoods tend to have more trees, however other variables could influence this as well, such as the age of the neighborhood. Most of the homes in this area were built prior to 1970, suggesting that it could be more common for older, more mature trees to be present in this area. This shows a potential correlation between an older neighborhood and established trees. This was verified when driving through this neighborhood as many properties had multiple large trees. The amount of tree cover in this area could relate to its residents cultural perceptions,

available time or financial situation. House ownership is often associated with higher levels of canopy cover, and this is true within Mineola, with 89% of the residents owning their houses and a large amount of tree cover in this area. After exploring this neighborhood it would suggest that this is the case.

Rathwood Neighbourhood

The Rathwood neighborhood is located about 5 km north-east of Square One Mall and the Mississauga City Centre. The specific area being researched lies between the major streets of Cawthra Rd, Central Pkwy, Burnhamthorpe Rd and the 403 Highway. The two dissemination areas in Rathwood combined have the lowest average income level of all the neighborhoods being researched in this study. This community can therefore be described as being primarily low income newer housing in comparison to the other areas being researched. It can be determined from the 2006 Census data that the two dissemination areas within Rathwood are mostly populated by adults between the ages of 30 and 59 years old, over 80% of the population in the neighborhood falls into this demographic. Since most of the homes were built post-1971 and the majority of the population is only between 30 and 59 years of age it seems evident that, a large amount of the current residents and homeowners were not the original occupants in the area upon development. Hence, few of the current residents, if any, had control over the original use of the land and what was planted. In addition, over 70% of the population are in the labour force and of those, 92% of them are employed. Only about 14% of the total population have a university education showing that this community consists mostly of 'working class' people. The neighborhood mostly consists of newer homes as over 90% were constructed after 1971. The data from Statistic Canada states that only about 40% of the populations in the neighborhood are non-immigrants, however over 90% speak the English language and 80% are Canadian citizens. This shows that despite being a large immigrant population the neighbourhood contains mostly permanent citizens who speak one of the countries national languages.

Based on the data provided and field observation, many of the houses in this neighborhood are a part of small townhouse communities where the homes are attached in rows. Of all the neighborhoods analyzed in this study, Rathwood has the greatest number of row-houses and the smallest number of single-detached homes, with only eighty present. In most cases, the front lawns of these homes are

relatively small and shared with neighbors. It appears that most of these residents do not have much influence over the presence of trees on their property based on the fact that most lawns have trees of the same species. The residents in these homes are generally renters and only 2.26% of the population in Rathwood are owners of their home. These row-house properties tend to have one mature tree on each lawn (approximately 30 feet). The front lawn areas of these homes are dominated by one tree, which does not allow for much else to be planted or grown. Most of these row-house complexes were found on Meadows Boulevard whereas on Wilcox Road there were a greater number of single-detached homes. Upon observation it was noticed that these properties had bigger yards and many of them had a greater variety and number of trees. These trees varied in size from approximately 5 – 30 feet and in species, varying from large coniferous trees to small trees in the garden. The single-detached homes appear to be older; this was determined based on the style of home, the size of the trees lining the street, and the fact that some of these larger trees had their canopies trimmed.

Methods

The primary method used in this research study was a mail-based survey. The group of intended participants came from the four neighborhoods in Mississauga; Lakeview, Meadowvale, Mineola, and Rathwood. A mailing address list was acquired for each neighborhood to determine which residents would receive the survey. These particular neighborhoods were chosen because they represent areas that are different in their overall age and their property values, which are key factors in determining the level of vegetation and condition and age of trees. The four areas offered a range from old to new neighborhoods as well as high and low property values. A total of 1399 households were contacted, 253 from Mineola, 584 from Meadowvale, 256 from Lakeview, and 306 from Rathwood. The survey was limited to only single family households. To achieve a random response any adult in the household over 18 years old was eligible to complete it.

Before the survey was mailed out a recruitment letter was sent to all households informing them of the coming survey and providing residents with the option to complete the survey early online. Shortly after, the complete survey package was sent to all residents. The package was addressed directly to the homeowner and contained a copy of the survey, a return envelope, and a cover letter informing

participants about the nature of the study, the requirements, ethical considerations, and contact information. Each survey was given a code that correlates with the code assigned to each house on the mailing list in order to keep track of the responses.

Questions in the survey ask residents about their attitudes towards neighborhood and private trees, details about trees on their property, and some basic household demographic information. Questions 1 and 2 asked participants to indicate how strongly they felt about a series of statements regarding trees in their community, using a scale that ranged from "Strongly Agree" to "Strongly Disagree". Questions 3 to 19 asked about the amount and type of trees present in the front and back yards and the means by which residents acquired their trees. Questions 20 to 25 asked residents about the amount of fruit and vegetable growth on their property. For question 26, participants indicated on a scale, ranging from "strongly agree" to "strongly disagree," of how they felt regarding the municipality's role in neighborhood tree care. Questions 27 to 39 asked participants to provide basic household and demographic information, such as education, income level, and number of household occupants. At the end of the survey participants were asked to provide their contact information if they were interested in participating in a follow up interview or receiving a copy of the study results. As residents expressed willingness to participate in the follow up interviews, properties were visited to gain first-hand knowledge of the vegetation present in each of the neighborhoods. The results from the interview portion of the study will be available in a later report.

The data from the returned surveys was compiled using an excel spreadsheet. This data was organized on the spreadsheet according to the date it was entered and differentiated by the code that each survey was assigned. The spreadsheet headings feature each question and the answers were entered using a coding system that abbreviated the responses allowing for more a efficient entry and organization. Once all data was entered into the system, it was summarized by using statistical calculations like mean and proportions. Charts and tables were created to display the information gathered from each neighborhood, which were then analyzed to make comparisons and identify trends. The details of these findings are available in the Results section of this report.

Results

Refer to Appendix A for the Demographics Chart of Lakeview, Meadowvale, Mineola, and Rathwood.

The majority of individuals responding to the survey were middle aged, with the average ages ranging from 47 to 56 years old. Meadowvale had the youngest average age of respondents and Mineola had the oldest. Rathwood had the highest percentage of respondents who obtained Apprenticeship, college, CEGEP, or other non-university degrees, while Lakeview had the highest level of respondents who had no certificate. The majority of individuals responding in Meadowvale and Mineola either obtained a university Bachelors degree, Masters or Doctorate degree. They were also the only neighbourhood that had a high proportion of respondents within these two education levels.

Overall most respondents indicated that their household income level was in the range of $30,000 to $59,000, with $60,000 to $89,000 being the second most common income range. The neighborhoods with the highest proportion of respondents indicating a household income between the ranges of $0 to $29,000 were Lakeview and Rathwood (15% and 14%, respectively). In addition, as expected the neighborhood Mineola had the highest proportion of respondents indicating a household income over $180,000. While the median household income for residents in Meadowvale ranged from $60,000 to $119,000.

The majority of survey respondents in the neighborhoods, with the exception of Mineola, were of European descent. In addition, the second most popular ethno cultural group across Meadowvale, Rathwood and Lakeview was the British Isles. While Mineola on the other hand, had the highest proportion of respondents that indicated they were of British Isles descent, and the European ethno cultural group was second most popular. Between the four neighborhoods, the Caribbean ethno cultural group constantly had the lowest proportion of respondents. Interestingly, many of those who indicated their ethno cultural group as other stated they were Canadian.

Residents' Opinions and Values on Trees and Neighbourhoods

Neighbourhoods	Strongly Agree (%)	Agree (%)	Neither Agree or Disagree (%)	Disagree (%)	Strongly Disagree (%)
Preference for Large Trees present	60	28	7	2	2
Preferring to live in a neighborhood with Trees in Front	53	35	8	3	0
Neighborhoods with tree are Attractive	75	21	3	1	0
Trees provide environmental benefits	68	29	2	0	0
Trees create Physical Hazards	3	7	21	44	25
Trees make neighborhood look less tidy	2	3	8	44	43
Trees make neighborhood less safe	2	6	18	45	30
I do not want trees because of allergies	2	1	9	44	44
I would like more trees in my neighborhood	28	27	30	13	2

Table 1. Percentage of responses from survey respondents to Question 1 regarding views on trees.

Residents living in the selected four neighborhoods of Mississauga generally strongly agree or agree that they would prefer large trees in their area and to have them located in front of their houses. Residents also agreed that neighborhoods with trees are more attractive than those without (this was seen with an average above 90% for each of the mentioned questions) (Table 1). The Mineola neighborhood had the highest percentage of surveyed individuals that strongly agreed that they would like to live in an area with mature trees (75%), when compared to the other three neighborhoods. Mineola also had the highest percent (89%) of respondents that see neighborhoods more attractive with trees than those without. Despite those living in Mineola favoring trees, 40% of its residents neither agreed nor disagreed that they desired more trees in the neighborhood. This could be related to the high number of mature trees already present in this area, and perhaps those living in Mineola are more interested in

maintaining the trees they have, then planting new ones. This is further supported by the large number of individuals in this area who agreed that they would like more information regarding tree care. Interestingly, Meadowvale had one of the highest percentages of residents stating that they wanted to live in a neighborhood with large trees, and felt that neighborhoods with trees were more attractive, but after interviewing residents in this area, it was noted that Meadowvale typically had less trees in comparison to the other areas selected for this study. Those living in Meadowvale also generally strongly agreed or agreed that they would like to see more tree coverage in their area.

Neighbourhoods	Strongly Agree (%)	Agree (%)	Neither Agree or Disagree (%)	Disagree (%)	Strongly Disagree (%)
Municipality should increase trees	25	22	33	16	3
Municipality should provide more information regarding trees	28	36	27	7	2
Municipality should offer trees at a reduced cost	32	35	24	7	2
Municipality should not allow people to cut trees on their property	24	21	25	23	7
Municipality should offer information regarding fruits and vegetables	25	36	32	4	2
Municipality should provide community gardens	26	36	31	7	3

Table 2. Participants from all four neighborhoods views regarding trees as well fruits and vegetables in percentages.

The Lakeview neighborhood had a very high percentage of its residents that strongly agreed and agreed with the environmental benefits that trees provided, but only 44% wanted more trees planted in the area. This response does not appear to be influenced by the safety risk or negative esthetics associated with having trees, as the majority of the residents disagreed or strongly disagreed with trees causing these issues (Table 2). Similar attitudes regarding trees were also found from the residents in

Rathwood. A large portion of those living in Rathwood wished to have large trees on their property, and most agreed that trees do offer environmental benefits. This is seen with around half of these residents who strongly agreed or agreed with wanting more trees in their neighborhood. Though only half desired more trees, this could be related to the size of the property, as the smaller lot size of townhouses prevents the planting of more trees.

A trend that emerges from the data is that all residents would like more information regarding the planting and caring of trees from the city (Figure 2). Those living in the selected areas feel that the city should encourage the planting of more trees by providing trees at a reduced cost (Figure 2). In Lakeview 46% stated they strongly agreed or agreed that they would like more trees in their neighborhood, however only 41% agreed and strongly agreed that they felt the municipality should increase the number of street trees. It would appear that residents in Lakeview would like to have more trees on their own private property rather than on city property, as 60% strongly agreed or agreed that the city should offer trees at a reduced cost. Another possible explanation for the lack of interest in having more street trees present in Lakeview could relate to the desire to plant fruit and vegetable gardens. This is supported by the high level of interest for information regarding the care of fruit trees, vegetables, and communal gardens, where the shade created by trees may conflict.

Mineola presently has a large amount of tree cover and this is reflected within the residents responding that they generally neither agree nor disagree that the city should plant more street trees; however 63% agreed/strongly agreed that city should offer trees at a lower cost. This could be a reflection of the desire to replace trees that have died or are diseased in the area.

Neighbourhoods	"Having at least one tree at my home is important to me"	"My ideal front yard would have at least one tree (including publicly owned street trees)"	"My ideal back yard would have at least one tree"
Lakeview	93%	87%	90%
Meadowvale	94%	92%	89%
Mineola	94%	89%	95%
Rathwood	91%	84%	82%

Total percentage of respondents who strongly agreed and agreed.	93%	88%	89%

Table 3. Percentage of respondents in each neighborhood who strongly agreed and agreed with the three sub questions in Question 2 of the questionnaire involving the importance of having trees on a property.

When analyzing respondents' thoughts on whether or not having at least one tree on their property was important to them, 93% of respondents agreed with the statement. This same sentiment was observed when the question was split in regards to the front and backyards (Table 3). Approximately 88% of respondents agreed that they wanted a minimum of one tree in their front yard and 89% of respondents agreed that they wanted at least one tree in their backyard. Meadowvale and Mineola had the highest percentage of residents who agreed that they wanted to have at least one tree on their property (94%). It is suspected that because these are higher income neighbourhoods with the highest proportion of well educated individuals of the selected neighborhoods, that there is a greater awareness of the environmental benefits of trees. Overall, it can be seen that residents want at least one tree on their property and believe having one is important.

Neighbourhoods	"Trees require more work than they are worth"	"I do not like trees in my yard because their roots cause problems"	"Trees conflict with the activities I enjoy doing in my front yard"	"Trees conflict with the activities I enjoy doing in my backyard"
Lakeview	79%	50%	80%	76%
Meadowvale	84%	58%	82%	82%
Mineola	91%	72%	85%	76%
Rathwood	73%	47%	70%	66%
Total percentage of respondents who strongly disagreed and disagreed.	82%	56%	80%	76%

Table 4. Percentage of respondents in each neighbourhood who strongly disagreed and disagreed with the four sub questions in Question 2 of the questionnaire involving maintenance of trees and conflict of activities.

The amount of maintenance and space are perceived to be significant factors when a resident is choosing what flora they would like to add to their property. As well the maintenance of trees can deter residents from investing in them. The results in Table 4 show a different case, as 82% of respondents disagreed that trees required more work than they were worth. In addition, over half (56%) of the respondents disagreed that they did not like trees because problems caused by tree roots. The amount of free space on a property can limit the number of trees present. The increased presence of trees on an individual's property can also decrease the amount of space for one to carry out any activities. The same pattern arose with space as it did with maintenance. Approximately 80% of respondents disagreed that trees conflicted with activities carried out in the front yard and 76% disagreed that trees conflicted with activities carried out in the backyard. Fewer respondents disagreed with the statement involving the backyard. This could relate to the fact that most residents carry out their activities in the backyard, where it is private. Hence, why more trees in the backyard would cause a greater conflict with activities than trees in the front yard. It is interesting to note that Rathwood had the highest percentage of respondents who strongly agreed that trees conflicted with activities they wished to carry out in either the front or back yard. Out of the four neighbourhoods, properties in Rathwood are significantly smaller. Any landscaping or flora decision made on a property like Rathwood's has more of an impact on available space than it does on a typical properties in Mineola. In general, calculations for both the amount of maintenance and space show that residents do not strongly feel as though these factors deter them from having trees on their property.

Neighbourhoods	"I prefer that the majority of my front yard have sun exposure"	"I prefer that the majority of my back yard have sun exposure"
Lakeview	51%	46%
Meadowvale	56%	61%
Mineola	66%	54%
Rathwood	50%	61%
Total percentage of respondents who strongly disagreed and disagreed.	56%	56%

Table 5. Percentages of respondents in each neighbourhood who strongly disagreed and disagreed with the three sub questions in Question 2 of the questionnaire involving sun exposure and the cooling benefits of trees.

Neighbourhoods	"I like the cooling benefits trees provide by shading my house in the summer"
Lakeview	88%
Meadowvale	84%
Mineola	94%
Rathwood	88%
Total percentage of respondents who strongly agreed and agreed.	88%

Table 6. Percentages of respondents in each neighbourhood who strongly agreed and agreed with the sub question in Question 2 about the cooling benefits of trees.

The impact of sun exposure on a house was explored through two statements involving the front and back yard. According to Table 5, approximately 56% disagreed that they would prefer the majority of their front and back yard have sun exposure. In the interviews, the majority of residents were more inclined to spend time in their yard if it was shaded. When asked about whether or not cooling benefits from trees were acknowledged, 12% disagreed that they liked the cooling benefits (possible cut). Thus, there was a strong agreement (88%) towards this statement, which could relate to the financial benefits that come with trees shading a house. Trees can help cool a house and lower the usage of an air conditioner, which in turn benefits the household financially, as there is less energy used. Meadowvale had the lowest percentage (84%) of respondents out of the four neighbourhoods who agreed that they liked the cooling benefits that trees provided. When exploring this observation further, it was found that Meadowvale was a newer neighborhood and was suspected to not have as many mature trees. The lower percentage could be caused by residents in Meadowvale having not yet fully observed the positive benefits of trees.

Contents of Residents' Front, Side, and Back Yards

Vegetation Types Present	Front Yard				Back and Side Yard			
	Lakeview	*Meadowvale*	*Mineola*	*Rathwood*	*Lakeview*	*Meadowvale*	*Mineola*	*Rathwood*
No Front, Back, or Side.	1%	2%	0%	6%	1%	0%	0%	1%
Grass	97%	95%	96%	90%	92%	97%	93%	80%
Flowers	98%	82%	92%	77%	84%	77%	88%	71%
Shrubs	82%	67%	90%	60%	79%	68%	91%	49%
Vegetables	4%	1%	2%	3%	51%	41%	46%	36%

Table 7. Percentage of vegetation types present for front and back yards between the four neighbourhoods.

Question 3 of the survey asked the resident to indicate what type of landscape is featured in their front yard. Only ten households reported having no front yard and six of these were from Rathwood and one from Lakeview. Both of these neighbourhoods have been classified as low property value areas which suggest that the presence and size of yard space correlates with property value. The overall response from the survey results indicated that 94% of the responding residents have grass in their front yard, 85% have flower beds, 74% have shrubs, and 2% have vegetables growing. As shown in Table 7, all four neighborhoods fall around average in these categories.

Question 12 asks residents to indicate the type of landscape located in their back and side yards. Less than 1% of the responding households reported having no back yard. 91% of all responding residents have grass in their backyard, 79% have flower beds, 71% have shrubs, and 43% have vegetables present. Vegetable growth is concentrated in Lakeview and Mineola, having 51% and 46% of houses reporting having vegetables in the backyard. This is more than Meadowvale and Rathwood, who only reported having 41% and 36%, respectively. In this case the older mature neighbourhoods are shown to have a greater amount of vegetable growth. This is interesting because these neighbourhoods would have older, larger trees than a newer neighbourhood, which would make it more difficult to grow a

vegetable garden. <mark>However, these neighbourhoods show a higher percentage of vegetable growth</mark> (repeat? Possible cut).

Trees present, planted, and removed in the front yard.	Lakeview	Meadowvale	Mineola	Rathwood
Current average number of trees.	2	2.63	3.6	3.2
Respondents who removed a tree in last year (%).	16%	15%	18%	16%
Respondents who planted a tree in last year (%).	16%	10%	9%	9%
Respondents who planted a tree since moving in (%)	47%	62%	58%	31%

Table 8. Average number of front yard trees present and amount of trees removed and planted in the four neighbourhoods.

Question 4 asks how many trees have been removed from the front yard in the last year and the overall average response is 0.24 trees. As displayed in Table 8, 16% of the respondents from Lakeview reported removing at least one tree in the last year and Mineola had the second highest amount of respondents at 8%. The proportion of Rathwood respondents who responded that they removed a tree was 6% while Meadowvale displayed the lowest percentage at 5%. This correlates with the fact that Meadowvale is a new community and therefore, the trees planted are young, recently planted, and do not require removal. Mineola, however, is a much older neighbourhood and many of the trees are close to a century old, and as these trees begin to die they will require more maintenance and removal.

The responses indicated that the average number of trees on the front yards for all the neighbourhoods is 2.7. All four neighborhoods reported having close to this average except for Lakeview, where the average was 3.5 trees in the front yard. Question 6 asks residents to indicate how many of their front yard trees were planted within the last year. Lakeview and Meadowvale had the highest amount with 16% from Lakeview and 10% from Meadowvale having reported planting a tree in the last year. Mineola and Rathwood were less with 9% each. When asked how many trees were planted on their

property since residents had moved in, 62% of respondents from Meadowvale expressed that they had

planted trees since they had moved in. This was the highest proportion of respondents who planted trees

since settling into their property, likely relating to age and wealth of the neighbourhood.

Trees present, planted, and removed in the back yards.	Lakeview	Meadowvale	Mineola	Rathwood
Current average number of trees.	3.3	4.3	8.5	2.5
Respondents who removed a tree in last year (%).	15%	15%	29%	10%
Respondents who planted a tree in last year (%).	13%	15%	15%	5%
Respondents who planted a tree since moving in (%).	54%	53%	65%	24%

Table 9. Average number of back yard trees present and amount of trees removed and planted in the

four neighbourhoods.

Table 9 displays the average responses of surveyors in regards to questions 13 to 16. These

questions are similar to 4 through 7 except that it pertains to the resident's back and side yards. The

average response when asked how many trees are currently in the back and side yards was 4.7.

Rathwood reported an average of 2.5, Lakeview 3.3, Meadowvale 4.3, and Mineola at 8.5. These results

support the argument that households with higher income and property value feature more trees, as the

amount of trees increases between the less and more affluent neighbourhoods.

Acquisition of trees in the front yard.	Lakeview	Meadowvale	Mineola	Rathwood
No tree has been planted.	33%	26%	34%	53%
Municipality provided.	18%	48%	9%	14%
Non-Government Organization	1%	11%	3%	9%
Nursery	27%	37%	43%	10%
Other store	4%	7%	3%	3%
Gift	10%	3%	15%	3%
Other	16%	14%	14%	9%

Table 10. Various methods front yard trees were acquired in the four neighbourhoods.

Question 8 asks the means by which residents acquired trees for their front yard. It is interesting to note the difference between Rathwood and Mineola when considering how they obtained their trees for the front yard. Of the Rathwood respondents, 53% reported having received their trees from the municipality, whereas in Mineola the main source of front yard trees were purchased at a nursery, 43% of Mineola respondents reported this. Furthermore, the data shows that a much higher percentage of respondents reported using "other" sources to acquire their front yard trees versus the back yard trees.

Acquisition of trees in the back yard.	Lakeview	Meadowvale	Mineola	Rathwood
No tree has been planted.	28%	19%	26%	37%
Municipality provided.	3%	6%	2%	4%
Non-Government Organization	3%	2%	1%	7%
Nursery	39%	42%	49%	17%
Other store	7%	12%	3%	2%
Gift	14%	8%	13%	5%
Other	1%	1%	1%	3%

Table 11. Various methods back yard trees were acquired in the four neighbourhoods.

Table 11 shows the responses to how the back yard trees were acquired. The majority of respondents from Lakeview, Meadowvale, and Mineola reported having bought them at a nursery. However, only 17% of Rathwood respondents reported having bought a tree from a nursery, the greater response from that neighborhood was that no tree had been planted.

Front Yard Trees on City Property				
	Lakeview	**Meadowvale**	**Mineola**	**Rathwood**
No	50%	44%	48%	53%
Yes	32%	38%	39%	18%
Don't Know	7%	10%	9%	11%

Table 12. Proportion of front yard trees located on city property within the four neighbourhoods.

Question 9 asks if any of the trees in the front yard are located on city property, it was noticed that the majority response from each neighborhood was `No`. In every neighborhood there were a greater number of residents without trees on city property than those with them. When asked if they would like to see more trees in the front yard the overall response was `No`, and Rathwood had the highest percentage of `No` responses at 53% followed by Lakeview at 50%.

Would residents like more trees in their front yard?				
	Lakeview	**Meadowvale**	**Mineola**	**Rathwood**
No	60%	52%	74%	63%
Yes	24%	27%	17%	14%
Don't Know	3%	13%	4%	8%
Would residents like more trees in their back yard?				
	Lakeview	**Meadowvale**	**Mineola**	**Rathwood**
No	65%	38%	63%	52%
Yes	17%	31%	23%	16%
Don't Know	6%	5%	5%	5%

Table 13. Residents opinions on increasing the number of trees in their front and back yards, from four neighbourhoods.

Table 13 shows the responses to whether residents would like to see more trees in their back and side yards. The majority of residents in Lakeview, Mineola and Rathwood said that they would not like to see more trees present. Meadowvale is a newer community and 31% of respondents reported wanting more trees and 38% did not. Overall residents seem to be satisfied with the number of trees currently in their front and back yards.

Conclusions

The majority of respondents prefer to have large trees present in their yards and recognize the economic and environmental benefits that trees can provide. The data shows that 93% of respondents from the four neighbourhoods agreed that having at least one tree at their home is important to them. This is supported by the fact that the average number of front yard trees reported for all the neighbourhoods is at least 2. Furthermore, over 75% of responding residents felt that neighbourhoods with trees are more attractive than those without trees. The majority of residents from all neighbourhoods agreed that they preferred living in a neighbourhood with large trees, and to having one in front yard was important. From each neighbourhood the majority stated that the most common method of acquiring trees was through a nursery, suggesting that residents prefer to manage their trees privately rather then from the city. In addition, residents showed that they recognized the economic and environmental benefits of having trees near their house, illustrated by the 85% of respondents from all neighbourhoods agreeing that they enjoy the cooling benefits of trees.

It was perceived that having trees in one's yard would be the greatest factor when making landscaping and vegetation decisions. Survey results showed that this was not the case, as the older neighbourhoods such as Lakeview and Mineola, had the highest proportion of respondents with vegetable growth in their yard (51% and 46%, respectively). Older neighbourhoods were expected to have a greater amount of conflict between tree canopy cover and vegetable growth. Respondents from the older neighbourhoods stated they were not finding any conflict between having trees and maintaining a vegetable garden. This is further supported by the fact that 54% of Lakeview respondents and 65% of Mineola respondents have planted trees since they moved in into their home, which are the highest proportions out of all the respondents. Despite the older neighbourhoods having a large amount of mature trees present, residents are still planting new trees, noted within the last year where 13% of Lakeview respondents and 15% of Mineola respondents planted trees on their properties. Again, these are the highest proportions out of all the respondents who have planted trees in the last year. (possible cut) It is evident that these older neighbourhoods with mature trees are not finding a conflict between tree canopy cover and owning a vegetable garden.

Majority of respondents, especially those within Lakeview and Rathwood, would like more information from the municipality about tree care. This is illustrated by 64% of respondents wanting more information regarding trees. Out of the total population selected for this study, approximately half expressed a desire for more trees, however, 67% believed that the municipality should provide trees at a reduced cost. The preference to have trees present in the neighborhoods is further supported by 88% of respondents stating that their ideal front yard includes at least one tree, illustrating the demand for trees and more information from the municipality.

Appendix

Appendix A – Demographics Table of Lakeview, Meadowvale, Mineola, and Rathwood.

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