

**PLANNING RECOMMENDATIONS FOR LAND USE REGULATIONS
FOR THE CULTIVATION OF NON-MEDICAL CANNABIS IN ONTARIO**

by
Jocelyn Cadieux

Supervised by Dr. Roderick MacRae

A Major Paper
submitted to the Faculty of Environmental Studies
in partial fulfillment of the requirements for the degree of
Master in Environmental Studies

York University, Toronto, Ontario, Canada

May 6, 2020

Abstract: On October 17, 2018, the *Cannabis Act* came into effect and non-medical cannabis became legal in all Canadian provinces and territories. Federal and provincial efforts focused on how cannabis would be sold and consumed, but hardly touch on the considerations for growing and cultivation. Issues such as nuisances and governance emerge in this fledgling field without any indication from public officials that these will be addressed. This paper makes recommendations at both the provincial and municipal levels on how to best adapt current land use regulations to minimize nuisances, ensure the most appropriate lands are used for cannabis production and permit economic prosperity for cannabis producers.

Key Words: Cannabis Cultivation, Land Use Planning, Zoning By-Laws, Nuisance Mitigation, Normal Farm Practises

Table of Content

Foreword	IV
Acknowledgements	IV
Introduction	1
Methodology	3
Section 1 — Cannabis Production	5
Indoor Operations	8
Outdoor Operations	13
Section 2 — Issues with Cannabis Production	15
Nuisances	15
Pesticides	17
Section 3 — Legislative Framework	19
Federal Legislation	19
Provincial Tools	21
Provincial Policy Statement:	21
The Right-to-Farm	22
Appeals	25
Municipal Planning	26
Official Plans	26
Zoning By-Laws	27
Site Plan Control	29
Interim Control By-Law	29
Section 4 — Municipal cases	32
Arnprior	32
Aurora	34
Brantford	35
Niagara-on-the-Lake	37
Pelham	39
Pembroke	40
Vaughan	42
Summary	43
Section 5 — Recommendations	44
Bibliography	49

Foreword

The major paper is the culminating work for students in the Master in Environmental Studies program at York University. Throughout the two-year program, we've had to develop a Plan of Study that outlines our learning objectives and what we wish to take away from the MES. Having chosen the Planning concentration, I declared in my Plan of Study my intentions to pursue membership with the Ontario Professional Planners Institute. With this major paper, I have satisfied my learning objectives laid out in my Plan of Study, including learning objectives 1.1, 1.2, 1.3, 2.2, 3.1 and 3.2.

In the MES Planning program, we learn to critique the entrenched planning systems that currently exist in Ontario and are encouraged to take this critical approach into the workforce to support communities and those who are systemically oppressed. This major paper criticizes current approaches at planning but does not question the overarching planning system and institution. However, throughout my career, I hope to apply all that I have learned during my time in the MES and will be able to lift up others and do the best that I can to reduce the systemic barriers in place.

Acknowledgements

I would first like to thank those who have been able to give me a proper foundation, filled with love and support. My loving parents and my brother have played a large role in my academic career by constantly encouraging me, answering my phone calls and always having my back. I would like to offer a big 'thank you' to my grandparents for their emotional support, always checking in and offering to do my laundry. My wonderful partner, Jason Batten-Carew, who moved with me from Ottawa to Toronto to also pursue his master's degree at the University of Toronto has been the best friend, ally and roommate I could hope for while I embarked on this academic journey. As well a big thanks to his parents for constantly taking us out for dinner whenever they visited Toronto and offering kind words of support and wisdom.

Next, I would like to thank some of the wonderful professors from the Faculty of Environmental Studies. Dr. Laura Taylor and Dr. Luisa Sotomayor have played a crucial role in my pedagogical process and have helped me properly critique planning systems. I have applied their teachings in this paper and will throughout my career. Dr. Liette Gilbert, Graduate Program Director and my faculty advisor and Dr. Roderick MacRae my research supervisor, have played a large role in my successes throughout the MES program. Both never failed to answer my emails within a few hours, have always offered sage advice, and were always available when I needed help.

Last and certainly not least, I would like to acknowledge the entire MES Planning 2020 cohort for their support and friendship. For most of us, this is our first time writing a thesis and it has been great to have such a supportive group to exchange knowledge and socialize with. Most of us had to finish our papers during the 2020 COVID-19 pandemic and we leaned on each other to keep working hard. My fellow classmates helped make my academic experience a wonderful one. Thank you, all! I look forward to seeing you in our future professions.

Introduction

Until July 2001 Canada had a strict prohibition on cannabis, meaning it was illegal to purchase, possess and grow cannabis in any way shape or form. The *Controlled Drugs and Substances Act 1996* introduced the *Marihuana for Medical Purposes Regulations* in 2001 (Department of Justice A, 2020). This allowed people with a prescription from their licenced medical practitioner to either grow their own cannabis or purchase some from Health Canada. Prior to 2001, there was an exception in Section 56 of the *Controlled Drugs and Substances Act* that provided some people with legal dried cannabis. Though, the *Marihuana for Medical Purposes Regulations* was the first law that actively permitted a specific type of access to cannabis (Health Canada, 2016). Many changes have been made to the *Controlled Drugs and Substances Act* and different regulations have been introduced to allow for market actors to grow medical cannabis for the federal government, adjust the types of medical cannabis that are offered and so on. On October 17, 2018, the *Cannabis Act 2018* came into effect. Via this act, the Government of Canada legalized the consumption, purchasing and possession of cannabis for non-medical purposes in all provinces and territories, and repealed and replaced the *Access to Cannabis for Medical Purposes Regulations*.

This major paper is concerned with the legalization of non-medical cannabis in Canada, as per the *Cannabis Act*, prepared and overseen by Health Canada. Non-medical cannabis is also often referred to as cannabis, recreational cannabis, weed, pot, dope, ganja, grass, marijuana and many other names. However, seeing as this is an emerging academic field, I feel as if I have a responsibility to lay the foundation for proper discourse around cannabis. Arguably, one of the most culturally common names for cannabis, and the most common name in regulations, is 'marijuana' and/or 'marihuana', the latter being the phonetic way to pronounce the term. In my own writing, I do not use either term since they have a racist history and were used to oppress racialized groups in the United States during prohibition in the 1920s and again during the American 'War on Drugs' (Halperin, 2018). This word has been used to imply that only racialized groups consume cannabis and that it propagates acts of violence, all while belittling the important cultural relationship shared between the substance and many groups. For several indigenous nations, cannabis plays an important role in cultural celebrations and medical practices (Delamont, 2018). The reality of the matter is that cannabis is a substance used by many people of all walks of life for a multitude of reasons, all of which do not merit racialized slander. The words 'marijuana' and/or 'marihuana' are used throughout this paper, but only when referring to previous or current legislation. As a result, I encourage all to change the words used when engaging in any discussions about cannabis.

In the 21st century, cannabis has kept its cultural and medical significance. During the 2020 COVID-19 (*novel coronavirus*) pandemic, all liquor and cannabis stores in Ontario, including the provincial online delivery store, were mandated to stay open and serve their respective communities (Mosleh, 2020). During the crisis, alcohol and cannabis were considered an essential service to help those with dependency issues retain access to their substances. Although withdrawal symptoms from cannabis are less severe and won't have the same long-term health repercussions as withdrawing from alcohol, access to cannabis was treated as crucial in order to help those with anxiety, pain relief and mitigation of alcohol withdrawal symptoms (Mosleh, 2020). Eventually cannabis stores were closed due to the increasing measures to prevent social interactions. The obvious contrast to make is that prior to October 2018, non-medical cannabis was illegal and possession in large amounts would merit a criminal record. In 2020, just two years post-legalization, cannabis businesses made it past the first round of service closures and were deemed an essential product during a time of crisis.

The legalization of non-medical cannabis has now opened up new avenues of research in Canada. Seeing as cannabis is now a legal consumable good and deemed essential, there's a need to understand the policies surrounding the cultivation of cannabis prior to its manufacturing and distribution. The research question that I intend to answer is what additional legislative land use changes need to be made to accommodate cannabis production in Ontario and what are the current efforts being undertaken in municipalities?

To answer these questions, I have divided my research into five sections. The first section goes into the details of cannabis production, the distinctions between indoor and outdoor methods of growing cannabis, and the energy requirements for these facilities. The second section in this paper looks into the current issues that are being faced by producing cannabis at such a large scale. These first two sections serve as foundations for understanding what cannabis is and its legislative status. Section 3 dives into the current legislation and governance of cannabis in Canada, as well as begin discussing the question of land use. It is within this section that I discuss the current planning and land use tools that exist in Ontario for regulating how cannabis can be cultivated. Topics such as normal farm practices, the Ontario *Provincial Policy Statement* and zoning by-laws are elaborated on. The fourth section looks at what efforts a few municipalities in Ontario have made to address the issue of regulating cannabis within their jurisdiction. Section 5, the final section, is my policy recommendations on the best ways to regulate cannabis in Ontario.

Methodology

I use a land use planning lens as my primary analytical framework. Answering my research questions through this lens is advantageous because it serves as truly novel research for commercial cannabis cultivation in North America and opens up further discussion on the topic.

Over the course of my research, I present and lay out the current policies on non-medical cannabis in Canada and Ontario and their legal scope. In order to prepare for this research, I have read over the Canadian *Cannabis Act*, *Cannabis Regulations*, the Ontario *Cannabis Statute Law Amendment Act* and the *Cannabis Licence Act*. While reading these pieces of legislation, I found the federal and provincial documents primarily focused on cannabis as a product and commodity, largely ignoring its cultivation as a crop. I found this to be an issue since the commercial growth of cannabis occurs within municipal boundaries and municipalities need guidance to adjust their land use regulations to sufficiently protect their community and offer support for the private sector. However, municipalities have not been able to understand or research all of the complexities at play when cultivating cannabis. The private sector, which is not bogged down by the same political bureaucracies, is able to react much faster. The problem with this is that municipalities have an objective to best serve their community. However, cannabis growers may take advantage of the lack of any updated land use regulations and develop their operations in lands not best suited for this.

This major paper uses primarily a qualitative approach. My research is comprised of findings from news articles, blog posts, public documents, municipal staff reports and legislation from the Canadian government, the Province of Ontario and municipalities. At this point there is limited academic literature due to the fact that this field of research is still emerging, and it will be some time before substantial peer-reviewed academic discourse becomes available. I have conducted interviews with land use professionals in the municipalities of Vaughan and Pelham to help me navigate some of their current zoning regulations and any proposed changes. The sole intent of these interviews was to gain a better understanding of information that was already available to the public and reiterate the municipality's public stance on cannabis cultivation.

A best land use study traditionally is conducted by planners to establish what lands are best suited for a specific activity. Determining the best lands for cannabis cultivation is different than most other activities since it has been strictly prohibited and illegal for almost a century. The academic literature and research available for cannabis has been mostly conducted using data from illegal growing operations. Data from these sources can involve ethical concerns, inaccurate findings and reduced scales (Mills, 2017). The legal non-medical cultivation industry takes place in legal facilities, approved by Health

Canada, independent of any other activities, the details of which are to be discussed later in this paper. Best land use studies often involve tracking energy and water usage to determine the location of municipal infrastructure best suited to service the activity. With illegal growing operations, this type of data collection can be inaccurate since issues of power theft emerge or more often than not, have not been tracked in the first place (Mills, 2017). The academic study of cannabis is currently in its seedling stage and its criminal past proves to be a challenge for it to grow any further. There's a dire need for primary research to be conducted by public institutions in order for it to flower.

Key considerations found in this paper include the distinction between fully enclosed indoor production, open-air outdoor production, and greenhouse production. Establishing the differences between these three methods serves to better understand how cannabis is produced. These are important to understand since they all present different land use, political and economic issues and cannot be treated identically. In Section 1, I categorize only 'indoor vs. outdoor production' and include greenhouses within the 'indoor' category because of its similar energy and building requirements as a fully enclosed facility. In sections 4 and 5, greenhouses are compared to outdoor facilities because of the designated land it would occupy. Another major topic touched on in this paper is the issue of nuisances. Obnoxious odours and light pollution are major factors in the cannabis industry and are arguably the biggest concern for residents and municipalities. This is also what makes cannabis different from many other municipal activities and is discussed at great length throughout every section.

The fourth section looks at how 7 municipalities in Ontario have reacted to the legalization of non-medical cannabis and if their zoning regulations have been adjusted. These 7 municipalities were chosen because they were located within 150 kilometres of Ottawa and Toronto, Ontario's 2 largest urban centres. This buffer was selected because it is where a significant portion of cannabis production activities are taking place in Ontario. Municipalities such as Brantford, Pelham, Niagara-on-the-Lake and Arnprior have been mentioned in several news articles throughout my preliminary research and I wanted to dive deeper into their zoning by-laws. Aurora, Pembroke and Vaughan were then selected because they each represented different approaches to the cannabis question, while still having sufficient public-facing information explicitly discussing cannabis. The intention of all of this reading and qualitative assessment is to make recommendations at both the provincial and municipal levels for best ways to adjust land use regulations and zoning by-laws to ensure that cannabis can be grown in a way that is safe for all residents and economically viable for producers. This involves determining which lands are optimal for growth, while minimizing the negative impacts on the community.

Section 1 — Cannabis Production

The regulation of the commercial production of cannabis is at the heart of this major paper. As planners and city officials embark on this journey to identify how planning regulations translate to the cannabis industry, it is important to understand what is being regulated. This section aims to familiarize the reader with cannabis as a plant. I begin this section by giving a high-level view of the way cannabis is produced from planting the seed to harvesting the plant along with explaining the particularities of commercial production and the nuisances involved. In Canada, there are three ways to produce cannabis: indoor production, outdoor production and plant production for individuals. Since only the first two methods allow producers to apply for a commercial growing licence from Health Canada, I focus my attention on these scenarios. With the exception of how it is presented within the *Cannabis Act*, individuals growing their own cannabis plants for personal consumption is not featured in this research.

Why do we grow and consume cannabis? Tetrahydrocannabinol, commonly known as THC, is one of over 100 cannabinoids found in cannabis. A cannabinoid is a chemical compound specific to the cannabis plant that binds itself to the brain's neural receptors when consumed (Lland, 2016). Amongst its nearly 100 counterparts in the cannabis plant, THC is specifically renowned for its dominant and abundant euphoric properties. Cannabis serves medicinal and recreational purposes, notably consumed for pain reduction, relaxation, sedation, and hunger stimulation (Lland, 2016). Experiencing these side effects after consuming cannabis is what has been socially known as being 'stoned'. Some less pleasant side effects can include increased anxiety, paranoia and dizziness. Medical professionals have often prescribed medical cannabis primarily for pain, increase appetite and anxiety relief (Cooke et al., 2020).

Royal Queen Seeds (2019), a cannabis producer from the United Kingdom and online store, has described the following 5 steps to produce high quality cannabis. Although climate and geography play a role in all farming and food production, the following process provides a general understanding on how to grow cannabis.

Step 1: The first step is to identify a plot, add good quality mineral-rich soil, lightly cover the seed and water daily. Germination is the process where the roots try to break out of the seed to reach the soil and starts right when you put the cannabis seed into its plot. This is the first 1–7 days (Royal Queen Seeds, 2019).

Step 2: The seedling stage is when one blade of the cannabis plant begins to come out of the soil and only has one 'finger'. A cannabis plant's leaf typically has 5–7 fingers. These fingers are the distinct features of the cannabis leaf that serve as a brand for the

cannabis industry (see figure 1). At the seedling stage, a cannabis plant requires 18 hours of direct light (natural or LED), needs to be maintained at 20–25 degrees Celsius, 70% humidity and lasts approximately 14 days (Royal Queen Seeds, 2019).



Figure 1: The image to the left is the socially recognized symbol and logo for cannabis, which is based on the leaf that is demonstrated in the right image. The pointed leaf ends are called 'fingers'. A leaf normally has 5–7 fingers, a sign that the cannabis plant is growing properly is when the first finger penetrates the soil after one week of being planted. This leaf does not possess any THC, nor does it produce any psychoactive effects. Images taken from Tiny House Staff, 2019.

Step 3: The vegetative stage is when the plant starts to mature and may need to be transferred to a new container unless initially planted in the largest container. This stage is when the leaves and roots mature, and the plant experiences the most of its growth. It is recommended that plants remain at 20–24 degrees Celsius for optimal growth conditions, with humidity reduced to 50%. These conditions promote the likelihood of a THC rich female plant. Male plants produce significantly less THC and require more plants and resources to create a THC potent product and are therefore not as desirable to produce. This stage can take anywhere between 2–8+ weeks and require 18+ hours of LED light if growing indoors. There are subtleties in the types of cannabis plants, their roles in the production and sex that impact how they should enter the vegetative stage; however, these are not pertinent to this major paper.

Step 4: The flowering stage is when the sex of the plant is revealed. Female and hermaphrodite plants produce a significant amount of THC. The buds gathered from female plants are used to make loose-leaf packages, cannabis cigarettes and psychoactive oils. Male plants produce less THC and are often used for the production of psychoactive oils, body products (massage oil, skincare, etc.) textiles and non-psychoactive food products. When in the flowering stage, cannabis plants require a drier heat, with temperature increases nearing 28 degrees Celsius and humidity around 40–50%. Flowering only commences at the end of the summer and the beginning of autumn

when grown outdoors. In contrast, flowering is initiated when the indoor facilities adjust the climate.

For the female and hermaphrodite plants that produce THC potent plants, there are two principal strains of cannabis: Indica and Sativa, and several hybrids of the two strains. Indica plants require a flowering process approximating 7–10 weeks, compared to the 10–14 weeks for Sativa (Royal Queen Seeds, 2019).



Figure 2: This is a THC potent bud, extracted from a female plant. Buds are the final product after extraction, curing and drying of the cannabis plant. These can be packaged as they are and intended to be smoked in cannabis paraphernalia or can be further processed into cannabis cigarettes or oils. Image taken from Haze, 2019.

Step 5: Harvesting and curing cannabis plants is the final step, occurring only when the plant is removed from its container and trimmed. The most important part of the curing process is to ensure that the extracted cannabis can dry without any mold. Therefore, the plants are placed in airtight containers (fill the container to approximately $\frac{2}{3}$ full). The containers are opened twice a day for the first two weeks to monitor for mold and replace the stale air. Following this, the containers only need to be opened once or twice a week for another 2 weeks, then the cannabis is ready for consumption (Royal Queen Seeds, 2019).



Figure 3: Located inside a greenhouse, cannabis is grown in individual parcels of land that are carefully measured to ensure maximal growing space. Image taken from Cumbers, 2019.

Growing good quality cannabis is different from many other crops because of the plant's very specific needs and growing conditions. As identified, cannabis requires nearly constant access to light, carefully monitored humidity controls and meticulous dehumidification, making it a very high maintenance plant. In order to satisfy the specific requirements of cannabis, there needs to be sufficient facilities and land use regulations to support it.

Indoor Operations

An indoor cannabis facility is currently the dominant way to grow in Ontario and Canada. For the purposes of this research, an indoor cannabis production facility is defined as a building that houses the growing of the cannabis plant and/or a greenhouse operation. Indoor operations also allow for regulated temperatures and a controlled environment (Hennings, 2016). For the purposes of this research, these two growing styles are looked at together since they both require meticulous temperature and light control.

Now found to be inaccurate, the original perceived advantage of growing indoors is more consistently aesthetically pleasing flowers with a higher THC concentration (Hennings, 2016). However, these perfectly controlled conditions have significant energy demands.

Greenhouses also allow for the production of cannabis to occur year-round. Greenhouses allow for the sun's heat to pass through its transparent or translucent walls, which heats the soil and plants (Hennings, 2019). Once these structures are heated, the greenhouse traps the infrared radiation that the soil and plants release themselves, ensuring continuous heat even during colder months. Artificial light sources are available in greenhouses to ensure a constant source of light (Hennings, 2019).

In order to build and operate a greenhouse in Ontario, an applicant is required to:

- "Obtain a 'Permit of Take Water' if it uses a minimum of 50,000 litres of water per day from a lake, river, groundwater stream or pond¹;
- Get approval from the Ministry of the Environment, Conservation and Parks to discharge sewage, including stormwater, process water and sanitary sewage;
- Get approval to use, operate, establish, alter, extend or replace new or existing sewage works;
- Properly store and handle pesticides; and
- Hold a pesticide licence or permit such as the Greenhouse/Interior Plant exterminator or Grower Certificate to apply certain pesticides" (Ministry of Environment, Conservation & Parks, 2019).

In their article Carbon Footprint of Indoor Cannabis Production, Evan Mills (2017) has conducted extensive energy consumption research in regard to cannabis production in California. Mills' research has merged findings from greenhouses and indoor operations, which makes it difficult to compare these two growing methods in this study. Much of the data collected by Mills are to be interpreted as generalizations and have a considerable margin of error as a result of the complicated legal history of cannabis.

Due to the proprietary and often illicit nature of cannabis cultivation, data are intrinsically uncertain. Key uncertainties are total production and the indoor fraction thereof, and the corresponding scaling up of relatively well-understood intensities of energy use per unit of production to state or national levels could result in 50% higher or lower aggregate results. Greenhouse-gas emissions estimates are in turn sensitive to the assumed mix of on- and off-grid power production technologies and fuels, as off-grid production (almost universally done with diesel generators) can—depending on the prevailing fuel mix in the grid—have substantially higher emissions per kilowatt-hour than grid power. Final energy costs are a direct function of the aforementioned factors, combined with electricity tariffs, which vary widely geographically and among customer classes. The assumptions about vehicle energy use are likely conservative, given the longer-range transportation associated with interstate distribution. Some localities (very cold and very hot climates) will see much larger shares of production indoors and have higher space-conditioning energy demands than the typical conditions assumed here. More in-depth analyses could explore the variations introduced by geography and climate, alternate technology configurations, and production techniques. (Mills, 2017: p. 59).

¹ Data on the amount of water needed to operate a cannabis facility is insufficient at this current time. It's unclear if 50,000 litres is an appropriate average amount of water necessary to supply a cannabis greenhouse.

This extracted paragraph is important to consider when conducting energy research involving cannabis in Ontario. Similar to California, Ontario is a significant land mass subject to large differences in temperature, weather, water, land and other factors. Moving forward in this field of research in Ontario will require several different studies in different geographies of the province before we can make definitive statements about the energy requirements and greenhouse gas emissions of cannabis production. Some of the produced research is helpful in beginning to understand some of the complexities of energy uses in the cannabis industry. In 1996, California officials saw a 50% rise in per capita residential power usage in Humboldt County where the cultivation of medical cannabis was permitted, compared to other regions in California (Mills, 2017). Much of these power demands come from the need for powerful lights that operate for prolonged periods of time. Mills goes into further detail about how power is used in indoor facilities.

Specific energy uses include high-intensity lighting, dehumidification to remove water vapour and avoid mold formation, space heating or cooling during non-illuminated periods and drying, preheating of irrigation water, generation of carbon dioxide by burning fossil fuel, and ventilation and air-conditioning to remove waste heat (Mills, 2017: 59).

As found in Jonathan Caulkins' Estimated Cost of Production for Legalized Cannabis (2010), the value of cannabis production is often incorrectly compared to that of industrial hemp. Hemp is a legal product to grow that is used and praised for its versatility, often used as industrial rope and in textiles (Hu & Lim, 2007; Caulkins, 2010). However, as identified in the Caulkins article, studies regarding hemp production have been conducted by unreliable sources and the total costs per acre lowballed since they excluded land and overhead costs.

Indoor facilities are able to produce cannabis at all times, often yielding as much as 6 crops per year (McLaren et al., 2008). For this reason, producers try to maximize the number of plants that can be grown in a 12-month period and grow plants more densely and harvest when they are smaller (McLaren et al., 2008; Caulkins, 2010). This contrasts with outdoor operations. For the most part, outdoor production yields one cycle of cannabis plants, which means that the plants can be spaced out and harvested as the plants are able to grow and mature, therefore producing much larger plants and yielding more cannabis in one growth cycle (Caulkins, 2010). The accelerated growth cycle of a cannabis plant indoors is due, as mentioned, to the early extraction of buds from the plant, as well as an increase in indoor carbon dioxide (CO₂) levels, as much as 4 times the natural levels (Mills, 2017). Mills also reports that the immediate exposure of such high levels of CO₂ over a shorter period of time could possibly reduce the final energy tally. As most people would assume, the largest factor contributing to the high energy levels of cannabis production is the industrial lights. These lights are reported to be 500-times brighter than recommended for reading, and nearly identical to those used in hospital

operating rooms. A close runner-up for most energy required is the ventilation systems, which change the air in a growing room nearly 30 times an hour (close to 60 times the rate in the average single detached dwelling) (Mills, 2017).

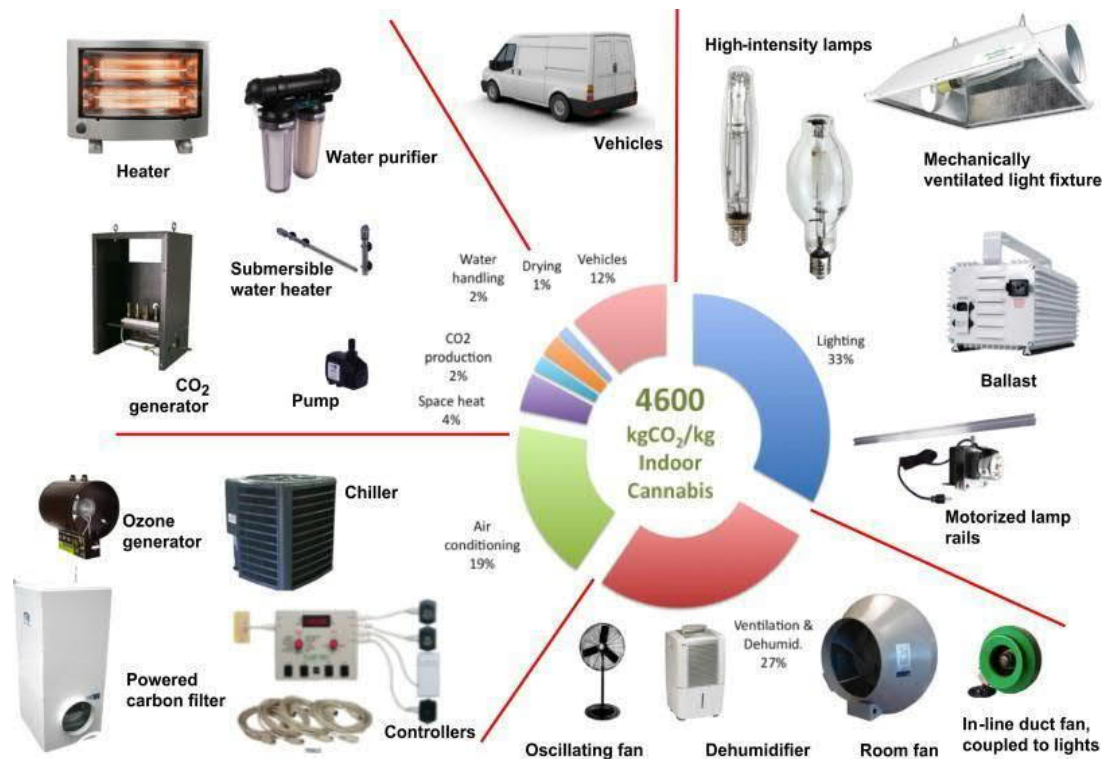


Figure 4: This figure highlights that 4,600 kilograms of carbon dioxide is required to produce one kilogram of cannabis, grown from an indoor operation located in Northern California, USA (Mills, 2017).

The above-used data is all speculative, context-based and subject to error since the academic study of cannabis is still in its fledgling stage. In order to move forward with any policies, municipalities, provinces and the Canadian federal government need to conduct reliable research on the energy requirements required to produce cannabis for different periods of time in various geographies. The results of this possible research would help municipalities prepare for the added burden to their energy grids and incorporate these into their environmental initiatives. Seeing as this is now legal in Canada, the research can be done with much more ease than in prior years.

When wanting to build a cannabis production facility, municipal administrators and operators need to consider the equipment requirements for the actual structure. James Lowe and Benjamin Franz (2018), proven entrepreneurs in the North American cannabis industry for over a decade, published a blog article in ConstructionCanada.net entitled Building Successful Indoor Cannabis Cultivation Facilities, which discusses the optimal floor plans and specialized equipment required in a cannabis facility. General considerations are outdoor landscaping, mechanical and electrical equipment placement,

CO₂ levels, parking, shipping and receiving, building heights and the interior layout of the facility. From a planning perspective, the interior layout is less pertinent for the purposes of this major paper but is crucial for a successful operation.

As previously mentioned, these facilities have large CO₂ requirements and need of storage tanks. Lowe and Franz (2018) recommend that these tanks be located as close to the building as possible in order to reduce the number of pipes that actively transport the CO₂. A design challenge, particular in repurposed buildings are supportive columns. Columns minimize the floor space for cultivation (Lowe & Franz, 2018). A very relevant building concern for planners and those involved in municipal governance is height. Lowe and Franz (2018) have addressed the importance of keeping the cultivation area of a cannabis production facility relatively short, with a height between 4 and 4.5 m, in order to ensure the perfect microclimate for production. A final consideration, which could address some of the nuisance issues (which is identified and discussed below), are that there should be no windows in the cultivation areas, “the movement of the sun and moon would interrupt the plants’ light cycle (which is carefully controlled using artificial lighting for optimum growth) and windows also pose an unnecessary security risk” (Lowe & Franz, 2018).

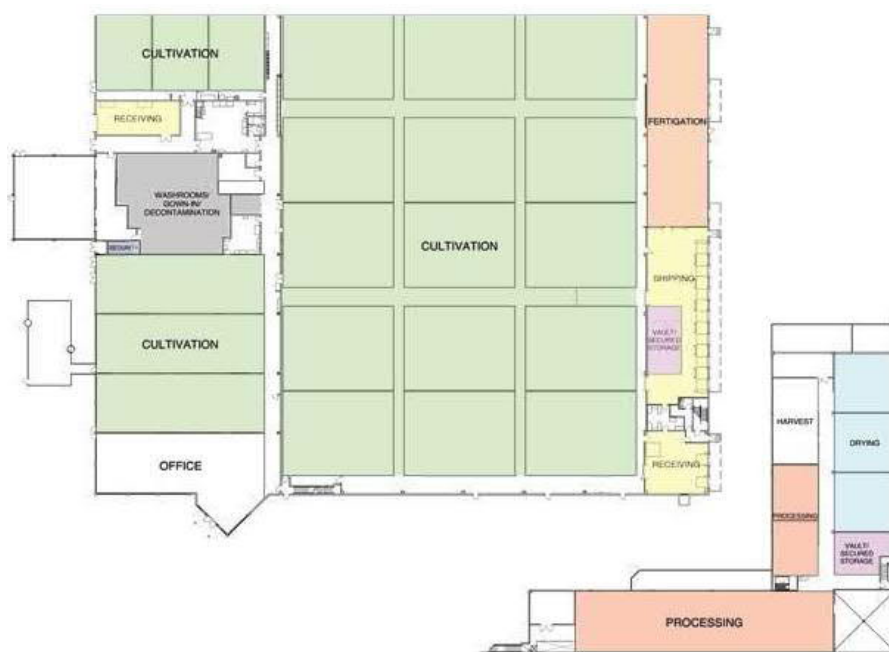


Figure 5, Taken from Lowe and Franz (2018) Building Successful Indoor Cannabis Cultivation Facilities. The above image shows a layout of a 11,1148 sq/m repurposed meat packing plant, being retrofitted as a cannabis production facility, which is expected to produce 907 kg (2000 lb) of cannabis per month.

Outdoor Operations

The merits of growing cannabis outdoors in the open air generates a wide variety of conflicting opinions. In several US states, many believe that cannabis grow in the open-air is less potent with THC when compared to that of indoor-grown cannabis. According to studies conducted by the United States Federal Government, cannabis connoisseurs, the State of California, and 48North (one of the major cannabis producers in Canada), this notion is not proven and the THC potency of the cannabis crops grown in either condition is reported to be similar when following best practices (Mills, 2017; McLaren et al., 2008; Carruthers, 2019; 48North, 2019; Hennings, 2016). The biggest difference, as mentioned in the previous section, is that outdoor operations can only yield one harvest per year (Caulkins, 2010). Seeing as outdoor producers aren't hurrying to grow new crops of plants, they are able to focus on the one batch that is being cultivated. This means that the plants can be spaced out to ensure maximal growth and maturing, producing a higher concentration of buds per plant. In contrast, indoor operations densely plant the seeds and harvest the buds before the plant reaches full maturity (Caulkins, 2010).

Another point of debate between indoor vs. outdoor growing are the costs of production. Jeannette VanderMarel, Co-Chief Executive Officer of 48North, is one of the few people in North America to have directly overseen the operations and financials of both an indoor and outdoor cannabis production facility. As quoted in the London Free Press, VanderMarel states that "it costs 25 cents to grow a gram of marijuana outside, compared to \$1 for greenhouse-grown cannabis and \$2 for plants grown indoors" (VanderMarel, as cited by Carruthers, 2019; Subramaniam, 2019). These are just the operating costs of an already built facility, and exclude the initial overhead required (Subramaniam, 2019). It is less expensive to construct an outdoor facility, and less expensive to maintain. However, they yield less cannabis per year and therefore need to sprawl to grow larger quantities. In Ontario, there is currently only one approved and functional outdoor open-air cannabis facility, the Good:Farm, operated by 48North. Located in the City of Brantford, this unique operation is 100 acres (404,685 sq/m) and expected to supply over 40,000 kilograms of cannabis in one growing season (48North, 2019; Carruthers, 2019; Carruthers, 2018). Currently, it is unclear what the specific energy demands are for this operation.

Mills (2017) writes that, compared to indoor operations, a significant proportion of the energy used in outdoor farms is for water pumping and transportation. Much of Mills' research on the topic of outdoor production focuses on smaller scale illegal operations, using outdated farming techniques and therefore not be pertinent for this study.

Outdoor farms are not without their advocates. Cannabis retailer, Mark Spear, predicts:

'[...] indoor [grows] are going to become dinosaurs in the next five to 10 years," [...]. "There's going to be a handful of them that produce exceptionally high-quality flower—top shelf—and people will pay for it, but that might be 10 percent of the market. The rest will be greenhouse or outdoor' (cited in Delamont, 2018).

Important considerations from a land use perspective for these types of farms are the security and fencing requirements, and proximity to pesticides from nearby farms. Sections 63 to 72 of the *Cannabis Regulations* outline security and facility requirements. The requirements do not explicitly mention how these facilities need to be designed, but instead have objectives that designs must consider such as "the site must be designed in a manner that prevents unauthorized access" (Department of Justice B, 2020). This does not explicitly require a fence, but many facilities have used fences to satisfy this requirement. Other requirements include separate physical barriers for each operating area, 24/7 video surveillance with records kept for a minimum of 365 days after recording, and intrusion detection systems (Department of Justice B, 2020). Pesticides are another consideration for outdoor production and are discussed in the next section.

Section 2 — Issues with Cannabis Production

The discussions between municipalities and private cannabis growers largely revolve around indoor versus outdoor cannabis growing operations. Based on my media analysis, it is my current assessment that municipalities generally advocate the use of indoor facilities, while the private industry pushes for outdoor operations. Municipalities seem to be primarily concerned with odour mitigation and they make the assumption that indoor facilities are the most efficient way to mitigate odours (Coles, 2018; Coles, 2019; Audet, 2019; Hauptert, 2018; Hein, 2017; Subramaniam, 2019). Growers seem to prefer outdoor growing operations since there are fewer overhead costs. This seems like a logical conclusion on their part, since the *Cannabis Act* requires growers to finance and build their operation before being able to apply for a grower's licence (Department of Justice, 2019). By having an outdoor grow, growers can minimize the time and costs required between applying for a cultivation licence and their overhead expenses. Growing outdoors would reduce significant upfront costs, but there is still the consideration that the climate in Canada isn't optimal for outdoor growth, although it is possible and feasible (Subramaniam, 2019). Despite these debates, both ways to grow bring forward questions around sustainability, nuisance, energy consumption and quality of the cannabis (Coles, 2019). This section goes further into the specific nuisances that emerge from growing cannabis and the complications brought on by pesticide approvals.

Nuisances

In the context of farming and agriculture, a 'nuisance', according to the Ontario Ministry of Agriculture, Food and Rural Affairs generally takes form in the 7 following ways:

- "Odours emanating from manure handling and storage;
- Light from greenhouses at night, or farm equipment used at night;
- Vibration from trucks, fans, or boilers;
- Smoke from burning tree pruning, or other organic wastes;
- Flies from manure, or spilled feed;
- Noise from crop drying fans, or irrigation pumps; and
- Dust from field tillage equipment, or truck traffic" (2019).

These nuisances represent the main acceptable reasons to lodge a formal complaint against a farming operation, although this list is not exhaustive. According to several news articles in rural municipalities, the odour and the light emitted by the cultivation of cannabis seem to be the large concerns for those residing near a cannabis production site (Canadian Press, 2019; Audet, 2019; Audet, 2018; Coles, 2018).

A significant nuisance for cannabis is the odour that it produces. A report from Public Health Ontario, a Crown corporation, found that cannabis crops release what are known as volatile organic compounds (VOCs). VOCs are chemicals that when exposed to

regular room temperatures have a high vapour pressure, meaning these can evaporate into the atmosphere at very low temperatures and can be odorous (Public Health Ontario, 2018). Rice et al. (2015), cited in Public Health Ontario's report (2018: 2), have "identified over 200 different VOCs from packaged cannabis samples." During the analysis of VOCs, it can be difficult to track which produces the notorious smell associated with cannabis. The presence of a high concentration of one particular volatile chemical may not be the cause for odours. The growing conditions play a large role in the VOCs chemical reaction and can change the potency of the smell. Chemical volatilization changes for many reasons, whether it's the time allowed for the leaves to dry, outdoor temperature conditions, etc., making it difficult for both tracking which chemicals produce odours and establishing strict and regular monitoring of odours for indoor and outdoor facilities (Public Health Ontario, 2018). According to the website MedicalJane, an online self-declared expert forum on all scientific matters pertaining to cannabis, and an article from Dr. Laura Hauptert, the odours from cannabis are produced when terpenes (hydrocarbon molecules) are secreted from the cannabis plant during prolonged light exposure (MedicalJane, n.d; Hauptert, 2018). The VOCs produced from cannabis crops have been deemed a public annoyance, but not physically harmful to anyone exposed to the odours. There is no research available for the psychological repercussions of being exposed to cannabis odours in this way.

As identified previously, the production of cannabis in greenhouses and indoors requires a significant amount of bright artificial light. In greenhouse settings, the light emitted can be an even larger concern for residents than the odour during production. In an example from the Town of Pelham, light pollution is the most pressing concern, said long-time area resident Josh Miner

'At night, it's ridiculous... I can walk in my backyard and it's bright as day," he said. Still, Miner recognizes the economic boost the industry brings and has positioned himself to benefit from it. His business Fenwick Pie Co. is near one of the cannabis cultivators in Pelham and has seen an influx of customers as a result. "People do need to realize that heavy industry is dead, or it's on its way to dying. And if people need jobs—that's a job," Miner said. A pungent aroma is a common by-product of any industry, he adds. "The way I look at it, we've been an agricultural area forever and I grew up near a chicken farm," Miner said. "So there's a negative smell there as well, but nobody has stopped raising chickens' (Josh Miner, Pelham resident as quoted by the Canadian Press, 2019).

Historically, there have been various ways that municipalities have dealt with nuisances, obnoxious and noxious odours. One solution utilized in North America is to change a zoning designation to allow for obnoxious odours (Valverde, 2019). As expected, in almost all cases, these exclude residential and commercial areas and mostly are modified industrial and agricultural designations. Currently, in Ontario, the principal method of handling nuisance complaints is through the Normal Farm Practises Protection Board

(Valverde, 2019; Ministry of Agriculture, Food and Rural Affairs 2019). The NFPPB is an appeal body that handles nuisance cases in Ontario. This body's authority and mandate is discussed in greater depth in the next section.

Section 85 of the *Cannabis Act* outlines that cannabis producers need to prevent odours in their production facilities. "The building or part of the building where cannabis is produced, packaged, labelled and stored must be equipped with a system that filters air to prevent the escape of odours". This requirement only applies to indoor production facilities. Through the process of amending their Zoning By-Law, the City of Brantford found that open-air growing, greenhouse facilities and sites that do not strictly follow Health Canada's guidelines produce the most odour. This is followed with their assessment that completely interior and enclosed production operations mitigate and mask most nuisances, including light emissions (Brantford Staff Report No. 2020-6, 2020). Therefore, the best way to grow cannabis in regard to nuisance control is by conducting the operation in a completely enclosed building.

Pesticides

Pesticide control is a significant factor in the production of cannabis. Under the *Cannabis Act* and the *Pest Control Products Act*, the Government of Canada has established stringent requirements to ensure that cannabis, whether fresh, dried or oil, has a minimal amount of pesticides and other artificial agents (Health Canada, 2019 A).

The language within the *Cannabis Regulations* goes so far as to state that "cannabis that is a cannabis product or that is contained in a cannabis accessory that is a cannabis product must not contain any substance other than the cannabis" (Department of Justice, 2020, B). However, subsection 93.2 expresses that the only exceptions are the maximum limits set forward by Health Canada in the *Pest Control Products Act*. In order to ensure the quality of the cannabis and its safety for consumption, a sample from each batch of cannabis from every production facility needs to be tested. The results need to indicate that there are minimal parts per million (PPM) of a certain pest control product on the cannabinoid product. On January 2 of 2019, Health Canada published an official list of pesticide residue thresholds for cannabis plants and oils (Health Canada, 2020). This list is only for the permitted thresholds of the 96 pest control products that may leave a residue on dried cannabis and oil extracts. The actual list of permitted pesticides that may be actively used during production to treat the plant is much smaller and limited to 28, per the federal government's Pesticide Label Search tool (Health Canada, 2020). A concern for these tight requirements is that there is a limit where producers may grow their cannabis since they cannot be at risk of having neighbouring crops contaminate the cannabis via pesticide drift. Pesticide drift, according to Ontario Ministry of Agriculture,

Food and Rural Affairs (2016 A), “is the aerial movement and unintentional deposit of pesticide outside the target area”.

The Province of Ontario also has a role to play in how pesticides are used for greenhouse and farming operations. These include the requirements to:

- store, handle and apply pesticides carefully;
- keep detailed pesticide application logs;
- ensure respirators are sealed from exposure to air and are not stored in pesticide storage areas;
- create a spill response plan so that everyone knows their role in the event of a significant spill;
- keep absorptive material near pesticide storage areas to deal with any minor liquid spills;
- ensure that everyone who uses pesticides receives training in both pesticide safety and practical application skills; and,
- mix pesticides and load the application equipment in a separated area (Ministry of Environment, Conservation & Parks, 2020)

Health Canada’s vigilant and frequent testing of cultivated cannabis samples are to ensure it meets the low pesticide residue levels it has outlined. Outdoor operations can, therefore, only be placed in areas where it can guarantee it won’t be contaminated (Carruthers, 2019; Health Canada, 2019 A).

The disposal of cannabis is a significant issue in Ontario. As per lawyers at Willms & Shier, Butler and Jackiw (2019):

Licensed cannabis processors and cultivators are authorized to destroy cannabis by methods that: (i) do not expose any individual to cannabis smoke or vapour, and (ii) meet all applicable federal, provincial and municipal environmental protection legislation.

Regardless of this mandate, there is no real solution for this issue that satisfies all of Health Canada’s requirements (Butler and Jackiw, 2019). This is a significant environmental consideration since it involves better understanding water management, energy consumption, and waste treatment, all while minimizing odour impacts during the disposal process. My understanding is that immediate and further research is needed to address this important gap. These considerations, important as they are, are currently beyond the scope of this paper. An additional gap in the literature is the water requirements for cannabis production. Several reports have come out of the State of California’s Department of Fish and Wildlife discussing the amount of water required to sustain the cannabis industry. However, these have been rebutted by cannabis think tanks and research centres and therefore it wouldn’t be appropriate to use this information. At the time this major paper was written, there is no consistency amongst multiple credible sources with regards to information on water usage rates and therefore is not a part of this study.

Section 3 — Legislative Framework

Federal Legislation

There are several pieces of legislation guiding the Canadian cannabis industry. The *Cannabis Act* (Bill C-45), overseen by Health Canada and the Department of Justice, is the overarching legal document outlining the roles, responsibilities and details of the legalization of cannabis. The *Cannabis Act* “creates a legal and regulatory framework for controlling the production, distribution, sale and possession of cannabis in Canada” (Health Canada, 2018). This Act gives the Canadian Government its authority to create regulations and policies that guide how cannabis is consumed, manufactured and produced in Canada. The *Cannabis Act* is primarily supported by two regulations: *Cannabis Regulations* and *Industrial Hemp Regulations* (Health Canada, 2019 B). These regulations are consistent with the purpose and intent of the *Cannabis Act*, while acting as a more specific source of guidance for Canadians on how to apply the *Cannabis Act*. Included in these regulations are requirements for what cannabinoid products may be sold, how much dried cannabis one individual may possess on their person at a time and how many plants one dwelling unit can grow for self-consumption (household and not individuals per dwelling unit).

Part of the federal mandate outlined in the *Cannabis Act* is to oversee licencing for production facilities. Health Canada is the only public institution in Canada that may issue a licence for production. There are currently 6 types of licences available in Canada: cultivation, processing, analytical testing, sales, research and cannabis drug licence (Department of Justice, 2019). This major paper is mostly concerned with the cultivation licence for the growth and production of cannabis but may refer to processing activities (transforming cannabis into a consumable product). In order to obtain a cultivation licence, a producer must fully finance and build the operation (Department of Justice, 2019). This process requires a lot of upfront costs and significant access to capital.

The Canadian government has delegated certain responsibilities to provinces and territories: the manner in which cannabis can be sold, the location of retail stores, the way in which stores operate and who may sell cannabis (Health Canada, 2019). To address the growth of cannabis, Health Canada has set guidelines for those seeking to grow cannabis recreationally and manages which applicants receive permits to grow. They have set certain rules regarding what physical and cybersecurity measures growers need to follow (Health Canada, 2019). These security measures, under the *Cannabis Regulation* Part 4, Section 62–72, include the following: the site’s perimeter needs to be monitored; the site must be designed to prevent unauthorized access; the site must have an intrusion detection system which must be operated and monitored at all times;

operation and storage areas must be surrounded by a physical barrier; these same areas must also be monitored by surveillance systems at all times to prevent illicit activities; and grow areas must be monitored only at the entry and/or exit points.

Bill 36, the *Cannabis Statute Law Amendment Act*, is the Province of Ontario's policy which oversees the use and sale of cannabis in Ontario. It is the province's response to Health Canada's *Cannabis Act*, after being mandated to facilitate sales and distribution of cannabis. This provincial act determines where cannabis can be publicly consumed (i.e., smoking in parks, on sidewalks, etc.). Statute 2 of Bill 36 brings to life the *Cannabis Licence Act*, administered by the Alcohol and Gambling Commission of Ontario (AGCO) (Kirkpatrick & Salafia, 2018). This act defines Ontario's selection and administering process for the sale of cannabis in retail locations. Current aspects of production and manufacturing have been left to municipalities to facilitate. There are significant provincial stakeholders involved in regulating the manufacturing and production of cannabis, such as the Ministry of Agriculture, Food and Rural Affairs, the Ministry of the Environment, Conservation and Parks, and the Ministry of Municipal Affairs and Housing.

The discussions and recommendations conducted in this paper focus primarily on land for cannabis production, although another component it considers is the manufacturing of cannabis goods, such as oils, pre-rolled cannabis cigarettes (commonly known as 'joints'), measuring and packaging of the buds, amongst other products. The Health Canada *Packaging and Labelling Guide for Cannabis Products*, created under the *Cannabis Regulations*, states in its Background section that,

The *Cannabis Regulations* set out requirements pertaining to how cannabis and cannabis products must be packaged and labelled prior to sale, distribution or export. Specifically, the regulations require plain packaging and labelling for all cannabis products with restrictions on logos, colours, and branding. Cannabis products must be packaged in a child-resistant container and be labelled with the standardized cannabis symbol, the mandatory health warning message, and include specific product information (e.g., brand name of the cannabis product, class of cannabis, delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD) information, licence holder information). These measures aim to reduce the risks of accidental consumption and overconsumption as well as reduce the appeal of cannabis products to young persons while providing consumers with the information they need to make informed decisions before using cannabis.

Licence holders are responsible for complying with the Act and Regulations, and other legislation that may apply to them or their activities. Health Canada does not review or pre-approve packages and labels of cannabis products" (Health Canada C, 2019)

While the federal guide goes into further details about the specific requirements for packaging, this information shows that cannabis producers must follow stringent requirements, which has zoning and land use implications that need to be considered by municipal officials and local producers.

Provincial Tools

Without going too deep into the weeds of land use planning governance in Ontario, I provide a brief overview of how authority and power percolate to municipal decision-making. In the current governance structure set by the *Constitution Act 1867*, a Canadian province has the final authority on how lands within its boundary can be used, with certain exceptions which fall under the federal government's jurisdiction (airports, telecommunications towers, military bases, indigenous lands, and a few others) (Foran & Harrington, 2019). Born from this authority and responsibility is the *Planning Act R.S.O 1990, Chapter P.13*, more commonly known as the *Planning Act*. Municipalities as corporate entities and governing bodies are created by the *Ontario Municipal Act*, but their legal authority on how land is used stems from the *Planning Act* (Foran & Harrington, 2019). Since this authority is delegated by the Province, municipalities need to create policies and regulations that are consistent with and conform to provincial laws. This section shall go into details about the tools and regulations that are created from the *Planning Act*. Proverbially speaking, the Province designed the sport, built the stadium, painted the lines, and hired the referees, and municipalities are now the ones who need to play the game while respecting the rules.

Provincial Policy Statement:

All planning matters in Ontario are required to be consistent with the *Provincial Policy Statement* (herein referred to as 'PPS'). The PPS was most recently updated in 2020 under Section 3 of the *Planning Act* as a foundation for "regulating the development and use of land" (Ministry of Municipal Affairs and Housing, 2020b). This means that zoning regulations created by municipalities that impact land use must be written and implemented in a way that supports the spirit and intent of this provincial policy. Below is a policy extract, which is the most relevant to the discussion around cannabis production.

Section 2.3.3.2 of the PPS reads as: "In prime agricultural areas, all types, sizes and intensities of agricultural uses and normal farm practises shall be promoted and protected in accordance with provincial standards" (Ministry of Municipal Affairs and Housing, 2020b).

The intent of this policy is to encourage a diversity of agricultural and farming activities in lands that have been designated as agricultural. While limiting what can be grown on this land does not respect the intentions of the Province's legislation, guiding a facility towards particular uses can fall within these parameters.

It is important to understand the specificity of the language used. Some of the key words to note are "prime agricultural areas". "Prime agricultural areas," meaning the physical

land, are what are being regulated under this policy and not the actual agricultural activities themselves or the facilities. The *Planning Act* and the *PPS* only have the authority to regulate land and how it is used.

The City of Brantford has proposed an amendment to their zoning by-law to change several definitions, including the introduction of a ‘Cannabis Production and Processing Facility’ definition, which is proposed to be permitted in their Light Industrial lands. Their proposed amendment goes into details about this very policy and justifies that their approach to amend their zoning by-law is attractive and consistent under the PPS.

The proposed amendments are not restricting where the growing of cannabis can occur; rather they are directing the processing of the crop to industrial zoned areas where full municipal services are available and where the lands are not impacted by sensitive and incompatible uses such as residential or institutional uses. This will also ensure that lands intended for future growth are not sterilized (Brantford Staff Report No. 2020-6, 2020).

This example, which is discussed in greater depth in sections 4 & 5, demonstrates the limitations of the PPS. The intent of the PPS is to support agricultural activities within agricultural lands. The proposed changes to the City of Brantford zoning by-law regulate a facility and not an agricultural activity, therefore permitting them to respect the intention of the PPS, all while limiting where cannabis may be grown. Cannabis grown on industrial lands are not subject to the same nuisance concerns as those on agricultural lands in the eyes of the PPS, since the PPS discusses agricultural uses only on agricultural lands. By moving cannabis cultivation facilities to industrial lands, the governance structure changes and therefore authorities such as the Ministry of Agriculture, Food and Rural Affairs are not involved (Ministry of Agriculture, Food and Rural Affairs 2019; Ministry of Municipal Affairs and Housing, 2020 B).

The Right-to-Farm

Should the Ontario Ministry of Agriculture, Food & Rural Affairs (herein referred to as ‘OMAFRA’) consider cannabis a ‘normal farm practice’ in a specific jurisdiction, it would be protected under the *Farming and Food Production Protection Act*, which protects from many nuisance complaints and restrictive zoning by-laws. The caveat here is that cannabis may be grown but may not be subject to the same protections as other crops. Yet, this is the case for all agricultural activities. The United States of America started implementing ‘right-to-farm’ legislation in 1963. In Canada, Manitoba was the first province to create this type of act in 1972, in order to protect their farmers’ interests’ (Lavery, 2008) (McCormally, 2007). “As their popular name suggests, “right-to-farm” laws are a form of statutory protection of farmers. While laws vary from jurisdiction to jurisdiction, their main purpose is to protect farmers from lawsuits, primarily those based on nuisance” (Lavery, 2008:2).

Ontario's right-to-farm legislation was created and adopted in 1998, entitled the *Farming and Food Production Protection Act*. This act sees that "Farmers are protected from nuisance complaints made by neighbours, provided they are following normal farm practises. No municipal by-law can restrict a normal farm practice carried on as part of an agricultural operation" (Ministry of Agriculture, Food and Rural Affairs 2019).

The Act defines a normal farm practice as one which:

1. is conducted in a manner consistent with proper and acceptable customs and standards, as established and followed by similar agricultural operations under similar circumstances, or
2. makes use of innovative technology in a manner consistent with proper advanced farm management practices (Ministry of Agriculture, Food and Rural Affairs 2019).

A notable example in Ontario that is foundational in nuisance case and farming law is the *Pike v. Tri Gro Enterprises* case. The case surrounds the Greenwood Mushroom Farm in Whitby, Ontario. The contested issue was the compost that resulted from the farming operation, which, reports indicated, produced "extremely unpleasant smells" (Valverde, 2019:337). The judge of the case ruled in favour of the residents and thus fined the Greenwood Mushroom Farm (Valverde, 2019). Shortly after this case, the Province created the Normal Farm Practises Protection Board (herein referred to as 'NFPPB'), under the *Farming and Food Production Protection Act*, a body whose decisions are legally binding but are not permitted to serve as a legal precedent, because if the decision stood, it would be difficult, at the time, for any mushroom farm to operate in Ontario since the compost (and its formula) are integral to the method of operating (Valverde, 2019). Shortly after the Pike case, there were many instances where farms were deemed nuisances in certain areas but not in others (Valverde, 2019).

The NFPPB is a provincial body under the OMAFRA, comprised of mostly farmers and chaired by a lawyer. They hear testimony in cases between farmers and residents/municipalities who believe that the nuisance is not a normal farm practice (Valverde, 2019) (Ministry of Agriculture, Food and Rural Affairs 2019). The Board sees 0 to 1 case per year, whereas the OMAFRA receives nearly 200 nuisance complaints per year (Valverde, 2019). This stark difference is primarily due to the fact that all nuisance cases are subject to mandatory mediation (Valverde, 2019) (Ministry of Agriculture, Food and Rural Affairs 2019). They only progress to the Normal Farm Practises Protection Board when the mediation process doesn't offer a solution.

Normal farm practice does not follow a customary practice of farming, but rather one that uses innovative technologies and best industry practises within an agricultural area. However, the most important part of this act is that the ministry explicitly states "What is normal, or not, varies depending on location, type of farm, method of operation, and timing of the farm practice. Normal is site-specific for a given set of circumstances and may change over time" (Ministry of Agriculture, Food and Rural Affairs 2019).

Under the *Farming and Food Production Protection Act*, the following protected nuisances apply to cannabis production.

The new legislation added light, vibration, smoke and flies to the previous list of noise, odour and dust as disturbances for which farmers are not liable, provided these disturbances result from normal farm practises (Ministry of Agriculture, Food and Rural Affairs 2019).

The bulk of farm nuisance complaints are about odours emanating from manure handling and storage. However, examples of other nuisance complaints might include:

- light from greenhouses at night, or farm equipment used at night [...] (Ministry of Agriculture, Food and Rural Affairs 2019).

This Act is very important in the agricultural sector since it allows all farmers to operate regularly without fear of repercussions from the municipalities who may see their work as disruptive. It is a valuable tool, also, for those who feel that they are being negatively impacted by farming practices. Residents or municipalities who feel that a farming operation is not taking proper measures to minimize its impact on the surrounding community can file a complaint and begin the appeals process. Unlike the *Planning Act* and *PPS*, the *Farming and Food Production Protection Act* has the authority to regulate an agricultural activity, but not how land is used.

A significant issue, highlighted in Valverde's conclusion, is that nuisances, which are subjective in nature, do not work well nor align with provincial legislation that is created to prevent nuisances, which are objective in nature (Valverde, 2019). That is, there is a disconnect between the realities of nuisances and the political systems in place trying to minimize their impact. Valverde argues that normal farm practises and nuisances are subjective, and "what is and is not a normal farming practice depends on the particularities of the social and economic (that is, farm-activity specific) context and the physical surroundings" (Valverde, 2019:339). This raises the question of whether it is appropriate to have such regulations in such a volatile and subjective field.

These questions of subjectivity and fluidity of nuisances raised by Valverde are very pertinent to the cannabis discussion, but municipal legislators are looking to move from a conceptual debate. The Province of Ontario has partially provided an adaptive tool for preventing incompatibilities between land uses in regard to odour concerns, the Minimum Distance Separation Formulae (herein referred to as the MDS). The MDS, as defined and supported by the PPS, is intended to establish setbacks for new developments from existing livestock facilities (MDS I), and setbacks for new livestock facilities from existing developments (MDS II) to reduce incompatibility concerns about odour (Ministry of Municipal Affairs and Housing, 2020 B; Ministry of Agriculture, Food and Rural Affairs, 2016 B). The MDS, overseen by OMAFRA, offers requirements in many specific scenarios and how a development application should proceed. A pertinent example would be scenario #10, MDS I Setbacks for Zoning By-Law Amendments and Official Plan Amendments (Ministry of Agriculture, Food and Rural Affairs, 2016 B: 21). In this

instance, any non-agricultural development in prime agricultural lands that require a rezoning, must follow the MDS I setback requirements. To complete the process and establish a proper setback, an applicant must fill in information about the nearby facilities, the amounts of specific livestock housed and use tables to calculate the approximate amount of manure produced in a facility (Ministry of Agriculture, Food and Rural Affairs, 2016 B). The entire document walks an applicant through the multiple steps to establish a setback requirement for both MDS I and MDS II developments.

Whenever referencing prime agricultural areas and rural lands in an official plan and a comprehensive zoning by-law, a municipality is required by the PPS to reference the MDS formulae in order to require the appropriate setbacks (Ministry of Agriculture, Food and Rural Affairs, 2016 B). In reference to the production of cannabis, there are no setback requirements in any provincial guidelines for crop cultivation in order to minimize concerns for nuisances. There are legal requirements, in Ontario, for nuisance planning in agricultural lands and the MDS could serve as a good foundation for not only considering livestock but crops as well.

Appeals

Cannabis sold in stores for recreational purposes is required to be grown in Canada. Per federal requirements, cannabis can only be imported from other countries for medicinal or research purposes (Subramaniam, 2019). By landlocking the non-medical industry, there need to be sufficient systems in place to allow for the regulation and growth of cannabis, including a proper appeals process. As it currently stands in Ontario, there are three ways to appeal matters related to cannabis. The first is with the Local Planning Appeals Tribunal (LPAT), which includes handling cases that pertain to land uses. In this instance, any party may request an appeal on a proposed development application or for any change in the municipality's legislation, most likely a zoning by-law amendment. If a cannabis operator were, as an example, to disagree with a proposed amendment to the zoning by-law put forward by the municipality, they could appeal it to the LPAT (Local Planning Appeals Tribunal, 2020). A resident opposed to an indoor cannabis production facility in an industrial zone could appeal to the LPAT. The tribunal, however, makes decisions based on their own interpretation of the provincial legislation, after hearing the arguments from all parties involved. As an example, the logic of arguments for appealing a proposed zoning by-law amendment would need to conform and be consistent with the *Planning Act*, the *Provincial Policy Statement*, the regional and municipal official plans, any secondary plans, and the intent of the zoning by-law. Decisions made at the LPAT can be used as legal precedence.

The second way to appeal, regarding cannabis, is with the NFPPB. The NFPPB was established to uphold and establish normal farm practises, with the objective of

[...] resolv[ing] disputes regarding agricultural operations and to determine what constitutes a normal farm practice. In performing that function, the board seeks to achieve the stated goal of the legislature in balancing the needs of the agricultural community with provincial health, safety and environmental concerns (Ministry of Agriculture, Food and Rural Affairs, 2019).

In order for cannabis to be considered a normal farm practice, it would need to demonstrate innovative and productive farming techniques and be desirable for its specific community. Decisions made at the NFPPB cannot be used as legal precedent in future cases (Ministry of Agriculture, Food and Rural Affairs, 2019). “Farmers are protected from nuisance complaints made by neighbours, provided they are following normal farm practises. No municipal by-law applies to restrict a normal farm practice carried on as part of an agricultural operation” (Ministry of Agriculture, Food and Rural Affairs 2019).

The third way to appeal is detailed in the *Cannabis License Act*. Cannabis retail locations are appealed to the Licence Appeal Tribunal, with the Alcohol and Gaming Commission of Ontario’s authority (AGCO, 2018). However, this remains to be beyond the scope of this research.

Municipal Planning

Via provincial and municipal legislation, planners have multiple tools at their disposal to guide how land is used and developed within their respective municipal boundaries. With minor exceptions, most tools and strategies are given power from sections of the Ontario *Planning Act*. Within the scope of this research the most relevant tools are: Official Plans (Section 16), Zoning By-Laws (Section 34), Interim Control By-Laws (Section 38), and Site Plan Control Area (Section 41).

Official Plans

An official plan is the foundational policy that guides growth and uses of land in a municipality. Upper-tier, lower-tier and single-tier municipalities are all required under Section 16.1.13 of the *Planning Act* to have an official plan. In regard to land uses, an official plan identifies all lands within the municipal boundary and provide a general designation to guide growth in a particular direction (Ministry of Municipal Affairs and Housing, 2020 A).

Official plans are vital for the governance and structure of a municipality. They guide important decision making and outline long-term environmental, economic and housing targets, and other municipal objectives (Ministry of Municipal Affairs and Housing, 2020 A). As crucial as they are for optimal municipal function, they, in my opinion, play a minor

role in the discussion surrounding cannabis production. An official plan may speak to the importance of diversified farming practices and can encourage economic and industrial growth in certain areas, but it need not explicitly include the production of cannabis. In an ideal world without any amendments made to an official plan or a zoning by-law, a zoning designation needs to respect the intended uses identified in the official plan.

In the case of upper and lower-tier municipalities, a lower-tier municipality's official plan must conform with that of an upper-tier municipality, as well as to the *Provincial Policy Statement*.

Zoning By-Laws

Land use is the very broad concept that looks at how land is managed, used and represented in regulations. In the context of Ontario, land is mostly divided and segmented into designations by zoning by-laws (Ministry of Municipal Affairs and Housing, 2019). Zoning by-laws are a tool in every municipality's arsenal, given by the Ministry of Municipal Affairs and Housing (2019) to establish

How land may be used, where buildings and other structures can be located, the types of buildings that are permitted and how they may be used and how the lot sizes and dimensions, parking requirements, building heights and setbacks from the street.

Zoning by-laws receive their legal authority under the *Planning Act* and serve as applicable law. Under the direction of an official plan, zoning regulations specifically outline permitted uses, distance, signage, parking and height requirements and many other details for all lands within a municipal jurisdiction (Ministry of Municipal Affairs and Housing, 2019). Certain zones may have holding, discretionary or conditional provisions within a zoning designation. These provisions identify specific parcels of land that have extra requirements compared to other similarly designated lands (Hoehn, 2019). A short list of examples includes requirements for an environmental, nuisance or energy study, and/or a specific height or density restriction that is different than what the normal designation would permit. Zoning plays a large role in the way in which cities are built and grow and are one of the most common and common important regulatory tools for the control of land (Hoehn, 2019). They are necessary because they

implement the objectives and policies of a municipality's official plan, provides a legal way of managing land use and future development, and in addition to the official plan, protects you from conflicting and possibly dangerous land uses in your community (Ministry of Municipal Affairs and Housing, 2019).

For the purposes of this research, zoning, zoning by-law(s) and land use(s) do not mean the same thing. A 'zoning by-law' refers to the current regulations approved in a municipality, whereas 'land uses' refers to the general idea of land being assigned

permitted uses in various levels of policy. ‘By-law’ (without zoning as a prefix) may refer to another type of municipal law that will be explained in the context for which it is used in this research.

When considering the cultivation of cannabis in Ontario, there is a major issue with land use designations. John Clark, Vice President, Tax & Valuation at development company The Regional Group of Companies (2019), remarks in an opinion piece that there is still debate over how cannabis should be classified in the zoning context. Cannabis, as a crop, hasn’t been designated as agricultural, industrial, rural, etc. in any provincial policies. This responsibility to designate the land uses of the crop has been given to municipalities, from the *Cannabis Act* (Department of Justice, 2019). He claims that municipalities in Ontario find it difficult to write proper zoning by-laws since they have no guidance. Much of the debate, according to Clark (2019), stems from the reality that cannabis, while a crop, doesn’t provide the same social benefit as fruits and vegetables and has different requirements for cultivation. Cannabis does not require the same land quality as other crops and allowing its cultivation on agricultural lands would reduce the availability of high-quality land for other crops. This discussion raises the question whether municipalities can and should designate crops to specific land quality classifications.

Similarly, Dean (2018) expresses that municipalities have three options to adapt to new cannabis cultivation applications: first, a specific zoning designation called “Cannabis Production Facility”, which would permit cannabis production facilities on specific parcels of land but leaving it to municipalities to establish their own setbacks and site statistics. This option helps future growers determine which municipalities allow them to be built and potentially work in collaboration with the municipality to sort out the details. Second, create a specific zoning designation called “Cannabis Production Facility”, designating parcels of land to allow for cannabis production facilities, but having set guidelines and rules in place. This approach makes it possible for growers to know exactly how to plan their operations when choosing a municipality, assuming the municipality has established these rules prioritizing their public’s interest. This option, however, restricts how a grower would develop. Third, is to establish which currently existing land use designation cannabis production falls under. This prevents the long process of amending a zoning by-law and official plan. However, growers have little guidance on how to develop their production and may run into an appeals process.

Clark (2019) and Dean (2018) bring up very pertinent points and there is no consistency or provincial understanding on how land-use regulations should treat the cultivation and commercial growth of cannabis. Since cannabis growers need to finance and build their operation before applying for a cultivation licence with Health Canada, they need to know where they can buy land and how to operate, as well as process their product. The

stringent requirement previously outlined demonstrate that the packaging process, alone, needs significant space. As previously mentioned, manufacturing also requires the assemblage of other cannabis products. Regardless if the cultivation company is different than the one manufacturing and processing the product, there's a need within the cannabis supply-chain to have a separate parcel of land for manufacturing or permission to allow manufacturing on the same site as the cultivation. A segregated and dedicated land use designation means that identified parcels of land is designated as only able to house one specific use (i.e. cannabis production).

Site Plan Control

Under Section 41 of the Ontario *Planning Act*, a municipality's Official Plan (Section 41.2) may designate lands that are required to produce a site plan agreement (SPA). Section 41.3 states that a by-law may be passed to require a site plan agreement for one or more land use designations. Certain municipalities have by-laws that designate their entire municipal boundary to be subject to site plan control, permitting certain exemptions for smaller developments. Section 41.1 & 2 state the conditions a site plan agreement needs to meet to receive municipal approval. This protects both the municipality and the applicant. A municipality is, therefore, able to ensure that an applicant has followed the proper steps to meet the municipality's needs, while keeping in communication with municipal staff. An applicant is then able to show to the municipality, hearing or public meeting that they followed the steps outlined by the *Planning Act*.

Much of what is included in a SPA are details about exterior design, construction materials, accessibility (including elevators), landscaping, affordable housing units, property massing and the relationship to nearby buildings and neighbours (section 41.2). A SPA does not address the particularities of interior design, the standard of construction nor the interior layout (Section 41.4.1). Some of these can be addressed through planning tools but are not within the scope of a SPA. A site plan Agreement, once approved by municipal staff and council, becomes law.

In the context of cannabis production, this could possibly ensure that facilities meet the security standards laid out in the *Cannabis Act* and *Cannabis Regulations*. As well, it opens up the discussion between the applicant and the municipality regarding nuisance mitigation strategies and how to reduce what is emitted outside of the building.

Interim Control By-Law

Under Section 38 (including subsections 1 through 9) of the *Planning Act*, municipalities in Ontario have the authority to conduct a review or study of land use regulations in a specific jurisdiction, called an interim control by-law. This review halts the specific land use in question for a period of up to a year and allows for a municipality to study the best

way to apply land use regulations moving forward, without having to simultaneously process requests for the specific issue in question. A municipality can request to extend the interim control by-law if they haven't been able to conduct enough research on the topic at hand and can continue their review up to one additional year (Section 38.2). Unlike the other planning tools mentioned thus far, an interim control by-law is a tool that won't directly impact how land is used per se but allows a municipality time to consult with residents, subject matter experts and assess a situation.

In Ontario, many municipalities have implemented interim control by-laws to prevent cannabis companies from purchasing lands and greenhouses for the production of cannabis. Interim control measures allow for municipalities to communicate with their residents, research best practices, and prepare long-term growth strategies. In regard to cannabis, most cases of interim control by-laws are seen as a temporary compromise and generally do not receive much support from the corporations nor the residents. Private sector actors seem to be resistant because these control measures halt their development process. In the Town of Pelham (herein referred to as 'Pelham'), a cannabis company had already purchased lands, received a cultivation licence from Health Canada to grow cannabis and went about their business respecting the proper legal channels at the time, only to be halted by the passing of an interim control by-law (Ontario Superior Court of Justice, 2019). The cannabis company, Leviathan Cannabis Group Inc. (herein referred to as 'Leviathan') is now pursuing legal actions against Pelham. Leviathan believes that it is within its rights to pursue development when it had followed every rule in place up until the point the interim control by-law was passed and believes that they should have proper exemptions from future land use regulations in regard to cannabis production (Ontario Superior Court of Justice, 2019). Residents want immediate action and see these control by-laws as too slow. However, throughout my analysis, residents appear more open to interim control by-laws and more willing to compromise than those in the private sector (Canadian Press, 2019; Edwards, 2019; Audet, 2019; Audet, 2018; Coles, 2018).

An interim control by-law is a very powerful preventative tool, but it has no power over applications that have already been finalized. Unlike the case in Pelham where a cannabis producer was interrupted by these measures before completing their development, the Township of Lincoln passed an interim control by-law after already having an active commercial cannabis production facility (Edwards, 2019). The municipality received complaints from residents and the community because the odour reached an elementary school (Edwards, 2019). The municipality had next to no authority to penalize the production facility, nor change its way of operating, but could prevent it from happening elsewhere.

These tools are all permitted under current provincial legislation and can offer municipalities a bit more control as to how their land is developed, while also opening up communication channels with those who wish to develop the land. Although these tools are very practical for planners, they aren't foolproof, nor should they be. The Province of Ontario has established other tools that protect residents and business actors from the decisions of the municipality. However, the issue currently seen in Ontario's cannabis industry is that these expensive appeal processes are becoming the standard way to negotiate between the cannabis industry and municipalities. In contrast, by having open communication between all stakeholders, proper land use tools can be established, which facilitates the process, all while saving time and money for all involved actors.

Section 4 — Municipal cases

This section looks at specific zoning by-laws from municipalities in Ontario and classify their efforts to adopt cannabis related land use regulations. The analysis of these municipalities serves to identify current land use solutions for the regulation of cannabis production in Ontario. These are compared and contrasted with one another in order to determine which options best support already existing legislation, such as the *Cannabis Act*, the *Farming and Food Protection Act*, and the *Provincial Policy Statement*. These municipalities have been chosen based on the availability of their zoning information, and a mention in news articles as either wanting to adapt and/or having a contentious relationship with their cannabis cultivation community.

I look look at proposed zoning by-laws (not yet approved by council) and/or staff reports prepared by planning staff. These reflect current schools of thought in the cannabis discussion amongst land use professionals. This paper is oriented towards best land use practises and I am not a political analyst, therefore the political aspect (ex. council refusing a proposed zoning by-law amendment) is not considered at all. It is to be assumed that if a municipal council refuses the recommendation of their planning staff, they are making a land use decision by considering non-land use factors and thus outside of the scope of this paper.

These ways to differentiate between current municipal efforts include:

- Segregated: when a municipality has created an entire zoning category, as discussed in an earlier section of this paper.
- Permitted: having a “cannabis production facility” definition, which supports the Cannabis Act’s definition of ‘cannabis’ in the Definitions section of the respective zoning by-law with a defined term as a permitted use in selected land uses.
- Absent: a municipality without any mention of cannabis
- Unchanged: referring to the former “medical marijuana production facility” as defined under the *Controlled Drugs and Substances Act* of 1996.

Arnprior

The Town of Arnprior (herein referred to as ‘Arnprior’) is a lower-tier municipality under the County of Renfrew. Arnprior is approximately 60 km west of Ottawa and was the first municipality to be considered for the Tweed cannabis production facility, now located in Smith Falls (Clark, 2019). Arnprior was unsuccessful in receiving the production facility, since its zoning by-law, at the time, was insufficient to support the facility’s needs (Clark, 2019). On October 9, 2018, Arnprior passed its new consolidated Zoning By-Law 6875-18, which includes relevant regulations supporting cannabis production.

Located in Section 3 of the zoning by-law, the municipality uses the following definition.

Cannabis Related Facility means an establishment where the cultivation, processing, analytical testing and/or research of cannabis occur as authorized by a licence by the Government of Canada. The retail sale of cannabis is not permitted in conjunction with a cannabis related facility” (Arnprior comprehensive Zoning By-Law 6875-18: Section 3, 2018).

Cannabis Related Facilities are to be completely indoors and permitted within Employment Zones (EMPL).

CANNABIS RELATED FACILITIES Cannabis related facilities are subject to the following provisions:

- a. No cannabis related facility shall be located closer than 100.0 metres from any residential or institutional use.
- b. No residential use shall be permitted on the same lot where a cannabis related facility is located.
- c. Loading spaces and storage must be conducted within a fully enclosed building.
- d. The retail sale of cannabis is not permitted in conjunction with the use” (Arnprior Zoning By-Law 6875-18: Section 8.4, 2018).

However, this permitted use is subject to a holding provision (Section 12, holding provision 4), which requires Cannabis Related Facilities to obtain explicit approval from the municipal council ensuring that “noise and odour from the facility will not create adverse effects on residential uses” (Arnprior Zoning By-Law 6875-18, section 12.1, 2018). Thus, classifying Arnprior as ‘permitted’.

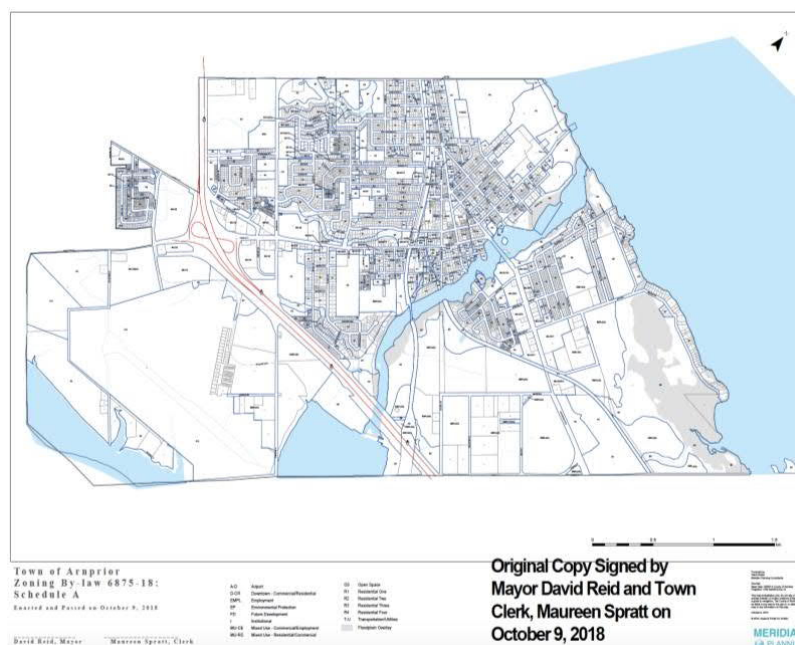




Figure 6: The Town of Arnprior—Schedule A, which highlights significant zones designated as Employment, with holding provision 4 (EMPL (H4)). All EMPL zones in Schedule A have this holding provision; thus, Cannabis Production Facilities are constantly subject to noise and odour assessments (Arnprior Zoning By-Law 6875-18, 2018).

Aurora

The Town of Aurora (herein referred to ‘Aurora’), a lower-tier municipality under the Region of York, uses the definition of ‘Medical Marihuana Production Use’ in its consolidated Zoning By-Law 6000-17:

means the use of land, buildings, or structures for the purpose of growing, cultivating, drying, harvesting, packing, processing, testing, treating, storing, shipping, and/or selling “marihuana”, “dried marihuana”, or “cannabis”, as defined by health Canada under Regulation SOR/2013-119, and includes facilities used for such purposes (Aurora, Zoning By-Law 6000-17, Section 3, 2017).

This definition is permitted under Employment Business Park (E-BP) designation and subject to Section 10.7, which expands on the site-specific provisions for Medical Marihuana Production Use. These specific provisions include a distance of 150 meters from any other zone other than E-BP, and a distance of 150 meters from any sensitive land uses, which includes residential areas, community centres, retirement homes, and so on. It is unclear how 150 meters was selected as a setback distance. Most notably, the zoning by-law requires that all production and any processing and packaging operation be in a wholly enclosed building (Aurora Zoning By-Law 6000-17, section 10.7, 2017).

Aurora would be considered as “unchanged” since they have kept the former definitions from the previous *Controlled Drugs and Substances Act*. As well, based

on my findings at this time, there seems to be no desire to make any changes to Zoning By-Law 6000-17.

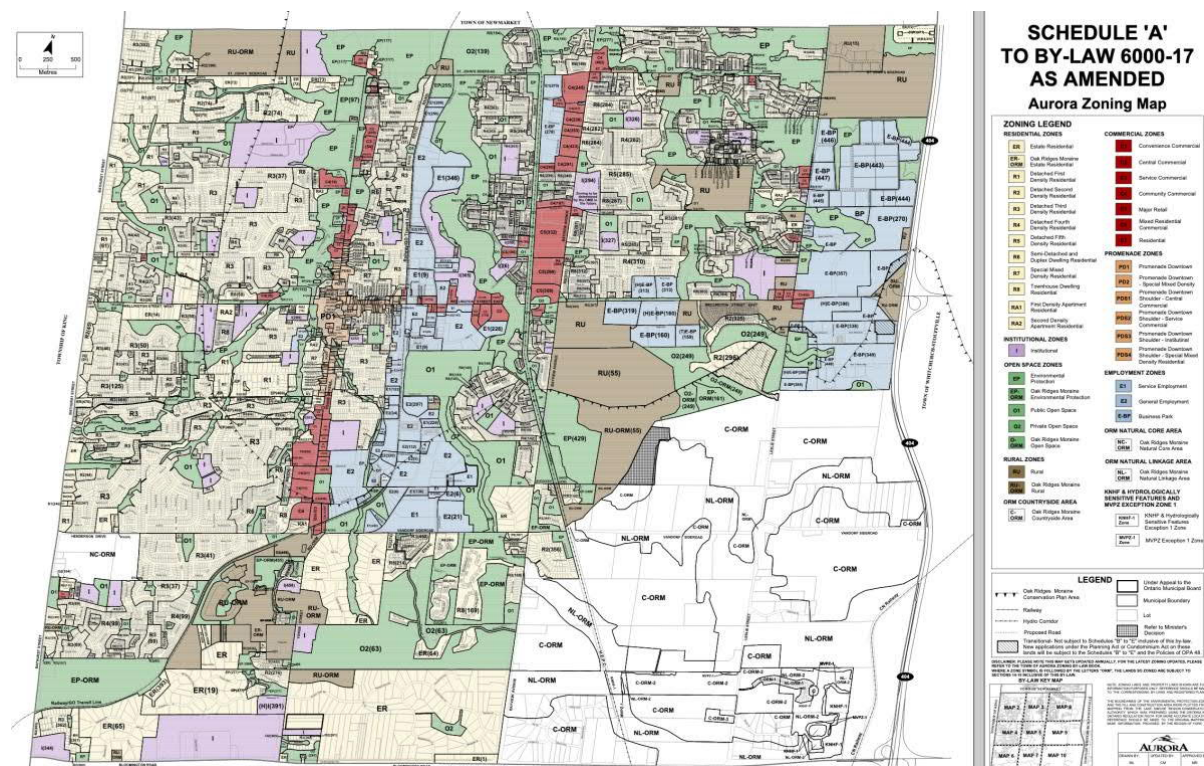


Figure 7: Schedule A of Zoning By-Law 6000-17 for the Town of Aurora. 'Medical Marijuana Production Use' are permitted in the Employment—Business Park zones, which are identified in some of the light blue parcels, located predominantly outside of the downtown core and along the municipality's eastern boundary (Aurora Zoning By-Law 6000-17,

Brantford

The City of Brantford (herein referred to as 'Brantford'), Ontario, approximately 100 kilometers southeast of Toronto, is home to 5 indoor Cannabis Production Facilities and 1 outdoor facility (Brantford Staff Report No. 2020-6, 2020). On January 14, 2020, municipal planning staff published a Staff Report, Report #2020-6, with their proposed recommendation to amend the City of Brantford Zoning By-law 160-90, and the County of Brant Zoning By-law 61-16. The report focuses on updating the current zoning regulations that govern land uses in Brantford to update and restrict where cannabis production and processing facilities may be located (Brantford Staff Report No. 2020-6, 2020). As it currently stands, cannabis production and processing may occur in several zones in both the City's and the County's zoning by-laws, such as multiple types of industrial and agricultural zones (Brantford Staff Report No. 2020-6, 2020). Planning staff are of the opinion that these activities should be contained within the General Industrial (M2) Zone, be entirely removed from the County of Brant Zoning By-Law 61-16 and wishes to delete the outdated Medical Marijuana Facilities definition. A major justification

for designating cannabis production within an M2 Zone is the access to municipal services such as connection to the public water system (Brantford Staff Report No. 2020-6, 2020). Unlike other municipalities, the Brantford Staff Report makes no mention of any specific setback requirements from adjacent uses, but rather predicts that their M2 zones are sufficiently removed that nuisances would not be a concern.

The opinions of staff within the report are that the proposed changes conform with the *Provincial Policy Statement 2014* (PPS). They refer to section 2.3.3.2 of the PPS, stating that

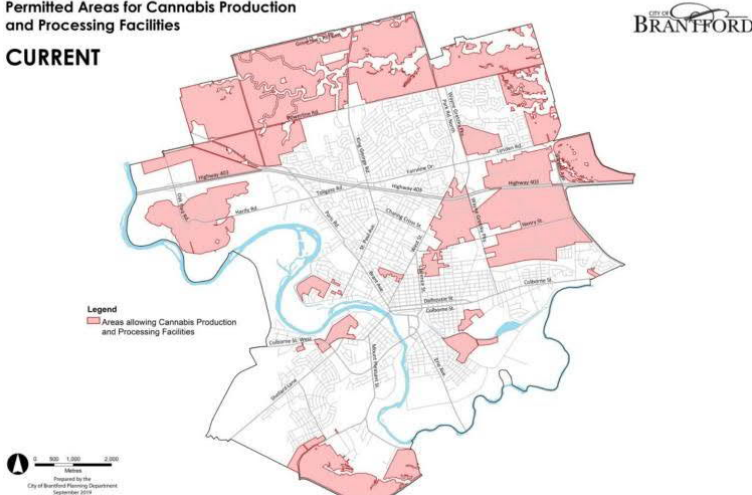
The proposed amendments are not restricting where the growing of cannabis can occur; rather they are directing the processing of the crop to industrial zoned areas where full municipal services are available and where the lands are not impacted by sensitive and incompatible uses such as residential or institutional uses. This will also ensure that lands intended for future growth are not sterilized” (Brantford Staff Report No. 2020-6, 2020: p.6).

The municipality’s justification focuses on the added benefit to cannabis growers by being located in an industrial zone. By moving production to an industrial zone, they hereby prohibit outdoor growing operations. Mapped below are the proposed changes to the zones. Including Staff Report No. 2020-6, I would classify Brantford’s approach to cannabis production regulations as “permitted”.

Areas where Cannabis Production and Processing Facilities are currently permitted

Permitted Areas for Cannabis Production and Processing Facilities

CURRENT



Proposed Areas Permitting Cannabis Production and Processing Facilities

PROPOSED

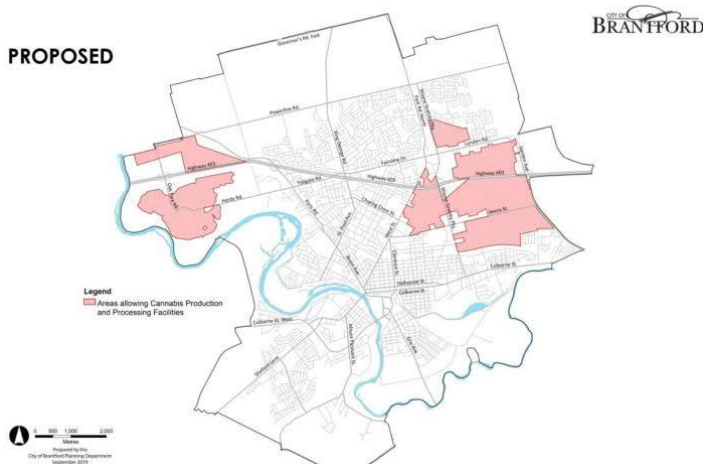


Figure 8: The current and proposed schedules for where cannabis production will be permitted in Brantford. The current regulations permit the production in the north of Brantford, which are designated as agricultural lands. The proposed changes restrict current permissions and only allow for production to take place in the east and west, in industrial areas (Brantford Staff Report No. 2020-06, 2020).

Niagara-on-the-Lake

The Town of Niagara-on-the-Lake (herein referred to as 'Niagara-on-the-Lake'), a lower-tier municipality within the Niagara Region, has issued an interim control by-law to halt new applications for all types of cannabis operations within its region until July 15, 2020 (Audet, 2019 A).

The Niagara-on-the-Lake Zoning By-Law 4316-09 currently permits Marihuana for Medical Purposes Production Facility in its Light Industrial Zone. This is currently

unsatisfactory for municipal officials and will be subject to further evaluation. Section 5 of Zoning By-Law 4316-09 has the following definition,

MARIHUANA FOR MEDICAL PURPOSES PRODUCTION FACILITY means a building used for the cultivation, processing, testing, destruction, packaging and/or shipping of medical marihuana, licensed under the Marihuana for Medical Purposes Regulations to the Controlled Drugs and Substances Act (Niagara-on-the-Lake Zoning By-Law 4316-09, Section 5, 2009).

After receiving an application for an outdoor cannabis facility at 930 Airport Road, the municipality stated that “The Town should use the two years to get it right” (Coles, 2018). At the time Councillor, now Mayor Betty Disero,

[...] asked planning staff to look at land use planning policies to see if they require amending—there could be issues of land use compatibility and conflicts that were not considered when the original agricultural zoning bylaw was written, she said (Coles, 2018).

This launched the review process to assess land use tools available to adapt to both indoor and outdoor cannabis production. The current regulations for indoor production are also being reviewed (Coles, 2018). Municipal officials have now invited members of the cannabis industry to sit on the Town’s agricultural committee and be part of the discussion (Coles, 2018). The motivation for this interim control by-law is to properly understand the issue of odour, how many meters the setbacks from the property line should be and the impact on the region’s tender fruit and grape cultivation. Niagara-on-the-Lake’s most recent proposal focuses on odour mitigation and aims to give the municipality the power to penalize cannabis growers if they have insufficient odour control (Audet, 2019).

The land use discussion includes the debate around property setbacks. In the case of Niagara-on-the-Lake, councillors are trying to impose a 1500 m setback on the site’s property lines (Audet, 2019 A; Audet, 2019 B). This proposal was made without including the cannabis community in the discussion, nor was it based on any scientific findings (Coles, 2018). Current efforts are focused on completely prohibiting outdoor farming and limiting production to greenhouses and retrofitted buildings in primarily industrial zones (Audet, 2019 B).

As per current definitions in Zoning By-Law 4316-09, Niagara-on-the-Lake would currently be considered “unchanged” but is taking its time to propose a substantial regulation. Seeing as their efforts are to focus their cannabis production to industrial zones and exclude outdoor operations, it would be classified as “permitted”.

Pelham

The Town of Pelham (herein referred to as Pelham), a lower-tier municipality within the Niagara Region, has a very active cannabis economy. Currently, the municipality is home to 6 cannabis producers (three major ones), all located within greenhouses (Canadian Press, 2019). Like many municipalities in Ontario, Pelham has implemented an interim control by-law, halting all new cannabis production applications so that it may take the time to properly research best practices in land-use regulations to minimize resident concerns. This by-law was unanimously implemented on October 15, 2018 and has been extended to July 15, 2020 by council (Pelham, 2019).

Pelham has also identified the need to propose a zoning by-law that would require all cannabis production facilities to prepare and negotiate a site plan agreement (SPA) with the municipality. After speaking with a planner from Pelham it was identified that current operating cannabis production facilities (in greenhouses), were approved without any SPA because existing three sites in Pelham were built in already existing greenhouses under an agricultural designation (Interview with Pelham Senior Planner, December 20, 2020). The staff member stated that a SPA would have greatly benefited the municipality, the residents and the producers since this would have opened-up a negotiation to minimize nuisances. The most obvious example given by the staff member was that one of the greenhouses has lights on through the night. A SPA, prior to the greenhouse's operation, would have required the producer to install blackout curtains, modified the light direction, which would improve the relationship with nearby community members, as outlined in Section 41.2.e of the *Planning Act*. Seeing as Pelham had a sufficient agricultural designation, cannabis producers were able to retrofit these old greenhouses without requiring a building permit or a site plan agreement, thus excluding the municipality from the construction process (Interview with Pelham Senior Planner, December 20, 2020). As a result, light emissions from the greenhouses are impacting the quality of life for many residents. With a site plan agreement, the town could have required light-emission mitigation tactics, such as blackout curtains during the night.

Comprehensive Pelham Zoning By-Law 1136 (1987) currently would fall in the “absent” category as currently written, however there is a proposed amendment to the by-law. This amendment, file number AM-07-19, aims to add a proper “cannabis production” use and permit under Light Industrial (M1) Zone (Town of Pelham, 2019).

Cannabis Production means lands, buildings or structures used for the commercial cultivation of marihuana (or alternative names including marijuana) and/or the processing, testing, destruction, packaging and/or shipping of marihuana (Pelham Zoning By-Law 1136(1987), Section 5, 1987).

Included in this proposal is an explicit clause to prohibit these facilities in the agricultural Use designation. A notable planning statistic includes a setback requirement when

abutting a sensitive land use, which will be the greater distance between 150 meters, or the distance recommended by an odour impact analysis. The proposed definition of a sensitive land use was created to include “[...] a grade school, secondary school, day care, playground, sporting venue, residential use, place of worship or a community centre” (Town of Pelham, 2019: p.3). The intent of this proposed requirement is to mitigate nuisance concerns for residents, which, as previously mentioned, is a hot button topic for the Town of Pelham. Including the proposed zoning by-law amendment, the Town of Pelham is currently approaching a “permitted” approach to their cannabis regulations.

Pembroke

Located along the Ottawa River, the City of Pembroke (herein referred to as ‘Pembroke’), is a lower-tier rural municipality located within Renfrew County and is approximately 140 kilometers west of Ottawa. Although it is currently not home to any cannabis producers, it has approved a new consolidated zoning by-law that was approved on January 21, 2020. Pembroke planning staff has proposed to remove the existing definition of “marijuana”, which refers to the definition within the *Controlled Drugs and Substances Act 1996* and replaced it with ‘Cannabis’ as defined in the *Cannabis Act*. For the purposes of this paper, the most notable changes in the by-law are the addition of a Cannabis Production Facility and the explicit mention in definitions where cannabis production isn’t permitted. The most noteworthy example is that ‘Commercial Greenhouse’ explicitly excludes cannabis production from its definition (Pembroke Zoning By-Law 2020-05, 2020).

The newly approved Zoning By-Law 2020-05 defines this as

CANNABIS PRODUCTION FACILITY shall mean a building used for growing, producing, processing, testing, destroying, storing, packaging and/or distribution of medical and/or recreational cannabis authorized by a federally issued licence or registration. For purpose of clarification, no part of this operation, whether accessory or not, may be located outside (Pembroke Zoning By-Law 2020-05, Section 3, 2020).

This zoning by-law includes Cannabis Production Facility under its General Industrial Zone (M1) and Economic Enterprise Zone (M2), requiring a distance of 70m from a residential or institutional zone and sensitive land uses such as schools, day nursery, community centre and training facilities aimed at children under the age of 16 (i.e. dance or gymnastics studios) (Pembroke Zoning By-Law 2020-05, 2020). Site plan control is required under this designation. As seen in the schedules below (figure 9), both the M1 and M2 designations are located throughout the municipality, with the largest parcels located in the city’s periphery. With the minimum 70-meter distance from the aforementioned sensitive uses, the proposed by-law would prevent the conversion of lands well-within the city’s core, therefore guiding cannabis producers to build an operation closer to the municipal boundary.

Unlike other municipalities, Pembroke is preparing an entirely new consolidated zoning by-law and has taken the opportunity to modernize their approach at regulation cannabis production. The zoning by-law and current efforts are classified as “permitted”.

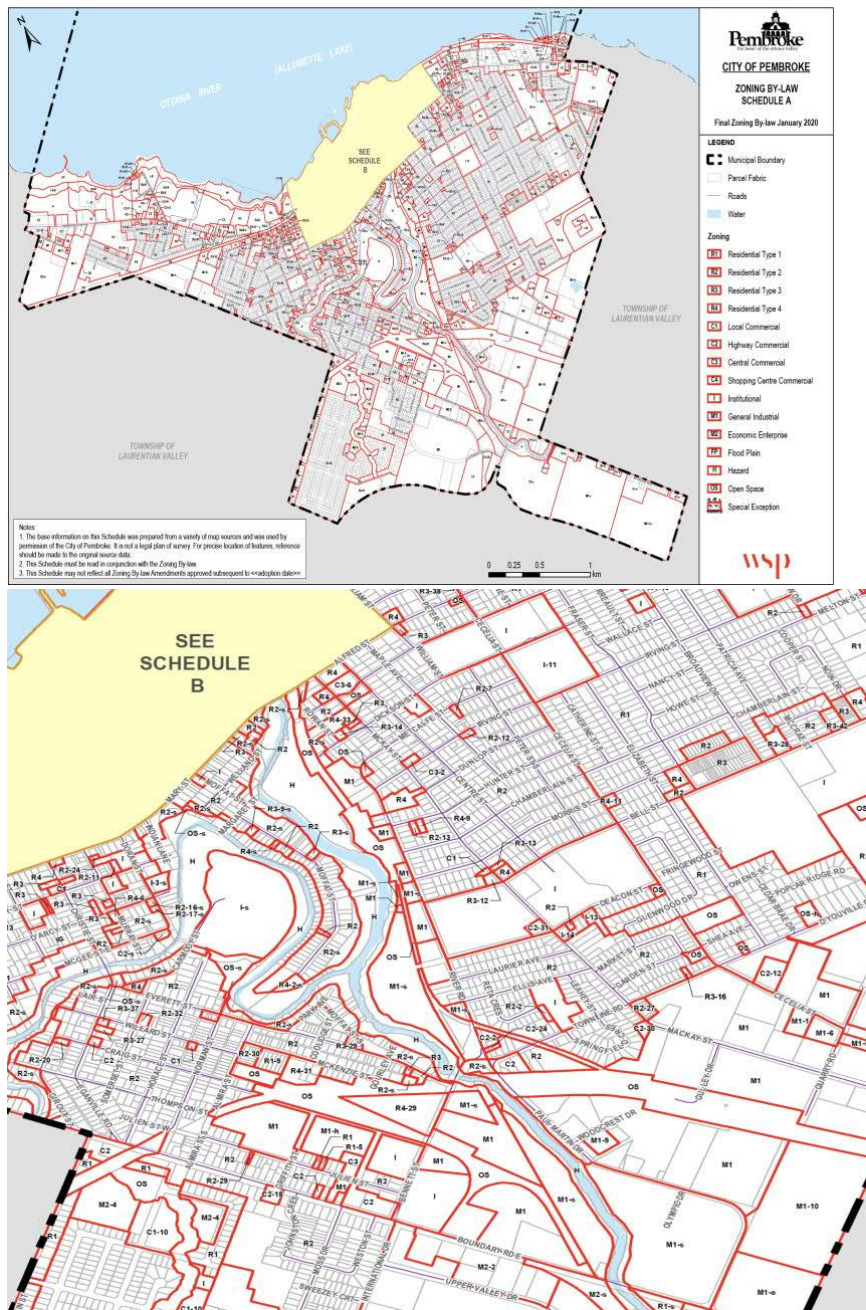


Figure 9: *Schedule A—Land Use* for the City of Pembroke proposed by-law. Cannabis production will be permitted in M1 and M2 zones, most of which can be found in the south and east of the City. There are a few M1 zones closer to the City’s core, however with the required 70-meter setback from sensitive land uses, it is unlikely that a cannabis production facility would be permitted in these and will inevitably be constructed on the periphery (Pembroke Zoning By-Law 2020-05, 2020).

Vaughan

The City of Vaughan (herein referred to as 'Vaughan') defines in *Zoning By-Law 1–88*, the following three terms: Use Agricultural, Use Industrial and Use Obnoxious.

USE, AGRICULTURAL — Means any general farming or agricultural use which is not obnoxious to the public welfare including animal hospitals, apiaries, aviaries, berry or bush crops, animal husbandry, dog kennels or the breeding, boarding or sale of dogs or cats, field crops, forestry research station, goat or cattle dairies, mushroom farms, orchards, riding stables or academies, the raising of sheep or goats, the raising of swine, tree and shrub farms, and such uses or enterprises as are customarily carried on in the field of general agriculture (Vaughan Zoning By-Law 1–88, *Section 2, 1988*).

USE, INDUSTRIAL — Means the use of land, building or structures for the warehousing, manufacturing, processing or assembly of materials to finished products or by-products, including the storage of such materials and products (Vaughan Zoning By-Law 1–88, *Section 2, 1988*).

USE, OBNOXIOUS — Means a use which, from its nature or operation creates a nuisance or is liable to become a nuisance or offensive by the creation of noise or vibration; or by reason of the emission of gas, fumes, dust or objectionable odour; or by reason of the unsightly storage of goods, wares, merchandise, salvage, refuse matter, waste or other material; and without limiting the generality of the foregoing shall include any uses which under the Health Protection and Promotion Act, R.S.O. 1990, c.H.7 or regulations thereunder may be declared by the Local Board of Health or Council to be noxious or offensive trade, business or manufacture (Vaughan Zoning By-Law 1–88, *Section 2, 1988*).

Planning and zoning staff from Vaughan explained in an interview on January 13, 2020 the current approach to cannabis production and how the by-laws should be interpreted. Currently, as stated in the above definitions, the agricultural designation permits the production of cannabis and doesn't prejudice any type of agricultural production. The caveat is that none of the production or farming operations are "obnoxious", as previously defined. These definitions extend to greenhouse and outdoor operations for cannabis. The municipality's only requirement is that any type of manufacturing cannot occur on agricultural lands. Manufacturing, converting the cannabis plant into a consumable product, may only occur on industrial lands. However, industrial uses may also permit small cultivation operations and therefore one could both grow and manufacture on the same site (City of Vaughan, By-Law No. 1–88, *Zoning By-Law, Section 2.0 Definitions*). In the case of the industrial designation, growth on an adjacent parcel of land to a processing/manufacturing facility wouldn't be permitted. The agricultural designation only permits the growth of a crop, with small other uses, none of which permit manufacturing uses (City of Vaughan, By-Law No. 1–88, *Zoning By-Law, Section 2.0 Definitions*). Vaughan, regardless of its lack of any active cannabis farm, hasn't changed any of their zoning regulations and are considered "permitted".

Summary

None of the selected municipalities, as of yet, have proposed an entirely segregated land use for cannabis production facilities. In fact, those who are taking proactive measures to modernize their zoning have proposed to update their Definitions section with current language and adjust the land use sections. With the exception of Vaughan, all cannabis production is exclusively permitted indoors. The required buildings to house the production facilities have, for the most part, been given setback requirements. There is no standard approach to establishing setbacks with no current indication as to how these distances were established. The most logical assessment at this time is that these are the maximum distances, within reason, that would ensure a sufficient amount of space for the production operations while minimizing the impacts of nuisances.

The exclusion of outdoor operations cannot be ignored. The clear conclusion to draw from this is that municipalities, in the interest of minimizing nuisances, wish to keep most of the operations fully indoors. By keeping these activities indoors, these municipalities are electing to designate cannabis production as an industrial or employment use. As previously mentioned in the Brantford Staff Report, part of the logic for this is to ensure that a production facility is able to connect to a municipal water source.

Municipalities	Updating Zoning (yes/no)	Permitted Zone Type	Indoor, Outdoor, greenhouse or all	Setback requirements (meters) from other zones	Classification
Arnprior	No	Employment	Indoor	100 m	Permitted
Aurora	No	Employment	Indoor	150 m	Unchanged
Brantford	Yes	Industrial	All	N/A	Permitted
Niagara-on-the-Lake	Yes	Industrial	Indoor	To be determined	Permitted
Pelham	Yes	Industrial	Indoor	150 m	Permitted
Pembroke	Yes	Industrial	Indoor	70 m	Permitted
Vaughan	No	Agricultural & Industrial	All	Site specific	Permitted

Table 1: a summary table of the selected municipalities that were studied. Indicators show that most municipalities have elected to adjust their zoning by-laws in response to the legalization of non-medical cannabis, and most wish to limit it to indoor cultivation.

Section 5 — Recommendations

Municipalities in Ontario, in my opinion, are correct to be cautious with their land use regulations and need time to think strategically about which lands these production sites occupy. With the prominent concern of nuisances, municipalities have a duty to ensure that they minimize risks and uphold their public's best interests. Municipalities are in a reactive phase where they need to make decisions and implement them quickly before the private sector dictates how their land is used. This is the problem with the fast-paced legalization of non-medical cannabis. Municipalities that have implemented an interim control by-law, in my opinion, have reacted appropriately to best assess the tools that they have at their disposal. There are instances where a municipality only implemented an interim control by-law after there were already active cannabis facilities but prevented future applications from proceeding in a way that was unsatisfactory to the municipality.

Growing legal non-medical cannabis is much more complex than it appears. While preparing the proposal for this major paper, I began with assumptions about how my research would be concluded. Many of my assumptions involved provincially standardized procedures for cannabis production, including established setbacks, set by-law regulations, etc. I quickly realized, as I was moving forward, that Ontario is too large with too many regional particularities to have a standardized approach for, not only cannabis production but, planning and farming as a whole. However, completely ignoring the gap in the current planning legislation for cannabis production is not a viable long-term solution. Upon further research and discovery, it became evident that the cultivation of cannabis not only presented a land use issue, but also an issue of economics. As seen in Section 1, it is more expensive to build and finance an indoor production facility making outdoor production a more viable option for small-scale farmers. Certain municipalities have now prohibited outdoor production, thus completely discouraging small and local farmers from being able to participate in the new industry. Municipal and federal regulations have done all but explicitly prohibit these people from producing cannabis and are encouraging large companies to dominate the market. There needs to be long-term consistency in municipalities that help promote the even distribution of economic activities and stimulate the cannabis industry, while having set plans to mitigate nuisances, all of which must conform to the *Provincial Policy Statement*. I now propose my recommendations. Similar to the structure of this major paper, the recommendations start with provincial changes, and funnel down to municipal actions.

The first point I would like to address is the question of establishing a land use designation. As seen in Section 4, many municipalities have restricted cannabis production to indoor buildings and greenhouses, prohibiting outdoor and open-air cultivation. In my opinion, both the indoor and outdoor production of cannabis (including greenhouses) ought to be permitted in all of Ontario. Municipalities are valid in wanting to

protect their community from nuisances, but as seen with the *Farming and Food Production Protection Act*, there are many instances where it is not within a municipality's legal right to explicitly prohibit farming activities. Instead, efforts should be put towards establishing proper sites on a zoning schedule with identified minimum nuisance concerns in agricultural zones. The way in which the current *Provincial Policy Statement* is written makes limiting the commercial production of cannabis to just indoor facilities in industrial zones consistent with the PPS.

Of the studied municipalities, Brantford is the only one to have given a justification for their decision to not permit outdoor open-air and greenhouse cultivation. Brantford planning staff made the argument that section 2.3.3.2 of the PPS refers to the cultivation of the cannabis plant as a crop, not the production facility in which it is grown (Brantford Staff Report No. 2020-6, 2020). The technicality in this argument is that Health Canada will only give a cultivation licence to a constructed and fully financed facility that meets all physical requirements set out in the *Cannabis Act* and *Cannabis Regulations*. Therefore, the reality is that in order to receive a licence to grow with the intention of selling, an operator must construct a "cannabis production facility", as opposed to a farmer simply planting the cannabis crop. Planning staff in Brantford have successfully kept their proposed zoning by-law amendment to conform with the PPS, all while in practice, limiting where cannabis can be grown, without 'actually' limiting the agricultural activity. This small distinction can successfully justify limiting production to a fully enclosed building. Similarly, Pembroke has proposed to explicitly restrict both open-air and greenhouse production facilities, although no justification was given. It can be assumed that the Pembroke Zoning By-Law used a similar logic to successfully prohibit outdoor production.

I propose that section 2.3.3.2 of the PPS be changed to include 'agricultural facilities', and read as follows: *In prime agricultural areas, all types, sizes and intensities of agricultural uses, agricultural facilities and normal farm practises shall be promoted and protected in accordance with provincial standards.* I would then include the definition of *agricultural facilities* as: *means any structure or building intended specifically to house the growth and production of an agricultural crop, in prime agricultural lands, including greenhouses and logistical support for farms, excluding manufacturing and livestock facilities.* Currently, greenhouses are not defined under the PPS and are acknowledged in this definition.

My second recommendation involves the minimum distance setback formulae for livestock. Stemming from the PPS it is an entrenched tool for land use planning in Ontario and has served to establish appropriate setbacks to maximize the distance between incompatible land uses and minimize nuisances. The MDS only enforce setback distances for livestock facilities. Although setback requirements are common in every

municipal zoning by-law, the MDS is adaptable to the context of a specific facility. This adaptability offers flexibility for farmers to grow their operations as needed with minimal fear of repercussions from neighbours. As well, if there are no sensitive land uses in close proximity, then the facility may operate with minimal considerations for setbacks. Establishing a specific setback requirement in a zoning by-law would require the facility to conform and have added restrictions, removing the option for flexible site design when the circumstances may not require strict distances. Relief of requirements for setbacks (and any other zoning obligations) may be requested, however, this is left to the discretion of the municipal authority and may be refused. My recommendation would be that the Ministry of Agriculture, Farming and Rural Affairs either expand their current MDS formulae to include crops with obnoxious nuisances or create new formulas for these. Included in this formula should be considerations for distances from other farming and cultivation operations so that pesticide drift can be minimized. These new formulae for obnoxious or pesticide sensitive crops give municipalities reassurances that adaptable measures are there to support them and their community, while also protecting the interests of the producers. As it is with the current MDS, this would only apply for outdoor and greenhouse operations located in agricultural lands. Indoor facilities wouldn't be subject to this recommendation and instead just follow the setback and site requirements normally identified in the respective zone, which is expanded on in the next recommendation. A key question for indoor facilities would be whether they have the ventilation and filtering gear to minimize odour release.

Following the idea of applying the MDS to greenhouse and outdoor production, my next recommendation would be that municipalities adjust their "cannabis production facility" definition (or specific naming) to "industrial cannabis facility" and use this definition for the indoor production in a fully enclosed building in industrial and/or employment zones. In order to maximise the uses of the production facility in industrial spaces, this definition should also include manufacturing and processing. Alongside this adjusted definition, I propose to create a new "agricultural cannabis facility" definition for both greenhouse and outdoor production and permit this use within specific agricultural zones. These two definitions would encourage municipalities to think differently about the ways cannabis is produced and better understand the technicalities involved in the various types of growing. As seen in Section 4, there is a clear preference for growing cannabis in a fully enclosed building in either industrial or employment lands. By permitting outdoor production in agricultural lands, the intention of the PPS is respected, all while allowing for the possibility of developing new and innovative technologies in agriculture and encouraging economic opportunities. As shown in Section 2, cannabis producers are concerned with the initial high costs associated with indoor production, driving more producers to consider outdoor operations. By including manufacturing (transforming the cannabis plant into another product) in a production facility in the same building and on

the same parcel of land, cannabis producers can save shipping and logistic costs and could be enticed to grow indoors. This would help municipalities drive cultivation indoors without prohibiting outdoor production.

My final recommendation would be that cannabis facilities of all types, whether in industrial or agricultural lands, be subject to site plan control. Planners have a responsibility to ensure that any development should be done in the best interest of their community. It is not up to private sector actors to make these decisions and force planners and municipal officials to react. By requiring a site plan agreement, a municipality can have a say in how these facilities are built to reduce nuisance concerns while opening communication channels with cannabis producers. In the case of Pelham, this is exactly what has not happened and has now caused conflicts between the cannabis producer and the municipality. This allows municipal staff to get more familiar with the efforts required to minimize nuisances and build a much-needed institutional knowledge for odour and light mitigation.

To summarize, these recommendations include:

- Add 'agricultural facilities' and its respective definition in section 2.3.3.2 of the PPS;
- Replace 'cannabis production facility' with 'industrial cannabis facility' permitting both indoor production and manufacturing on the same parcel of land in industrial and/or employment zones;
- Create an 'agricultural cannabis facility' permitted in agricultural lands for outdoor and greenhouse production;
- Adjust the current MDS formulae or create a new one for obnoxious and/or pesticide sensitive crops; and,
- Subject all cannabis production and manufacturing facilities to site plan control.

These recommendations are intended to support land use planning and to be utilized by planners but are limited since these require approval from municipal and provincial legislators who may make a decision based on factors other than good land use planning. Any land use decision at the municipal level may be appealed to the LPAT. This could open up a years-long appeal process for any proposed changes to a zoning by-law, potentially halting new cannabis production applications.

Literature and research focusing on cannabis are emerging but there are still many questions that need answering. These questions include water and energy usage rates, nuisance mitigation in both production and disposal of cannabis waste. Water and energy use for cultivating cannabis in all types of climates and geographies need to be understood. Having an accurate idea of how much water is consumed during the production process allows for better environmental planning initiatives and further

research efforts to minimize water consumption. The issue of nuisance is one of the main themes of this paper and needs to be further researched. The reality is that many steps in the cannabis supply-chain deal with the issues of nuisance. Odour and light are a problem during cultivation and odour is a problem during the disposal of cannabis waste. Mitigation tactics and strategies need to be further studied to help improve the relationship between municipalities and the cannabis industry. These research efforts need to be undertaken by the federal and provincial governments and cannabis experts so that they may share their findings with all in their networks. Canada is in a proper position to set a positive precedent on innovations in the cannabis industry and could impact the global community.

Bibliography

- Agriculture, Food and Rural Affairs, Ministry of. (2019). Normal Farm Practices Protection Board. Province of Ontario. Retrieved from URL: <http://www.omafra.gov.on.ca/english/engineer/nfpfb/nfpfb.htm>
- Alcohol and Gaming Commission of Ontario. Hearings—Cannabis. Province of Ontario. Retrieved from URL: <https://www.agco.ca/content/hearings-cannabis>
- Arnprior, Town of. (2018, October 9). Consolidated & Comprehensive Zoning By-Law 6875-18.
- Ashworth, K., Vizuite, W. (2017). High Time to Assess the Environmental Impacts of Cannabis Cultivation. *Environmental Science & Technology*. 51(1), 2531–2533.
- Audet, B. A (2019, July 16). NOTL extends cannabis interim control bylaw. *St-Catharines Standard*.
- Audet, B. B (2019, September 19). With Appeal Looming, NOTL Speeds up Cannabis Bylaw Process. *St-Catharines Standard*.
- Audet, B. C (2019, November 10). 'We are on the front lines of a very unique war': NOTL solicits feedback for cannabis bylaw. *St-Catharines Standard*.
- Aurora, Town of. (2017, June 27). Comprehensive Zoning By-Law 6000-17.
- Bernard, F., Noordwijk, M., Luedeling, E., Villamor, G., Sileshi, G., Namirembe, S. (2014). Social actors and unsustainability of agriculture. *Current Opinion on Environmental Sustainability*. 6(1), P: 155–161.
- Brantford, City of. (2020, January 14). Report no. 2020-6, Amendments to the City of Brantford Zoning By-law 160-90, and County of Brant Zoning By-law 61-16, for the annexed lands, respecting "Cannabis Production and Processing Facilities" –PZ-06-18.
- Brown, I. (2019, June 4). Illinois Cannabis and Land Use. Shapiro Associates and Law Legal Blog.
- Butler, R., Jackiw, R. (2019, October 31). Cannabis Solid Waste—a problem that's growing like a weed. *Willms & Shier Legal Blog*.
- Canadian Press. (2019, January 14). Pot Producers in Pelham Face Pushback Over Bright Lights and 'Skunk Smell'. *CBC News*.
- Carah, J., Howard, J., Thompson, S., Gianotti, A., Bauer, S., Carlson, S., Dralle, S., Gabriel, M., Hulette, L., Johnson, B., Knight, C., Kupferberg, Martin, S., Naylor, R., Power, M. (2015). High Time for Conservation: Adding the Environment to the Debate on Marijuana Liberalization, *BioScience*, 65(8), P: 822–829.
- Carruthers, D. (2018, December 7). Brant Farm Eyed for First Outdoor Cannabis Crop. *The Brantford Expositor*.

- Carruthers, D. (2019, May 23). Opportunity as Big as All Outdoors for First Licensed Outdoor Pot Grower. *The London Free Press*.
- Caulkins, J. (2010). Estimated Cost of Production for Legalized Cannabis. *RAND, Drug Policy Research Centre*. P: 1–28.
- Chaitanya, S. (2015, September 23). Cannabis Cultivator's Report on Water Usage. *Marijuana Venture*.
- Clark, J (2019, January 14). Should cannabis 'farming' be assessed as industry of agriculture? *Real Estate News EXchange*.
- Coles, P. (2018, September 2). Town puts a temporary stop to new cannabis production facilities. *Niagara Now*.
- Coles, P. (2019, July 17). Council okays limits to cannabis operations. *The Niagara-on-the-Lake Local*.
- Cooke, A., Chavez L., Freisthler, B. (2020). The relationships between chronic pain and changes in health with cannabis consumption patterns. *International Journal of Drug Policy*. 76, p: 1–7.
- Cumbers, J. (2019, September 27). Forget the Grow Room and the Plant: Companies can now Brew Cannabis like Beer. *Forbes*.
- Dean, L (2018, January 10). Municipal Land Use Regulations and Cannabis Production Facilities. *Aird Berlis and Associates*.
- Deaton, J., Vyn, R. (2010). The Effect of Strict Agricultural Zoning on Agricultural Land Values: The Case of Ontario's Greenbelt. *American Journal of Agricultural Economics*. P: 141–155.
- Department of Justice (2019, July 1). Cannabis Act (S.C. 2018, c. 16). Government of Canada. Retrieved from URL: <https://laws-lois.justice.gc.ca/eng/acts/C-24.5/page-8.html#h-77411>
- Department of Justice A (2020, February 7). Access to cannabis for medical purpose regulations. Government of Canada. Retrieved from URL: <https://www.laws-lois.justice.gc.ca/eng/regulations/SOR-2016-230/page-1.html>
- Department of Justice B (2020, February 26). Cannabis Regulations. Government of Canada. <https://laws-lois.justice.gc.ca/eng/regulations/SOR-2018-144/page-10.html#h-848277>
- Delamont, K. (2018, April 19). Decolonizing Cannabis: can Legalization set Indigenous Communities Free?. *Toronto Now*.
- Delamont, K. (2018, December 12). Let the sun shine in: Canada's first outdoor cannabis farms are promising better quality weed. *Now Toronto*.
- Edwards, L. (2019, January 8). Lincoln council tackling cannabis greenhouse odour issues. *The St Catharines Standard*.

- Foran, P., & Harrington, P. (2019). *Ontario Planning Legislation and Commentary*. Toronto, ON. LexisNexis.
- Ferguson, S (2019, September 12). Pelham Residents want Town to Stand up to Cannabis Producers. *St Catharines Standard*.
- Hauptert, L. (2018, September 6). Smell science: Addressing odour issues in cannabis production. *Grow Opportunity*.
- Haze, N. (2019, October 19). Ready-To-Harvest Cannabis Picture Gallery. *Grow Weed Easy*.
- Health Canada (2016, August). Understanding the New Access to Cannabis for Medical Purposes Regulations. Government of Canada. Retrieved from URL: <https://www.canada.ca/en/health-canada/services/publications/drugs-health-products/understanding-new-access-to-cannabis-for-medical-purposes-regulations.html>
- Health Canada (2018, June 20). The Cannabis Act: the Facts. Government of Canada. Retrieved from URL: <https://www.canada.ca/en/health-canada/news/2018/06/background-under-the-cannabis-act-the-facts.html>
- Health Canada B, (2019, June 14) Cannabis in the Provinces and Territories. Government of Canada. Retrieved from URL: <https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/laws-regulations/provinces-territories.html>
- Health Canada C, (2019, December 9) Packaging and Labelling Guide for Cannabis Products. Government of Canada. Retrieved from URL: <https://www.canada.ca/en/health-canada/services/cannabis-regulations-licensed-producers/packaging-labelling-guide-cannabis-products/guide.html>
- Health Canada (2020, March 28). Pesticide Label Search Tool. Government of Canada. Retrieved from URL: <https://www.canada.ca/en/health-canada/services/consumer-product-safety/pesticides-pest-management/registrants-applicants/tools/pesticide-label-search.html>
- Hein, T. (2017, December 18). WHERE TO GROW: In A Greenhouse or Warehouse?. Greenhouse Canada.
- Hennings, T. (2019, March 21). Growing Marijuana in a Greenhouse: What Are the Benefits?. *Leafly News*.
- Hoehn, F. (2019). The Limits of Local Authority Over Recreational Cannabis. *Ottawa Law Review*. Law Review 329, p: 329–362.
- Hu, R. and Lim, J. (2007). Fabrication and Mechanical Properties of Completely Biodegradable Hemp Fiber Reinforced Polylactic Acid Composites. *Journal of Composite Materials*. 41(13), p: 1655–1669.
- Kirkpatrick, K., Salafia, N. (2018, October 16). Weed Control: A Municipality's Role in the Legalization of Recreational Cannabis. *Bordner Ladner Gervais LLP*.

- Lland, R. (2016, December 2). What is THC (Tetrahydrocannabinol)?. *Leafly*.
- Ligaya, A. (2019, January 13). Pot 'skunk smell' pits producers against residents of small Ontario farming town. *The Financial Post*.
- Lowe, J. and Franz, B. (2018, October 23). Building Successful Indoor Cannabis Cultivation Facilities. *ConstructionCanada.net*.
- Luymes, G. (2018, May 24). ALC no longer reviewing applications to grow cannabis on farmland, leaving it up to local governments. *Vancouver Sun*.
- McLaren, J., Swift, W., Dillon, P., Allsop, S. (2008). Cannabis potency and contamination: a review of the literature. *Australia National Drug and Alcohol Research Centre*. 103(1), 1100–1109.
- MedicalJanen (n.d). Introduction to Terpenes. [Web log post]. Retrieved from URL: <https://www.medicaljane.com/category/cannabis-classroom/terpenes/#introduction-to-terpenes>
- Meyfroidt, P., Lambin, E., Erb, K., Hertel, T. (2013). Globalization of land use: distant drivers of land change and geographic displacement of land use. *Environmental Sustainability*. 5(1): P 1–7.
- Mills, E. (2012). The carbon footprint of indoor Cannabis production. *Energy Policy*. 46(1), 58–67.
- Ministry of Municipal Affairs and Housing. (2014). Provincial Policy Statement. Province of Ontario. Retrieved from URL: <http://www.mah.gov.on.ca/AssetFactory.aspx?did=10463>
- Ministry of Municipal Affairs and Housing. (2019). Citizen's Guide to Land Use Planning, Zoning bylaws. Province of Ontario. Retrieved from URL: <https://www.ontario.ca/document/citizens-guide-land-use-planning/zoning-bylaws>
- Ministry of Municipal Affairs and Housing. (2020) A. Citizen's Guide to Land Use Planning, Official Plans. Province of Ontario. Retrieved from URL: <https://www.ontario.ca/document/citizens-guide-land-use-planning/official-plans>
- Ministry of Municipal Affairs and Housing. (2020) B. Provincial Policy Statement. Province of Ontario. Retrieved from URL: <https://files.ontario.ca/mmah-provincial-policy-statement-2020-accessible-final-en-2020-02-14.pdf>
- Ministry of Agriculture, Food and Rural Affairs. (2016) A. Pesticide Drift from Ground Application Factsheet. Province of Ontario. Retrieved from URL: <http://www.omafra.gov.on.ca/english/crops/facts/11-001.htm>
- Ministry of Agriculture, Food and Rural Affairs. (2016) B. The Minimum Distance Separation (MDS) Document: Formulae and Guidelines for Livestock Facility and Anaerobic Digester Odour Setbacks. *Publication 853*. Province of Ontario.

- Ministry of Agriculture, Food and Rural Affairs. (2019). The Farming and Food Production Protection Act (FFPPA) and Nuisance Complaints. Province of Ontario. Retrieved from URL: <http://www.omafra.gov.on.ca/english/engineer/facts/05-013.htm#8>
- Mosleh, O. (2020, March 27). Why are cannabis and liquor stores considered essential services during the COVID-19 outbreak?. *The Star*.
- Niagara-on-the-Lake, Town of. (2009, July 27). Zoning By-Law 4316-09.
- Ontario Superior Court of Justice. (2019, August 29). Woodstock Biomed Inc. v. the Corporation of the Town of Pelham. CV.19.00626396.0000. Province of Ontario.
- Owram, K. (2019, August 7). 'Growing outside is a dream': Asparagus makes way for cannabis in Canada's fields. *The Financial Post*.
- Pelham, Town of. (2019, September 24). Town extends cannabis interim control bylaw. *Town of Pelham News*.
- Pelham, Town of (1987, June 23). Consolidated Zoning By-Law 1136 (1987).
- Pembroke, City of (2020, January 21). Updated and consolidated Zoning By-Law 2020-05.
- Pond, D. (2009). Institutions, political economy and land use policy: greenbelt politics in Ontario, *Environmental Politics*, 18:2, 238–256.
- Rice, S., Koziel, J. (2015). Characterizing the smell of cannabis by odor impact of volatile compounds: an application of simultaneous chemical and sensory analysis. *PLoS One*. 10(12).
- Subramaniam, V. (2019, May 9). Cannabis can be grown outdoors for pennies on the dollar. So why is hardly anyone doing it?. *The Financial Post*.
- Tiny House Staff. (2019, April 24). Tips for Starting Your Own Tiny Hemp Farm. *Tiny House Blog*.
- Tribunals Ontario, Safety, Licensing Appeals and Standards Division. Appeals and Applications. Retrieved from URL: <https://slasto-tsapno.gov.on.ca/lat-tamp/en/general-service/appeals-applications/>
- Valverde, M. (2019). The Law of Bad Smells: Making and Adjudicating Offensiveness Claims in Contemporary Local Law. *Canadian Journal of Law and Society*. 34(1), 328–344.
- Vaughan, City of. (2019). Cannabis Information. City Hall. Retrieved from URL: <https://www.vaughan.ca/cityhall/departments/bclps/Pages/CannabisInfo.aspx>
- Vaughan, City of. (1988, September 18). Comprehensive Zoning By-Law 1–88.
- 48North. (2019). Cultivation—Good: Farm. Retrieved from URL: <https://48nrth.com/en/cultivation/>