Ensuring the Safe Installation of Hydroponics Equipment

A Discussion Paper

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Executive Summary

Across B.C., high-wattage hydroponics equipment is being used in private homes to grow marijuana (both legally and illegally), along with orchids, tomatoes and various other organic crops. If installed incorrectly, the high-wattage bulbs, ballasts and other devices bring a high risk of fire and electrocution to the occupants, their neighbours and to emergency responders.

However, despite these public safety risks, there is no means to ensure regulation of the use of hydroponics equipment in residential settings. While electrical permits are required by law to ensure safe installation of this high-wattage equipment in homes, this permitting process never takes place. The two most likely reasons are that the equipment is used for illegal purposes, or that the legitimate user ignores or is unaware of the law.

The risk is significant. Municipal safety inspections have found similar violations of the provincial fire code, building code and electrical safety code in both criminal marijuana grow operations and legal medical marijuana production sites. Further, given the lack of regulation and high wattage of the equipment, it can be expected that at least some hydroponic gardeners of flowers and vegetables are unwittingly employing unsafe electrical practices.

Lack of authority regarding hydroponics equipment was identified as a key problem during a consultation workshop the City of Surrey, B.C. hosted in May 2008 with the aim of eliminating the use of hydroponics in marijuana grow operations.

Workshop participants and speakers – representing government, public safety, policing, electrical engineering and academic interests – identified a lack of clear leadership, authority or responsibility concerning the safe installation and use of hydroponics equipment.

The effect is that communities across B.C. face significant but hidden public safety threats with no avenue to address them.

Efforts to encourage provincial regulation of hydroponics equipment have been unsuccessful to date. Steps are now being taken towards development of a model municipal bylaw that would help communities ensure that all hydroponics equipment installed and used in their jurisdictions is done so safely and legally. The proposed permitting process makes use of existing provisions in the *Community Charter* and *Safety Standards Act*.

This paper outlines the proposed model bylaw and is intended to promote discussion, input and finally adoption in BC communities.

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Problem: Hydroponics Equipment is Threatening Public Safety

Unsupervised and unsafe installation of high-wattage hydroponics equipment is creating a hidden but significant public safety threat in B.C. communities.

Whether used for illegal (e.g. marijuana) or legal (e.g. medical marijuana or vegetables) purposes, hydroponics equipment requires professional installation because it involves alterations to a home's electrical system that are regulated by the *Safety Standards Act*. However, due to lack of adherence to the regulation, this high-wattage equipment is typically installed in an unsafe and illegal manner, threatening the safety of occupants, neighbours and emergency responders.

Use of Hydroponics

Hydroponics typically refers to the growing of plants in water or another medium rather than soil. In an indoor setting, hydroponic gardeners provide all necessary nutrients and artificial light for the plants' photosynthesis process. High-wattage lights, ballasts, pumps and other equipment is commonly used (see below).

In B.C., most marijuana is grown hydroponically; a study of B.C.'s marijuana grow operations[1] found that 75% of the confirmed grow operations in B.C. were in a residential setting (e.g. house or apartment).

It is impossible to know how many illegal grow operations exist without the knowledge of police, although based on recent research, it can safely be estimated there are thousands currently operating in B.C.[2]

Gauging the number of medical grow sites is also difficult, although it can be assumed a healthy share of the 2,841 Marihuana Medical Access Regulations (MMAR) production licences held by Canadians in June 2009 are located in British Columbia, given that B.C. is second only to Ontario in the number of Authorizations to Possess marijuana issued.[3]

Identifying the number of hobbyist hydroponics gardeners of flowers and vegetables is also impossible, given the lack of regulation.

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[1] *Marihuana Growing Operations in British Columbia Revisited 1997-2003* was conducted by Dr. Darryl Plecas, Aili Malm and Bryan Kinney through the Centre for Criminal Justice at the University College of the Fraser Valley. Funded by RCMP "E" Division, the study reviewed all 25,014 alleged marijuana cases that came to the attention of police in B.C. from 1997 to 2003. It was completed in March 2005.

[2] *Police Statistics on Marijuana Drug Files in Surrey, the Lower Mainland, and the Rest of British Columbia 2004-2008: A Comparative Analysis*, conducted by Irwin M. Cohen, Darryl Plecas, Amanda V. McCormick, and Tara Haarhoff at the University of the Fraser Valley's Centre for Criminal Justice Research (2009), revealed 777 police marijuana production files in 2008. This figure does not include cases not known to police. The Plecas *et al.* (2005) study found that 75% of all marijuana grow operations take place in a residential setting.

[3] Statistics from the Health Canada website (http://www.hc-sc.gc.ca/dhp-mps/marihuana/index-eng.php). Health Canada does not inform communities of the location of MMAR sites, and a request for a province-by-province breakdown of cultivation licences was denied.

Legal and Illegal Uses

The use of hydroponics in illegal marijuana grow operations, along with legal activities (medical marijuana production, gardening of flowers and vegetables), was noted in previous sections.

While holders of MMAR medical marijuana production licences are required to observe all laws and bylaws, Health Canada does not enforce license holders to adhere to the local government laws and refuses to provide communities with locations of MMAR sites so that they can do so.

Fire departments are finding that growers licensed under the MMAR are not adhering to zoning, fire and safety regulations – perhaps due to the lack of enforcement by Heath Canada, or perhaps to avoid exposing themselves to criminal activity by hiring a contractor. Whatever the reason, the MMAR licence holders are performing electrical wiring and equipment installations themselves, generally without knowledge of safe electrical practices.

In B.C., the Lower Mainland communities that conduct public safety inspections of grow operations have come across about 50 MMAR grow operations – identified by their high electricity consumption or by police tips.

Experienced electrical inspectors have observed there is often little difference in the electrical installations between legal and illegal grow operations. In both cases, there has been little regard to proper or safe electrical installations, thus exposing the occupants and their neighbours to a real electrical and fire safety threat.

Of the nine MMAR sites found in Surrey, B.C. in recent years, violations of municipal regulations were found at all sites, as well as numerous violations to the provincial electrical code, building code and fire code. Several sites required immediate electrical remediation, and there was also evidence of improper chemical storage, mould and excess moisture, electrical violations, fire hazards, and structural changes that would help spread flames and heat in a fire.

As a result, this paper does not distinguish between legal and illegal hydroponic marijuana grow operations in terms of public safety risk. And while hobbyists growing orchids and tomatoes indoors may not have the same scale of hydroponics operation as someone growing marijuana, they still use the same high-wattage equipment without any regulation. In any application, hydroponics equipment presents a significant fire and electrical hazard to the occupants, neighbours and emergency responders if not properly and legally installed.[4]

Equipment

Ongoing investigations of indoor grow operations and a comprehensive 2007 inventory of equipment seized has determined that certain devices are commonly used to hydroponically grow marijuana.[5]

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[4] Based on comments by electrical engineer Richard van Leeuwen at a May 2, 2008 Consultation Workshop to Eliminate Use of Hydroponic Equipment in Marijuana Grow Operations.

[5] Information is from the papers *An Analysis of Marijuana Grow Equipment Seized from Lower Mainland Operations*, written in 2007 by Surrey Fire Chief Len Garis and Dr. Darryl Plecas, RCMP Research Chair in Crime Reduction, School of Criminology and Criminal Justice of University College of the Fraser Valley; as well as *Common Electrical Devices in Marijuana Grow Operations,* written in January 2007 by Forensic Electrical Engineer Richard van Leeuwen, P.Eng. The *Analysis of Marijuana Grow Equipment* studied equipment seized from 284 individual grow operations relating to police files from 1998 to 2007 in 15 policing jurisdictions in B.C.

Elements distinctive to hydroponic grow operations are:

- **Lights** – Most of the lights found at grow operations are 1000-watt HID (High Intensity Discharge) lights. Although 500-watt lights can be used, the 1000-watt size is ideally sized for the wiring commonly available, and the common circuit-breaker size. The lights support the plants' photosynthesis process.

- **Ballasts (Transformers)** – Most were 1000-watt ballasts used for the 1000-watt High Intensity Discharge lights – each light requires a ballast, which is the light's power supply.

- **Other** – timers regulate the plants' light-exposure time, and CO_2 generators assist with the growers' considerable energy requirements.

Hobbyist hydroponics gardeners use similar equipment. Hydroponics equipment can be obtained from specialty hydroponics shops, from building supply, hardware and department stores,[6] as well as from online stores.

Hazards to Communities

Hydroponic operations present unique public safety hazards because they are frequently located in residential areas and exist in close proximity to people who are unaware of their existence.

Electrical and Fire Hazards

Electricity is the lifeblood of hydroponic operations, fueling increasingly sophisticated equipment such as high-wattage lights to boost plant growth, as well as fans, pumps and other electrical devices.[7]

Illegal operations typically use an unsafe, unapproved network of electrical wiring that poses significant electrocution and fire risk; according to electrical engineer Richard van Leeuwen's report (2004) on the electrical risks associated with grow operations. As noted above, medical marijuana sites present the same hazards as illegal grow sites.

Noted electrical hazards in marijuana grow operations include:

- Unsafe electrical practices such as open wiring and lack of fuses;

- Crudely-made bypasses that can electrify the conduit, which, if connected to a home's ground rod, could electrify the surrounding ground up to 10 metres (almost 33 feet) away;

- Tripping, shock and fire hazards due to poor installation; and

- Overloaded electrical circuits that could cause short circuits or electrify adjacent metal.

These hazards bring not only a risk of electrocution to occupants, emergency responders and neighbours, but a significantly heightened risk of fire. In fact, the likelihood of a grow operation

[6] Bauman *et al.* (2006).

[7] Plecas *et al.* (2005); *Marihuana Grow Operations and Hydro Bypasses Report,* written by Richard van Leeuwen, P.Eng in 2004.

catching fire is one in 22 – that is, a home with a grow operation is 24 times more likely to catch fire than a typical home.[8]

Fire loss statistics obtained from the BC Fire Commissioner's Database demonstrates the occurrences and corresponding losses attributed to hydroponics equipment used for both legal and illegal pursuits:

- From 2004 to 2009, 314 fires across B.C. were caused by grow operations or drug labs, resulting in two deaths, 26 injuries and more than $16 million in damage.
- From 2005 to 2009, 136 fires across B.C. were directly attributed to electrical bypasses and lights associated with hydroponic operations. *Six of those fires were found at sites using the equipment for legal[9] purposes.*

Structural hazards
In hydroponic grow operations, holes are frequently made in walls and floors for venting or wiring, and mould and rot caused by the moist growing conditions add to the structural instability of the building, as well as create health risks. In addition, carbon dioxide, fungicides, fertilizers and other toxins used in hydroponic grow operations are fire, explosion and health risks.

Violence
Hydroponic grow operations bring violence into neighbourhoods. The grow operation culture exposes occupants and neighbours to threats such as guns, booby traps, vicious dogs and home invasions ("grow rips"). As well, an annual RCMP report on drugs in Canada[10] highlights the connection between violence and drug production (including marijuana) and details an increase in violent incidents including home invasions, drug rip-offs, burglaries, assaults, booby traps and murders.

Presence of children
A study of B.C. data indicates a growing number of children are present at grow operations.[11] According to the data, at least one child was found at 20% of grow operations in 2003, up from 13.7% in 2002 and 4.5% in 2001. Another report reviewing more than 25,000 B.C. cases over a seven-year period found children at 21% of grow operations.[12]

Solutions Attempted to Date

Following the development of Electrical and Fire Safety Inspections of grow operations in the City of Surrey in 2005, a Public Safety Task Force was established to identify and help solve emergent public safety issues related to illegal drug production in the province. Co-chaired by the Office of the Fire Commissioner and the Fire Chiefs' Association of BC, the task force includes both public and private agencies with a vested interest in public safety and/or knowledge in related topics.

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[8] Plecas *et al.* (2005).

[9] Legal uses of hydroponics equipment can include the licenced growing of medical marijuana or the growing of flowers and vegetables.

[10] *Drug Situation in Canada – 2003* was written by the RCMP Criminal Intelligence Directorate (2004).

[11] From *Preliminary Data on Hazards in Marihuana Grow Operations* (Darryl Plecas and Aili Malm, 2004).

[12] Plecas *et al.* (2005).

In 2007, the task force began to focus on the unsafe use of hydroponics equipment to grow marijuana. It was understood that – as with municipal safety inspections – a widespread solution would be required to ensure the problem doesn't simply relocate from one community to the next. The work of the task force included:

- Facilitating a Union of BC Municipalities resolution requesting that the Province of British Columbia create regulations that ensure hydroponics equipment is only sold by licenced retailers, and that purchasers of hydroponics equipment have a valid electrical permit.
- Conducting research and presenting a discussion paper to stakeholders and government with potential regulatory solutions.
- Obtaining support for greater regulation for hydroponics equipment from the City of Surrey, Union of BC Municipalities, British Columbia Fire Prevention Officers' Association, Fire Chiefs' Association of British Columbia, British Columbia Police Chiefs' Association, Canadian Association of Fire Chiefs, Surrey Board of Trade, Surrey Crime Prevention Society and Fraser Valley Real Estate Board.
- Writing letters and providing briefing notes to the relevant Provincial authorities and ministers.
- Holding a consultation workshop on May 2, 2008 bringing together a variety of stakeholders to discuss possible solutions.
- Attempting to engage manufacturers of hydroponics equipment in the consultation process.

At the May 2008 consultation workshop hosted by the City of Surrey, Minister of Public Safety and Solicitor General John van Dongen acknowledged the benefits of a partnership between provincial and municipal governments to deal with the issue, but also expressed concern about the impact on legitimate businesses.

At the time, van Dongen indicated his support in working together to achieve practicable and sustainable solutions that will complement criminal law and successfully deal with privacy restrictions.

No further provincial action on the issue has been seen. Response to the UBCM from the Ministry of Public Safety and Solicitor General has indicated a concern for implications on businesses and a desire for further research.

Municipal Regulation for Safe Hydroponics Equipment Use

Recognizing the need to move forward on this important public safety issue, the Fire Chiefs' Association of B.C. has provided funding for legal advice and the development of a model municipal bylaw that leverages existing *Community Charter* and *Safety Standards Act* provisions to give municipalities a tool to ensure hydroponics equipment is only used in a safe and legal manner within their jurisdiction.

It is not unusual for cities to regulate the sale of items deemed to be public safety hazards. For example, many Lower Mainland municipalities have introduced fireworks bylaws that regulate the sale and use of fireworks. Like the proposed municipal regulation of hydroponics equipment sales, fireworks bylaws impact both vendors and consumers in the interest of protecting the public from a known safety hazard.

When attempting to address widespread public safety issues, regulation at the provincial level is preferred to localized efforts, for consistency and more effective containment of the problem. However, in the absence of provincial action on hydroponics equipment sales, municipal regulation via bylaw will allow communities to act to protect the safety of their citizens. It is expected that cities with municipal public safety inspection programs will be among the first to consider a bylaw that allows them to ensure hydroponics equipment is being installed safely.

Please refer to the Appendix for a copy of the legal opinion and model bylaw.

Model Bylaw Overview

Based on a legal opinion from Staples McDannold Stewart, the model bylaw outlines the following process:

- Vendors within the municipality cannot sell lamps or ballasts rated greater than 500 watts unless the buyer presents a permit issued in their name.
- The permit must be either a valid electrical installation permit or operating permit issued under the Electrical Safety Regulations of the *Safety Standards Act*.
- Vendors must record the sale and permit information, and maintain the record for inspection by the municipality.
- The municipality can only use the information to ensure the buyers had a valid permit – not to bring proceedings against the buyer.

The model bylaw essentially puts the onus on users to obtain the proper permit in order to purchase lights and ballasts rated greater than 500 watts. However, due to the regulatory powers available to municipalities, the focus of the bylaw is on the vendors who sell this equipment.

Implications Regarding Existing Laws

Trial law, along with the *Community Charter* and the *Safety Standards Act,* were considered in the drafting of the model bylaw.

Community Charter
The legal opinion concludes that the general regulatory and business regulation powers provided in the *Community Charter* contain sufficient authority for such a bylaw:

- Subsection 8(6) authorizes municipalities to "regulate" in relation to business.
- "Regulate" includes the power to control, inspect, limit, restrict and establish rules in relation to a person, property, activity, things or other matters being regulated.
- The bylaw would regulate the manner in which certain goods may be sold – retailers that wish to sell the prescribed equipment are limited to selling the equipment to buyers who produce the required permit.
- The bylaw merely regulates – it does not prohibit or impose requirements.

The legal opinion also argues that the purpose of the bylaw is in accord with principles of the *Community Charter* that allow municipalities to balance the needs of the individual with the public interest.

Safety Standards Act
The legal opinion concludes that the *Safety Standards Act* would not interfere with the authority of a municipality to adopt and enforce the model bylaw:

- The model bylaw does not concern a "standard" that is or could be dealt with under the Act or its regulations.
- The bylaw has no effect on the standard or manufacture of the equipment, nor does it regulate the method or place of installation of the lamps or ballasts.
- The bylaw does not waive or eliminate the requirement for permits under the Act; rather, it reinforces the Act's requirement for a permit.

In terms of the permitting requirements, the model bylaw adheres to existing provisions in the Act*:*

- The Safety Standards General Regulation (*Section 27(1)*) requires individuals to obtain a permit to undertake regulated work or use a regulated product. This includes the requirement for an electrical installation permit to install hydroponics equipment in a residential setting, since the equipment's electrical requirements may exceed normal residential use.
- The Safety Standards General Regulation (*Section 19 (1)(b)*) specifies that an operating permit is required to operate a regulated product. BC Safety Authority Directive No. D-E3 070801 7 requires operating permits for sites where the electrical supply is more than 250 kVA (kilovolt amps). These would include legitimate non-residential users of HID lights such as warehouses, shopping malls, schools and greenhouses.

Municipal electrical bylaws also typically outline penalties for those found to have not obtained the necessary permit to conduct electrical work.

The Pawnshop Case

The content of the model bylaw was influenced by the judgment of the B.C. Court of Appeal in *Royal City Jewellers & Loans Ltd. v. New Westminster (City)*, with respect to the use of the data collected under the City of New Westminster's pawnshop bylaw.

However, the legal opinion concluded that the model bylaw would be defensible in court based on the broader powers conferred on municipalities by the *Community Charter*, and because its focus is on preventing the vendor from facilitating the commission of an unlawful act in the interest of public safety.

Implications for Vendors and Buyers

The model bylaw does not prevent hydroponics gardeners from legally purchasing, installing or using the equipment. As noted above, the installation of hydroponics equipment in a residential setting must be completed by permit, so the model bylaw merely ensures enforcement of an existing requirement. This permitting step is often missed now unless the individuals themselves initiate the permitting process, as no mechanism exists for identifying the locations of these installations.

The model bylaw will also have little impact on legitimate non-residential users of HID lights who obtain operating permits as required by *Electrical Safety Regulation*. Under the model bylaw, these businesses need only produce their existing operating permit to purchase additional lights and ballasts.

As for the vendors of hydroponics equipment, the model bylaw protects them from unwittingly abetting the commission of an offence under the *Safety Standards Act* by the buyer. The vendor's only responsibility is the collection and recording of the permit information for inspection by the municipality. No permit is required to sell the products, no changes are required of the vendor's property, no security must be provided, and no expenditures are required to sell the products, other than the minimal cost of maintaining the record.

Enforcement

Before commencing enforcement of the bylaw, municipalities should educate vendors and the community about the bylaw, the types of permits required and the process for obtaining a permit. To enforce the bylaw, individuals may pose as buyers to see if they are asked to produce a permit.

Inspections of the store register may be made from time to time, but testing compliance through attempted purchases without a permit may be sufficient.

Potential Challenges

Opposition

Any municipality adopting the bylaw should be prepared for some opposition from vendors, hydroponics equipment users and possibly the general public. This opposition can be countered with the following reasoning:

- The unsafe installation of hydroponics equipment is creating electrical and fire safety hazards in the community.

- The current lack of regulation is hiding this unsafe activity from the oversight of authorities and thereby endangering residents.
- This is a natural complement to the municipal safety inspection process.

Knowledge of the dangers may help convince retailers, legitimate buyers and the public of the necessity of some controls over hydroponics equipment sales.

Enforcement

It can be expected that retailers that knowingly sell hydroponics equipment to illegal marijuana growers will not comply with the bylaw. As mentioned above, compliance can be tested by attempting to purchase the equipment without a permit.

Further, few businesses using HID lights currently comply with the requirement to obtain an operating permit under the *Safety Standards Act*. A phase-in period may be required to accommodate the backlog of applications.

Costs

The introduction of the bylaw will create some cost for the municipality, in terms of establishing the system and ongoing management and enforcement. Municipalities will need to weigh the cost of the program with its public safety benefits.

Legal Challenges

The legal opinion asserts that the *Community Charter* provides municipalities with the necessary authority to create the bylaw, but that because of its controversial nature, a court challenge is likely. It is suggested that the model bylaw be adopted as a stand-alone bylaw rather than integrated into a general business regulation bylaw, so that a court challenge wouldn't affect any other regulations.

The legal opinion further states that the requirement to maintain a record of permits for inspection by the municipality (section 3 of the model bylaw) is disposable if required due to legal action.

Relocation of the Problem

In the absence of provincial legislation, this model bylaw will help alleviate the safety hazards created by hydroponics equipment, on a community-by-community basis. However, local efforts may simply push the problem to other communities, as has been experienced with the piecemeal introduction of municipal inspection programs.

Widespread adoption – and ideally, involvement from the provincial government – is required to have any real impact on this public safety issue.

Next Steps

The model bylaw and this background paper will form part of a kit the Fire Chiefs' Association of B.C. intends to make available to municipalities. The kit will also include a model corporate report.

The model bylaw and paper are now being circulated to the FCABC membership for comment before final revisions and distribution to interested municipalities.

The bylaw may also be submitted as a resolution to the Union of B.C. Municipalities, in the same manner as the Controlled Substance Bylaw that municipalities have adopted in some form to enable municipal safety inspections.

Conclusion

The introduction of municipal safety inspections in 2005 was a positive step towards alleviating the public safety threats related to residential hydroponics operations. The success of that alternative approach showed that a willingness to try something new and to work together can have a real impact on the safety of our communities.

In the absence of provincial government action, this model bylaw is a logical next step for municipalities that wish to protect their citizens from the public safety threats related to unregulated hydroponics use. It is hoped that, over time, incremental and dedicated action at the local government level may spur the broader provincial response that is necessary to fully address this threat.