

# **Remediation of Drug Production Properties in British Columbia**

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## **Executive Summary**

Provincial legislation addressing remediation processes of drug production properties is absent in British Columbia. The responsibility of developing legislation has been downloaded to municipalities to draw upon provincial Acts for authority or in adopting their own distinct bylaws. While this piecemeal method of municipal regulations may contribute to the characteristics of each community, established provincial standards would benefit communities with consistency in practices and enforcement of laws. Provincial statute would set a benchmark across municipalities in restoring these properties, more specifically, marijuana grow operations.

Jurisdictions across Canada, the United States, Australia, New Zealand and Britain were reviewed for regulations, guidelines and processes in the remediation of marijuana grow operations. Legislation in Australia and the province of Ontario provides notification for further inspections of suspected marijuana grow operations, but no firm criteria covering remediation processes. Guidelines drafted by several associations have identified adaptable, specific, quantifiable approaches in which to apply these practices.

As a snapshot of events, an evaluation of municipal bylaws containing marijuana grow operations and its remediation processes was conducted on participating municipalities in British Columbia. The results indicated that, as suggested by other research, regulations set at the provincial and municipal levels are successful in attaining their objective.

Recommendations include establishing provincial standards in the remediation of marijuana grow operations by setting well-defined terms and remediation processes, and confirming qualifications of professionals with suggested cost schedules. Additionally, complete further research to identify necessary requirements for legislation through the collaboration of municipalities and stakeholders.

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## **Introduction**

Marijuana is the most commonly used illegal drug in Canada. With outdoor cultivation of marijuana crops being less popular in British Columbia, most likely associated with the risk of discovery, indoor marijuana grow operations are the logical alternative. Choosing residential houses to grow marijuana, criminals are able to access electrical power and create favourable conditions for grow operations. In the aftermath of discovery, remediating former marijuana grow operations can be extensive and expensive for the homeowner.

The need for consistent, fair regulations available to all citizens facing this task is necessary and in British Columbia, stakeholders are working together towards such legislation. This report reviews a wide variety of legislation, standards, statistics, media and academic research to uncover existing practices addressing the remediation of marijuana grow operations in jurisdictions across North America, Australia, New Zealand and Britain. Along with defining terms, a closer look at legislation and processes in these jurisdictions will reveal trends and practices that may be adaptable to British Columbia.

## **Definitions**

Clear, concise definitions are valuable. They provide a distinct explanation leaving little room for misinterpretation. Although each district does not employ the same definitions, in this review of selected terms, some jurisdictions supply more comprehensive interpretations than others.

**Drug Lab** – Usually referred to as clandestine drug laboratories, the Minnesota Department of Health states that it is a place where methamphetamine is manufactured or “cooked” (Minnesota Department of Health, n.d.). The City of Prince George (2010) describes a drug lab as “the manufacture of amphetamines, ecstasy, LSD (lysergic acid diethylamide), GHB (gamma hydroxybutyrate), crack cocaine, marijuana oil or its derivatives”. In Australia, this term is typically associated with the manufacture of amphetamine-type stimulants (ATS), in particular methamphetamine, which is an illicit drug in New South Wales (NSW) under the Drug Misuse and Trafficking Act 1985 (Wright, 2015). Drug labs can range in size from small ‘one-pot’ methods for personal use to large scale labs (Wright, 2015).

**Drug Operation** – Often referred to as a clandestine drug laboratory operation or clandestine drug operation, varied definitions highlight the important characteristics to each region or authority. In Minnesota, Kanabec County Ordinance No. 30 identifies a clandestine drug laboratory operation by the unlawful manufacture of a controlled substance within a structure such as a building, motor vehicle, trailer, boat or appliance (Kanabec County, 2005). Ontario recently amended the Building Code Act of 1992 to include the definition of a clandestine drug operation. It is defined as ‘an illegal operation where any substance listed in any of Schedules I – IV to the Controlled Drugs and Substances Act (CDSA) (Canada) can be obtained by any method or process’ (Bill 29, 2013). This process includes manufacturing, synthesizing or using any means to alter chemical or physical properties of the substance or cultivating, growing or harvesting the substance or any living thing from which the substance may be extracted or obtained (Bill 29, 2013).

The American Industrial Hygienist Association (AIHA) defines a drug operation as “an unlawful operation involving the processing or disposal of any controlled substance or counterfeit substance, or its precursors, reagents, waste streams, equipment or drug paraphernalia regardless of location” (Koch, Chambers, Bucherl, Martyny, Cotner, Thomas, 2010). Yet, the most comprehensive is an American legal definition of a clandestine laboratory operation. It includes the purchase, procurement, transportation or arranging for the transportation of chemicals, supplies, equipment or laboratory location, and setting up equipment or supplies for the unlawful manufacture of controlled substances (US Legal, 2016). Also included is the distribution or disposal of chemicals, equipment, supplies or products by the unlawful manufacture of controlled substances (US Legal, 2016).

**Healthy Home** – Currently, there is no formal legislation defining healthy homes only guidelines. Both Health Canada and Canada Mortgage and Housing Corporation (CMHC) place indoor air quality at the top of their healthy home list. In Health Canada’s guide to a healthy home, ways to reduce the risk of mould, smoke, carbon monoxide and radon are some of the tips offered to maintain an environmentally friendly home (Health Canada, 2014). Comparatively, the Tennessee Department of Health believes that a healthy home must also be designed, built and managed to support good health by keeping the home dry, clean, pest and contaminant-free, safe, well ventilated and regularly maintained (Tennessee Department of Health, n.d.).

The Centers for Disease Control and Prevention (CDC) has released a detailed guidebook, *Healthy Housing Inspection Manual* in an attempt to improve effectiveness in identifying, preventing, and controlling health problems associated with housing. The manual also provides a standardized assessment methodology in which to develop consistent evaluations through a holistic approach (Centers for Disease Control and Prevention, US Department of Housing and Urban Development, 2008). Together with the US Department of Housing and Urban Development (HUD), the CDC's Healthy Home initiative is a reference tool only for local jurisdictions to use or modify ensuring that housing is safe, decent and healthy for their citizens (CDC & HUD, 2008).

**Marijuana Grow Operation** – Definitions are broad in scope. Taken from the Union of British Columbia Municipalities (UBCM) Nuisance (Controlled Substances) Bylaw, a marijuana grow operation (MGO) means the cultivation of marijuana plants or mushrooms that are controlled substances or the production of amphetamines (Union of British Columbia Municipalities, 2005). The City of Ottawa's definition classifies a property or portion of a property that a police force has identified in writing to the City pursuant to subsection 447.2(1) of the Municipal Act, 2001 as having contained a marijuana grow operation (City of Ottawa, 2015). In Toronto's Municipal Code, the City defines marijuana grow operations as "any property or portion of a property which the Toronto Police Service, the Ontario Provincial Police or the Royal Canadian Mounted Police has identified in writing to the City as having contained a marijuana grow operation" (City of Toronto, 2007).

A commissioned report from the Alberta Real Estate Association (AREA) characterizes a marijuana grow operation consisting of marijuana plants grown indoors in containers filled with a soil-based media (Lee & Rollins, 2009, p.4). It can be a simple operation consisting of a few potted plants, or a large-scale venture of hundreds of plants in various stages of growth, tended throughout the property under an arrangement of commercial grow lamps (Lee & Rollins, 2009, p.4). Yet, in Canada, there is no precise number of marijuana plants identified in which to classify a marijuana grow operation.

The Controlled Drugs and Substances Act does not specify an exact number of marijuana plants to be classified as an MGO, but does determine a limit for discipline. Part 1, Section 7(2)(b)(i), Production of Substance of the CDSA, outlines punishment of imprisonment for a minimum term of six months if the number of plants produced is less than 201 and more than five with the intent

to traffic (Government of Canada, 2016). There is no clear regulation for the production of five marijuana plants or less where consequences may be determined through civil authority.

In those states where marijuana is legal, different terms are used to specify growing facilities over manufacturing and testing facilities. In Colorado, a “marijuana cultivation facility” denotes the license to grow, prepare and package marijuana and sell to retail marijuana stores, product manufacturing facilities and other cultivation facilities, but not to a consumer (Campaign to Regulate Marijuana like Alcohol, 2012). For those individuals who choose home cultivation, Amendment 64 allows up to six plants per adult as well as the ability to grow marijuana on a person’s private property (Campaign to Regulate Marijuana like Alcohol, 2012).

**Nuisance** – Nuisance is one of the oldest causes of action, historically including any offence against civic order (Fric & Tomasich, 2011). At common law, a nuisance is a condition in which a property interferes with a neighbouring owner’s peaceful enjoyment of his land. With reference to the leading Canadian nuisance decision, *Tock v. St. John’s Metropolitan Area Board*, the Supreme Court of Appeal defines nuisance as “any activity or state of affairs causing substantial and unreasonable interference with a claimant’s land or his use or enjoyment of that land.” (Fric & Tomasich, 2011). To constitute a legal nuisance, the annoyance must be classified as both substantial and unreasonable. In British Columbia (BC), the Court has used the objective test for nuisance to determine the standards of an ordinary reasonable person with case law *Popoff v. Krafczyk* (Mackie, 2010):

“In every case it is not whether the individual plaintiff suffers what he regards as substantial discomfort or inconvenience, but whether the average man who resides in that locality would take the same view of the matter. The law of nuisance does not guarantee for any man a higher immunity from discomfort or inconvenience than that which prevails generally in the locality in which he lives.”

As well, consideration must also be granted to character of the neighbourhood, frequency, duration and other factors in special circumstances (Mackie, 2010). In Alberta, under the Public Health Act, nuisance is defined as “a condition that is or that might become injurious or dangerous to the public health, or that might hinder in any manner the prevention or suppression of disease” (Government of Alberta, 2000).

**Professional Cleaner** - A number of communities have defined a “professional cleaner” as an individual or corporation experienced and qualified in removing contaminants from buildings and holds a business license in that district including Maple Ridge, Pitt Meadows, and Richmond (City of Maple Ridge, 2004; Corporation of the District of Pitt Meadows, 2005; City of Richmond, 2005). In the cities of Kelowna, Prince George, Surrey, and West Vancouver, the term professional cleaner is further qualified by identifying the types of contaminants to be removed from a residence including pesticides, fertilizers, chemicals in the manufacture of amphetamines or grow controlled substances, moulds, or fungi (City of Kelowna, 2005; City of Prince George, 2010; City of Surrey, 2006; City of West Vancouver, 2005). Interestingly, Chilliwack’s definition of a professional cleaner includes the home owner along with an experienced and qualified individual or corporation in removing contaminants from residential premises, (City of Chilliwack, 2004).

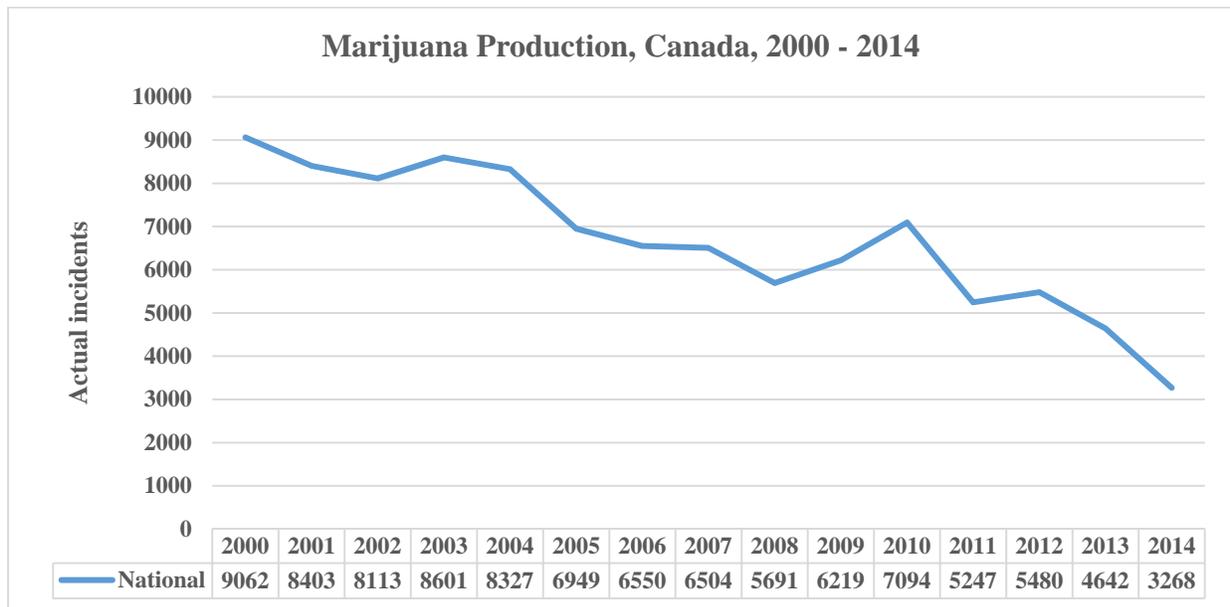
**Qualified Professional** – Also referred to as a ‘certified’ or ‘registered’ professional, BC municipalities stipulate various definitions with some stating a specific description and others offering a broader scope. The cities of Surrey and Prince George define a qualified professional as a certified industrial hygienist, registered occupational hygienist, registered professional biologist or mycologist holding a Ph. D (specialist in the study of fungi) (City of Surrey, 2006; City of Prince George, 2010). Burnaby uses the term ‘registered professional’ citing the Community Charter section 55 for a definition (City of Burnaby, 2004). Within section 55 of the Community Charter, the definition of a qualified professional refers to a certified architect, professional engineer or professional geoscientist (Community Charter, 2016). Geoscience is a broad field studying natural geologic systems including minerals, soil, water, energy resources and the environment (Geoscientists Canada, n.d.).

The District of Logan Lake (2006) refers to certified professionals as individuals in good standing with the Association of Professional Engineers and Geoscientists in British Columbia and qualified in environmental sciences that must identify, inspect, recommend a remedial plan and provide certification to the municipality. The City of Abbotsford references multiple Acts to assist with definitions or interpretations of its Controlled Substance Property Bylaw referring to the British Columbia *Interpretation Act*, *Community Charter* or *Local Government Act* to define words or phrases unless otherwise defined in its bylaw (City of Abbotsford, 2006).

## Background

Marijuana is the top domestically produced drug in Canada. Of all drug seizures in Canada in 2008, approximately 75% were marijuana confiscations (Royal Canadian Mounted Police, 2010). In 2013, marijuana possession in Canada is recorded at 80% of police-reported offences and accounted for 54% of all police-reported drug crime (Statistics Canada, 2015). While the rate of marijuana possession has increased by 23% since 2003 and 114% since 1991, the supply of police-reported marijuana offences (trafficking, importing, exporting and production) has decreased (Statistics Canada, 2015). However, the supply of other controlled drugs and substances, such as methamphetamines (crystal meth), ecstasy, and precursors, has risen since 1997 (Statistics Canada, 2015-a). Referring only to the production of marijuana across Canada, graph 1 illustrates the overall decrease in marijuana production from 2000 to 2014.

**Graph 1. Marijuana Production in Canada, 2000 - 2014**



Source: Statistics Canada, CANSIM Table 252-0051

Reasons for the decline in marijuana production are difficult to determine. The number of illegal operations may have dropped with the implementation of the Marijuana Medical Access Regulations (MMAR) policy established in 2001. Under this policy, personal (or designated person) licenses were issued allowing for the possession and production of medical marijuana under the authorization of a physician (Health Canada, 2013). Section 30 of the MMAR

specifically defined the number of marijuana plants in terms of expectation to produce a prescribed amount of dried marijuana. Depending on where plant production is located, in either indoor or outdoor areas, four individual formulas are used to decide the maximum number of allowable plants (Health Canada, 2001). As of March 31, 2014, the MMAR was repealed in favour of the Marihuana for Medical Purposes Regulations (MMPR) in an attempt to create a commercial industry for the production and distribution of marijuana for medical purposes and remove personal licensing (Health Canada, 2015). Since then, there has been a recent boost in retail medical marijuana dispensaries in Vancouver.

In an attempt to deal with the surge of medical marijuana shops, Vancouver city council has voted to regulate and license approximately 100 medical marijuana retail stores (City of Vancouver, 2015). Even though Vancouver has relaxed medical marijuana legislation, retail dispensaries are considered illegal at the federal level. Response to the federal government's actions to tighten medical marijuana laws have resulted in litigation. In an effort to maintain personal medicinal marijuana licenses, an injunction granted in April 2014 is currently in effect permitting previously authorized individuals to possess and produce marijuana until a final decision by the Court has been made (Health Canada, 2015).

Another reason for the drop in marijuana production may be due to police reporting methods. Police-reported statistics of drug offences may be affected through police discretion in dealing with minor offences, such as grow operations with five or less marijuana plants. Police or municipalities may choose to use municipal bylaws or provincial provisions rather than the Criminal Code (Statistics Canada, 2015). Nevertheless, even with the decrease in reported overall marijuana production, BC was identified as the province with the most drug-related offences.

Of police-reported CDSA violations for 2013, BC held the highest marijuana (395 per 100,000), crystal meth (28 per 100,000) and overall drug offence rate (576 per 100,000) of all provinces (Statistics Canada, 2015-b). Within BC, Kelowna's marijuana possession rate was almost double that of Vancouver at 70% as well as having the highest rate of drug production offences of 56 incidents per 100,000 persons (Statistics Canada, 2015). The majority of drug production was in the cultivation of marijuana.

### *Impact of Marijuana Grow Operations*

Marijuana grow operations are a danger to public health and safety as well as a major contributor to organized crime activity. The Royal Canadian Mounted Police (RCMP) present in their Marihuana and Synthetic Drug Initiative the dangers of MGOs. At the top of the list is the possibility of fire usually due to the use of large amounts of electricity together with illegal tampering of electrical systems which can lead to electrocution (Royal Canadian Mounted Police, n.d.). The increase of possible violence due to having an MGO in the neighbourhood is a real and serious threat. Organized crime involvement in the production of marijuana can lead to violence, turf wars, and intimidation while increasing funding for other organized crime activity (NNC Working Group, 2002).

Aside from MGOs being vulnerable to extortion, burglaries, assaults and home invasion, illegal grow operations are targets for criminals to steal marijuana crops, also referred to as 'grow rips' (NNC, 2002; RCMP, n.d.). In order to circumvent the theft of these crops, operators of an MGO may place concealed traps throughout the premise to injure or kill uninvited visitors, or first responders (RCMP, n.d.). As well, health effects of an MGO arise from the chemicals and their mixtures in marijuana production as well as the growth of toxic mould and fungus from questionable ventilation and the poor air quality that results (RCMP, n.d.). MGOs also produce economic losses.

There is a loss in revenue for public utilities due to theft of electricity in which the utility inevitably attempts to recover through rate increases to paying customers. There is also concern that the value of local real estate may decrease with any combination of MGO hazards existing within a neighbourhood (NNC, 2002). The stigma a property may hold due to being a former MGO may make reintegration back into the community difficult. With the knowledge of a former MGO obtained through property disclosure documents, potential home buyers may be afraid to purchase a remediated house for fear of risk of being targeted by criminal elements unaware that the property is no longer an MGO (McManus, 2011). There are liability concerns regarding the possibility of a former MGO house not being thoroughly clean and becoming 'sick' in the future, or other material latent defects being discovered after remediation is complete (Brown, 2010; Lee & Rollins, 2009).

## Legislation

### *Canada*

Presently across Canada there are no federal or provincial standards for the remediation of marijuana grow operations. Looking toward alternative legislative measures outside of the Criminal Code and the CDSA framework, research suggests that the responsibilities for remediation may have the greatest impact at the provincial and municipal level (NNC, 2002). In reviewing each provincial and territorial Municipal Act, there are no specific references to marijuana grow operations or drug operations except in Ontario. Ontario is the only province to specify provincial regulations regarding marijuana grow operations. Under sections 447.2 and 447.3, the Ontario Municipal Act allows for the notification and inspection of buildings containing marijuana grow operations with written notification from police to the municipal clerk (Government of Ontario, 2016). The Act does not provide standards to guide municipalities towards the remediation process of MGOs.

Stakeholders from other provinces are attempting to enact more detailed legislation. In May 2014, the Associate Minister of Recovery and Reconstruction of High River and Public Safety of Alberta released the final recommendations report *Grow Op Free Alberta*. In his report, the Honourable Rick Fraser outlined recommendations for remediation of MGOs in which the Conservative government at the time accepted (Alberta Justice and Solicitor General, 2014). Fraser (2014) proposed to include areas outside of buildings and structures to be restored as well. More specifically, recommendation 27 suggests adapting a certificate remediation program for MGOs from Alberta's Environment and Sustainable Resource Development's Remediation Certificate Program. This program currently ensures that sites are remediated by "issuing approvals, collecting security, conducting inspections, issuing reclamation certificates, developing information documents, undertaking compliance and publishing reports and certificates" (Fraser, 2014). British Columbia has similar environmental regulations and are already in use in some municipalities.

In BC, the Environmental Management Act sets out provincial legislation for the remediation of contaminated land sites. Under this environmental umbrella, concerns of pollution from hydroponic waste, groundwater, wastewater, improper use of insecticides and fertilizers are

addressed (Amendments to Land Use Code, 2014). The Act requires quantitative measures as part of its environmental remediation standards specifying “numerical standards relating to concentrations of substances and standards relating to risk assessment, as prescribed in the regulations” (Environmental Management Act, 2003). The Act identifies the process to remediate contaminated land through site profiles, investigation requirements of approved professionals, determination of contaminated sites and establishment of a site registry. Liability for remediation and implementation is defined along with certificates of compliance and independent remediation procedures. As part of Port Coquitlam’s MGO remediation process for example, the Ministry of Environment is to be notified when a site profile has been submitted to the engineering department.

As a provincial legislative and civil initiative, the Safety Standards Amendment Act of 2006 is available to assist municipalities in actively pursuing clandestine residential marijuana grow operations. Under this Act, electricity producers disclose electricity consumption information to municipalities as well as provincial or municipal police authorities (Bill 25, 2006). On the assumption that an unusually large consumption of electricity could identify the presence of hydroponic equipment use, the disclosure of this information allows municipal safety authorities to proceed with an inspection of the premise.

Without a provincial standard on the remediation of marijuana grow operations, municipalities create bylaws from different areas of legislation. The most common types of municipal bylaws dealing directly or indirectly with MGOs include: building, development, dangerous and unsightly premises, noxious substances, fire safety, property maintenance and repair, zoning, nuisance and controlled substance property bylaws. Municipalities may also combine or separate their MGO bylaws. Vancouver’s MGO remediation bylaw operates under Building Bylaw 2007, 9419 however the remediation process is described under the re-occupancy permit process (City of Vancouver, 2014).

As the responsibility of MGO remediation has been relegated to municipalities, a number of BC communities have adopted the UBCM’s Controlled Drugs Nuisance Bylaw. Many municipalities that have adopted this bylaw, also referred to as the Grow Operation Bylaw, consider this rule as “leading edge” in the protection of future occupants of homes that were used as MGOs and as a cost recovery mechanism for the municipality (City of Port Coquitlam, n.d.). In BC, particular municipalities such as Surrey, Kelowna, Chilliwack, Squamish, North Cowichan, Montrose and

Tahsis have adopted this bylaw in order to protect its future homeowners, renters, neighbourhood, and community.

The City of Ottawa has enacted the Marijuana Grow Operation Remediation Bylaw No. 2012 – 402 which details the prohibition, inspection and remediation of buildings used for marijuana grow operations with direct reference to Ontario’s Municipal Act, 2001 (City of Ottawa, 2015). Yet in Toronto’s bylaw of remediation of MGOs, the City does not reference Ontario’s Municipal Act, only the City of Toronto Act, 2006. In Toronto’s Municipal Code Chapter 565, Marijuana Grow Operations, section 565-2D outlines a broad remediation process with notable fines for contravention yet excludes inspection fees, permits or charges (City of Toronto, 2007). Alberta takes a different approach.

In Alberta, authority for remediating illegal drug operations resides with Environmental Public Health under the Department of Alberta Health Services. Authority for inspection is derived from the Alberta Public Health Act under two different capacities of Nuisance and General Sanitation regulations, and Housing Regulations including the supplemental Minimum Housing and Health Standards (S. Hussey, personal communication, Jan. 26, 2016). Supplemental standards are included to ensure minimum requirements are met for rental housing as many illegal MGOs are found in rental homes.

### *United States*

In 2014, the United States Drug Enforcement Administration (US DEA) noted that marijuana is the most commonly abused drug in the United States (Drug Enforcement Administration, 2015). The US DEA (2015) indicates that the increasing availability of marijuana stems from large-scale importation from Mexico and a rise in domestic indoor MGOs partially due to the legalization of marijuana in certain states or state medical marijuana initiatives (DEA, 2015). Even though the availability of marijuana across the US is highest amongst all drugs, those drugs considered to be the greatest threat are methamphetamines in the US Pacific, Central, Southwest, the Southeast, and Florida, while heroin scores highest in the Great Lakes, Northeast, and Mid-Atlantic regions (DEA, 2015).

From 2002 to 2006, methamphetamine production and abuse were at high levels peaking at 731,000 incidents in 2006 (DEA, 2014). Due to these escalating drug conditions, the

Methamphetamine Remediation Research Act of 2007 was passed directing the Environmental Protection Agency (EPA) to establish voluntary guidelines for the remediation of former methamphetamine laboratories (Methamphetamine Remediation Research Act, 2007). Taken from the US EPA 2013 *Revised Voluntary Guidelines for Methamphetamine Laboratory Cleanup*, table 1 provides quantitative remediation recommendations for drugs, chemicals and wipe areas (United States Environmental Protection Agency, 2013). Suggested US EPA remediation sequence and techniques are detailed in Appendix 1.

**Table 1. Suggested Remediation Standards for Methamphetamine Laboratory Cleanup**

<i>Suggested Remediation Standards</i>	
<i>Methamphetamine*</i>	1.5 µg /100 cm <sup>2</sup>
<i>Ephedrine*</i>	0.1 µg /100 cm <sup>2</sup>
<i>Pseudoephedrine*</i>	0.1 µg /100 cm <sup>2</sup>
<i>Volatile Organic Compounds (VOC)</i>	VOC air monitoring < 1 ppm
<i>Corrosives</i>	Surface pH of 6 to 8
<i>Lysergic Acid Diethylamide (LSD)*</i>	0.1 µg /100 cm <sup>2</sup>
<i>Ecstasy*</i>	0.1 µg /100 cm <sup>2</sup>
<i>Lead</i>	4.3 - 1 µg /100 cm <sup>2</sup>
<i>Iodine</i>	22 µg /100 cm <sup>2</sup>
<i>Mercury</i>	0.05 - 3.0 µg /m <sup>3</sup> air
<i>*Wipe area</i>	Three - 10 cm x 10 cm (100 cm <sup>2</sup> )

Source: US EPA

Many states have adopted clandestine drug lab remediation laws, regulations, standards and disclosure, as well as have access to the national online clandestine methamphetamine lab registry (DEA, n.d.). However, similar guidelines and regulations for marijuana grow operations in the US have not been established.

Currently there are 23 states, plus the District of Columbia, that have legal medical marijuana laws, fees and possession limits. There are 16 more states that have approved a Cannabidiol (CBD) Bill that legalizes one ingredient in marijuana, cannabidiol, that can be “recommended” by physicians under several conditions such as cancer, epilepsy, or severe muscle spasms (ProCon.org, 2016). Unlike Health Canada, 13 of these states have determined the number of plants to be within legal

possession limit. The number of plants, and at which stages of growth, vary from one in Arizona up to 24 plants in Oregon (ProCon.org, 2016). The medical marijuana program is not regulated under the same department in each state, but through distinct state agencies.

In most of the 23 states with medical marijuana legislation, it is under the governing body of the Department of Health in which the medical marijuana program is administered. Connecticut operates under the Department of Consumer Protection, Vermont through the Department of Public Safety, and Michigan through the Department of Licensing and Regulatory Affairs, Bureau of Health Professions (ProCon.org, 2016). Yet remediation of marijuana grow operations is not considered an issue.

In the US, there are no federal or state remediation laws for marijuana grow operations. In the Revised Code of Washington (RCW) Chapter 64.44 of Contaminated Properties, the intent is to address contamination caused by the use of hazardous chemicals in the illegal manufacture of drugs, such as methamphetamine, as these chemicals have been proven to be a health hazard (Washington State Legislature, 2016). The Washington Department of Health does not regard remediation of MGOs to be a significant health risk. As marijuana can be grown completely without any chemicals, any determination of a hazard requiring remediation would have to be determined on a case by case basis to decide whether hazardous chemicals were used and caused contamination to the extent the property was rendered unfit for human habitation (K. Weeks, personal communication, Jan. 21, 2016). In the report *Health Effects Associated with Indoor Marijuana Grow Operations*, testing of 30 MGOs was completed on mould, spore, tetrahydrocannabinol (THC) levels, VOC, carbon dioxide and carbon monoxide levels, pesticides and fertilizers. Results noted that the principal concern of indoor MGOs is the presence of excessive mould spore levels with no chemical concerns (Martyny, Van Dyke, Schaeffer, Serrano, n.d.).

### *International*

Marijuana laws vary worldwide. Many countries are relaxing marijuana possession laws with only a few legalizing possession, sale, transport and cultivation of marijuana. Even though most countries consider marijuana illegal, many have adopted laws to decriminalize or allow marijuana for medical use. However, there have been minimal or no remediation laws for MGOs found.

Similar to the United States, Australia reports that the availability of marijuana is high. In a national study, the Australian Crime Commission disclosed that between 2011 and 2013, 93 percent of respondents indicated that access to marijuana was very easy (Australian Crime Commission, n.d.). The number of marijuana seizures has increased overall from 2003 to 2012 with a 4.6 percent increase from 2012 to 2013 reaching the greatest number of seizures in the last decade (ACC, n.d.).

In New South Wales (NSW) Australia, remediation of a former clandestine drug laboratory or MGO is granted authority by the issuing of Orders or Notices by councils through an Order under Section 124 of the Local Government Act, to identify the building; and a Notice under Section 91 of the Protection of the Environment Operations Act (POEO Act) to determine the contaminated area outside of the building on land, waterways, drains, and surrounding areas (Wright, 2015). Thorough remediation guidelines for the clean up of clandestine drug laboratories have been established detailing four phases of remediation. Phase one notes the triggers for assessment, phase two sets out the preliminary assessment and action to be taken, phase three is site assessment and remediation, and phase four covers validation, ensuring that Remediation Action Plan (RAP) objectives have been met (Commonwealth of Australia, 2011).

The National Drug Intelligence Bureau of New Zealand, working in joint operation with Customs, Health and Police, has provided marijuana indoor cultivation occurrences and number of plant seizures for the past eight years. In 2015, there has been a 66 percent decrease in marijuana cultivation occurrences since the peak in production in 2010 and a 67 percent decline in plant seizures since 2012 (J. O’Keeffe, personal communication, March 24, 2016). Further research on remediation laws for MGOs in New Zealand has found no information.

In the United Kingdom, total marijuana seizures have been decreasing. Over the period from 2006 to 2015, seizures peaked in 2009 and have since shown a general decline (Government of the United Kingdom, n.d.). As with New Zealand, retrieving data on the remediation of MGOs in the United Kingdom has been equally unsuccessful. In email communications, Crime Statistics and Analysis of the Office for National Statistics responded that marijuana production or MGO information is not monitored (G. Quayle, personal communication, January 26, 2016).

## **Process**

### *Canada*

There are no formal, detailed regulations for the remediation process of marijuana grow operations in Canada. Of the jurisdictions that do require remediation of MGOs, many only provide general guidelines. Of those BC municipalities that have adopted bylaws or similar legislation to the UBCM's suggested Nuisance (Controlled Substances) Bylaw, there are similar requirements across these communities that must be met. Power is given to the municipality to enter and inspect the property, revoke occupancy, issue notice of remediation and discontinue municipal services of gas, water and electricity.

Authorities are broadly identified in employing rights of entry to former MGO properties through the Community Charter. In municipal bylaws, recognized individuals usually include building inspectors, fire chiefs, police, engineers, bylaw officers or persons authorized by Council to regulate, prohibit or impose requirements, execute remedial action, inspect, and disconnect municipal services. Once entry onto an MGO property has been made and the building inspected, occupancy status is rescinded. Utility services are then disconnected and a notice of remediation is given to the home owner. The onus is then assigned to the property owner to restore the home in accordance with municipal bylaws and all provincial health and safety legislation.

The homeowner must undertake remediation action in order for the home to re-gain occupancy status or decide on demolition. If remediation is chosen, the homeowner must follow municipal bylaws to ensure the success of MGO remediation as there are no provincial remediation standards. The first step in the remediation process is the removal of all equipment, material, waste and refuse from the former MGO. Some municipalities that require the removal of carpets and curtains, allow the homeowner to do this himself, while in other communities, Vancouver and Ottawa for example, bylaws state that contractors must perform all removals (City of Vancouver, 2014; City of Ottawa, 2015). In bylaws that allow carpets and curtains to remain, a professional cleaner is usually required to clean walls, carpets, floors, curtains, ceilings, furnace, air ducts, venting and filters.

In determining the extent of remediation, the homeowner may require assistance. At this point the homeowner must hire a qualified professional or industrial hygienist to test the home for mould,

water damage and other hazardous materials. An industrial or occupational hygienist is classified as an individual or corporation certified by the Canadian Registration Board of Occupational Hygienists or the American Board of Industrial Hygiene to provide written certification that the home is free from contaminants. A number of municipalities have noted in their bylaws that a certified industrial hygienist or occupational hygienist must be used as with Kelowna, Abbotsford, Chilliwack, Richmond, Port Coquitlam, Whistler and West Vancouver. Other municipalities identify a qualified professional or professional engineer to administer the same scope of work. Professional engineers generally take the responsibility of ensuring that a structure is sound and in compliance with municipal bylaw requirements and conforms to all British Columbia Building and Electrical Codes.

Certification that a home is contaminant-free is determined through air quality sampling and testing. When air quality testing is performed, comparative measures used against indoor air samples are outdoor air samples. This is regular procedure when sampling for mould due to variations in climate across regions (J. Schmidt, Medallion Healthy Homes, personal communications, Jan. 13, 2016). Health Canada's guidelines on *Fungal Contamination in Public Places* notes that a measure of ten times more mould detected inside a building than outside is a failing grade (Health Canada, 2004).

The objective of air quality certification confirms that cleaning of the residence has been satisfied in accordance with the municipal bylaw, and that the building is substantially free of any pesticides, fertilizers, toxic chemical contamination, moulds or fungi, prior to the re-occupancy of the building. Some municipalities establish further that certification must meet the United States Institute of Inspection, Cleaning and Restoration Certification (IICRC) Standard S-500 and S-520. Under Section 500 Water Damage Restoration, the IICRC endorses a specific set of practical standards for water damage restoration based on reliable restoration principles, research, and experience determined through consultation with the scientific community, international, national, and regional trade associations (Institute of Inspection, Cleaning and Restoration Certification, 2012). Section 520 Mold Remediation states procedural standards for the remediation of mould damaged structures and contents. These standards are the result of collaboration with microbiologists, public health professionals, industrial hygienists, remediation contractors, restoration contractors, cleaning and restoration training facilities, trade associations involved in

the restoration industry, and related experiences (IICRC, 2012). Once certification has been received by the municipality, some condition re-occupancy on notification to a prospective occupant in writing that a grow operation has been removed with all requirements of the bylaw having been satisfied.

Once remediation is complete, any alterations to water, electrical or gas services require municipal permits to complete needed repairs. A final inspection of the building is performed by a municipality's building inspector to assure the property complies with all health and safety requirements of the BC Building Code, the municipal bylaw and all other health and safety requirements, codes and standards. If the home has passed inspection, a re-occupancy permit or notice is issued to the homeowner.

In Alberta, the remediation process is initiated through an executive officer with Alberta Health Services (AHS) following recommendations in the *Marijuana Grow Operation Repair, Rehabilitation, and Remediation Requirements* and *Fungal Air Testing, Investigation and Reporting Requirements for Mould Remediation* (Alberta Health Services, 2011-a). The executive officer is granted authority under section 62(1) of the Public Health Act to carry out inspections and issue written orders (AHS, 2011). The executive officer assesses and notes a list of building and service deficiencies and nuisance conditions which is then provided to an environmental consultant (AHS, 2011-a). It is the responsibility of the homeowner to hire an environmental or industrial health consultant to assess and determine the scope of work. Visual and intrusive testing are completed by the environmental consultant who oversees a remediation contractor to complete necessary repairs. "Intrusive" testing includes cutting access holes in walls and ceilings, lifting carpets or vinyl flooring, removing wallpaper, and wooden or vinyl baseboard mouldings (AHS, 2011-b). Mould investigation and air sampling is then performed to meet health requirements (AHS, 2011-b; Health Canada, 2004). Inspections, permits and certificates must be submitted to AHS for acceptance on notice removal. The full checklist is available in Appendix 2. Australia has adopted some of these requirements.

### *International*

In Australia, a report on *NSW Remediation Guidelines for Clandestine Drug Laboratories and Hydroponic Drug Plantation* was released to address the remediation of contaminated sites due to chemical processes from illegal drug manufacturing as well as MGOs. Under 4.3.2, points one

through seven are taken directly from Alberta Health Services *Marijuana Grow Operation Repair, Rehabilitation, and Remediation Requirements* (AHS, 2011-a). In this overall approach, there are similarities to BC municipal MGO bylaws. The removal of building and waste material, including the disposal of fertilizers and pesticides, through existing environmental regulations is the initial step. Moisture and water damage, and their causes, should be identified and repaired together with the restoration of water, heating, electrical and gas systems completed by a licensed contractor. Checking for visible mould growth in all areas as well as ongoing sources of moisture and humidity are to be fixed and mould affected materials cleaned or replaced. There are some noticeable differences.

In Australia, clean up and repair or replacement of materials must be done according to a professional environmental assessment and remediation plan. In BC, not all municipalities dictate an environmental assessment or a specific remediation plan. The NSW Remediation Guidelines do not mention who is to provide the building assessment report and plan, perform the remediation, or that air quality sampling and testing is to be completed. Yet the guidelines specifically mention to check for residual chemicals associated with tetrahydrocannabinol (THC) extraction such as isopropyl alcohol, naphtha or ethanol (Appendix 3).

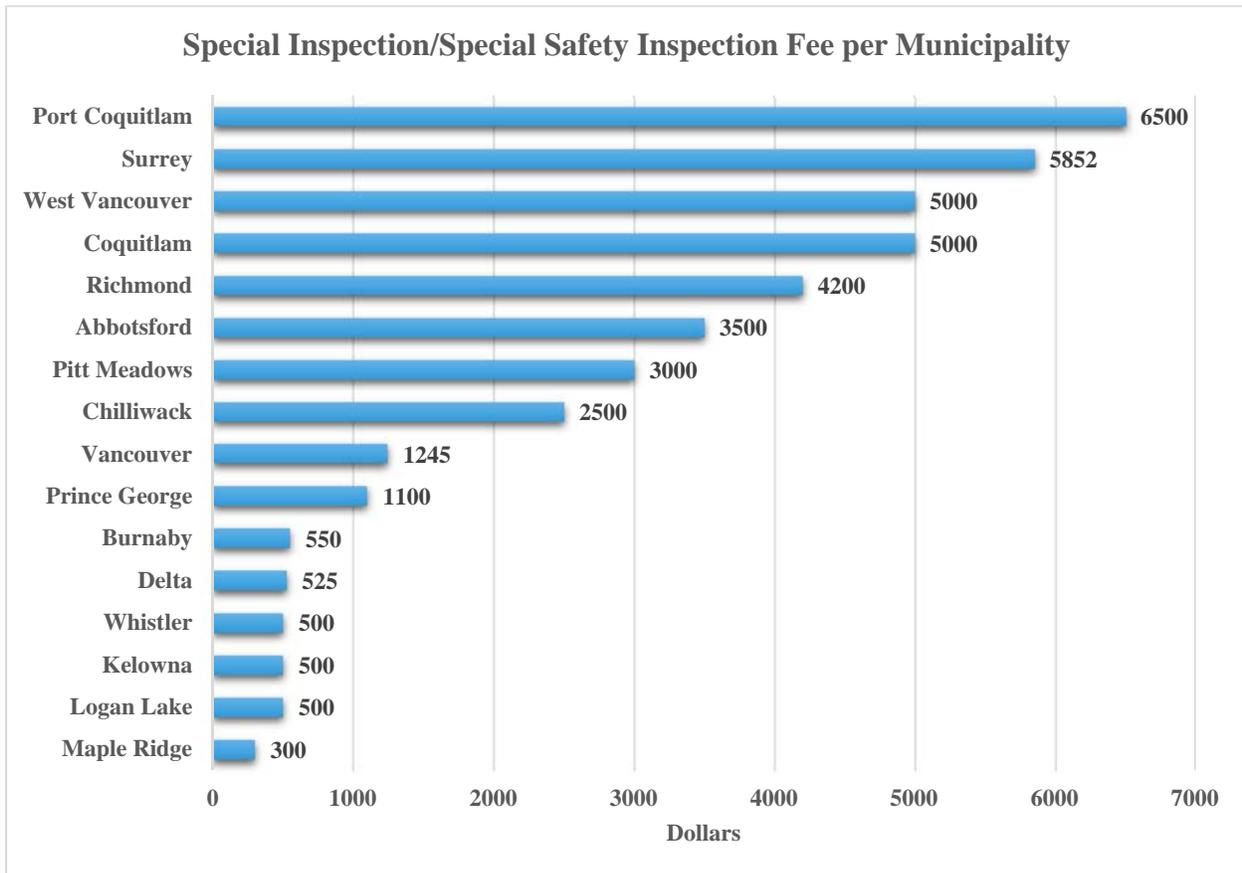
Unique to the NSW Remediation Guidelines are the choices offered after the removal of lingering chemicals used in MGOs from cleaning with detergent and water. The suggestion of encasing odour or stains on materials instead of replacement is not an option given in BC municipal MGO bylaws. As this report notes “if staining or odours remain the affected materials may be replaced or encapsulated with paint or sealant” (Wright, 2015). In the US EPA guidelines, the distinction is made that encapsulating may be considered *after* meeting all remediation requirements. Finally, as proof that the residence is safe and ready for occupancy, a report detailing all assessment, remediation and repair work must be provided instead of a single certification document as required in BC municipalities. Full guidelines are located in Appendix 3.

### *Cost Recovery*

As a cost recovery measure, BC municipalities are able to levy fees and fines on to the property owner usually with any unpaid costs added to annual property taxes. Documented in a municipality’s bylaw addressing MGOs, inspections, permits, charges and fines are thoroughly detailed. Of particular interest are special inspection or special safety inspection fees issued in

conjunction with former marijuana grow operations. These charges can change considerably across communities. Graph 2 illustrates the range of fees starting at \$300 in Maple Ridge up to \$6500 in Port Coquitlam.

**Graph 2. Special Inspection or Special Safety Inspection Fee charged by Municipality**



Source: Municipal Bylaws

The total cost of remediation for the property owner also varies. Restoration companies quote cost based on square footage of the home to be restored. As restoration rates are not the same across the industry, the cost of restoration may show considerable differences, even in comparable circumstances. Cost differences also occur depending on who assigns remediation plans and to what extent. Remediation plans assigned from qualified professionals are determined through expertise in the field unlike plans developed under the direction of the property owner. Provincial standards in determining cost schedules and specific remediation requirements could assist both the homeowner and qualified professionals. Cost schedules would provide assurance that the

homeowner is receiving fair pricing while supporting equal opportunities for qualified professionals while working within provincial restoration standards ensures that all health and safety requirements have been met.

## **Evaluation**

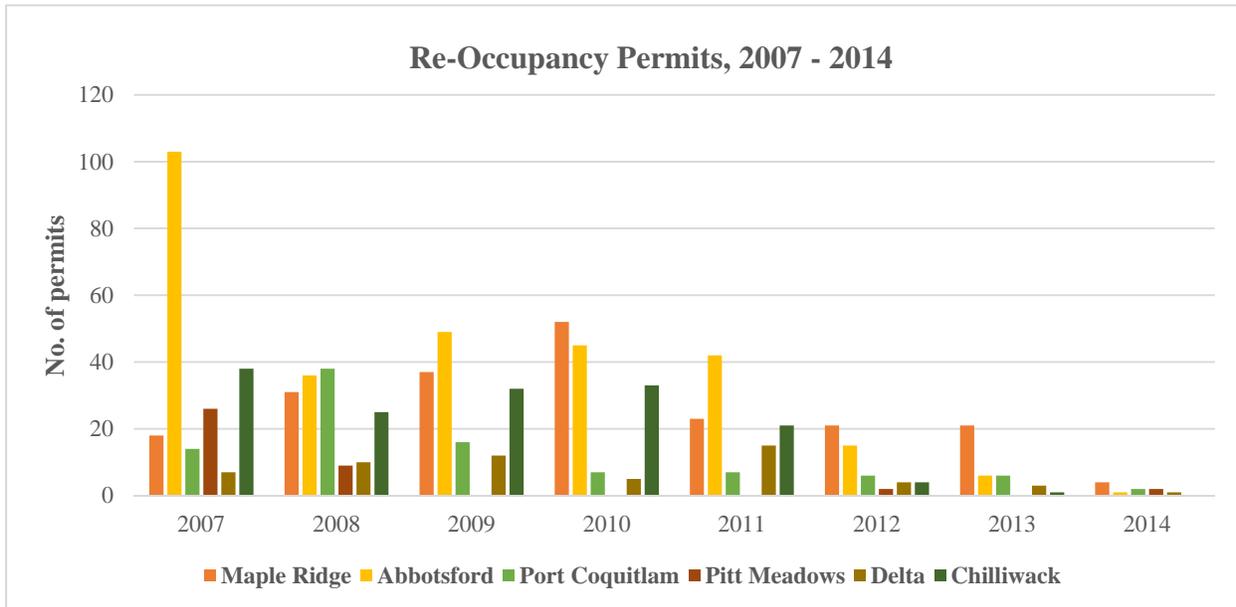
Evaluations of legal processes are often overlooked. Programs and personnel are usually the focus of evaluations with well-defined measurable criteria. As municipalities are busy with daily tasks of running a community, the success of bylaws is not always measured. Some municipalities keep statistical information well organized and available while others do not monitor all areas of information. As well, some communities are willing to provide information where others are cautious, consulting their legal department on information release. Nevertheless, collecting information on the remediation of MGOs in some BC municipalities has been successful.

In an effort to measure performance of bylaws addressing remediation of marijuana grow operations, the collection of re-occupancy permits granted by the municipality is meant to provide a glimpse as to the success of this legislation. Of the 162 municipalities in BC, 16 were chosen as a sample where bylaws addressing marijuana grow operations and the remediation of the property are available. Due to the different years in which MGO bylaws were implemented, the year range of 2007 to 2014 is used for comparison across responding municipalities to enable a complete review. These municipalities were sent a request for the number of re-occupancy permits issued per year since the implementation of the bylaw as well as the total number of homes to be remediated. Six municipalities responded with their statistics, six did not respond, one had only mixed aggregate data and three municipalities required Freedom of Information (FOI) requests. FOI requests often include fees with some municipalities charging on an hourly basis for collection of information. The timeline is 30 days to complete the request and there is no guarantee the municipality has the required information or that the information provided is exactly as requested.

In graph 3 the results of the data show that in the six participating municipalities, there is an overall decline in the number of re-occupancy permits issued. From 2008 to 2010 in Maple Ridge and Chilliwack, there was a rise in re-occupancy permits issued while Pitt Meadows and Port Coquitlam saw a decline. The maximum number of re-occupancy permits issued varies across communities. In 2007, Abbotsford, Pitt Meadows and Chilliwack show the maximum number of

permits issued while Maple Ridge peaked in 2010, and Delta in 2011. Since 2011, most communities have seen a decrease in re-occupancy permits issued.

**Graph 3. Municipal Re-Occupancy Permits, 2007 - 2014**



Source: Municipal Data

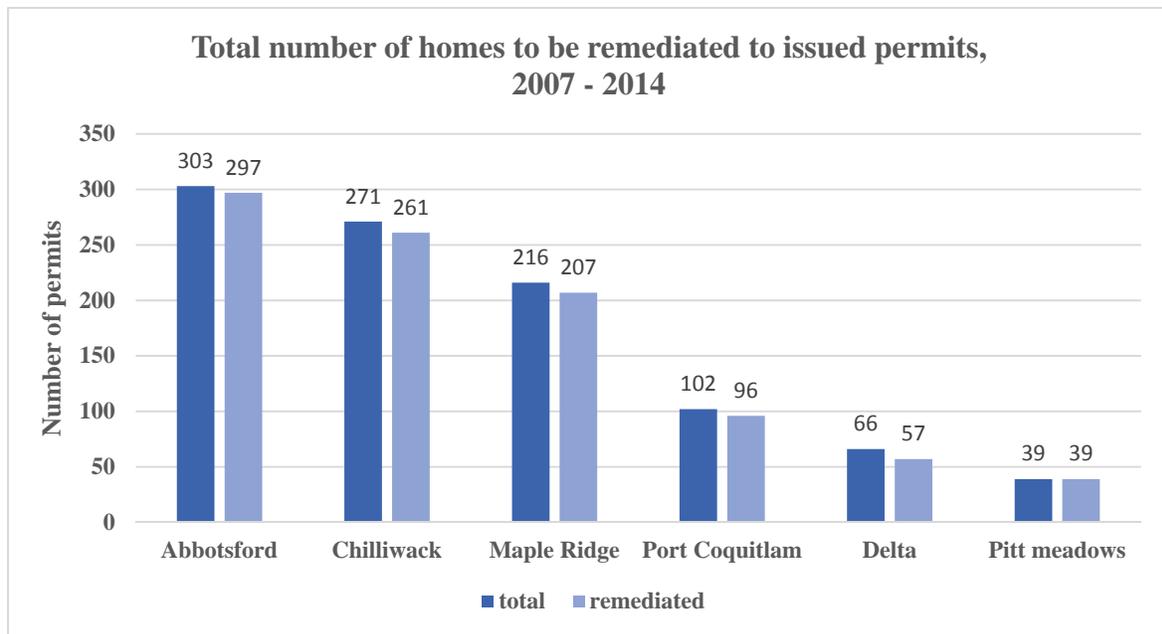
There may be a number of reasons for this overall decline. Some municipalities reported that there has been a general reduction in reported MGOs possibly due to MMAR with many residents now holding personal medical marijuana licenses. With a personal medical marijuana license, residences are not regarded as an MGO and therefore would not be included in an MGO remediation count. Detection of grow ops may be improving through police reports, better awareness of potential MGOs with increased inspections from property managers or owners and through neighbourhood watch programs. Property owners may have become aware of B.C. Civil Forfeiture rules operating under the authority of the Civil Forfeiture Act. The Civil Forfeiture Act and Regulations allow civil court proceedings against properties believed to be the instrument or proceeds of unlawful activity as well as against property valued at \$75,000 or less that is not real estate (Minister of Justice, n.d.). It is also possible that there are existing MGOs in communities which have not yet been detected.

With the overall national decrease of marijuana production, as indicated in graph 1, the corresponding decline in re-occupancy permits is consistent. When a correlation was run between

national drug production illustrated in graph 1, to the decline in re-occupancy permits issued at the municipal level in graph 3, the result of 0.84 indicates a strong positive relationship. However, even though there is a strong correlation between these two data sets, caution is needed in interpreting results as the data proximity does not imply that one is the cause of the other.

The sample of municipalities shown in graph 4 illustrates the high compliance rate between the total number of homes to be remediated to the number of municipal re-occupancy permits issued. Graph 4 shows the level of compliance with each municipality’s MGO remediation bylaw as very high at an average of 95%. Reasons for the differences between those homes identified for remediation and those issued re-occupancy permits include demolition of the structure, an on-going remediation process, or non-compliant property owners.

**Graph 4. Total number of homes to be remediated to issued re-occupancy permits, 2007 - 2014**



Source: Municipal Data

## Methodology

The methodology of study used in this research uses both qualitative and quantitative approaches. The analysis encompasses a broad scope of current and historical information addressing the remediation of homes from drug production as well as collecting data for comparison. This

research has reviewed standards, regulations, enforcement authorities and relevant data in remediation processes over different jurisdictions. The review began with a search through municipal acts of the provinces and territories focusing on existing legislation of remediation of drug production properties. Research also covered media, provincial and federal acts, industrial and occupational hygiene reports and association standards, local and national statistics on marijuana offenses and production, grow operations and remediation. American state legislation, environmental and health regulations have been examined in several states as well as guidelines presented by the US EPA. Australia, New Zealand and Britain were also reviewed for general statistics on marijuana, drug production and remediation laws or guidelines. Data have also been collected through email and telephone requests for national legislation, municipal bylaws and processes. This review also includes personal communications with stakeholders and academic research accessed through university databases.

#### *Limitations on Methodology*

Comparison is heavily concentrated in Canada, mostly in BC, Alberta and Ontario. The US has greater concern with clandestine methamphetamine drug labs than MGOs as shown with state law provisions. The comparison of BC municipal data on re-occupancy permits is to determine the level of compliance with the selected municipalities' remediation of marijuana grow operations bylaw. Caution is needed when interpreting the given correlation result as correlation does not imply causation.

## **Discussion**

To date, municipal regulations have determined remediation processes of marijuana grow operations in British Columbia. Establishing provincial standards would launch benchmark legislation on which all municipalities and homeowners could rely. In the US, comprehensive guidelines for the remediation of drug properties have allowed states to establish law on the cleanup of these properties. Likewise, Alberta Health Services oversees MGO remediation through the department of Environmental Public Health. In BC, there is established, effective provincial regulation available to form legislation needed in the remediation of MGOs.

## *Acts*

As mentioned earlier, the BC Environmental Management Act can play a coordinated part in provincial MGO remediation laws. The Act, covering contaminated sites, has been included in some municipal MGO remediation regulations to account for all outside areas of drug production such as water, soil and vegetation. Australia's guidelines also include site remediation. Even though the US EPA guidelines are directed at methamphetamine drug laboratories, recommendations cover outdoor sampling in relation to hazardous and solid wastes found on contaminated sites (Appendix 1), as well as buildings and structures in drug production clean up (US EPA, 2013).

While the BC Safety Standards Amendment Act is used in conjunction with municipal bylaws for the purposes of MGO discovery, caution is necessary. In the case of *Arkininstall v. City of Surrey*, Section 8 of the Canadian Charter of Rights and Freedoms "everyone has the right to be secure against unreasonable search or seizure" challenges warrantless entry and inspection of homes for the purpose of electrical inspection (Boyd & Carter, 2014, p.149; AHS, 2011). Utilizing the Safety Standards Amendment Act by Surrey's Electrical and Fire Safety Inspection Team (EFSIT), suspicion of an illegal MGO was raised due to the higher than normal electrical consumption rates indicated at this residence. The Arkininstall residence was not an MGO, but a 6800 square foot home with an indoor pool, sauna and steam room, hot tub, greenhouse and central air conditioning explaining the higher than average electrical consumption (Boyd & Carter, 2014, p.149). In appeal, the judge concluded that "warrantless entry and inspection of residential premises for the regulatory purpose of inspecting electrical systems for safety risks that may be related to marijuana grow operations" do infringe on Section 8 of the Charter of Rights and Freedoms (Boyd & Carter, 2014, p.151). A similar case was launched in 2009 in Mission, BC.

Under a class action lawsuit, 499 residents of Mission, BC filed suit with the District of Mission seeking losses for inspection fees and related charges, ensuing stigma, and infringement of the Charter of Rights and Freedoms (Boyd & Carter, 2014, p.154). Under Mission's Controlled Substance Property Bylaw, safety inspection teams were able to enter private residences for inspection of increased electrical consumption. While none of these Mission residents had marijuana grow operations, each was billed the \$5200 special safety inspection fee (Boyd & Carter, 2014, p.152). Clean-up fees were also billed to homes that had some signs of an MGO. If

there were signs of mould, holes in walls or other infractions, additional fees such as water testing and professional carpet cleaning were added to the resident's bill (Boyd & Carter, 2014, p.152). In this case, there is concern that the criteria were so broad that any home could be regarded as having evidence of a marijuana grow operation (Boyd & Carter, 2014, p.163). As of January 2013, the District of Mission has repealed the Controlled Substance Property Bylaw 5044-2009 (District of Mission, 2013).

### *Guidelines*

A number of associations and agencies have attempted to fill the gap in legislation by providing guidelines for the remediation of MGOs. Alberta's *Marihuana Grow Operations Abatement Program* supplies detailed steps to complete the MGO remediation process. This guide was completed by certified professional hygienists and a professional engineer with extensive experience outlining decisive instructions for remediation (AHS, 2011). The Canadian Construction Association (CCA) also recognizes the absence of federal legislation for effective mould remediation practices. In 2002, the CCA developed national guidelines to minimize risk of mould growth through step-by-step instructions on mould remediation protocols, disposal of materials and selection of mould remediation contractors (Canadian Construction Association, 2004). In several BC municipal bylaw requirements, certification of a former MGO remediated home must meet the US Institute of Inspection, Cleaning and Restoration Certification Standards. A December 2015 update has been released covering not only mould remediation and water restoration practices, but instructions on hard surface, textile, carpet and upholstery cleaning as well as crime scene clean up (IICRC, 2012).

### *Bylaws*

Provincial standards for the remediation of marijuana grow operations could provide specific measures for each municipality in British Columbia to remediate MGOs effectively. Setting a standard encompassing definitions of terms and both qualitative and quantitative criteria for remediation plans, roles and responsibilities, liabilities, and qualifications of professionals and contractors will contribute to greater confidence, accountability, and transparency in the MGO remediation process.

Municipalities have established bylaws addressing marijuana grow operations and remediation under many different names. Abbotsford, Coquitlam, Delta, New Westminster, Port Moody, Prince George, and Surrey operate under the name Controlled Substances Property Bylaw. This bylaw is classified under Richmond's Property Maintenance and Repair Bylaw, Chilliwack's Nuisance, Noxious or Offensive Trades, Health and Safety Bylaw, Ottawa's Marijuana Grow Operation Remediation Bylaw and Pitt Meadow's very concise Grow Operation Bylaw. The diversity of bylaw names continues with bylaw definitions. While bylaw names are unique to each community, consistency in terms and definitions throughout the province decreases chances of misinterpretation.

As noted under definitions, there are a variety of interpretations of given terms coming from different sources. Abbotsford looks to provincial acts when defining terms, such as a qualified professional, compared to West Vancouver's well-defined "professional cleaner" in its Controlled Substance Nuisance Bylaw. The actual remediation process is also described under various terms in municipal bylaws.

As an example, Port Moody, New Westminster and Delta package municipal requirements for the remediation of MGOs under the condition of a "hazardous situation". These municipalities similarly define a hazardous situation to include "any real or potential risk to the health or safety of persons or property arising or resulting from the use of a property for the manufacture of a controlled substance or for the trade, use, sharing, sale or barter of a controlled substance therein" (City of Port Moody, 2002; City of New Westminster, 2001; Corporation of Delta, 2004). Pitt Meadow and Chilliwack both widely identify the remedial action of an MGO under the *Community Charter*, Division 12 of Part 3 (City of Pitt Meadows, 2005; City of Chilliwack, 2004). This section encompasses council's duties, hazardous conditions, nuisances, harm to drainage or dike, time limits for compliance, notice to property owner, owner requests to council and recovery of municipal costs through the sale of property (Community Charter, 2016).

A key area that would benefit from provincial legislation is a descriptive process available to homeowners and all qualified professionals to determine thorough remediation plans. Currently, there is no requirement that a qualified professional must be hired and submit remediation plans in BC. From speaking with a number of restoration companies, it is apparent that remediation plans are not always comprehensive. For example, in receiving remediation plans from an

industrial hygienist, having completed a visual assessment only, one restoration contractor noted that restoration was limited to surface cleaning. In the course of cleaning walls, electrical outlet covers were removed to find heavy mould growth behind the drywall (J. Short, On Side Restoration, personal communication, Jan. 29, 2016). Alberta's environmental consultants also recognize this concern. In the 2009 report *Recommendations of the Assessment and Remediation of Properties Used as Illegal Drug Operations* consultants recommend that there should be more intrusive testing and less reliability on visual assessment (Lee and Rollins, 2009). When restoration plans are dictated by the homeowner without consultation of a qualified professional, remediation may not be as extensive. The cost to assess and submit remediation plans is in addition to post air quality sampling and testing for certification that is required by municipalities. This extra cost of testing and receiving remediation plans may be cost prohibitive for some homeowners. Aside from cost of mould and water testing, other concerns have been raised.

Lee and Rollins (2009) note the lack of qualified professionals and contractors. In communication with Medallion Healthy Homes, an industrial hygiene firm, there is agreement as to the lack of qualified individuals. Observations included that not all hygienists are licensed under the same governing body and that not every company performing air quality sampling and testing are certified (J. Schmidt, personal communication, Feb. 9, 2016).

### *Evaluation*

It is difficult to measure procedures without standardized policies. When policies are in place, planning, implementing and reporting evaluation results have many practical benefits. Planning evaluations can increase the impact of the policy, implementing identifies effectiveness and reporting results increases citizen awareness and interest. As a glance to the effectiveness of municipal MGO bylaws, a comparison was done between the number of former MGO homes to be remediated to those that were issued re-occupancy permits.

Compliance with remediation of MGOs in municipal bylaws, as shown in graph 4, is considered high and in some communities successful. The City of Port Coquitlam's assistant manager considers bylaw compliance strong due to the municipality's proactive approach together with utilizing existing provincial legislation. Bylaw staff demonstrate a proactive approach in finding MGOs through tips from the public and from the BC Safety Standards Amendment Act, relying heavily on electrical usage data provided by BC Hydro (P. Jones, personal communication, Jan.

12, 2016). Staff analyze this data carefully as they are aware that swimming pools will mirror marijuana grow ops consistently throughout the year in terms of higher electrical usage.

Having successful municipal bylaws serves to strengthening discussion around developing provincial legislation for MGO remediation. In the United States, state laws in the remediation of drug properties are well established regardless of which authority is responsible. From guidelines developed by the US EPA, states are able to select quantitative measures from given ranges and adopt these regulations into law. Similar to those US states that regulate remediation programs through the Department of Health, Alberta takes authority from its provincial Public Health Act. Ontario's Municipal Act allows for notification of an MGO, requiring municipalities to follow up with a building inspection in a timely manner, but does not mention any remediation processes. British Columbia has existing, successful rules and bylaws, as well as available guidelines from which to draw and assemble statutes governing the remediation of marijuana grow operations, but it is political will that is needed to complete this task.

## **Recommendations**

Recommendations drawn from this report emphasize setting specific standards adaptable from existing laws in BC and other jurisdictions for the remediation of marijuana grow operations.

1. In an effort to set provincial standards, establishing definitions of relevant and specific terms, such as a “marijuana grow operation” and “qualified professionals”, would provide certainty and clarity in avoiding misinterpretations.
2. A standard remediation process, including specific measurable criteria for the removal of mould and fungi as suggested in several stakeholder guidelines, could be developed to benefit all stakeholders.
3. Ensure qualification of all professionals in the area of remediation.
4. Implement cost schedules to maintain market competition and consistency for homeowners to obtain the highest level of remediation possible.
5. To conduct additional research in collaboration with BC municipalities and stakeholders to contribute practical and effective recommendations for legislation.

Even with the current decline in marijuana production in Canada, the likelihood of MGOs completely disappearing is remote. Provincial policy standards addressing the remediation of marijuana grow operations, while heeding the Charter of Rights and Freedoms, are essential.

#### *Future Considerations*

There is growing acceptance in Canada towards the legalization of marijuana. With the recent national election and sweeping victory of the Liberal government, federal laws regarding marijuana and its production will continue to change. Medical marijuana legislation regarding personal licensing is currently under review by the Supreme Court of Canada and the City of Vancouver, in terms of harm reduction, has pioneered change with its own municipal regulations. The outcome of these decisions are important to consider in addressing the remediation of marijuana grow operations in future provincial legislation.

## Appendix 1

### US EPA suggested remediation sequence and techniques

- 1) Secure the property to prevent unauthorized entry. The structure should not be reoccupied until after remediation is complete.
- 2) Hire a contractor to conduct remediation, sampling and air monitoring.
- 3) Ventilate or “air out” the structure with fresh, outdoor air [e.g., open doors and windows; use fans, blowers and/or a negative air unit with a high efficiency particulate air (HEPA) filtration system] to ensure worker safety and health. Continue ventilation during the remediation process, taking steps to protect nearby or adjacent structures from contamination.
- 4) Perform a preliminary assessment:
  - a. Conduct an off-site evaluation using relevant documentation.
  - b. Conduct an on-site evaluation.
  - c. Assess the need for pre-remediation and post-remediation sampling.
- 5) Conduct pre-remediation sampling, if applicable.
- 6) Develop a cleanup plan using information from the preliminary assessment. This should include a waste disposal plan.
- 7) Remove contaminated materials. Any materials or objects that will be disposed of should be discarded before cleanup begins.
- 8) Vacuum walls, floors and other hard surfaces using a vacuum with a HEPA filter.
- 9) Complete an initial washing of the walls and floors to remove the majority of contamination.
- 10) Clean and seal the heating, ventilation and air conditioning (HVAC) system. Do not run this system again until all other cleanup is complete.
- 11) Flush plumbing traps.
- 12) Use a detergent-water solution to wash ceilings, walls, floors, non-porous furniture and other items that will be kept.
- 13) Conduct post-remediation sampling, if applicable. (Ensure structure/items are completely dry before sampling.)
- 14) Consider encapsulating washed ceilings, walls and floors once they meet remediation requirements or guidelines.
- 15) If wastewater from detergent-water washing is disposed of down drains within the structure, flush the system again after remediation.
- 16) Ventilate the structure once more after indoor cleanup is complete.

- 17) Perform outdoor remediation activities.
- 18) Secure the property once more to prevent unauthorized entry.
- 19) Prepare the final report.

## Appendix 2



# Checklist For Phases of Remediation Marihuana Grow Operations: Repair, Rehabilitation and Remediation Requirements

If a property is the subject of an Executive Officer's Order relating to a former marihuana grow operation, be aware that the Registered Owner and/or Agent shall complete the following:

*(Phase 1 - removal of all contaminated materials, waste matter and refuse and reinstatement of utility services, furnace, etc. At this point, however, there would still be very restricted entry allowable, such as contractors or inspectors.)*

- OBTAIN ORDER** - Obtain a copy of the Executive Officer's Order from Alberta Health Services (AHS).
- HIRE CONTRACTORS** - Hire an environmental consultant and a remediation contractor (hereinafter known as the "Contractors").
- OBTAIN PERMISSION TO ENTER** - The *Contractors* shall obtain written permission from the Executive Officer of Alberta Health Services **prior to entering the premises**. The *Contractors* shall provide AHS with written documentation from the property owner authorizing them to act on their behalf.
- PREPARE ASSESSMENT & SCOPE OF WORK** - The *Contractors* shall prepare a detailed assessment and Scope of Work based on their initial inspection **prior to carrying out any work inside including cleaning. Intrusive testing shall be carried out at this time by the environmental consultant**. The *Contractors* shall oversee all remediation and repair work and perform or arrange for a complete mould investigation and air sampling. Work shall follow the requirements indicated in the Executive Officer's Order and established in the Alberta Health Services *Marihuana Grow Operations Repair, Rehabilitation and Remediation Requirements* and the *Fungal Air Testing, Investigation and Reporting Requirements for Mould Remediation*.
- HIRE ELECTRICAL CONTRACTOR** - Hire a qualified electrician(s) to repair the electrical deficiencies to the service and to any wiring. **THIS MUST BE DONE BEFORE OBTAINING THE PERMIT SO THE ELECTRICAL CONTRACTOR CAN BE NAMED ON THE PERMIT.**
- HIRE PLUMBER/GAS FITTER CONTRACTOR** - Hire a qualified plumber/gas fitter(s) to repair any defects to the gas service and perform a gas line pressurization test. **THIS MUST BE DONE BEFORE OBTAINING THE PERMIT SO THE PLUMBING/GAS FITTER CONTRACTOR CAN BE NAMED ON THE PERMIT.**

- ❑ **APPLY FOR PERMITS** - Application shall be made to the City or Municipality for all required permits (Environmental Restoration, or ERP, is required by the City of Calgary. The term "Building Permit for Restoration" is used in other municipalities). The detailed Assessment and Scope of Work report must be submitted with this application to the City or Municipality. The detailed Assessment and Scope of Work report must include a hazardous materials summary. A STRUCTURAL ENGINEER'S REVIEW MAY BE REQUESTED BY THE CITY BASED ON THEIR INSPECTOR'S NOTES OR THE SCOPE OF WORK.
- ❑ **SUBMIT DOCUMENTS TO AHS** - The detailed Assessment and Scope of Work report must also be submitted to Alberta Health Services. The detailed Assessment and Scope of Work report must include a hazardous materials summary.
- ❑ **REQUEST INSPECTION** - Call the City or Municipality to carry out an "electrical service inspection" and a "gas inspection" when related deficiencies have been corrected.
- ❑ **REINSTATE GAS & ELECTRICITY** - Once these initial inspections have passed, contact the utility companies to reinstate the services that have been disconnected (electrical, gas and/or water service). (Proper and thorough remediation work and air sampling cannot be completed nor accepted without the availability of heat, light and hot water.)
- ❑ **REINSTATE WATER SUPPLY.**
- ❑ **FLUSH PLUMBING AND SEWER LINES** – thoroughly flush all lines to remove all stagnant water, microorganisms, and any leachates or particulates.
- ❑ **SUBMIT WATER BACTERIOLOGICAL SAMPLE FOR ANALYSIS** – Contact a private laboratory to obtain the sample bottle and instructions for taking and submitting the water sample.

*(Phase 2 - surface cleaning and furnace cleaning followed by air sampling. After this point and once air samples have been accepted by AHS, realtors and potential purchasers, etc. could access.)*

- ❑ **REMEDiate & CLEAN** - Ensure that all remediation is completed by the *Contractors* according to the requirements set out in the Executive Officer's Order and the prepared Scope of Work.
- ❑ **FURNACE, HOT WATER TANK & FIREPLACE** – Hire professional and reputable companies to inspect and clean the furnace and ducting, hot water tank exhaust, and/or fireplace. Ensure that inspections and cleaning are completed. Inspection reports/ documentation will be required for review by AHS.
- ❑ **AIR SAMPLING** - *Contractors* must arrange for air sampling to be done after all remediation and cleaning, including that of the furnace and ducting, have been completed.
- ❑ **SUBMIT DOCUMENTS** - Submit all documents to AHS for review and acceptance.

- **AIR RESULTS - SATISFACTORY** - If the air results are acceptable, Alberta Health Services will arrange to inspect the premises. City/Municipal gas and electrical inspectors must also be contacted to carry out their **final inspections**. The building inspector must be contacted to carry out a **framing inspection** prior to reinstallation of insulation and vapour barriers. He will carry out a final inspection after reinstallation of insulation and vapour barriers. **The City/Municipal inspectors will not enter the facility for final inspections until satisfactory air sampling has been confirmed by Alberta Health Services.**
- **AIR RESULTS - UNSATISFACTORY** - If the air results are not acceptable, further cleaning and remediation will be necessary. Contact the Executive Officer for further information.

*(Phase 3 - complete rebuild, including cosmetic repairs. Only after Phase 3 would the Unfit Order be lifted.)*

- **COMPLETE RENOVATIONS** – Once all documents are submitted to AHS, the necessary inspections have been completed, and permission to proceed is obtained from the Executive Officer, the final renovations may be done to ensure the dwelling is in a habitable condition (reinstallation of walls, floor coverings, cabinetry, etc.). When the basement is redeveloped, separate electrical, building and plumbing permits are required.
- **LIFTING OF ORDER** - If all inspections pass and all documents have been submitted as required, AHS will lift the Unfit Order and prepare a Rescind notification. Any postings may then be removed from the premises.

*For more information, please contact your nearest Environmental Public Health office.*

Edmonton Main Office  
Calgary Main Office  
Lethbridge Main Office

780-735-1800  
403-943-2295  
403-388-6689

Grande Prairie Main Office  
Red Deer Main Office  
[www.albertahealthservices.ca/eph.asp](http://www.albertahealthservices.ca/eph.asp)

780-513-7517  
403-356-6366

4EPHB-11-026  
Created: Jul/11

## Appendix 3

### Australia - Remediation Guidelines of Hydroponic Plantations

#### 4.3 Approach

The following outlines the approach to be adopted for the assessment and remediation of premises formerly used for hydroponics plantations:

1. Obtain a building assessment report and develop a plan that identifies the damage, hazards and repairs required to remediate the property.
2. The assessment, repair and remediation of the premises are required to consider the following, unless there is evidence available to preclude any of them:
  1. Repair and restore damaged building materials, finishes, and windows, ensuring that the building is windproof, weatherproof, and waterproof.
  2. Remove extraneous building materials and plastic sheeting; examine materials remaining indoors, crawl-spaces and roof spaces for evidence of water damage and/or mould growth; clean, repair, or replace materials in accordance with a professional environmental assessment and remediation plan.
  3. Reduce interior clutter, and properly dispose of waste materials.
  4. Repair and restore electrical systems to proper operating condition.
  5. Repair and restore heating, ducting and ventilation systems to proper operating condition.
  6. Repair and restore plumbing systems to proper operating condition.
  7. Repair and restore any gas lines and connections to proper operating condition.
  8. Remove and properly dispose of any remaining chemicals. These are likely to primarily consist of fertilisers and pesticides however there may also be some chemicals associated with THC (tetrahydrocannabinol) extraction (such as isopropyl alcohol, naphtha or ethanol). These chemicals should be removed and disposed in accordance with existing protocols as outlined by the NSW EPA for the disposal of:
    9. Pesticides
    10. Household chemicals

The areas where chemicals were used should be cleaned with detergent and water. If staining or odours remain the affected materials may be replaced or encapsulated with paint or sealant.

1. Any moisture or water damage should be identified, the underlying causes corrected and water-damaged materials repaired or replaced.
2. Check for the presence of visible mould growth in all areas including air conditioning ducting and wall cavities. Any ongoing sources of moisture/humidity should be repaired and mould affected materials cleaned or replaced (where they cannot be cleaned or it is not

accessible or cost effective to clean). Professional services may be used to check for and remediate mould issues, if required.

3. Where required, council approval for building repair works should be obtained;
4. Where required, permits for electrical, water or gas works should be obtained;
5. Licensed contractors are required to undertake structural, electrical, plumbing and gas works.
6. Document all assessment, remediation and repair work in a report to demonstrate that the premises are safe and suitable for habitation.

## References

- Alberta Health Services (AHS). (2011). *Marijuana Grow Operations Abatement Program*. Retrieved from [http://www.nceh.ca/sites/default/files/MGO%20Program%20Report%20\(v20\).pdf](http://www.nceh.ca/sites/default/files/MGO%20Program%20Report%20(v20).pdf)
- Alberta Health Services (AHS). (2011-a). *Marijuana Grow Operation Repair, Rehabilitation, and Remediation Requirements*. Retrieved from <http://www.albertahealthservices.ca/assets/wf/eph/wf-eh-marihuana-growop-repair-rehab-remediation-requirements.pdf>
- Alberta Health Services (AHS). (2011-b). *Fungal Air Testing, Investigation and Reporting Requirements for Extensively Mould-Contaminated Buildings*. Retrieved from <http://www.albertahealthservices.ca/assets/wf/eph/wf-eh-fungal-air-testing-for-mould-contaminated-buildings.pdf>
- Alberta Justice and Solicitor General. (2014). *Grow Op Free Alberta Final Recommendations Report*. Retrieved from [https://justice.alberta.ca/programs\\_services/safe/growop/Documents/Marijuana%20Grow%20Op%20\(MGO\)%20Report%20Recommendations.pdf](https://justice.alberta.ca/programs_services/safe/growop/Documents/Marijuana%20Grow%20Op%20(MGO)%20Report%20Recommendations.pdf)
- Amendments to Land Use Code: DC-14-0001*. (2014). Retrieved from <http://www.bouldercounty.org/doc/landuse/dc140001boccrec.pdf>
- Australian Crime Commission (ACC). (n.d.). *Illicit Drug Data Report 2012-13*. Retrieved from <https://crimecommission.gov.au/publications/intelligence-products/illicit-drug-data-report/illicit-drug-data-report-2012-13>
- Bill 25, Safety Standards Amendment Act*. (2006). First Reading, 38<sup>th</sup> Parliament, 2<sup>nd</sup> Session. Retrieved from [https://www.leg.bc.ca/pages/bclass-legacy.aspx#/content/legacy/web/38th2nd/1st\\_read/gov25-1.htm](https://www.leg.bc.ca/pages/bclass-legacy.aspx#/content/legacy/web/38th2nd/1st_read/gov25-1.htm)
- Bill 29, Clandestine Drug Operation Prevention Act*. (2013). First Reading, Retrieved from [http://www.ontla.on.ca/web/bills/bills\\_detail.do?locale=en&BillID=2747&detailPage=bills\\_detail\\_the\\_bill](http://www.ontla.on.ca/web/bills/bills_detail.do?locale=en&BillID=2747&detailPage=bills_detail_the_bill)

- Brown, G.R. (2010). *Practices in Identifying, Remediating, and Reoccupancy When Mold Occurs*. Retrieved from <http://www.crcnetbase.com/doi/abs/10.1201/9781439801475-8>
- Boyd, S.C., & Carter, C.I. (2014). *Killer Weed: Marijuana Grow Ops, Media, and Justice*. University of Toronto Press: Toronto.
- Campaign to Regulate Marijuana like Alcohol. (2012). *Amendment 64: the Regulate Marijuana Like Alcohol Act of 2012*. Retrieved from <http://www.regulatemarijuana.org/s/regulate-marijuana-alcohol-act-2012>
- Canadian Construction Association (CCA). (2004). *Mould Guidelines for the Canadian Construction Industry*. Retrieved from <http://www.cca-acc.com/documents/cca82/cca82.pdf>
- Centers for Disease Control and Prevention (CDC), & US Department of Housing and Urban Development (HUD). (2008). *Healthy Housing Inspection Manual*. Retrieved from [http://www.cdc.gov/nceh/publications/books/inspectionmanual/healthy\\_housing\\_inspection\\_manual.pdf](http://www.cdc.gov/nceh/publications/books/inspectionmanual/healthy_housing_inspection_manual.pdf)
- City of Abbotsford. (2006). *Controlled Substance Property Bylaw No. 1611-2006*. Retrieved from <https://abbotsford.civicweb.net/document/7482>
- City of Burnaby. (2004). *Building Bylaw 2004, No.11729*. Retrieved from <https://burnaby.civicweb.net/filepro/documents/5529?preview=10174>
- City of Chilliwack. (2004). *Nuisance, Noxious or Offensive Trades, Health and Safety Bylaw 2004, No. 3044*. Retrieved from <http://www.chilliwack.ca/main/attachments/Files/363/BL%203044%20Nuisance-%20Noxious%20or%20Offensive%20Trades.pdf>
- City of Coquitlam. (2007). *Controlled Substance Property Bylaw No. 3833, 2007*. Retrieved from [http://www.coquitlam.ca/docs/default-source/council-agenda-documents/RegularCouncilMeeting2007-03-19\\_802.pdf?Status=Master&sfvrsn=0](http://www.coquitlam.ca/docs/default-source/council-agenda-documents/RegularCouncilMeeting2007-03-19_802.pdf?Status=Master&sfvrsn=0)
- City of Kelowna. (2005). *Nuisance Controlled Substance Bylaw No. 9510*. Retrieved from <http://apps.kelowna.ca/CityPage/Docs/PDFs/Bylaws/Nuisance%20Controlled%20Substance%20Bylaw%20No.%209510.pdf>

- City of Maple Ridge. (2004). *Grow Operation, Health, Nuisance and Safety Bylaw 6274 – 2004*.  
Retrieve from <https://www.mapleridge.ca/DocumentCenter/View/537>
- City of Ottawa. (2015). *Marijuana Grow Operation Remediation By-law No. 2012 – 402*.  
Retrieved from  
[http://documents.ottawa.ca/sites/documents.ottawa.ca/files/documents/mgo\\_en.pdf](http://documents.ottawa.ca/sites/documents.ottawa.ca/files/documents/mgo_en.pdf)
- City of Port Coquitlam. (n.d.). *Controlled Substance Nuisance Bylaw*. Retrieved from  
[http://www.portcoquitlam.ca/City\\_Government/Bylaws\\_Enforcement/Controlled\\_Substance\\_Nuisance\\_Bylaw\\_Grow\\_Operation\\_Bylaw\\_.htm?PageMode=Print](http://www.portcoquitlam.ca/City_Government/Bylaws_Enforcement/Controlled_Substance_Nuisance_Bylaw_Grow_Operation_Bylaw_.htm?PageMode=Print)
- City of Port Moody. (2002). *Bylaw No. 2523*. Retrieved from  
<http://www.portmoody.ca/modules/showdocument.aspx?documentid=5399>
- City of Prince George. (2010). *Controlled Substance Property Bylaw 8298, 2010*. Retrieved from  
from  
[http://princegeorge.ca/cityservices/bylawservices/citybylaws/Bylaw%20Documents/BL8298\\_Controlled\\_Substance\\_Property\\_Bylaw.pdf](http://princegeorge.ca/cityservices/bylawservices/citybylaws/Bylaw%20Documents/BL8298_Controlled_Substance_Property_Bylaw.pdf)
- City of Richmond. (2005). *Property Maintenance and Repair Bylaw No.7897*. Retrieved from  
[http://www.richmond.ca/\\_shared/assets/Bylaw\\_7897\\_12030924608.pdf](http://www.richmond.ca/_shared/assets/Bylaw_7897_12030924608.pdf)
- City of Surrey. (2006). *Controlled Substance Property Bylaw, 2006, No. 15820*. Retrieved from  
[https://www.surrey.ca/bylawsandcouncillibrary/BYL\\_reg\\_15820.pdf](https://www.surrey.ca/bylawsandcouncillibrary/BYL_reg_15820.pdf)
- City of Toronto. (2007). *Toronto Municipal Code Chapter 565, Marijuana Grow Operations*.  
Retrieved from [http://www.toronto.ca/legdocs/municode/1184\\_565.pdf](http://www.toronto.ca/legdocs/municode/1184_565.pdf)
- City of Vancouver. (2014). *Re-occupancy permit process*. Retrieved from  
<http://vancouver.ca/home-property-development/re-occupancy-permit-process-former-grow-operation.aspx>
- City of Vancouver. (2015). *Regulations for medical marijuana-related businesses*. Retrieved from  
<http://vancouver.ca/doing-business/medical-marijuana-related-business-regulations.aspx>

- City of West Vancouver. (2005). *Controlled Substance Nuisance Bylaw No. 4417*. Retrieved from <http://westvancouver.ca/sites/default/files/bylaws/Controlled%20Substance%20Nuisance%20Bylaw%20No.%204417,%202005.pdf>
- Commonwealth of Australia. (2011). *Clandestine Drug Laboratory Remediation Guidelines*. Retrieved from <https://www.ag.gov.au/CrimeAndCorruption/Drugs/Documents/Clandestinedruglaboratoryremediationguidelines.pdf>
- Community Charter. (2016). (*SBC 2003*) Chapter 26, Division 8 – Building Regulation, Requirement for professional certification 55(1). Retrieved from [http://www.bclaws.ca/civix/document/LOC/complete/statreg/--%20C%20--/42\\_Community%20Charter%20\[SBC%202003\]%20c.%2026/00\\_Act/03026\\_03.xml](http://www.bclaws.ca/civix/document/LOC/complete/statreg/--%20C%20--/42_Community%20Charter%20[SBC%202003]%20c.%2026/00_Act/03026_03.xml)
- Corporation of Delta. (2004). *Controlled Substance Property Bylaw No. 6200, 2004*. Retrieved from <https://delta.civicweb.net/filepro/documents/33009?preview=35362>
- Corporation of the District of Pitt Meadows. (2005). *Grow Operation Bylaw No. 2202*. Retrieved from <http://www.pittmeadows.bc.ca/assets/Bylaws/2202%20-%20Grow%20Operation%20Bylaw%20-%20Consolidated%20Version%202007.pdf>
- District of Logan Lake. (2006). *Controlled substance Property Remediation Bylaw 600 2006*. Retrieved from <https://loganlake.civicweb.net/filepro/documents/811?preview=816>
- District of Mission. (2013). *Highlights of the Regular Council Meeting January 7, 2013*. Retrieved from <http://www.mission.ca/wp-content/uploads/Highlights-2013-01-07.pdf>
- Drug Enforcement Administration (DEA). (n.d.). *National Clandestine Laboratory Register*. Retrieved from <http://www.dea.gov/clan-lab/index.shtml>
- Drug Enforcement Administration (DEA). (2014). *National Drug Threat Assessment Summary*. Retrieved from <http://www.dea.gov/resource-center/dir-ndta-unclass.pdf>
- Drug Enforcement Administration (DEA). (2015). *National Drug Threat Assessment Summary*. Retrieved from <http://www.dea.gov/docs/2015%20NDTA%20Report.pdf>

- Environmental Management Act (SB 2003). *Part 4 - Contaminated Site Remediation*. Retrieved from [http://www.bclaws.ca/civix/document/LOC/complete/statreg/--%20E%20--/Environmental%20Management%20Act%20%5BSBC%202003%5D%20c.%2053/00\\_Act/03053\\_04.xml#section40](http://www.bclaws.ca/civix/document/LOC/complete/statreg/--%20E%20--/Environmental%20Management%20Act%20%5BSBC%202003%5D%20c.%2053/00_Act/03053_04.xml#section40)
- Fraser, R. (2014). *Grow Op Free Alberta: Final Recommendations Report*. Retrieved from [https://justice.alberta.ca/programs\\_services/safe/growop/Pages/default.aspx](https://justice.alberta.ca/programs_services/safe/growop/Pages/default.aspx)
- Fric, L., Tomasich, L. (2011). *Canada: A Balancing Act: The Ontario Court Of Appeal Clarifies The Function Of The Tort Of Nuisance In Our Modern Society*. Retrieved from <http://www.mondaq.com/canada/x/135276/Corporate/A+Balancing+Act+The+Ontario+Court+Of+Appeal+Clarifies+The+Function+Of+The+Tort+Of+Nuisance+In+Our+Modern+Society>
- Geoscientists Canada. (n.d.). *What is Geoscience*. Retrieved from <http://geoscientistscanada.ca/profession-of-geoscience/what-is-geoscience/>
- Government of Alberta. (2000). *Public Health Act, Revised Statutes of Alberta. (2000, c. P-37)*. Retrieved from [http://www.qp.alberta.ca/1266.cfm?page=P37.cfm&leg\\_type=Acts&isbncln=9780779733873](http://www.qp.alberta.ca/1266.cfm?page=P37.cfm&leg_type=Acts&isbncln=9780779733873)
- Government of Canada. (2016). *Controlled Drugs and Substances Act S.C. 1996, c. 19*. Retrieved from <http://laws-lois.justice.gc.ca/eng/acts/c-38.8/FullText.html>
- Government of Ontario. (2016). *Municipal Act, 2001, S.O. 2001, c. 25*. Retrieved from <http://www.ontario.ca/laws/statute/01m25>
- Government of the United Kingdom. (n.d.) *Seizures of drugs in England and Wales, 2014/15*. Retrieved from <https://www.gov.uk/government/statistics/seizures-of-drugs-in-england-and-wales-financial-year-ending-2015>
- Health Canada. (2001). *Marihuana Medical Access Regulations (MMAR)*. Controlled Drugs and Substances Act. Retrieved from [http://www.canlii.org/en/ca/laws/regu/sor-2001-227/91759/sor-2001-227.html#sec21subsec2\\_smooth](http://www.canlii.org/en/ca/laws/regu/sor-2001-227/91759/sor-2001-227.html#sec21subsec2_smooth)

- Health Canada. (2004). *Fungal Contamination in Public Buildings: Health Effects and Investigation Methods*. Retrieved from <http://publications.gc.ca/collections/Collection/H46-2-04-358E.pdf>
- Health Canada. (2013). *Drugs and Health Products*. Retrieved from <http://www.hc-sc.gc.ca/dhp-mps/marihuana/about-apropos/gloss-eng.php>
- Health Canada. (2014). *Is Your Home Healthy? Easy Steps to Maintaining a Healthy Home*. Retrieved from [http://www.hc-sc.gc.ca/hl-vs/alt\\_formats/pdf/pubs/seniors-aines/senior-guide-aines-eng.pdf](http://www.hc-sc.gc.ca/hl-vs/alt_formats/pdf/pubs/seniors-aines/senior-guide-aines-eng.pdf)
- Health Canada. (2015). *Medical Use of Marijuana*. Retrieved from <http://www.hc-sc.gc.ca/dhp-mps/marihuana/index-eng.php>
- Institute of Inspection, Cleaning and Restoration Certification (IICRC). (2012). *Standards*. Retrieved from <http://www.iicrc.org/standards/>
- Kanabec County. (2005). *Cleanup of Clandestine Drug Lab Sites Ordinance*. Kanabec County Ordinance No. 30. Retrieved from <http://www.kanabecounty.org/vertical/sites/%7BDF6C195B-A507-4144-A2C4-98906E3F0669%7D/uploads/%7B3B2369C2-055F-4657-A77C-553B039386EF%7D.PDF>
- Koch, T.D., Chambers, C.L., Bucherl, S., Martyny, J., Cotner, H., Thomas, S. (2010). *Clandestine Indoor Marijuana Grow Operations - Recognition, Assessment, and Remediation Guidance*. Retrieved from [https://scholar.google.ca/scholar?hl=en&q=Clandestine+Indoor+Marijuana+Grow+Operations+-+Recognition%2C+Assessment%2C+and+Remediation+Guidance&btnG=&as\\_sdt=1%2C5&as\\_sdtp=](https://scholar.google.ca/scholar?hl=en&q=Clandestine+Indoor+Marijuana+Grow+Operations+-+Recognition%2C+Assessment%2C+and+Remediation+Guidance&btnG=&as_sdt=1%2C5&as_sdtp=)
- Lee, T. & Rollins, K. (2009). *Recommendations of the Assessment and Remediation of Properties Used as Illegal Drug Operations*. Retrieved from <http://aref.ab.ca/wp-content/uploads/2012/08/2009-19.pdf>
- Mackie, L. (2010). *Law of Nuisance*. Memorandum. Retrieved from [http://www.choa.bc.ca/resources/AHBL\\_Memo\\_regarding\\_nuisance.pdf](http://www.choa.bc.ca/resources/AHBL_Memo_regarding_nuisance.pdf)

- Martyny, J.W., Van Dyke, M.V., Schaeffer, J., Serrano, K. (n.d.). *Health Effects Associated with Indoor Marijuana Grow Operations*. Retrieved from [http://www.cdiausa.org/html/Press%20report%20\\_1b.pdf](http://www.cdiausa.org/html/Press%20report%20_1b.pdf)
- McManus, N. (2011). *Marijuana Grow Operations*. Retrieved from <http://www.nwohs.com/marijuana%20grow%20operations%20website.pdf>
- Methamphetamine Remediation Research Act. (2007). HR 110-143. Retrieved from <https://www.gpo.gov/fdsys/pkg/CRPT-110hrpt8/pdf/CRPT-110hrpt8.pdf>
- Minister of Justice. (n.d.). *Civil Forfeiture in British Columbia*. Retrieved from <http://www.pssg.gov.bc.ca/civilforfeiture/>
- Minnesota Department of Health. (n.d.). *Methamphetamine and Meth Labs. What is a Meth Lab?* Retrieved from <http://www.health.state.mn.us/divs/eh/meth/lab/>
- NNC Working Group (NNC). (2002). *Marijuana Grow Operations. Report and Recommendations to Ministers*. Retrieved from [http://www.oacp.on.ca/Userfiles/Files/NewAndEvents/PublicResourceDocuments/2003\\_National%20Joint%20Committee%20Report%20on%20Marihuana%20Grow%20Operations%20\\_20September%202003.pdf](http://www.oacp.on.ca/Userfiles/Files/NewAndEvents/PublicResourceDocuments/2003_National%20Joint%20Committee%20Report%20on%20Marihuana%20Grow%20Operations%20_20September%202003.pdf)
- ProCon.org. (2016). *23 Legal Medical Marijuana States and DC. Laws, Fees, and Possession Limits*. Retrieved from <http://medicalmarijuana.procon.org/view.resource.php?resourceID=000881>
- Resort Municipality of Whistler. (2007). *Property Nuisance Bylaw No. 1795, 2007*. Retrieved from <http://members.rebgv.org/realtorlink/rebgv/laws/Whistler%20Property%20Nuisance%20Bylaw%20No.%201795,%202007.pdf>
- Royal Canadian Mounted Police (RCMP). (n.d.). *Marihuana Grow Operations*. Retrieved from <http://www.rcmp-grc.gc.ca/drugs-drogues/msdi-ilcmds/grow-ops-culture-eng.htm#danger>
- Royal Canadian Mounted Police (RCMP). (2010). *Drug Awareness – Frequently Asked Questions*. Retrieved from <http://www.rcmp-grc.gc.ca/docas-ssdco/faq-eng.htm>

- Statistics Canada. (2015). *Drug-related offences in Canada, 2013*. Retrieved from <http://www.statcan.gc.ca/pub/85-002-x/2015001/article/14201-eng.htm#a1>
- Statistics Canada. (2015-a). *Incident-based crime statistics, by detailed violations*. Retrieved from <http://www5.statcan.gc.ca/cansim/a47>
- Statistics Canada. (2015-b). *Police-reported Controlled Drugs and Substances Act (CDSA) violations, by type of substance, by province and territory, 2013. Table 2*. Retrieved from <http://www.statcan.gc.ca/pub/85-002-x/2015001/article/14201/tbl/tbl02-eng.htm>
- Tennessee Department of Health. (n.d.). *Healthy Homes*. Retrieved from <https://www.tn.gov/health/topic/healthy-homes>
- Union of British Columbia Municipalities (UBCM). (2005). *Nuisance (Controlled substances) Bylaw*. Retrieved from [http://www.ubcm.ca/assets/library/Policy~Topics/Community~Safety/Marijuana~Grow-Ops/Model\\_Controlled\\_Substance\\_Bylaw2007.pdf](http://www.ubcm.ca/assets/library/Policy~Topics/Community~Safety/Marijuana~Grow-Ops/Model_Controlled_Substance_Bylaw2007.pdf)
- United States Environmental Protection Agency (US EPA). (2013). *Voluntary Guidelines for Methamphetamine Laboratory Cleanup*. Retrieved from [http://www.epa.gov/sites/production/files/documents/meth\\_lab\\_guidelines.pdf](http://www.epa.gov/sites/production/files/documents/meth_lab_guidelines.pdf)
- US Legal. (2016). *Clandestine Laboratory Operation Law & Legal Definition*. Retrieved from <http://definitions.uslegal.com/c/ clandestine-laboratory-operation/>
- Washington State Legislature (WSL). (2016). *Chapter 64.44 RCW Contaminated Properties*. Retrieved from <http://app.leg.wa.gov/rcw/default.aspx?cite=64.44>
- Wright, J. (2015). *NSW Remediation Guidelines for Clandestine Drug Laboratories and Hydroponic Drug Plantation. A Report to Health Protection NSW*. Retrieved from <http://www.health.nsw.gov.au/environment/hazard/Documents/clan-lab-guidelines.pdf>