

# Distressed Properties: Pathways of Decline and the Emergence of Public Safety Risk



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*May 2016*



## Executive Summary

The intent of this study is to develop an understanding of the forces and factors that trigger and accelerate the decline of residential properties in the City of Surrey, British Columbia (BC), and to create a framework for action that can stem such decline. Identifying residential properties trending toward a distressed state is essential given the effects of declining neighbourhoods and inherent risks to the community. There are numerous implications of declining properties and neighbourhood distress which include heightened fire risk, crime and disorder, and by-law violations at or near such places. This study selected distressed residential areas in Surrey for intensive problem management and, crucially, areas that are undergoing shifts in land economics and tenure. By identifying neighbourhoods and residential properties tipping toward a state of distress, local government can take pre-emptive measures to avert the most adverse problems before they occur.

Another issue relates to the desire to purchase land for development during favourable housing market conditions. Investments can be undertaken by investors buying up smaller parcels on the same block and eventually assembling them into a large land package for re-development. In some cases, the land is purchased, but then it is up to the investor when they want to build. This means they have little, if any, incentive to stop houses falling into decay. Disinvestments occur when maintenance is deferred or completely withheld, resulting in an individual unit that is vacant or an increase in abandoned residential properties that are vulnerable to intrusion, theft, vandalism, fire risk or arson. Some distressed properties have been re-purposed into drug recovery group homes, rooming houses or similar uses and vulnerable people will gravitate to such places wherever they exist. Residential custodianship at these properties is low or absent. Other properties will fall victim to criminal activity or disorder. Speculative land practice and disinvestment in housing are pathways to neighbourhood distress and the emergence of public safety risk.

Perhaps the most important lesson from the study is the difficulty of pinpointing a specific trigger that initiates residential distress and neighbourhood decline. Indeed, neighbourhood decline does not have a readily identifiable starting point or single isolated cause. Rather, decline is triggered by a set of circumstances that is specific to particular cities. Once underway, decline and disinvestment tend to be evolutionary and accretive. In essence, neighbourhood decline is a complex, self-reinforcing phenomena in which symptoms of decline themselves become causes.

## KEY FINDINGS

- The study is conceptualized and framed in terms of stages of neighbourhood decline. Neighbourhoods are shaped, to a large extent, by local and regional economic drivers and demographic shifts in the resident population. They typically evolve through phases of growth, stability and decline, and stressed residential areas often undergo five stages of decline. They are: (1) incipient decline; (2) imminent decline; (3) clearly declining; (4) accelerating decline; and (5) abandonment. The stages of neighbourhood decline are not linear nor necessarily terminal, they can be managed, halted or reversed depending on the ability of residents and responsible tiers of government to act. However, the ability to pre-empt or otherwise halt the trajectory and velocity of a declining neighbourhood is made increasingly difficult at the more advanced stages of decline. It is imperative to focus on the full life-cycle of places, and interrupt the cycle of decline at the onset, not just focus on abandonment, which is the last stage in the decline cycle.
- In 2014 there were 12,646 residential properties in Surrey that were classified as older, pre-1980s housing stock built on high value land. Overall, their land value is higher than the value of the structure and, therefore, is subject to development pressures. Spatially, there is clustering of such properties north and west of Surrey City Centre and in Newton. They are located at or near areas with a higher density of crime and fire risk, and suffer from low levels of residential guardianship. These areas are well-known to local authorities and first responders as chronic hotspots that consume a disproportionate share of resources compared to other areas in Surrey. However, this study also points to emerging areas of residential distress when looking at land economics, that is, Cloverdale and South Surrey, communities that are undergoing development pressures. In settings where the value of a lot far exceeds the value of a building, the property may tip into disinvestment and decline or be purchased on speculation by investors with a view to developing the property and adjacent properties. Depending on the housing market and timetable of investment, these residential properties can sit vacant for a lengthy period of time and are susceptible to fire, crime, and disorder.
- A proxy of incipient decline is property tax arrears and property tax delinquency, objective indicators of neglect and pathways to neighbourhood distress. Unlike vacancy, property tax arrears do not have definitive indicators visible on the street. However, they represent important economic markers of neighbourhood distress which are rarely considered in neighbourhood distress studies. Spatial analysis was conducted on abandoned residential properties, residential structure fires, and tax delinquent residential properties in Surrey. What is notably different from existing hotspots is risk clustering in the Cloverdale area of Surrey. Risk densities in the Cloverdale area are comparable to those existing in the area north and west of Surrey City Centre and in Newton. Spatial analyses of abandoned properties, residential structure fires, and property tax arrears points to an entirely new area of public safety risk in Surrey.

- The Census Low Income Measure after Tax (LIM-AT) is an internationally used measure of low income. The concept underlying LIM-AT is that a household has low income if its income is less than half of the median income of all households. There are approximately 19,086 residential units in Surrey that were constructed pre-1970 according to the 2015 Surrey Building Inventory. Approximately 9,041 of these units are located within areas that have 'moderately high' to 'very high' number of low income residents in Surrey. The LIM-AT insert map reveals clustering in the area north and west of Surrey City Centre and cluster in space with other risk measures such as fire, crime, and disorder.
- A Neighbourhood Vulnerability Index (NVI) revealed concentrations of distressed areas in Surrey. A comparison of the NVI map with LIM-AT spatial clustering shows overlap: the tract bounded by 112<sup>th</sup> Avenue to the north, 96<sup>th</sup> Avenue to the south, and bordered by 132 Street to the west and 140 Street to the east. These stress maps identify hotspots where fire, police, and emergency medical calls-for-service intersect. However, when building values and lot values are considered along with property tax arrearage, parts of Cloverdale and South Surrey are apparently entering imminent decline. In addition to addressing chronic hotspots, namely, the area north and west of Surrey City Centre and Newton, the study also considered long-range strategies to relieve emerging distress in Cloverdale and South Surrey.

## Introduction

### SCOPE, NATURE, AND IMPACT OF DISTRESSED PROPERTIES AND PERSONS

Cities as places of human habitation have multiple and interwoven impacts on the built and natural environment and upon their inhabitants. Many impacts are positive and contribute to liveability and a better quality of life for residents, while others erode the fabric of life. Distressed cities, neighbourhoods and their inhabitants suffer from a disproportionate share of social and economic malaise relative to healthy and resilient cities and neighbourhoods, and vulnerable people tend to consume a larger share of government services in distressed places. These range from social housing and welfare programs and services to police, fire, by-law, and ambulance services.

Vulnerable people gravitate toward distressed neighbourhoods seeking affordable, subsidized, and supportive housing and rental accommodation as well as access to transit, government, and community-based services. They tend to avoid more affluent parts of a city as unwelcoming places, while criminal sub-groups target these very areas and people in a predatory cycle. Many vulnerable people fall victim to the push/pull effect of social dynamics in cities which can be polarizing and stigmatizing for individuals, neighbourhoods, and communities (Gaffikin and Morrissey 2011). For example, high-frequency service users struggle with mental health and addiction issues which often lead to recurring medical or psychiatric crises, evictions, homelessness, criminal acts or incivilities. In a 2015 Vancouver-based study, two cohorts of persons with complex co-occurring disorders (concurrent mental illness, substance dependence, multiple convictions, hospitalizations, and shelter assistance) consumed a substantial array of public services.

From more than 14,000 offenders sentenced in Vancouver's Downtown Eastside, very high frequency service users associated with community (n=216) and custody (n=107) sentences incurred average attributable public service costs of \$168,000 and \$247,000 respectively over a 5-year period of observation. Health-related costs for both groups were over \$80,000 per person, primarily associated with hospital admissions (Somers et. al. 2015, 1).

Across both groups, 99 per cent had been diagnosed with at least one mental disorder and over 80 per cent had co-occurring substance use and another mental disorder (Somers et. al. 2015, 1). Substance dependence fuels the rapid cycling through of public services with life-threatening implications for those who use illicit narcotics such as fentanyl. In 2015, there were 465 apparent illicit drug overdose deaths in BC with fentanyl detected in 30 per cent of them, an increase from the previous year (BC Ministry of Health, 2016).

Regardless of their diagnoses, high-frequency service users cannot work which means that government benefits, property crime or panhandling becomes their primary revenue source. From the victim's perspective, this is particularly costly. Addicts can spend anywhere from \$70 to \$1,000 per day on their substance of choice. In order to support their drug habit, addicts will steal goods worth up to 10 times that amount (Plecas 2014, 12). The immediate and downstream costs to Canadian society and toll on persons with complex co-occurring disorders are staggering. Costs are also borne by distressed neighbourhoods where property crime, drug trafficking, and chronic substance use intersect. Drug trafficking operations at the street level drives neighbourhood distress in Canadian communities. Drug dealers continually seek out new clients who are, for the most part, high-frequency service users. Demand and supply drives this lucrative enterprise. It is estimated that drug dealers in BC may generate anywhere from \$7,000 to \$15,000 per day at the low end. A drug line shift worker on a high end established drug line in Surrey will see potentially 4 clients per hour in a 12 hour shift, at minimum \$300 per person. This equals \$14,400 per 12 hour shift. The more established drug lines can generate anywhere from \$14,000 to \$28,000 per day. Drug traffickers operate 365 days a year, 24 hours a day (Bemister 2015).

Research has demonstrated that burglaries and residential structure fires occur in the same places but at different times (Wuschke, Clare, and Garis 2013, 1-2). Areas with higher rates of unemployment, single parent headed families, and low-income households, as well as neighbourhoods with more vacant properties, older properties, and properties in need of repair, are associated with higher crime rates. Risks are elevated for households with at least one young child, seniors or person with a disability. In addition, rental units, households in low-income areas also experience elevated risk. Neighbourhood distress can take many forms and may, if left unchecked, cascade in a self-reinforcing process of decline that potentially leads to heightened public safety risk (Morckel 2013, 469; Han 2013, 316; Appel et. al., 2014, 161; Xiong, Bruck and Ball, 2015).

There exist concentrations of stressed and vulnerable people living or gathering at distressed places in the City of Surrey, and these individuals experience greater levels of risk and self-harm arising from the social, economic, medical, and legal upheaval in their lives. Social disorganization and civic disengagement may ensue which ultimately detracts from the underlying health and welfare of viable communities. A spread effect exists where social disorder and accompanying risk

can potentially go beyond the range and limits of distressed neighbourhoods and erode healthy and resilient communities. Local government is often left having to address a wide variety of seemingly intractable and increasingly complex societal issues with existing city resources and limited municipal authority to act. The consequences of this dynamic have far-reaching implications for the community as a whole. Neighbourhood distress and social conflict may lead to heightened public safety risk which is the catalyst for residential fires and medical emergencies, criminal activity and disorder, all of which beset Canadian cities and neighbourhoods to some extent. Surrey is no exception.

## **RATIONALE**

In 2007, Surrey City Council implemented the Crime Reduction Strategy, an innovative problem-solving approach to addressing the causes and effects of crime or put more broadly, neighbourhood distress. Neighbourhood distress is defined as a situation reflecting concentrated social and economic conditions which point toward lower quality of life standards for residents, and where such conditions can present public safety hazards and raise service demands on local, provincial, and federal government and community non-profit organizations (Jennings 2012, 465). Several studies have recently addressed the issue of neighbourhood distress in Surrey. In 2014, BC government unveiled their *Report of the Blue Ribbon Panel on Crime Reduction* which examined the complex and multi-faceted aspects of crime and disorder in BC, and local initiatives such as those existing in Surrey. In the same year, the Surrey Criminal Justice Task Force was formed and charged with examining the unique justice needs and challenges in Surrey. It assessed a variety of public safety issues such as domestic violence, mental health, and illicit substance use, as well as prolific property offending, and considered promising local initiatives. Related efforts such as the Surrey Integrated Services Network, an inter-agency provincial and municipal committee focussed on enhancing justice and public safety service delivery in the City, represents yet another initiative in dealing with neighbourhood distress. The topic of neighbourhoods in transition was addressed in 2016 by members of the City of Surrey's Emerging Leaders Program (ELP), and was discussed at a City-sponsored Innovation Forum on Distressed Properties and Public Safety.

These studies and local initiatives pointed to interconnected socio-economic, health, crime and disorder issues in Surrey with a growing number of vulnerable segments of the population residing at or gathering in distressed neighbourhoods or places within the City. With the presence of distressed neighbourhoods or hotspots invariably come offenders and victims alike as well as vulnerable persons some of whom engage in risky behaviours and lifestyles. These behaviours are expressed in a variety of ways ranging from criminal or delinquent activity to reckless or negligent acts that may lead to heightened public safety risk. The net effect of these acts and behaviours has significant and enduring negative implications for the safety and welfare of the City and its residents.

A challenge facing many BC municipalities is the identification and treatment of depressed residential properties in distressed neighbourhoods and, crucially, residential properties on the verge of decline. Properties at a tipping point are difficult to identify as they are not beset by obvious signs of decline characteristic of derelict or unsightly properties, that is, broken windows, graffiti, refuse, etc. Therefore, it is essential to understand when a residential property starts its decline so that efforts can be focussed on pre-emptive problem-prevention measures. Successful early intervention and treatment to minimize or potentially reverse the harmful spillover effects of distressed residential properties is arguably the best course of action because deterioration compounds quickly over time (Raleigh and Galster 2014; Morckel 2013, 470; and Gilreath 2013).

Three specific questions are posed and frame this study:

1. Is there a sequence of events that lead to distressed residential properties and neighbourhood distress? If so, where in this continuum should local government act to effectively pre-empt decline and address public safety risk?
2. Are property tax arrears and land value versus building value effective proxies of incipient decline? If so, what long-term strategies can be developed to prevent the decline of properties and neighbourhoods? How can evidence-based, data-driven solutions be leveraged for early intervention?
3. How can the City integrate departmental data in order to identify those residential properties or problem properties that require attention? What regulatory tools and strategies does the City have in place to tackle these issues?

In order to answer these three questions, the scope of this research involved:

- Undertaking a review and assessment of 12 datasets relating to neighbourhood distress including land value metrics, a critical literature review of three distinct yet complimentary academic and professional studies, as well as extensive consultation with law-enforcement and fire experts. Field studies were also conducted.

## **INTENT OF STUDY**

The aim of this study is to identify Surrey neighbourhoods and residential properties that are declining or at-risk of decline and ensuing fire hazard and public safety risks. Recommendations are made relating to the identification of vulnerable residential properties for treatment, problem management, and evaluative purposes. The study employed a retrospective analysis of fire events, and dealt primarily with intra-city analysis from the perspectives of the neighbourhood, building, and household level. It is conceptualized in terms of risk to people and property and focusses on vulnerable persons and problem properties. Ultimately, it is the residents or occupants of distressed residential properties and nearby settings that are most at-risk for fire loss and injury.

The implications of non-compliance with the *Fire Code* are not trivial, and may result in tragedy if left unaddressed. In 2010, a rooming house fire occurred at 2862 Pandora Street, Vancouver where three individuals died. The house was designed as a single family dwelling, but its owner had rented rooms to transients on a monthly basis. Conditions leading up to the fatal fire at Pandora Street are similar to non-compliance issues and associated risks existing at many recovery houses in Surrey. The Pandora Street rooming house was used in a manner that went beyond its intended design, that is, to house a family.

The residence had frequently come to the attention of Vancouver City officials in ways similar to how non-compliant recovery houses are identified in Surrey. That is, through fire safety inspections or public complaints. The owner of the Vancouver rooming house was ordered to make improvements to the property in order to bring it into compliance with the *Fire Code*, but did not comply. Whether a rooming house or a recovery house, both facility types carry a similar level of risk especially when they are non-compliant with the *Fire Code*, have a high occupancy load, and lack effective fire safety devices. Occupants of these facilities are all vulnerable persons, the risk of fire-related death or injury is equally present, and the owners/operators are often aware of the problems but unconcerned about fixing them.

## Study Area

The City of Surrey is part of the Vancouver Census Metropolitan Area, and is one of Canada's largest and most rapidly growing cities. Covering a total of 314.7 km<sup>2</sup>, the 2011 Canadian Census reports that Surrey has a population of 468,251: an 18.6 per cent growth since the previous census period (as compared to the national average growth rate of 5.9 per cent). The urban area is experiencing rapid redevelopment, growth, and population expansion. Surrey is bordered on the north by the Fraser River and on the south by the United States Canada international border, and is bounded on the west by the Corporation of Delta and to the east by the Township of Langley. The City contains a variety of land uses, ranging from high-density residential areas and commercial zones, through to parks and farmland. Surrey is comprised of six distinct communities which are shown in Figure 1.

FIGURE 1:



Source: City of Surrey Planning and Development Department

Surrey's population has grown significantly between 2004 and 2014 and continued growth is expected for the foreseeable future. During these 10 years, the City's population has increased by approximately 100,000 residents (Estimates are based on a combination of Surrey's Building Permit Data and BC Assessment information). According to 2016 population estimates and projections, the City can anticipate approximately 577,595 residents by the year 2021.

Along with population growth comes challenges and opportunities in terms of meeting the needs of all Surrey residents with municipal infrastructure, access to recreation and fitness, transportation, police and fire services as well as green spaces to ensure a vital part of a livable, modern city. A challenge related to such unprecedented growth and prosperity is addressing the reverse or opposite side, that is, neighbourhood distress. This entails meeting the needs of vulnerable segments of society and addressing public safety issues. Another challenge relates to the desire to purchase land for re-development purposes. The land is bought, but then it is up to the developer when they want to build. This means they have no incentive to stop it falling into decay. Vulnerable persons will often gravitate to such problem properties wherever they exist in Surrey, thereby increasing public safety hazards at or near these places. It is a perfect storm.

### **Precipitating Factors in Neighbourhood Distress: Literature Review**

Measuring and mapping levels of neighbourhood social and economic distress can enhance our understanding of the needs of vulnerable persons and communities and ensure their health and safety. Importantly, it can facilitate civic engagement in the development of long-range strategies, remedies, and place-based responses to address public safety risk. To that end, a multi-disciplinary literature review was carried out that anchors the latest research in the current understanding of urban growth and social challenges in Surrey.

The study examined literature from several academic disciplines and professional fields as they relate to neighbourhood distress and public safety and fire risk. The material references leading practices in several countries with an emphasis on the Canadian experience. The literature is divided into three distinct yet complimentary areas of inquiry:

1. environmental criminology, including community and land use planning
2. fire risk and life safety
3. urban land economics

Literature relating to demography, a key aspect of this study, is also examined. The study incorporated established theories, practices, and principles from the three literatures and combined them into a theoretical construct for identifying distressed neighbourhoods and residential properties in Surrey.

### **CRIME AND DISORDER & NEIGHBOURHOOD DISTRESS**

Perhaps the most widely known body of literature to public safety professionals is environmental criminology theory, a sub-set of criminology (Brantingham and Brantingham, 1981). Environmental criminology (such as routine activity theory and crime pattern theory) is different from traditional criminological theories because it does not attempt to explain the root causes of crime and why people become criminals. Instead, it focuses on the various aspects of 'settings' and 'opportunity' in which crime occurs. In order for a crime to occur, a likely offender must engage a suitable target at a setting that lacks proper custodianship. Figure 2 shows the intersection of these three elements:

**FIGURE 2: ROUTINE ACTIVITY**



Source: Cohen and Felson, 1979

A setting is a location for recurrent use for a particular activity at known times. It is held that crime is not uniformly distributed throughout a city but is concentrated within certain areas or settings and absent in others. The idea of settings was popularized in an article written by George L. Kelling and James Q. Wilson titled *Broken Windows* which appeared in the March 1982 issue of *The Atlantic*. The authors stated that incivilities such as window-breaking, if left unrepaired, is a signal that no one cares which can ultimately lead to the emergence of property crime and serious crime (Kelling and Wilson 1982). At the community level, disorder and crime are usually inextricably linked, in a kind of developmental sequence. Kelling and Wilson and environmental criminologists alike had argued that indicators such as vacant and abandoned properties as well as unsightly properties and broken windows are vital cues of neighbourhood distress.

Areas where crime and disorder cluster are generally termed 'hotspots' (Paulsen 2013, 15). While there is no established definition of hot spots, they are generally understood to be settings that have a greater than average number of crimes (or fires), or settings where people have a higher than average risk of victimization. In terms of geographic size, hot spots range from a single address, to a neighbourhood block, a group of blocks or even an entire neighbourhood. Hotspot crime mapping at the micro-geographic level centred along street segments is of value to this study as it informs an understanding of the scope, nature, and impact of crime and distressed properties (Weisburd et al. 2012, 5; Appleyard 1981, 243). These crime hot spots are highly stable over time, and thus present a particularly promising focus for crime prevention efforts and, by virtue of geographic overlap, fire prevention efforts (Weisburd et al. 2012, 5; Wuschke, Clare and Garis 2013, 3; and Chainey, 2013). Hotspots rarely 'move around the corner' as a result of targeted policing efforts, they must be frequently re-engaged by authorities. Moreover, research indicates that place-based crime prevention does not necessarily lead to crime displacement as there is a tight coupling of crime and place (Weisburd et al. 2012, 53).

According to environmental criminologists, urban design that may unintentionally give rise to crime opportunities include:

1. connectivity or the physical configuration of a street network
2. mixed land use
3. zoning practices
4. transit-oriented design

There is a sizeable literature on parks, trails and greenbelts as they relate to crime and disorder. However, this material is outside the scope of this study. In terms of connectivity, the physical configuration of a street network inhibits permeability by physically constraining access and movement within a neighbourhood and influences crime risk. It is generally held that overprovision of connectivity increases the risk of burglary victimization. Simply, high levels of permeability are associated with higher levels of crime and residential properties located at major streets, permeable gridded street networks, corner locations, and cul-de-sacs linked to other spaces via pedestrian walkways are at greater risk (Paulsen 2013, 18-22; Johnston and Bowers 2010; Cozens and Love 2009; Schneider and Kitchen 2007, 50). While it is obvious that every modern city has these types of arterials, street networks and design configurations, they act as important node and edge reference points in any spatial risk assessment that employs multiple variables, including non-crime data.

**FIGURE 3: THE EVOLUTION OF STREET PATTERNS & DESIGN CONFIGURATIONS IN NORTH AMERICA**

	<b>Gridiron</b> (c. 1900)	<b>Fragmented parallel</b> (c. 1950)	<b>Warped parallel</b> (c. 1960)	<b>Loops and lollipops</b> (c. 1970)	<b>Lollipops on a stick</b> (c. 1980)
<b>Street patterns</b>					

Source: Schneider and Kitchen 2007, 49

The benefits of mixed land use are fairly well known and include improved vibrancy in the urban core, more active environments, increased affordability of housing, reduced car dependence, and safer communities (Paulsen 2013, 22). These are important sustainability goals and objectives and found in the official community plans and land use designations of many cities and towns in BC, including Surrey. However, the extent to which mixed land use contributes to safer communities is open to discussion given relevant criminological research stating that residential burglary increases the closer a residence is to mixed land uses and commercial properties (Paulsen 2013, 23). Certain types of land uses and facilities generate crime due to the daily activities associated with them and the number and types of people they attract. The presence of specific land uses, that is, increased diversity of land uses; is theoretically predictive of crime levels in the neighbourhoods surrounding them (McCord and Ratcliffe 2009, 18).

Research has found that increased diversity of land uses is strongly associated with increased levels of physical deterioration and physical disorder within neighbourhoods. Physical deterioration and disorder have been found to precede serious crime within neighbourhoods as well as increase the fear of crime. Thus, increased diversity of land use can be accurately said to be associated with neighbourhood distress. Additionally, settings with large numbers of multi-family dwellings tend to have higher crime rates ranging from property crimes to violent crimes and increased levels of neighbourhood distress. Demographically, older multi-family developments tend to have more transient and vulnerable persons as tenants, leading to decreased community ties and decreased levels of community efficacy, both of which have been found to increase criminal victimization. A finding relevant to this study is that one and two-family residential dwellings located next to poorly-run multi-family housing units tend to be at greater risk of crime and disorder, in particular property crime.

Closely related to the discussions of mixed land use and connectivity is the impact of zoning practices on crime patterns. Well-intentioned minimum standards for parking, fencing, landscaping, and open space have the unintended consequences of increasing opportunities for crime. Research has found that lack of surveillance or clear sightlines, often caused by improper landscaping and fencing, increases victimization. In addition, minimum parking standards for multi-family residential zones often require one parking space per bedroom, leading to large surface parking lots that provide ample criminal opportunities. This coupled with insufficient street lighting at or near older multi-family developments amplifies the crime risk these places pose to nearby residential properties (Anderson, MacDonald, Bluthenthal, and Ashwood 2013).

Often discussed within the context of mixed use developments, transit-oriented developments are structures that incorporate residential and commercial components around a central transit hub. While the type of hub varies depending on whether light rapid transit is involved, all transit-oriented developments put a premium on walkability, public transit, and density of uses. However, transit-oriented developments also inspire concern because of the issues associated with crime and fear of crime. Research has conclusively established that crime occurs two to three blocks away from well-protected light rapid transit stations, and less serious crimes take place at bus stops close to negative uses such as abandoned and vacant residential properties. Relevant criminological theories support the contention that connectivity, mixed land use, zoning, and transit-oriented design have a bearing on crime and disorder and; therefore, are important considerations for this study.

However, environmental criminological theory and advocates of place-based crime deterrents and target hardening are sometimes viewed as contrary to the tenets of planning theory and advocates of social inclusion and free access to public spaces (Paulsen 2013, 1-7; Nan 1997, 101-114). As with most such debates, the reality lies somewhere in between these two perspectives as they are not mutually-exclusive with local government striving to find a balance between public safety and inclusionary social practices. While environmental criminology is a valuable theory in explaining how the built environment gives rise to crime and disorder, it does not account for the social dynamics of offending and the impact of land economics as precursors to neighbourhood distress and the emergence of public safety risk.

## **FIRE RISK & NEIGHBOURHOOD DISTRESS**

Fire is both a social and physical phenomenon. As Charles Jennings observed, “fire transcends the individual, and simultaneously affects the built environment, which includes knock-on effects for the economic livelihood of communities and viability of individual buildings and their surrounding neighbourhoods.” (C. Jennings 2014, 14). Jennings and other fire researchers examined the association of socio-economic factors, fire incidence and risk largely from an urban perspective, observing that residential fires were shown to exhibit the strongest correlation to levels of deprivation (C. Jennings 1999; and Corcoran et. al 2007, 628). In particular, researchers analyzed the demographics of fatalities and injuries from fires and found that in a local setting, low socio-economic status was associated with increased fire risk. Jennings identified related areas of risk, including high levels of smoking and alcohol consumption among individuals and areas with higher than average proportions of young children, the elderly, and disabled.

Jennings concluded that several different variables exhibit, to varying degrees, correlations of significance between socio-spatial characteristics and different types of fires. These characteristics are:

- age of structure
- average rent
- property value
- percent units occupied
- percent units owner occupied
- percent commercial properties
- percent population over 65 years of age
- poverty rate in community
- percent of residential structure
- education of occupants
- average number of persons per room or population density
- family stability in community

(Jennings 1999, 7-34).

Guldaker and Hallin expanded upon Jennings’s typology and examined the association between distressed neighbourhoods characterized by social stress, substance abuse, mental health, as well as crime and disorder and the potential for residential fires (Guldaker and Hallin 2014, 73). Wuschke, Clare and Garis considered the relevance of environmental criminology theory for understanding the temporal and spatial distributions of residential structure fire calls in addition to residential burglaries in Surrey. The study revealed that residential fires and burglaries occur in the same places or settings but at different times. Areas with higher rates of unemployment, single-parent headed families, and low-income households, as well as neighbourhoods with more vacant properties, older properties, and properties in need of repair, are also often associated with higher crime rates. In a similar way, there is evidence that fire experiences cluster with respect to victims and building type. Findings suggest that fire risk is increased for the very old, the very young, and the socially-disadvantaged. From a dwelling perspective, fire risk has also been demonstrated to increase as a function of characteristics such as building age and construction type.

Wuschke, Clare, and Garis provides an understanding of why older or abandoned residential properties are the foci of crime and disorder as well as fire risk, and why these places and their occupants – who are the victims of crime, fire loss and injury – constitute an essential starting point in addressing distressed neighbourhoods (Wuschke, Clare, and Garis 2013, 3; and Chainey 2013, 30). In essence, they are inextricably linked, that is, today's burglarized residential dwelling located within a low-income area of a city may become the scene of tomorrow's residential structure fire and victimize the same individuals as well as surrounding properties and residents. The fire literature supports a systemic approach to addressing problem-oriented persons, places, and properties, including a city-wide strategy involving fire, police services, and by-law services.

Schacterle et al. examined the contribution of vacant buildings to the incidence of fires in Baltimore, Maryland. Since fires in vacant buildings are more likely to spread beyond the structure of origin, they pose an inordinate risk to neighbouring properties (Schacterle et al. 2013, 100; Jennings 2014, 15). The concern is an obvious one: proximity to a fire hazard equates to risk. However, Schacterle et al. were able to distinguish between mere presence of vacant dwellings in the census tract and actual distance from vacant properties to fire-affected properties. By geo-coding both fires and vacant dwellings, they found statistically-significant evidence that vacant properties elevated risk of fire for properties within 100 metres and that the risk was higher the closer a property was to a vacant dwelling (Schacterle et al. 2013, 100; Jennings 2014, 15).

The authors explored the relationship between vacant buildings and fire rates at the census tract level by examining overlap between the rate of fires per census tract and the proportion of vacant buildings per census tract. Negative binomial regression was used to estimate the association between vacancy rates and incident fire rates per dwelling. In addition, the relationship between vacancy and fires was examined at the level of the individual dwelling with a Poisson multi-level model (Schacterle et al. 2013, 99). While fire codes, building materials, and side yard setback provisions existing in Baltimore are appreciably different from those in Surrey, the findings are empirically-valid and methods are transferable to other urban settings.

Corcoran et al. have published numerous studies incorporating geographic information systems (GIS) and spatial statistics in recent years. Using the spatial statistic of kernel density estimation (KDE), they used GIS to visualize the density of fires against geographic areas or other proxies of population at risk. By examining fire incidents by type, and employing regression analysis, they were able to associate socio-economic characteristics with both risk and concentration of specific types of incidents within space (Jennings 2013, 16; Corcoran 2007, 637-641). Corcoran et al. expanded on traditional conceptions of fire risk modeling to consider weather and calendar event in addition to socio-economic patterns (Corcoran et al., 2009).

In sum, fire studies offer the potential for deep transformative insight into specific causes and may be effective at identifying specific interventions by which to target fire scenarios. Studies conducted by the University of the Fraser Valley (UFV) in Abbotsford, Canada, have conclusively established that fire incidence varies systematically according to socio-economic characteristics of residents, as well as by housing and neighbourhood conditions. In practical terms, these findings have informed and guided the design and implementation of Surrey Fire Service's HomeSafe program, a targeted campaign to addressing fire risk in Surrey.

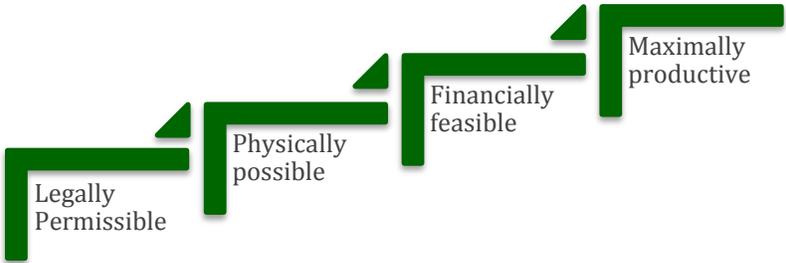
This latest research lays the essential foundation for fire prevention initiatives and emphasizes the importance of demography and health data when developing strategies to address fire risk across communities in BC. It confirms that present, functioning smoke alarms have been demonstrated to save lives, reduce fire-related injury, reduce the spread of fires, and reduce the damage of fires.

**URBAN LAND ECONOMICS & NEIGHBOURHOOD DISTRESS**

The literature examined thus far reveals that neighbourhood conditions, including functional or economic obsolescence of housing units could lead to greater risk of fires, abandonment of properties, as well as crime and disorder. It is important, therefore, to consider the economic determinants leading to obsolescence of housing stock and corresponding neighbourhood distress. A consideration of urban land economic practices and principles is essential. One such principle, highest and best use or highest or best use (HBU), is a concept in real estate appraisal that shows how the highest value for a property is arrived at. In a case where the market value of real property is sought, that value must be based on its highest and best use. Highest and best use is always that use that would produce the highest value for a property, regardless of its actual current use. The Appraisal Institute of Canada defines highest and best use as “that reasonably probable and legal use of vacant land or an improved property that is physically possible, legally permissible, appropriately supported, financially feasible, and that results in the highest value” (The Appraisal of Real Estate, 14<sup>th</sup> Edition, 2015).

Any proposed or theoretical use of a property must pass a series of tests before it can be accepted as the highest and best use of a given property. These four tests are applied in their corresponding order, in other words the test of legally permissible must be met before the test of physically possible may be applied, and so forth.

**FIGURE 4: HIGHEST AND BEST USE**



Source: The Appraisal of Real Estate 2015, 331

Highest and best use underpins the practices of investment and disinvestment, and left unchecked, can potentially have negative implications for the stock of older residential properties. Building speculation can be undertaken by developers, landlords or owners and can occur as an investment or a disinvestment. Investments typically occur in the face of increasing returns, when future profit-taking is anticipated.

Disinvestments usually occur in the face of decreasing returns, when future profit-taking is either uncertain or unlikely. Thus, current disinvestments translate into current profit-taking, which may decrease and possibly vanish in the future. Investment can occur at a smaller scale when residents upgrade their properties with enhancements of kitchen, bathroom, and living areas or the addition of legal secondary suites. At a larger scale, investments can be undertaken by investors or developers buying up smaller parcels on the same block and eventually assembling them into a large land package. This may lead to the eventual tear down of residences and construction of multiple family developments. Disinvestments can occur when maintenance is deferred or completely withheld, possibly resulting in an individual unit that is vacant or an increase in abandoned residential properties that are vulnerable to intrusion, theft, vandalism, fire risk or arson (Whitaker and Fitzpatrick 2013).

From an urban land economics perspective, the presence of an older residential dwelling built on high value land is not generally considered highest and best use, and may be seen as an impediment to realizing maximal return on investment. From a criminological perspective, the negative impacts of investment and disinvestment can potentially lead to urban decay and increasing levels of crime and disorder. From an urban planning perspective, poor investment and disinvestment practices may potentially lead to a reduction in the supply of affordable housing, the erosion of livability, and eventual decline of stable neighborhoods. These are systemic and inter-related dynamics, which may over time result in the abandonment of residential properties or tear downs, with public safety and fire risk implications.

Property values decline through disinvestment and reduced commerce, tourism, and aesthetic appeal. Adjacent properties may require higher insurance premiums or be denied casualty insurance altogether. Lower property values equate to lower property tax revenue, which reduces funding for government services. As property taxes increase, property owners, particularly those who invest to maximize wealth, may invest less in repairs and improvements. As the rise continues, property owners may consider selling, defaulting on the mortgage and abandoning the property.

When the current mortgage exceeds the property's value, it is more likely the owner will dispose of the property. If a residential property is older, it may be rendered obsolete by features that limit its functionality and marketability, such as:

- limited off-street parking
- small footprint, fewer bathrooms, no garage
- a small or non-conforming lot
- too expensive to rehabilitate or remediate (e.g., lead paint and asbestos abatement, marijuana grow operation and toxic mould abatement, etc)
- too close to an adjacent house
- located in a mixed use area among warehouses, junkyards, or stores and subjected to noise, smoke and vibration

The cycle of disinvestment and neighbourhood decline is complex. Many theories contribute to an understanding of these processes, but none dominate the literature. Characteristics of declining neighbourhoods are well understood and ways to measure them are conceptually clear, although not always empirically-available. Nonetheless, important indicators are proposed to identify neighbourhoods experiencing decline and to measure the level of this decline. It may be also possible to identify thresholds or levels beyond which decline reaches a 'point of no return.' At the core of the disinvestment process in many urban areas is the 'market gap problem,' which arises when the cost of renovation and property acquisition exceeds the market value of a renovated home. When circumstances in a neighbourhood begin to induce decline in property values and these values drop below the cost of new construction or renovations, conventional financing by private capital becomes impossible. In these circumstances, work that would prevent further deterioration and eventual abandonment of residential units is not done. This has often been a signal to lenders and insurance companies to either 'redline' the area, or to at least raise interest rates, premiums and equity requirements to cover the increased risks.

The market gap problem illustrates the self-reinforcing nature of the decline and disinvestment process: the development of one symptom often leads to the emergence or aggravation of other symptoms, thus exacerbating neighbourhood distress. The market gap problem also illustrates why the private sector cannot, on its own, reverse disinvestment once it reaches an advanced stage; the risk and possibility of loss are simply too great. Under such circumstances, effective intervention to reverse decline and associated public safety issues will require the public sector to reduce risk. The following stages of neighbourhood decline is proposed based on a review of the relevant literature as well as an understanding of the forces and factors at work in Surrey (Raleigh and Galster 2014).

## Five Stages of Neighbourhood Decline

Neighbourhoods typically evolve through phases of growth, stability, and decline, and stressed places undergo five stages of decline over a period of many years. These are shaped, to a large extent, by local and regional economic drivers and demographic shifts in the resident population. The stages of neighbourhood decline are not linear or necessarily terminal, they can be managed, halted or reversed depending on the ability of residents and responsible tiers of government to act. However, the ability to pre-empt or otherwise halt the trajectory and velocity of a declining neighbourhood is made increasingly difficult at the more advanced stages of decline (Raleigh and Galster 2014).

**FIGURE 5: A CONCEPTUAL FRAMEWORK OF NEIGHBOURHOOD DECLINE**

	Five Stages	Indicators
Proactive	Incipient decline	Low-value structures built on high-value land; property tax arrears and delinquent taxes
	Imminent decline	More dwellings shift from owner to renter occupancy
Reactive	Clearly declining	More single-parent headed families; and widespread minor deficiencies in home repair (unsightly properties)
	Accelerating decline	Fewer residential vacancies; start of spot residential abandonment
	Abandonment	Abandoned properties; increased calls-for-service

Source: Garis, Thomas, and Tyakoff (2016)

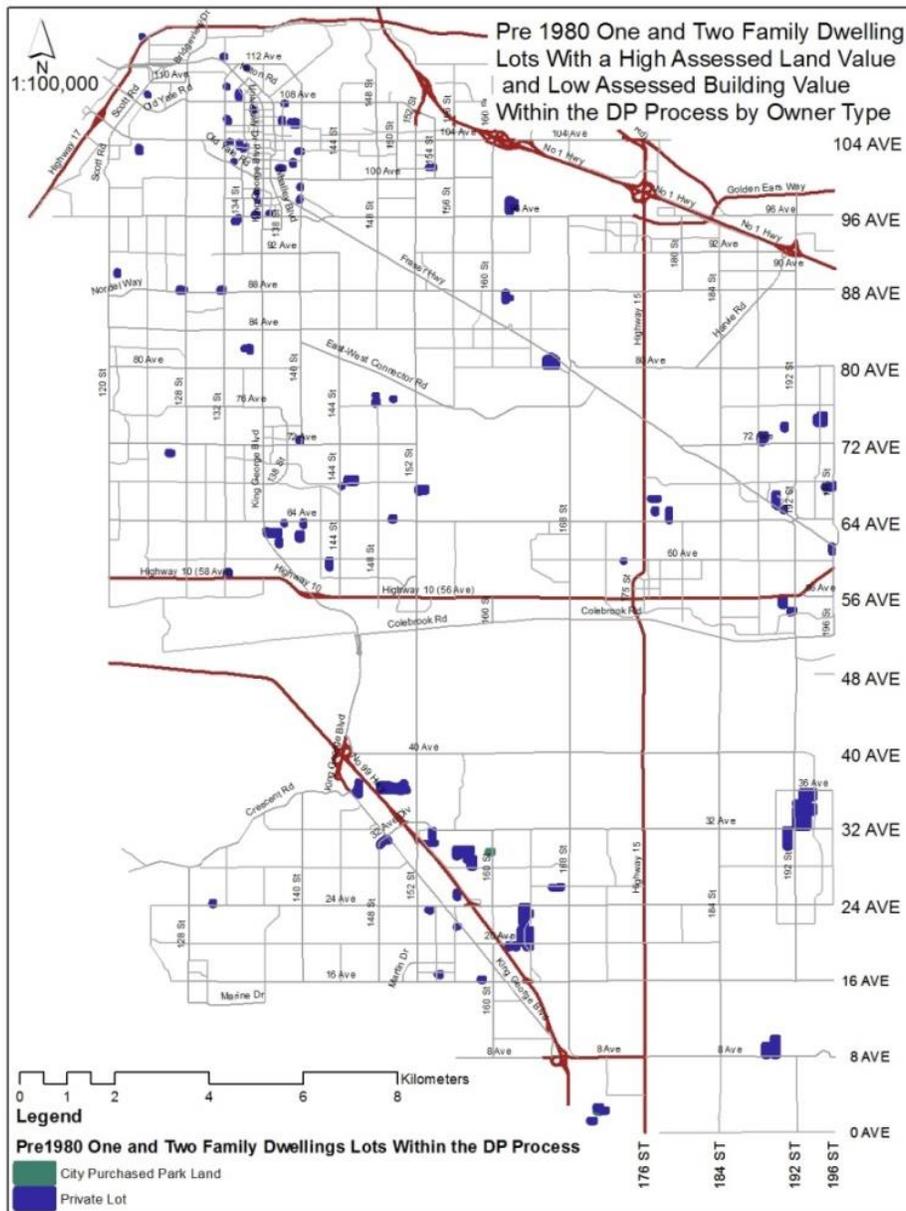
As a neighbourhood moves into the initial stage of **incipient decline**, two changes transpire that will adversely affect stability of the area: low-value structures built on high-value land and property tax arrears and delinquency. As the neighbourhood enters the next stage of decline, **imminent decline**, the profile of in-movers begins to differ from that of current residents (and out-movers) in terms of socio-economic status and more dwellings shift from owner to renter occupancy. In the next life-cycle stage of **clearly declining**, the above changes become intensified and are supplemented by two other forces that will contribute to decline: more single-parent headed families (fewer resources for supervision of youth); and widespread minor deficiencies in home repair (unsightly properties, visible disorder). In the next stage of **accelerating decline**, prior forces grow more powerful and are supplemented by fewer residential vacancies and the start of spot residential abandonment. The final stage is **abandonment**, the end state of a long-term process and most powerful signal of neighbourhood decline (C. Jennings 2016). At this point, the only remaining residents are of the lowest socio-economic status, the local rental market has collapsed (rent collection problems, eviction) and the physical environs are characterized by generalized dilapidation, housing abandonment, and vacant lots. It is at this stage of the neighbourhood life-cycle that police, fire, and ambulance services are frequently engaged to address risk-causing places and risky occupants. It is imperative to focus on the full life-cycle of places, and interrupt the cycle of decline at the onset, not just focus on abandonment, which is the last step in the decline cycle.

### INCIPIENT DECLINE

The pressures on neighbourhoods can be measured in a variety of ways. There exist two economic proxies that may serve to determine whether residential properties and lots in Surrey are entering incipient decline. They are land value versus building value and property tax arrears and property tax delinquency (Goldsmith and Crawford 2014, 119-138). For this study, the assessment value ratio was used with land value versus building value to determine the economic standing of one and two-family dwelling lots. Together they indicate the value of the land times the value of buildings on the lot. It also provided an assessment of how many residential properties were in the City's development permit application process, a pathway to investment or disinvestment (i.e., tear-down, abandonment, etc.). According to the 2014 Surrey Building Inventory, there existed 111,497 residential housing units in the City. Of these, 12,646 were pre-1980s private residential dwellings with a high assessment ratio that could theoretically be demolished. Two hundred and eleven residential dwelling lots were in various stages of the development permit application process. While some of these residential properties will be improved by owners, others may be subject to re-development or speculative practices. They represent residential properties in transition that are situated on high-value land. In some cases, their land value is 36 times higher than the structures themselves, and subject to highest and best use principles and eventual development.

Figure 6 reveals the locations of pre-1980s residential dwelling lots with a high assessed land value and low assessed building value. It reveals clustering of residential properties in the area north and west of Surrey's City Centre and Newton and corresponds with prevailing knowledge of these communities. That is, areas with a higher density of crime and fire risk, older housing stock and the prevalence of low-income dwellers and vulnerable persons. However, it also points to emerging areas of concern when looking at land metrics, that is, South Surrey and Cloverdale, communities that are undergoing development pressures. These pressures and land value to building value indicators are early markers of incipient decline, and can be monitored along with more traditional risk measures.

FIGURE 6:



Source: City of Surrey Planning & Development, 2014

Another proxy of incipient decline is property tax arrears and delinquency, an objective indicator of neglect. Unlike vacancy, tax arrearage do not have definitive indicators visible on the street. If the homeowners are unwilling or unable to pay their property taxes, which could result in tax foreclosure, it is very likely that they are unwilling or unable to maintain the property. These properties include homes owned by the landlords who choose not to pay the taxes to increase their profit or minimize their losses. The possibility of losing the home to a tax foreclosure is a risk they are willing to absorb. Presumably, these owners perform the absolute minimum maintenance necessary to attract tenants to the property in the case of rental units. In other cases, homeowners whose incomes have fallen due to retirement or job loss cannot cover the costs of homeownership.

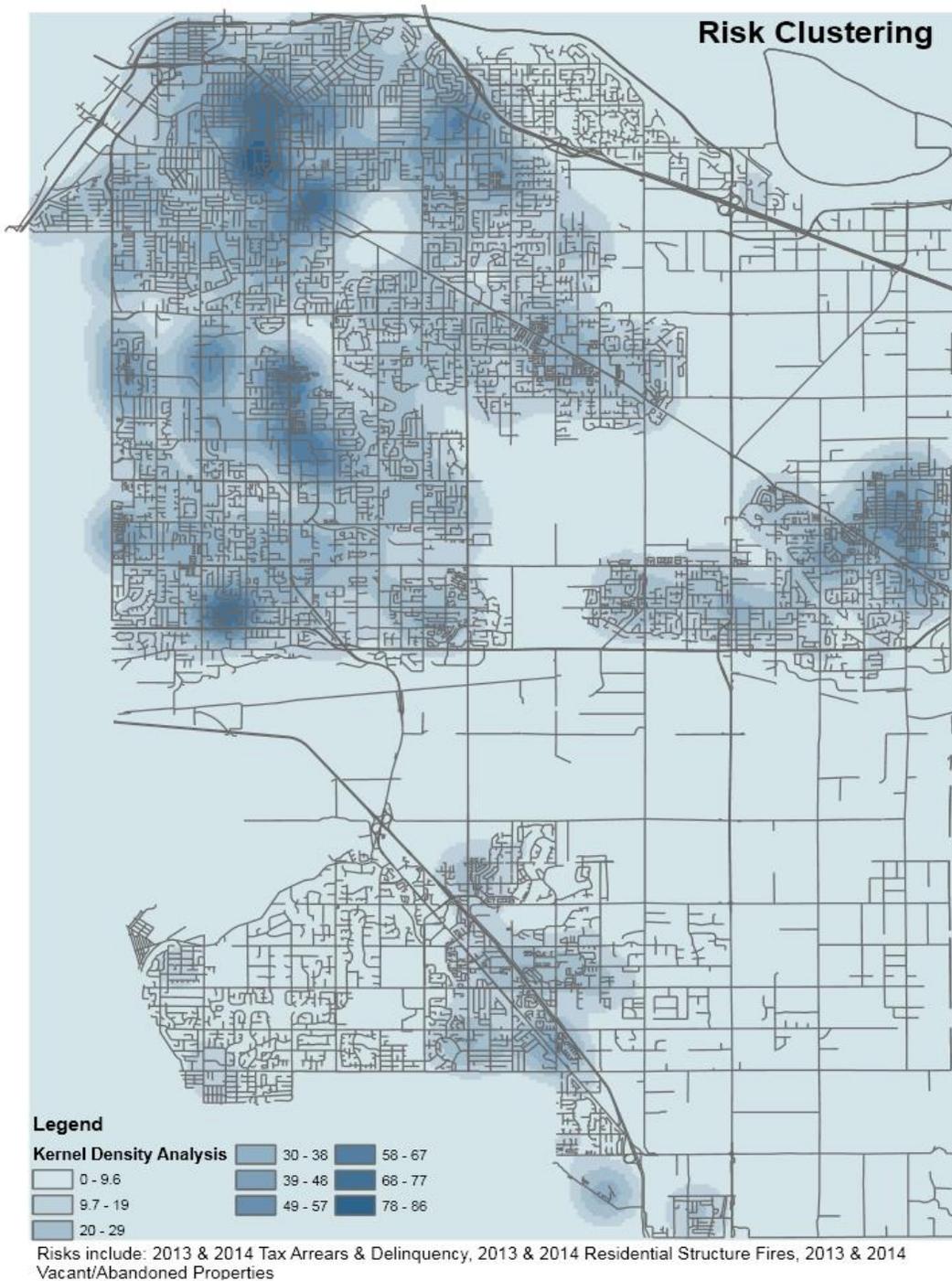
These households would have difficulty paying for the home repairs that would maintain property values on their block (Whitaker and Fitzpatrick 2013, 80).

The *Local Government Act* requires BC municipalities to sell at tax sale all properties whose taxes are in a delinquent balance, which reflects three years of unpaid taxes. Owners of residential properties that are tax delinquent for 24 months will often struggle to recover. These tax delinquent properties are considered, to a large extent, 'economically-abandoned' (Arsen 1992, 363). Residential properties that are in tax arrears for a period of 12 months are seen to be tipping into incipient decline (Morckel 2013, 480). While the homeowner may become tax current or eligible for tax deferment, it is also possible that the financial situation may potentially worsen and force a tax sale. In either scenario, the residential property can decline owing to homeowner cash flow problems and deferred maintenance (Morckel 2014, 9).

In some cases, ownership abandonment is not a random or unexpected event, but a planned occurrence. These markets are said to attract specialized entrepreneurs for whom ownership abandonment is but the last step in a planned process of deferring maintenance, dropping services, and generally trading-off immediate profits against a lengthening of the owned lifetime of the building. Landlords follow a particular order in reducing expenses. First, they delay or drop non-essential repairs. Second, they default on mortgage obligations. This may lead to foreclosure by the lender, but often does not if the lender does not wish to own the building. Third, property tax payments are stopped. This starts a timetable for loss of ownership, since local government take over properties whose taxes are in arrears for a certain number of years, usually three. Thus, the decision to cease paying property taxes is a decision to abandon the building, once tax arrears exceed the City's foreclosure period (White 1986, 312-313). Whether property tax arrears are the result of financial hardship or speculative practice, these residential properties are economically-distressed and; therefore, susceptible to incipient decline and a heightened level of community risk.

Kernel density analysis was undertaken for abandoned residential properties, residential structure fires, and tax arrears and delinquency data for 2013 and 2014. The Risk Clustering map is congruent with the Census Low Income Measure after Tax (LIM-AT) and Neighbourhood Vulnerability Index (NVI), risk maps depicted in Figures 8 and 9 respectively. What is different from LIM-AT and NVI maps is risk clustering in the Cloverdale area. The statistically-higher KDE scores of 78 to 86 are comparable to spot densities existing in the area north and west of Surrey City Centre and Newton. The inclusion of abandoned properties, residential structure fires, and tax arrearage data points to an entirely new area of public safety risk.

**FIGURE 7: RISK CLUSTERING OF TAX DELINQUENT PROPERTIES, RESIDENTIAL STRUCTURE FIRES AND ABANDONED PROPERTIES: 2013-2014**

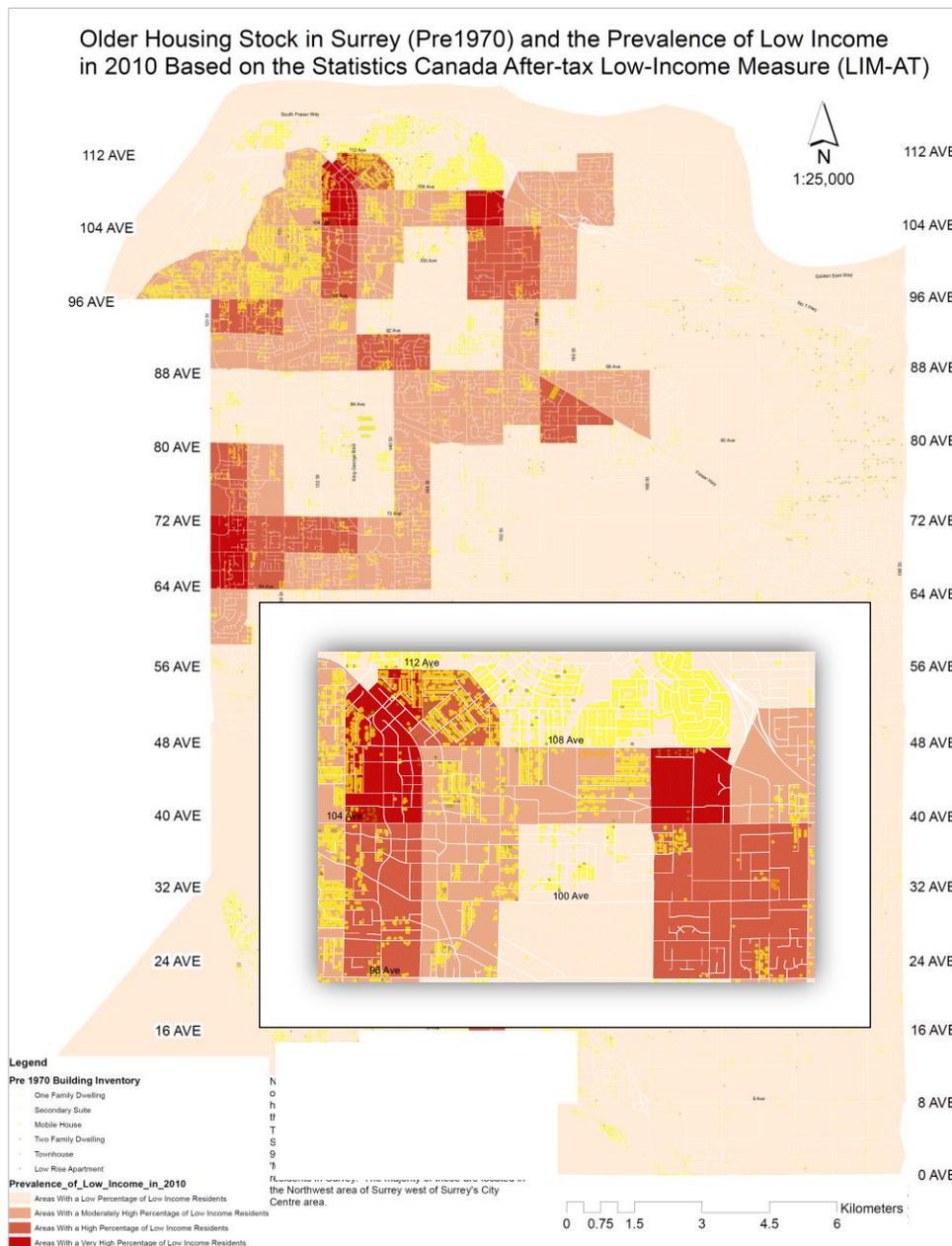


Sources: City of Surrey Finance Department & Surrey Fire Service (2013-2014)

## IMMINENT DECLINE

The Census Low Income Measure after Tax is an internationally-used measure of low income. The concept underlying LIM-AT is that a household has low income if its income is less than half of the median income of all households. There are approximately 19,086 residential units in Surrey that were constructed pre-1970 according to the 2015 Surrey Building Inventory. Approximately 9,041 of these units are located within areas that have 'moderately high' to 'very high' number of low-income residents in Surrey. The majority of these units are located in the area north and west of Surrey City Centre as illustrated in Figure 8.

FIGURE 8:



Source: City of Surrey Planning & Development, 2015

The LIM-AT clusters in the northwest area of Surrey City Centre and aligns, in part, with clustering of pre-1980 residential one and two-family dwellings lots with a high average of land value versus building value. Having said, this is were the similarity ends, underscoring the need to include economic indicators in any determination of neighbourhood distress.

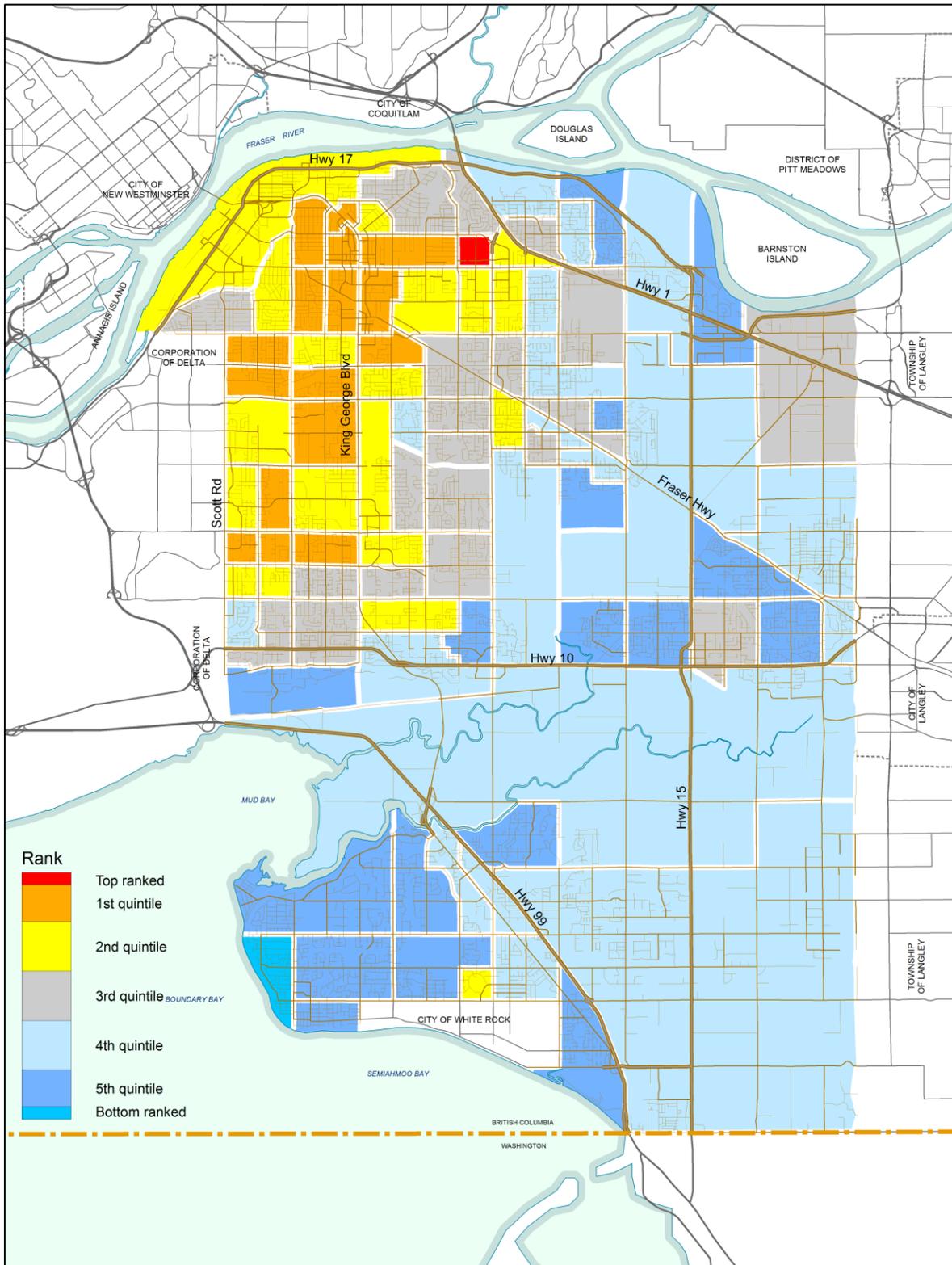
### **CLEARLY DECLINING**

The CA Neighbourhood Vulnerability Index (NVI) at the census tract level based on demographic factors from the 2011 Census reveals concentrations of distressed areas in Surrey. The map shows the City's census tracts divided into quintiles. The 12 factors are:

1. low median income
2. high levels of low income households (total and with children)
3. high levels of English as a second language (ESL)
4. high levels of recent immigrants
5. high levels of major repairs to housing stock
6. low housing value
7. high percentage of tenants' income spent on shelter costs
8. high levels of rental housing
9. high levels of lone parent families
10. high unemployment levels
11. low education attainment
12. high levels of mobility

A comparison of the NVI map with LIM-AT clustering shows overlap. The overlap is the tract bounded by 112<sup>th</sup> Avenue to the north, 96<sup>th</sup> Avenue to the south, and bordered by 132 Street to the west and 140 Street to the east. The NVI does not point to Cloverdale or South Surrey in any appreciable way. Like LIM-AT spatial clustering and aside from the inclusion of housing value, it does not include metrics such as tax arrearage or dwelling lot value.

**FIGURE 9: NEIGHBOURHOOD VULNERABILITY INDEX (NVI)**



Source: Community Planning, City of Surrey, 2015

## ACCELERATING DECLINE

In the next stage of accelerating decline, prior forces grow more powerful and witness the emergence of re-purposed one and two-family residential properties into basic shelter. A rooming house is a dwelling unit where boarders, lodgers, and roomers live in a house with each person having a separate tenancy agreement and having control over and responsibility for their own space. Rooming houses are often designed as single-family private dwellings with rooms rented to low-income residents or transients on a monthly basis. In many cases, rooming houses evolve into multiple suite buildings in order to maximize owner profits and as such, must conform to the *BC Building Code*. A dwelling unit ('house'), which is altered or occupied to provide accommodation for boarders, lodgers or roomers often lack the fire and life safety measures that are required in buildings that contain multiple residential suites or tenancies. These safety measures can include appropriate fire separations, means of egress, emergency lighting, smoke alarms and fire extinguishers. The majority of rooming houses in existence within BC require improvements to bring them into compliance with local by-laws and code. Many rooming houses are re-purposed multiple suite buildings that are being rented out individually with low levels of residential custodianship. Poorly-operated buildings are typically overcrowded, smoke alarms are not operational (removed or tampered with), egress routes are blocked, electrical hazards exist and there are fire separation issues. Conditions in the worst kept rooming houses often constitute an extreme and imminent danger to life, and should a fire occur in the building, the occupants would be unlikely to escape. In addition to fire safety issues, rooming houses attract crime and disorder.

## ABANDONMENT

Abandoned residential structures are unsightly, attract criminal activity, lead to fire hazards, and are a concern to public safety and community well-being wherever they exist. The costs of renovation or restoration may exceed market value. Proximity to vacant structures can increase insurance costs or cause cancellation of coverage. These dwellings are often linked to increased rates of crime and disorder in Surrey. In November 2015, a majority of residential break and enters, thefts, and mischief calls involved homes that were either under construction, being renovated, or have been abandoned or foreclosed. In some of the rural areas of the City, nearly 60 per cent of these calls have involved these types of residences.

A major contributing factor to abandonment of residential dwellings is the desire to purchase land for development during favourable housing market conditions. Investments can be undertaken by investors buying up smaller parcels on the same block and eventually assembling them into a large land package development purposes. Land is purchased, but then it is up to the developer when they want to build. This means they have little incentive to stop properties falling into decay as residential custodianship is low or absent. Disinvestments occur when maintenance is deferred or completely withheld, resulting residential properties that are vulnerable to intrusion, theft, vandalism, fire risk or arson. These properties may eventually be developed and can sit vacant for years and attract intruders, squatters, and generate public safety risks.

**FIGURE 10: AN ABANDONED RESIDENTIAL PROPERTY IN SURREY, BRITISH COLUMBIA**



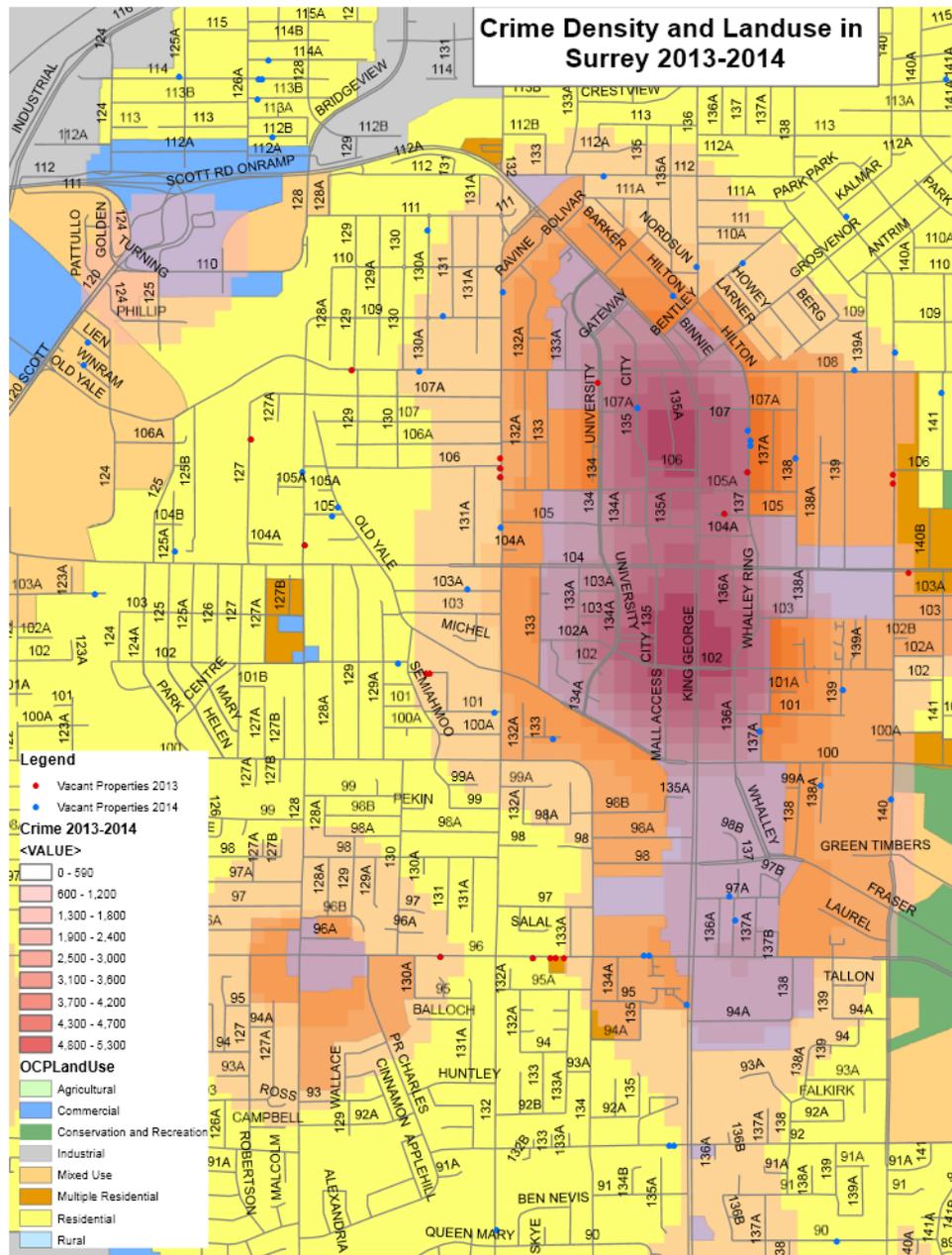
Source: City of Surrey Fire Service, 2015

The maintenance or demolition of abandoned residential properties is a major expenditure for many cities. Local governments bear the cost of maintaining, administering, and demolishing abandoned and vacant properties, as well as servicing them with police and fire protection and public infrastructure. Research demonstrates that boarding up or fencing off abandoned residential properties is largely ineffective, these anti-intrusion measures are easily defeated (Kondo et. al. 2015). Municipalities also incur administrative costs as they search for absentee owners, enforce by-laws, and oversee foreclosures, although they may recover some of these costs through fines or fees if an owner can be identified and compelled to pay.

Vacancies also reduce local government revenues directly, because owners may walk away from their tax obligations, and indirectly, because of their impact on nearby property values and tax assessments. Although in some instances cities can recover this lost revenue through tax sales, in others property ownership reverts to the city, which has no viable option other than demolition. The presence of abandoned residential properties has direct and indirect cost implications for local government, as well as ongoing public safety ramifications (Morckel 2013, 471).

Figure 11 reveals the concentration of crime relative to the location of abandoned residential properties in Surrey.

FIGURE 11:



Source: City of Surrey Fire Service and COSMOS Crime and Land Data, 2015

Notwithstanding ongoing fire and life safety concerns at such problem properties, vulnerable people with limited financial means will continue to seek low-rent accommodation given the lack of affordable housing in the Metro Vancouver region. This demographic shift is expected to continue as the rental market in the City of Vancouver is prohibitively expensive, and Surrey is widely seen as a more affordable place to live. These forces coupled with increasing levels of gentrification in Vancouver’s shrinking Downtown Eastside will invariably result in more vulnerable people moving to Surrey to access shelter and social services which means an increase in the number of problem properties in the City.

## Conclusion

The study examined the scope, nature, and impact of distressed properties in Surrey, as well as the social, economic, and building stock characteristics as they relate to residential fire risk, crime and disorder in neighbourhoods. The objective of the study was to examine the relationship between City characteristics, property tax arrearage, and land value that may lead to abandoned residential properties and re-purposed dwellings. Regional developments in the housing market suggest that the residential housing market may decline in late 2016, potentially leading to speculative practices, distressed residential properties, and increases in the number of abandoned residential properties. Once it is understood that neighbourhood distress is part of a larger process it becomes clear that the way to prevent it is to take effective action early in the process.

A promising area for consideration is the utilization of data-mining tools and applications to determine future vacancy risks for individual properties and for neighbourhoods using a variety of structural, demographic, socio-economic, and City activity nodes with high accuracy. The predictive component can be designed to use historical data to learn which features are indicative of either vacancy or the risk of future vacancy. In this way, local government can take pre-emptive measures before residential properties slide into irreversible decline (Appel et al. 2014, 161-173).

## Recommendations

This study proposes the following recommendations:

### **TAKE THE LONG VIEW AND ADDRESS FUTURE RISK**

Focus on identifying and treating at-risk one and two-family dwellings located in suburban and urban neighbourhoods of Surrey before they degrade and incur future public safety risk. This means looking at pre-stress indicators and other metrics that predict decline in the next 5 to 10 years. Once these residential properties are identified through a process of evidence-based, data-driven research, and considering land economics and property tax arrears, early intervention strategies can be prescribed to address incipient decline.

### **PIVOT SOUTH, TREAT RESIDENTIAL PROPERTIES BEFORE THEY DECLINE**

Design and implement problem prevention strategies for Cloverdale and parts of South Surrey where land development pressures and risk factors are starting to intersect. Properties where the value of the land outweighs the value of the structure should be considered along with by-law code violations such as unsightly properties and property crime and disorder in these areas. If there is a common theme of absentee or speculative property owners this can also be a predictor of future property distress. Strategies should engage residents with tailored fire and crime prevention opportunities relating to the risks of abandoned residential properties and nuisance properties and how to safeguard their premises and report non-conforming structures and issues to the City. It is proposed that Surrey Fire Service's Home Safe program act as an essential guide to the development of such a strategy.

## PREVENT THE EMERGENCE OF ABANDONED RESIDENTIAL PROPERTIES

Given the continuing threat of abandoned residential structure fires in Surrey, it is proposed that an Order to Remedy Conditions (OTRC) be legally attached to a private residential dwelling that has been purchased for development purposes as soon as the property is bought. The OTRC could be made a condition of the development permit application process, thereby addressing concerns around speculative practices and disinvestment up front. That way, property owners that sit on vacant, decaying and non-conforming residential properties can be billed for cost right from the start, avoiding a lengthy after-the-fact process of cost-recovery.

## LEVERAGE DATA-DRIVEN SOLUTIONS TO PREDICT RISK

Develop a distressed property early warning system. Such a predictive system of proactive enforcement should ideally capture the following indicators: (1) previous fires, crime and disorder; (2) histories of property back taxes; (3) land value and building value ratio; (4) demographic and population shifts; (5) unabated by-law violations; and (6) building owners that have a history of abandoning properties or linked to problem properties in Surrey. As it presently stands, City data resides in departmental siloes making real-time analytics difficult. By accessing enterprise data, City staff can explore federated data and produce timely risk analytics that are predictive and measurable. Residential properties where the value of land outweighs the value of structures and cluster with properties in tax arrearage and related metrics should be pre-treated with fire and crime prevention initiatives specific to problem and risk-prone properties.

## References

1. Anderson James M., John M. MacDonald, Ricky Bluthenthal, and Scott Ashwood. 2013. Reducing crime by shaping the built environment with zoning: An empirical study of Los Angeles. *University of Pennsylvania Law Review* 161: 699-756.
2. Appel, Sheila R., Derek Botti, James Jamison, Leslie Plant, Jing Y. Shyr, and Lav R. Varsney. 2014. Predictive analytics can facilitate proactive property vacancy policies for cities. *Technological Forecasting & Social Change* 89: 161-173.
3. Appleyard, Donald. 1981. *Livable streets*. Berkeley: University of California Press.
4. Appraisal Institute. 2015. *The Appraisal of Real Estate, 14<sup>th</sup> Edition*. Chicago: The Appraisal Institute.
5. Arsen, David. 1992. Property tax assessment rates and residential abandonment: Policy for New York City. *American Journal of Economics and Sociology* 51 (3): 361-377.
6. Asgary, Ali, Alireza Ghaffari, and Jason Levy. 2010. Spatial and temporal analyses of structural fire incidents and their causes: A case of Toronto, Canada. *Fire Safety Journal* 45: 44-57.
7. Brantingham Paul J., and Patricia L. Brantingham. 1981. *Environmental Criminology*. Beverley Hills: Sage Publications.

8. Chainey, Spencer. 2013. Using the vulnerable localities index to identify priority areas for targeting fire safety services. *Fire Safety Journal* 62: 30-36.
9. Chhetri, Prem, Jonathan Corcoran, and Robert J. Stimson. 2010. Modelling potential socio-economic determinants of building fires in South East Queensland. *Geographical Research*. 48 (1): 75-85.
10. Cohen, Lawrence E., and Marcus Felson. 1979. Social change and crime rate trends: A routine activity approach. *American Sociological Review*. (44): 588-608.
11. Corcoran, Jonathan, Gary Higgs, Chris Brunsdon, Andrew Ware, and Paul Norman. 2007. The use of spatial analytical techniques to explore patterns of fire incidence: A South Wales case study. *Computers, Environment and Urban Systems* 31: 623-647.
12. Corcoran, Jonathan, Gary Higgs, David Rohde, and Prem Chhetri. 2009. Investigating the association between weather conditions, calendar events and socio-economic patterns with trends in fire incidence: An Australian case study. *Journal of Geographic Systems* 13 (2): 193-226.
13. Cox, Ed and Anna Turley. 2013. *Love thy neighbourhood: People and place in social reform*. Newcastle Upon Tyne: Institute for Public Policy Research.
14. Cozens, Paul M., 2008. Crime prevention through environmental design in Western Australia: Planning for sustainable urban futures. *International Journal of Sustainable Development and Planning* 3 (3): 272-292.
15. ———. 2008. New Urbanism, crime and the suburbs: A review of the evidence. *Urban Policy and Research* 26 (4): 1-17.
16. Cozens, Paul and Terence Love. 2009. Manipulating permeability as a process for controlling crime: Balancing security and sustainability in local contexts. *Built Environment*. 35 (3): 346-365.
17. Dear, Michael and Jennifer R. Wolch. (1987). *Landscapes of despair: From deinstitutionalization to homelessness*. New Jersey: Princeton University Press.
18. Ellin, Nan. 1997. *Architecture of Fear*. New York: Princeton Architectural Press.
19. Gaffikin, Frank, and Mike Morrissey. 2011. *Planning in Divided Cities: Collaborative Shaping of Contested Space*. London: Blackwell Publishing Ltd.
20. Garis, Len. 2015. *Allard et al. v. Her Majesty the Queen in Right of Canada*.
21. Garis, Len, Joseph Clare, and Sarah Hughan. 2015. *Smoke alarms work, but not forever: revisited*. Abbotsford: Centre for Public Safety and Criminal Justice Research.
22. Gilreath, Morgan B. 2013. A model for quantitatively defining urban blight by using assessment data. *Fair & Equitable*: 3-13.
23. Goldsmith, Stephen, and Susan Crawford. 2014. *The Responsive City: Engaging communities through data-smart governance*. San Francisco: Jossey-Bass.
24. Guldaker, Niklas and Per-Olof Hallin. 2014. Spatio-temporal patterns of intentional fires, social stress and socio-economic determinants: A case study of Malmo, Sweden. *Fire Safety Journal* 70: 71-80.
25. Han, Hye-Sung. 2014. The impact of abandoned properties on nearby property values. *Housing Policy Debate* 24 (2): 311-334.
26. Hart, Timothy C. 2014. Street robbery and public bus stops: A case study of activity nodes and situational risk. *Security Journal* 27 (2): 180-193.

27. Hart, Timothy C., and Terance D. Miethe. 2015. Configural behavior settings of crime event locations: Toward an alternative conceptualization of criminogenic microenvironments. *Journal of Research in Crime and Delinquency* 52 (3): 373-402.
28. Hollis-Peel, Meghan E., Danielle M. Reynald, Maud van Bavel, Henk Elfers, and Brandon C. Welsh. 2011. Guardianship for crime prevention: A critical review of the literature. *Crime, Law and Social Change*. 56: 53-70.
29. Jennings, Charles. 2013. Social and economic characteristics as determinants of residential fire risk in urban neighborhoods: A review of the literature. *Fire Safety Journal* 62: 13-19.
30. Jennings, James. 2012. Measuring neighborhood distress: A tool for place-based urban revitalization strategies. *Community Development* 43 (4): 464-475.
31. Johnson, Shane D., and Kate J. Bowers. 2010. Permeability and burglary risk: Are cul-de-sacs safer? *Journal of Quantitative Criminology*. 26 (1): 89-111.
32. Kelling, George L., and James Q. Wilson. March 1982. Broken windows: The police and neighborhood safety. *The Atlantic*.
33. Kennedy, Leslie, Joel Caplan and Eric Piza. 2011. Risk clusters, hotspots and spatial intelligence: Risk terrain modeling as an algorithm for police resource allocation strategies. *Journal of Quantitative Criminology* 27 (3): 339-362.
34. Kondo, Michelle C., Danya Keene, Bernadette C. Hohl, John M. MacDonald, and Charles C. Branas. 2015. A difference-in differences study of the effects of a new abandoned building remediation strategy on safety. *PLoS One* 10 (8): 1-14.
35. Latkin, Carl, Aaron Curry, Wei Hua, and Melissa Davey. 2007. Direct and indirect associations of neighborhood disorder with drug use and high risk sexual partners. *American Journal of Preventative Medicine* 32 (6): 234-241.
36. Mayor's Task Force on Crime Reduction and Public Safety. 2007. *Crime reduction strategy*. City of Surrey.
37. MacDonald, John. 2015. Community design and crime: The impact of housing and the built environment. *Crime and Justice*. 44 (1): 333-383.
38. McCord, Eric S., and Jerry H. Ratcliffe. 2009. Intensity value analysis and the criminogenic effects of land use features on local crime patterns. *Crime Patterns and Analysis* 2 (1): 17-30.
39. Miethe, Terance, Timothy C. Hart, and Wendy Regoeczi. 2008. The conjunctive analysis of case configurations: An exploratory method for discrete multivariate analysis of crime data. *Journal of Quantitative Criminology* 24: 227-241.
40. Morckel, Victoria C. 2014. Predicting abandoned housing: Does the operational definition of abandonment matter? *Community Development* 45 (2): 121-133.
41. ———. 2014. Spatial characteristics of housing abandonment. *Applied Geography* 48: 8-16.
42. ———. 2013. Empty neighborhoods: Using constructs to predict the probability of housing abandonment. *Housing Policy Debate* 23 (3): 469-496.
43. O'Brien, Daniel. 2015. Custodians and custodianship in urban neighborhoods: A methodology using reports of public issues received by a city's 311 hotline. *Environment and Behavior* 47 (3): 304-327.
44. O'Brien, Daniel, and Barrett Montgomery. 2015. The other side of the broken window: A methodology that translates building permits into an econometric of investment by community members. *American Journal of Community Psychology* 55: 25-36.

45. O'Brien, Daniel, and Robert Sampson. 2015. Public and private spheres of neighbourhood disorder: assessing pathways to violence using large-scale digital records. *Journal of Research in Crime and Delinquency* 52 (4): 486-510.
46. Paulsen, Derek J. 2013. *Crime and planning: Building socially sustainable communities*. Boca Raton: CRC Press.
47. Plecas, Darryl, MLA. 2014. *Getting Serious About Crime Reduction: Report of the Blue Ribbon Panel on Crime Reduction*. Victoria: Government of British Columbia.
48. Raleigh, Erica, and George Galster. 2014. Neighborhood disinvestment, abandonment, and crime dynamics. *Journal of Urban Affairs* 00 (0): 1-30.
49. Roberts, Marion, and Adam Eldridge. 2009. *Planning the night-time city*. New York: Routledge.
50. Rukus, Joseph, and Mildred E. Warner. 2012. Crime rates and collective efficacy: The role of family friendly planning. *Cities*. 31: 37-46.
51. Schachterle, Stephen, David Bishai, Wendy Shields, Rebecca Stepnitz, and Andrea C. Gielen. 2012. Proximity to vacant buildings is associated with increased fire risk in Baltimore, Maryland, homes. *Injury Prevention* 18: 98-102.
52. Schneider, Richard H., and Ted Kitchen. 2007. *Crime prevention and the built environment*. London: Routledge.
53. Somers, Julian M., Stefanie N. Rezansoff, Akm Moniruzzaman, and Carmen Zabarauckas. 2015. High-frequency use of corrections, health, and social services, and association with mental illness and substance use. *Emerging Themes in Epidemiology* 12 (17): 1-10.
54. Weisburd, David, Elizabeth R. Groff, and Sue-Ming Yang. 2012. *The criminology of place: Street segments and our understanding of the crime problem*. New York: Oxford University Press.
55. Whitaker, Stephan, and Thomas Fitzpatrick J. 2013. Deconstructing distressed-property spillovers: The effects of vacant, tax-delinquent, and foreclosed properties in housing submarkets. *Journal of Housing Economics* 22: 79-91.
56. White, Michelle J. 1986. Property taxes and urban housing abandonment. *Journal of Urban Economics* 20: 312-330.
57. White, Roger, Guy Engelen, and Inge Uljee. 2015. *Modeling Cities and Regions as Complex Systems: From Theory to Planning Applications*. Cambridge, Massachusetts: The MIT Press.
58. Wuschke, Kathryn, Joseph Clare, and Len Garis. 2013. Temporal and geographic clustering of residential structure fires: A theoretical platform for targeted fire prevention. *Fire Safety Journal* 62: 3-12.
59. Xiong, Lin, Dorothy Bruck, and Michelle Ball. 2015. Comparative investigation of 'survival' and fatality factors in accidental residential fires. *Fire Safety Journal* 73: 37-47.

## Data Sources Consulted

This study analyzed quantitative and qualitative data obtained from the City of Surrey as well as federal and provincial data agencies. For the most part, public domain information was used. In other cases, specific data requests were made. The following is a list of 12 datasets used in the study:

1. Residential Building Inventory
2. Property Crime and Disorder
3. Property Tax Arrears and Delinquency
4. Population, Land Use and GIS layers
5. BC Assessment
6. Development Permit Applications
7. Residential Structure Fires
8. Vacant and Boarded Houses
9. Unsightly Properties
10. Census Low Income Measure after Tax
11. Neighbourhood Vulnerability Index
12. Statistics Canada Census and BC Statistics

Databases queried include the City of Surrey's AMANDA, TEMPEST, COSMOS, POSSE, and FDM databases, as well as the RCMP PRIME system for property crime data which is also publically-available on COSMOS. Internet search engines, namely, EBSCO® and ProQuest® as well as other indexes and databases were used to locate peer-reviewed academic journals and scholarly texts, as well as government documents, white papers, and technical briefs. A comprehensive search strategy included combinations of the following search terms: "neighbourhood decline;" "distressed properties;" "environmental criminology;" "crime and disorder;" "mental illness and substance use;" "fire risk and prevention;" "land use and community planning;" "built environment;" "social planning and housing;" "population and demography;" "abandoned residential properties and vacant lots;" "urban land economics;" "housing markets;" "real estate, building and land values;" "property tax arrears and tax delinquency;" "predictive analytics;" and "ecometrics."

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## Chief Fire Officers Association (CFOA)

### RESEARCH SHARING BETWEEN CANADA AND THE UNITED KINGDOM

In 2016, CFOA signed a landmark agreement with the University of the Fraser Valley (UFV) Centre for Public Safety and Criminal Justice to share fire related data and research results, conduct joint research, participate in student and faculty exchanges, and seek international funding for new research. Anticipated benefits from the first formal research sharing initiative between fire researchers in Canada and Fire Rescue Services in the UK include:

- the improved use of existing resources
- greater access to international fire research and data
- the development of new data and best practices

For more information contact CFOA at [www.cfoa.org.uk/](http://www.cfoa.org.uk/)

## Acknowledgements

The authors would like to thank Dr. Terry Waterhouse, Director, Public Safety Strategies, City of Surrey, Dr. Charles R. Jennings, Director, Christian Regenhard Center for Emergency Response Studies (RaCERS), John Jay College of Criminal Justice, The City University of New York, and Dr. Joseph Clare, School of Law, Murdoch University, Australia, for their careful edits. The study was inspired by thoughtful papers on the topic by Charles Jennings, Joe Clare, and Dr. Darryl Plecas, MLA Abbotsford South, Professor Emeritus, University of the Fraser Valley. The study also benefited from the City of Surrey's Emerging Leaders Program and their ideas on how to fully support neighbourhoods in transition.

We are indebted to the Surrey Fire Service's Command Staff for reviewing earlier drafts of this study; their insights are derived from many years of operational experience in the field. In particular, the authors wish to thank Ms. Sarah Hughan, GISP, Computer Specialist, at Surrey Fire Service for her invaluable GIS expertise.

The authors would like to thank community planners at the City of Surrey who have made significant contributions to the development of this study. The following individuals merit special appreciation: Mr. Stuart Jones, MCIP, RPP, Senior Planner and Mr. Ron Gill, MCIP, Current Planning Manager – North, Planning and Development Department, City of Surrey. Special thanks to Mr. Don Luymes, MCIP, Manager, Community Planning, City of Surrey and Mr. Andrew Dong, Planning Analyst.

Finally, the authors would like to thank Mrs. Sally Bhullar-Gill, Property Taxes and Utilities Manager, Finance and Technology, Financial Services, and Mr. Sandeep Brar, PMP, TEMPEST Solutions Manager, Property and Payment Services, City of Surrey. Finally, the authors would like to thank Mr. Harry Gill, By-Law Enforcement Manager, Legal Services Division, By-Law & Licensing Section, City of Surrey.



