Surrey's Underutilized ALR Lands

An Analysis of their Economic, Job Creation, and Food Production Potential in Direct Market Agriculture

Revised May, 2013

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KWANTLEN POLYTECHNIC UNIVERSITY

INSTITUTE FOR SUSTAINABLE HORTICULTURE

The Institute for Sustainable Horticulture

This document reports on research Conducted for the City of Surrey by the Sustainable Food Systems Research Group at The Institute for Sustainable Horticulture, Kwantlen Polytechnic University. The research was conducted from 2010 – 2011. This version of the report was revised and republished in May of 2013.

The Institute for Sustainable Horticulture (ISH) is an applied research unit of Kwantlen Polytechnic University. The Institute is comprised of two research groups: The Bio-Control and Bio-Products Research Group associated with the Canadian Foundation for Innovation research laboratory on the Langley campus; and the Sustainable Food Systems Research Group based on the Richmond campus.

The Sustainable Food Systems Research Group is co-Directed by Drs. Kent Mullinix and Arthur Fallick. The Research Group's applied research, extension, and education focus is on regional-scale, human intensive food systems. Our past and current work falls under two categories: MESA projects and Bio-Regional Food Systems projects.

Through our MESA ("Municipally Enabled Sustainable Agriculture") projects, we have worked with municipalities in south-west BC to investigate the direct economic, environmental, and social benefits that could result if municipalities invested in and supported small scale agriculture in their communities. Our work has demonstrated significant potential for increased food security, a reduction of farmland loss to urban sprawl, job creation, and wealth generation.

In our Bio-Regional Food Systems projects, we are working to evaluate the potential for food systems organized at the eco-region scale and comprised of small scale, human intensive, and ecologically sound supply chain components to improve food self-reliance, minimize environmental impact, improve economic viability of farms and ancillary businesses, contribute to the local economy, and strengthen communities.

More information is available at www.kwantlen.ca/ish.

Acknowledgements

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For their support and guidance as we completed a historical analysis of Surrey's ALR lands, we owe thanks to Brian Underhill at the Agricultural Land Commission, Susan Wilson at the City of Surrey, and Ryan Gallagher at the Surrey Archives. For the information and photographs they supplied about the history of Surrey's dyking and drainage infrastructure, thanks go out to Carrie Baron and Remi Dube at the City of Surrey. For their assistance with our survey of landowners in the ALR, thanks go out to City of Surrey Staff Joanne McCurdy, Debbie Gallichen, and Melanie Atkinson. For their support sourcing and interpreting the geographic information system data used in our analysis, we thank Deepa Spaeth Filatow in the Knowledge Management Branch at the Ministry of Environment, as well as City of Surrey staff Stuart Jones and Bill McKay.

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EXECUTIVE SUMMARY

Project Genesis and Research Questions

This study was commissioned by the City of Surrey in 2010, after a series of meetings between Surrey Mayor Dianne Watts and Drs. Kent Mullinix and Arthur Fallick, Directors at the Institute for Sustainable Horticulture. During these meetings, Mayor Watts shared her interest in increasing the agricultural utilization of the city's ALR lands and identifying specific ways that these lands could contribute to economic activity, and create jobs within the municipality.

Given Mayor Watts' interest in these issues, the research questions asked in this study were as follows:

1. What is the history of change, loss, and subdivision of Surrey's ALR lands? Are there patterns in the historic sequence of ALR land development and loss?
2. How much of Surrey's ALR is currently underutilized for agriculture?
3. What are the food production, job creation, and economic potentials of Surrey's underutilized ALR lands?
4. What strategies can the City of Surrey employ to support and encourage the growth of agriculture on their underutilized ALR lands?

Surrey's Current Agri-Food Sector

Surrey has a long agricultural history and farming remains an important component of Surrey's municipal landscape today. Surrey's agricultural lands comprise 22,000 acres which span north-south across the city and account for 15% of all the agricultural land in Metro Vancouver. Most of these lands are considered "Prime" for agriculture and are protected by the BC Agricultural Land Reserve.

Surrey is home to approximately 487 farms which produce a range of animal and vegetable products. Berry production, forage, and pasture dominate agricultural production in Surrey.

Surrey's current agriculture sector generates over $153 million in annual farm receipts and over $37 million in wages paid. Approximately 4,470 people are employed on Surrey farms, which have average gross receipts of $315,000. Most Surrey farms, however, report gross receipts of less than $10,000. This is reflective of the high incidence of hobby farms.

Although farming remains an important component of Surrey's municipal landscape, Statistics Canada data reveals that farm numbers in the municipality are steadily declining. The number of census reporting farms has dropped by approximately 30% over the past 20 years.

The Evolution of Surrey's ALR Since 1973

Our investigation of change to Surrey's ALR since 1971 indicates that most subdivision of Surrey's current ALR land occurred before the ALR was created and that very few Surrey parcels have in fact been lost to the ALR as a result of exclusion applications since 1973. Relative to other areas in BC, the City of Surrey has done an exemplary job of maintaining the borders of its agricultural land base.

Underutilized Land in the Surrey ALR

If a significant amount of land has not been lost from the ALR, then how has its utilization evolved since 1973? Our research revealed that a greater threat to agricultural viability than the loss of ALR land out of the reserve in Surrey is non-farm use of parcels *within* the ALR.

To understand and assess the extent to which the underutilization of ALR land remains an issue today, we conducted an inventory of 669 properties, covering 7,500 acres (3,035 ha) or approximately 33% of the total Surrey ALR, which had been identified as underutilized for agriculture by the Ministry of Agriculture in 2004.

Our field work revealed that at least 556 of the parcels which were underutilized for agriculture in 2004 remained underutilized in 2011. This amounts to 6,043 acres (2,446 ha), or 27% of Surrey's ALR. Approximately 3,339 acres (1,351 ha) of this land could feasibly be used for agriculture.

The amount of underutilized ALR land that is potentially available for agriculture represents a significant untapped resource for the City of Surrey with enormous potential from food production, economic, and job creation perspectives. However, bringing this land into agricultural production will be challenging for a variety of reasons. There is a high incidence of ownership of these parcels by non-agriculturalists with a wide range of interest, willingness, and ability to make their land available to farmers or take up farming themselves. On many parcels, degradation has made soil-based agriculture impossible, and the costs associated with developing structure based alternatives may be prohibitive to landowners in the short term.

Agricultural Potential of Surrey's Underutilized ALR Land

Five scenarios for human-scale agriculture or food system services were developed to illustrate the potential to support agriculture on all of Surrey's underutilized ALR lands. The scenarios were based upon an evaluation of the various sizes of underutilized ALR parcels observed during the field work; the type of agricultural activities possible on different underutilized ALR parcel sizes observed during the field work; and the inputs, infrastructure, equipment, labour, and capital necessary to support them.

Economic and Food Production Potential on Surrey's Underutilized Agricultural Lands

For illustrative purposes, we developed a static analysis based on small scale, human intensive[1], direct market[2] agriculture to evaluate and illustrate the potential of Surrey's underutilized ALR lands to contribute to the local economy and satisfy Surrey residents' current consumption of some commonly consumed fruits, vegetables, and animal products.

The analysis demonstrates that if all 3,339 acres of available underutilized ALR land in the City of Surrey were brought into agricultural production, they would have the potential to satisfy 100% of Surrey residents' consumption of 27 crops and animal products for six months of the year, contribute over $183 million in gross revenue to Surrey's economy, and create over 1,500 full time equivalent jobs.

[1] Human intensive refers to production methods that rely more on human labour, hand tools, and small machines and less on extensive and expensive mechanization.

[2] Direct marketing refers to the practice of farmers selling their products directly to the consumer, rather than through a broker, packing house, wholesaler, or grocer.

Recommendations

The transition of these lands into full agricultural utilization is not without significant policy and strategic challenges, all of which are related to two underlying problems: non-farmer ownership of ALR land, and limited resources and support for small-scale farmers. Tackling these critical issues can be done in a manner which will not detriment Surrey's existing agriculture sector. It will require an integrated, systems approach that addresses economic, social, and political factors related to small-scale farmers, landowners, and the wider community in Surrey. The report offers 34 specific recommendations to address these issues. These recommendations are summarized in Table 1 (page 8).

Table 1: Summary of Recommendations to Address Challenges Related to Surrey's Underutilized ALR Lands

Challenge		Potential Solutions & Recommendations		Potential Partners
1	**Water for Agricultural Operations**	**1.1**	Conduct a review of Bylaw 16337 in light of its impact on the viability of small scale agriculturalists and new farmers.	
		1.2	Collaborate with the Ministry of Environment (Water Stewardship Division) to explore opportunities to promote the sharing of existing ground and surface water resources among established and new farmers.	Ministry of Environment - Water Stewardship Division
2	**Skilled, Knowledgeable Small Scale Farmers**	**2.1**	Publicly celebrate Surrey farmers and promote small-scale agriculture as a legitimate career path within Surrey, akin to professions such as medicine, engineering, or education.	Surrey Board of Trade
		2.2	Develop a "Farm School" or other formal education program to prepare people from all walks of life for careers in agriculture.	Institute for Sustainable Horticulture (Kwantlen Polytechnic University)
		2.3	Provide support to link future or inexperienced farmers with established farms seeking interns or employees.	Young Agrarians (Farm Folk/City Folk), SOIL
3	**Constraints to Accessing Agricultural Land for Farming**	**3.1**	Assist with the establishment of an independent organization or civic department which could serve to connect willing landowners to farmers seeking land.	Young Agrarians (Farm Folk/City Folk), SOIL
		3.2	Make city-owned land available for agriculture on a long term basis.	Farm Folk/City Folk - Community Farms Program, The Land Conservancy of British Columbia
		3.3	Conduct a further, comprehensive examination into the extent of agricultural land under-utilization on all Surrey agricultural land (including all ALR lands and those zoned municipally for agriculture).	Ministry of Agriculture, Institute for Sustainable Horticulture (Kwantlen Polytechnic University)
		3.4	Identify strategies to stem speculation on agricultural land.	Real Estate Foundation of BC
4	**Limited Technical Support, Equipment, and Infrastructure for New Farmers**	**4.1**	Establish an Agricultural Development Office, with permanent full time staff, dedicated to providing technical extension services for small scale farmers.	Metro Vancouver and its Municipal Governments, Institute for Sustainable Horticulture (Kwantlen Polytechnic University)

		4.2	Make City of Surrey owned land available for small scale agriculture research and demonstration.	Institute for Sustainable Horticulture (Kwantlen Polytechnic University)
4	**Limited Technical Support, Equipment, and Infrastructure for New Farmers (Continued)**	**4.3**	Assist with the establishment of a farming machinery and implement cooperative, or lending library, so that farm-members can pool resources to collectively own or affordably borrow large farm equipment.	
		4.4	Conduct a review of Zoning By-law 12000 in light of its impact on the potential for establishing food-system services on non-arable ALR land.	
5	**Financing for New Farmers**	**5.1**	Incorporate agriculture and food systems into amenity contribution categories.	Agricultural Land Commission
		5.2	Explore Community Trust Farming as means to acquire land for under-capitalized farmers.	Institute for Sustainable Horticulture (Kwantlen Polytechnic University), Farm Folk/City Folk Community Farms Program, The Land Conservancy of British Columbia
		5.3	Work with the financial sector to develop a micro-loans program for new small scale farmers.	
6	**Constraints to Value-Added Processing**	**6.1**	Identify non-arable land on which "Agricultural Enterprise Zones" could be established to stimulate the co-location of agricultural and food system services.	Agricultural Land Commission
		6.2	Assist with the establishment of a cooperative hub for small-scale food processing and storage.	Local Food First, BC Cooperative Association
		6.3	Conduct a review of Zoning By-law 12000 in light of its impact on the potential for small scale food processing in Surrey.	Agricultural Land Commission
		6.4	Lobby the Province to have the income generated from on-farm value added processing eligible as farm income for tax assessment purposes.	BC Assessment
		6.5	Encourage local health authorities to work with small-scale farmers to re-develop small-scale food processing guidelines that are appropriate for their scale.	Agricultural Land Commission, Regional Health Authorities, Get Local BC, Fraser Valley Farm Direct Marketing Association

7	**Under-Developed Markets for Local Food**	**7.1**	Lead by example, supporting local farmers and encourage healthy eating at the Local Government level.	Neighbouring Municipalities
		7.2	Support and encourage farm gate sales in the ALR.	Get Local BC (FF/CF), Fraser Valley Farm Direct Marketing Association
		7.3	Develop a comprehensive farmer's market strategy and suite of supportive policies.	BC Association of Farmers Markets
		7.4	Investigate the feasibility of providing property or business tax benefits to retailers that devote a certain percentage of their store's floor space to local farm produce.	BC Assessment
		7.5	Foster broad-based public support and understanding for local food and agriculture.	
8	**The Non-Agricultural Use of Surrey's ALR**	**8.1**	Consider stronger regulations around or penalties for the non-agricultural use of Surrey's ALR.	Agricultural Land Commission
		8.2	Limit home-plate size, scale, and placement in the ALR.	Agricultural Land Commission
		8.3	Strengthen enforcement of existing rules pertaining to permitted activities on A1, A2, A3, and other zones in the ALR.	
		8.4	Consider amendments to Bylaw 16337 to restrict the use of City water for non-agricultural uses in the ALR.	Agricultural Land Commission
		8.5	Ensure BC Assessment is reviewing and monitoring residents claiming farm class status for tax assessment purposes.	BC Assessment
9	**Landowners' Unwillingness to Allow Agricultural Use of their ALR Land**	**9.1**	Educate landowners in the ALR about the benefits of leasing land to farmer.	Surrey Realtors
		9.2	Develop additional incentives for allowing the agricultural use of ALR land by leasing to farmers	
		9.3	Lobby the Province to make changes to the Assessment Act which would encourage landowners to enter long term leases with farmers.	BC Assessment

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Preface: Project Genesis and Research Questions

This study was commissioned by the City of Surrey in 2010, after a series of meetings between Surrey Mayor Dianne Watts and Drs. Kent Mullinix and Arthur Fallick, Directors at the Institute for Sustainable Horticulture. During these meetings, Mayor Watts shared her interest in increasing the agricultural utilization of the city's ALR lands and identifying specific ways that these lands could contribute to economic activity, and create jobs within the municipality.

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1.0 INTRODUCING SURREY'S CURRENT AGRI-FOOD SECTOR

Figure 1: Surrey's Peri-Urban Agricultural Landscape in the Regional Context

With a population of over 474,000 people, Surrey is British Columbia's second largest municipality and one of the fastest growing in the country. Surrey's extensive agricultural lands, which run geographically north-south through the heart of a very urbanized municipality, are a unique feature for a city of this size that lead many to describe it as having a dual "urban and rural" character. Surrey's 22,000 acres (9,000 hectares) of agricultural lands currently make up approximately 25% of the city's total jurisdictional area and account for about 15% of all the agricultural land in Metro Vancouver[3].

Surrey has a long agricultural history, as the city grew up around the pioneer family farms which were established in the fertile Nicomekl and Serpentine River lowlands during the late 1800's. These early farms, which produced a variety of agricultural products, played a key role in what was then a relatively local agri-food system reliant on rail and shipping to transport goods to markets in the Lower Mainland, Vancouver Island and interior British Columbia.

By 1940, the completion of the Pattullo Bridge and King George Highway had connected Surrey to neighbouring municipalities which would eventually form the Greater Vancouver and Fraser Valley Regional Districts. This was a period of rapid urbanization, and marked the beginning of a trend towards suburban development and the conversion of much of Surrey's farmland into residential neighbourhoods which became populated by families escaping the higher cost of housing in Vancouver and other municipalities. This pattern was reflected across the province, where overall as many as 6,000 hectares of prime agricultural land were being lost each year to urban and other uses[4].

[3] BC Ministry of Agriculture and Lands, 2009
[4] BC Provincial Agricultural Land Commission, 2002

Urban development of farmland continued unabated until 1973, when the provincial government introduced the Agricultural Land Commission Act with the objective of protecting threatened farmland in perpetuity. The Act resulted in the creation of The Agricultural Land Reserve (ALR), a "provincial zone in which agriculture is recognized as a priority use, farming is encouraged, and non-agricultural uses are controlled"[5]. In Surrey, approximately 21,704 acres (8,787 hectares) were designated as part of the ALR. Despite this, however, the pressure to develop farmland is intense in the region, and farmland values are unusually high as a result. Surrey realtors report that ALR land in the municipality sells for $175,000 - $200,000 per acre, a price that cannot be justified based on agriculture and make it nearly impossible for new entrants to farming to attain secure land.

> "Surrey's agricultural land deserves continued protection as part of creating a more sustainable region that can meet a share of its food needs locally. This requires a long-term vision and commitment in view of increased pressure to convert agricultural land to other uses."
>
> Surrey Sustainability Charter p.26

The proximity of Surrey's ALR to highly urbanized, metropolitan areas offers local agriculturalists unique opportunities for direct marketing and the integration of their agriculture into the vitality of Surrey's urban community. Likewise, it endows the City of Surrey with increased capacity to enhance food security and self-sufficiency, to improve population health and nutrition, to strengthen the local economy, and to adapt to climate change – all of which are characteristics of a healthy and vibrant food system. At the same time, however, the close proximity of urban and agricultural lands poses serious threats to the viability of Surrey agriculture and raises unique challenges for the municipality's planners and policy makers, speculation, development pressure, and the high price of farmland being just some of them. In order to contextualize the issues which will be discussed in the body of the report, this section will outline key facts and figures about this unique, "peri-urban," agricultural area and introduce some critical issues and opportunities facing Surrey's agriculturalists.

[5] BC Provincial Agricultural Land Commission, 2002

Surrey's Agricultural Capability

Southwestern BC is one of Canada's most productive agricultural regions, of which Surrey's agricultural lands represent one critical component. Endowed with naturally fertile soils and a temperate climate, and aided by extensive engineering improvements put in place by the City of Surrey to address drainage and flooding issues, Surrey's ALR is capable of supporting a wide range of crops and livestock.

Climate and Soils

Surrey;s ALR lands are part of the Pacific Maritime Eco-zone that extends along Canada's Pacific Coast. They typically have over 200 frost free days and receive 1500mm of precipitation annually due to the influences of the ocean[6]. Gleysolic and Organic-Fibrisol soils dominate Surrey's agricultural lands, where organic materials accumulate around the surface area of the clay within the soil. With proper drainage these soils are considered prime agricultural land due to the high nutrient content.[7]

> "Land capability for agriculture is determined by assessing both climate and soils. In general, the climate determines the range of crops possible in an area and the soils govern the type and relative level of management practices required."
>
> MOE Manual: Land Capability Classification for Agriculture in BC p.5

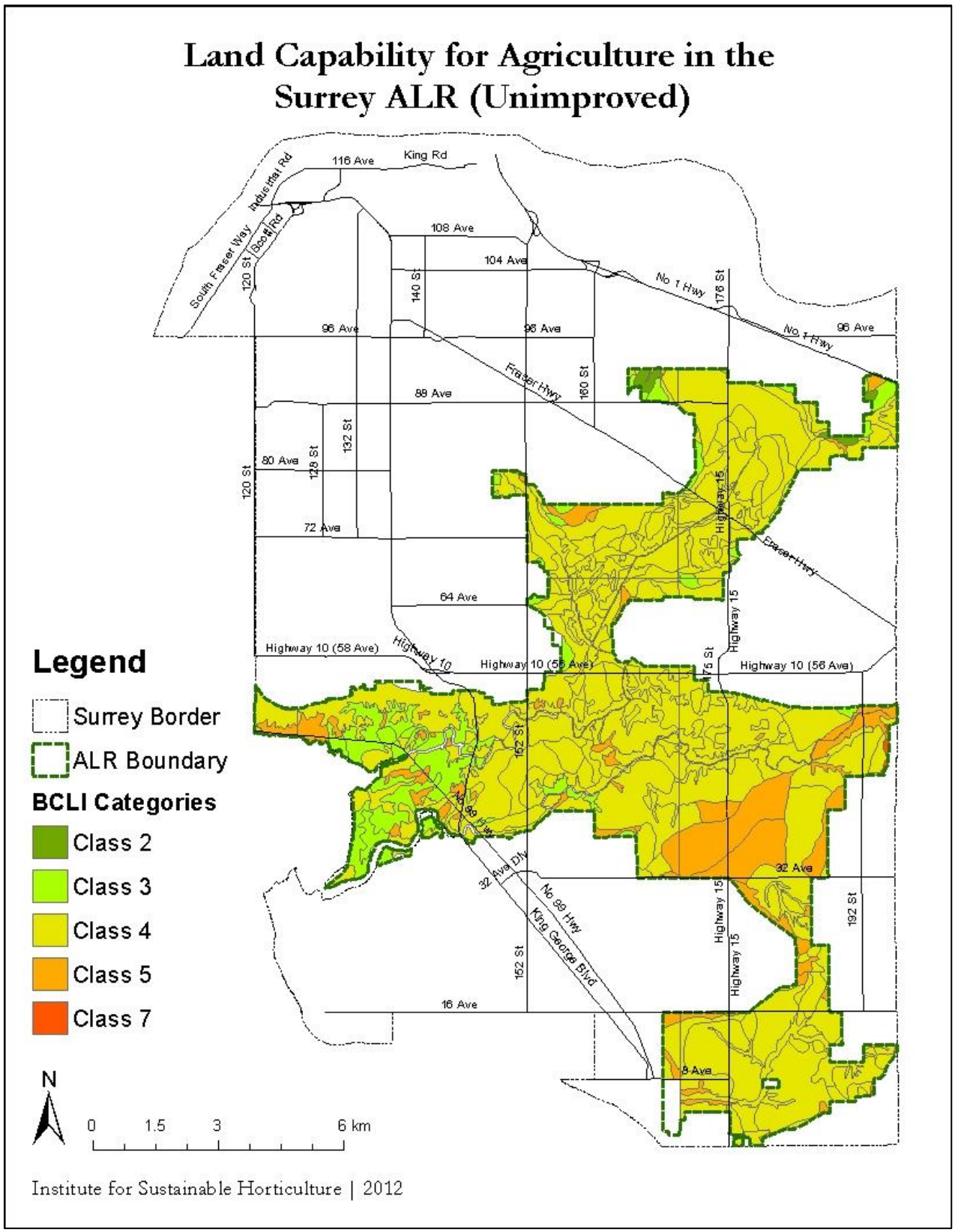
Surveys conducted by the provincial government in the 1980s have been used to classify the quality of all of BC's agricultural land according to the "Land Capability Classification for Agriculture in BC." In this classification system, lands are assessed on a scale of 1 – 7 for both climate and soil factors. In general, the range of suitable crops decreases and/or the management inputs needed increases from Class 1 to 4. Class 5 lands are considered only useable for perennial forage or specially adapted crops, Class 6 lands for sustained natural grazing for livestock, and Class 7 lands cannot support either grazing or cultivation. [8]

The system considers both *unimproved ratings,* which are based on the conditions that existed at the time of the soil survey, without irrigation and *improved ratings,* which indicate the lands' capability for agriculture after the alleviation of limitations and/or hazards through improvements such as drainage, irrigation, diking, stone removal, desalinization, sub-soiling, and the addition of fertilizers or other soil amendments.

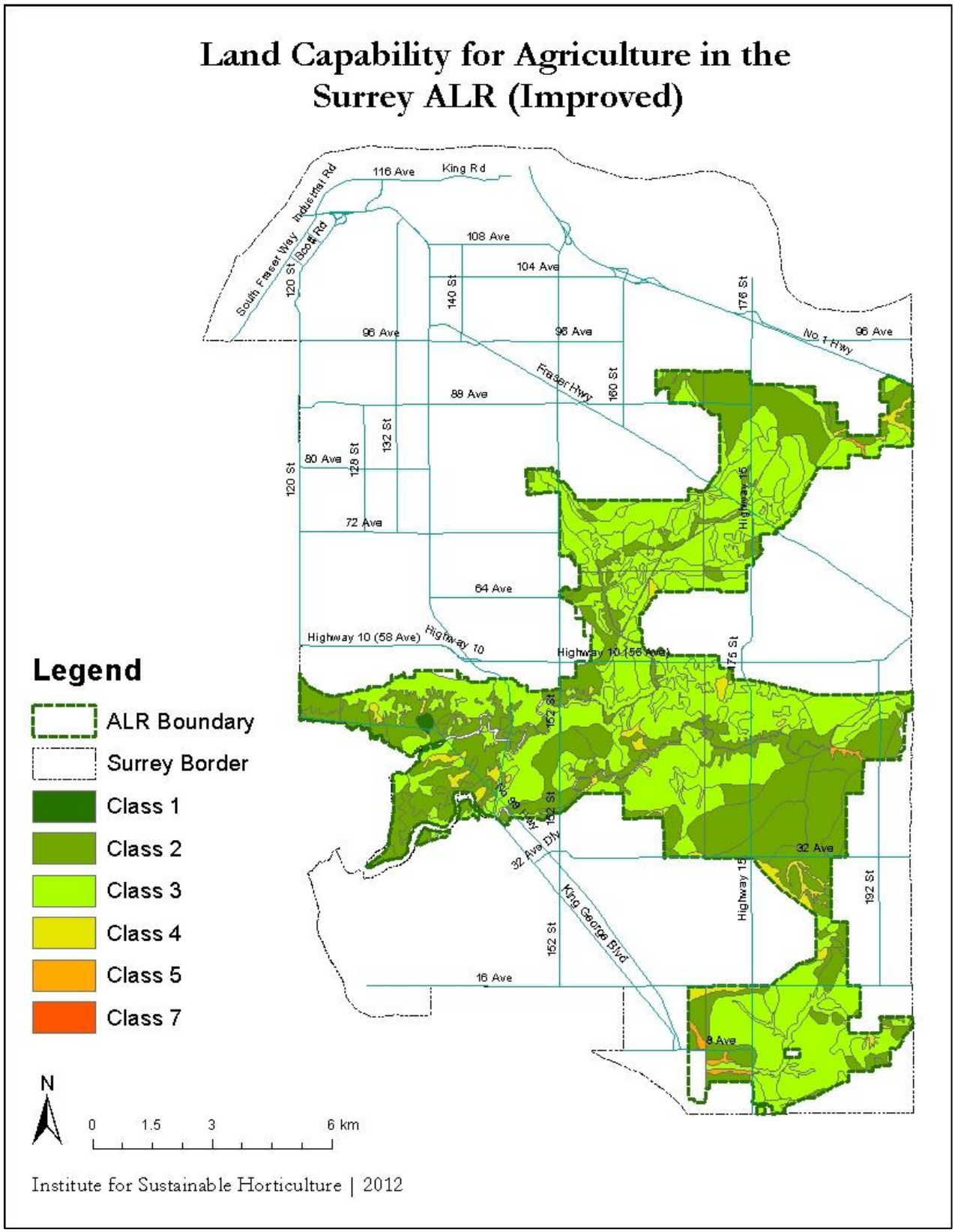
The following series of maps, generated for this study, are based on soil surveys completed by the Ministry of Agriculture and Food in the 1980s and show unimproved and improved BC Land Capability for Agriculture ratings for Surrey's ALR and. Unimproved, Surrey's ALR lands largely fall into the Class 4 rating, with some Class 3 unimproved soils in the Mud Bay area and some unimproved Class 5 soils scattered throughout the municipality (See *Map 1: Unimproved Land Capability for Agriculture*).

As illustrated in *Map 2: Improved Land Capability for Agriculture*, once improved, the majority of Surrey's soils are rated at Class 2 or 3, and are considered "prime" agricultural land. Dyking and flood control measures put in place on Surrey ALR lands have been instrumental in achieving improved ratings for agriculture, largely in the Class 1 – 3 range, these are discussed in the next section (See p.24).

[6] Agriculture and Agri-Food Canada, 2000a; Environment Canada, 2012
[7] Agriculture and Agri-Food Canada, 2000b
[8] All information in this section from: Ministry of Agriculture and Food, Ministry of Environment, 1983



Map 1: Unimproved Land Capability for Agriculture in the Surrey ALR



Map 2: Improved Land Capability for Agriculture in the Surrey ALR

Figure 2: Degradation of Surrey's ALR

Not reflected in these capability ratings are the impacts of degradation to agricultural land that has occurred since the data were collected (over thirty years ago). During this time, the deposition of fill and paving of prime farmland, both legal and illegal, have decreased the potential for soil-based agriculture in many areas of the ALR, and led to the widespread non-farm use of this land. *Figure 2*: Degradation of Surrey's ALR is illustrative of this trend, which will be discussed further in other sections of this report.

Improvements to Agriculture Lands

Figure 3: Early Flooding in Surrey's Agricultural Lowlands

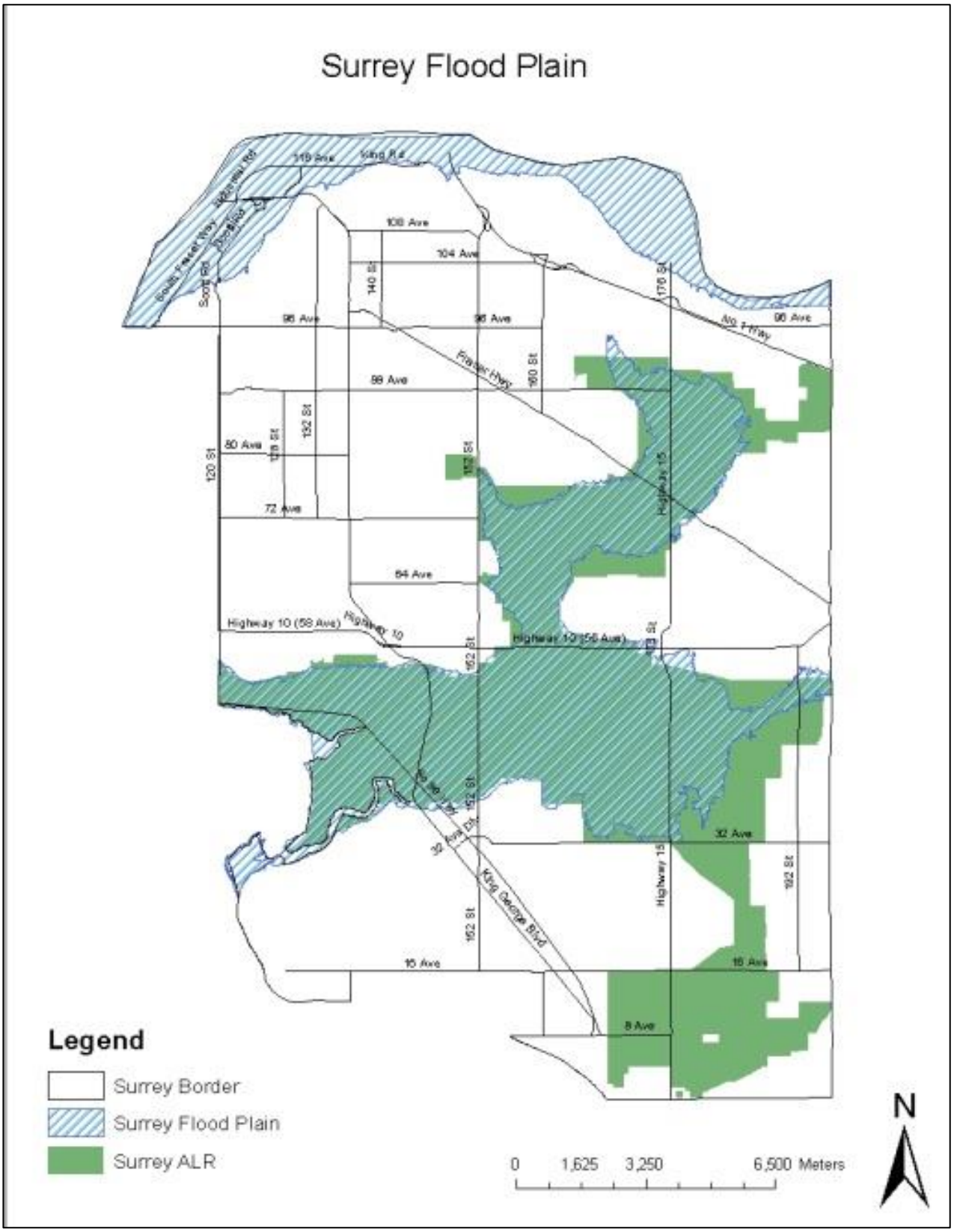
Flood Control Infrastructure[9]

Flooding has long been an issue affecting Surrey farmers, as the city's agricultural lands lie within natural lowlands separated by three tidal rivers, the Serpentine, Nicomekl, and Campbell (See Map 3: Surrey Flood Plain). At an average elevation of only 5 to 30 feet above sea level, these lowlands flooded frequently before today's modern infrastructure was put in place.

Flood control efforts began as early as the 1860's, when area farmers began building dykes along the Serpentine and Nicomekl rivers to allow further cultivation of the fertile lowlands. In 1910, the Surrey Dyking District (SDD) was formed to bring a more coordinated approach to the efforts of individual farmers. Most significantly, the SDD took on the construction of two sea dams, river gates which open when tides are low to allow fresh water to flow to Mud Bay, and close to prevent salt water from migrating up the river into farm land when tides are high. Despite these and continued efforts to construct and maintain the dyking infrastructure, flooding persisted in the Serpentine-Nicomekl lowlands into the 1990s. Although the fundamental cause of flooding in the lowlands was the area's low elevation and range of ocean tide levels, accelerated urban development and logging in the uplands of Surrey was also contributing to increased frequency and duration of flooding.

> *"The problem with Surrey's flood plain isn't the flood plain, [it's] the developer on the highlands. This was emphasized at the annual meeting of Surrey Dyking District, [where] a resident on 83rd avenue north of Fry's Corner told of the tremendous flow of water coming from off the Clayton hillside and also from Port Kells. "It's a river now, not a ditch," the property owner declared."*
>
> *- The Surrey Leader*
> February 18th, 1972

[9] All information in this section from personal communication with Reme Dube and Carrie Baron, City of Surrey Engineering Department, and the City of Surrey presentations entitled "The Development of a Strategic Plan for Lowlands Flood Control" and "The Implementation of a Strategic Plan for Lowlands Flood Control."



Map 3: Surrey Flood Plain

In 1994, recognizing that municipal support was needed to control flooding and establish a set level of service that could support and promote agricultural activities within the 56.1km^2 floodplain, the City of Surrey began a consultation process with the local agricultural community, the BC Ministry of Agriculture, the BC Ministry of Environment, local Dyking Districts, and the Department of Fisheries and Oceans to determine how they would address the issues. This process led to the implementation, beginning in 1997, of the "Serpentine and Nicomekl Lowlands Flood Control Project", which saw the City of Surrey actively planning, designing, and constructing dykes, pump stations, and conveyance improvements within the lowlands (See *Figure 4: Sea Dam (L) and Ditch (R) Construction*).

Figure 4: Sea Dam (L) and Ditch (R) Construction

Today, the project is nearing completion. With almost all pump stations and dykes installed and only the conveyances to complete, the system has already delivered significant benefits to the lowland agricultural community by providing greater protection against frequent flood events, faster flood relief during periods of heavy rainfall and, according to City staff, rendering essentially the entire ALR area suitably drained for agricultural production. While initial financing for the $45.7 million dollar project came solely from The City of Surrey, costs to maintain the infrastructure are now offset by a Drainage Tax levied on all Surrey properties[10].

Agricultural Water

Surrey's farmers rely on ground and surface water to meet their farm operation water needs, as the municipal water can only be used for residential purposes. The use of surface water (from ditches and watercourses) is governed by the BC Water Act. Under the Act, a license from the BC Ministry of Environment is required for the use of surface water for irrigation purposes, at a rate of $100/year for an area smaller than 5 hectares (12.35 acres), $150/year for an area 5 – 50 hectares (12.35 – 123.5 acres), or $400/year to irrigate 50 hectares (123.5 acres) or more[11].

Figure 5: Irrigation Ditch

[10] Non-farm and farm properties pay annual rates of $161 and $105, respectively.
[11] BC Ministry of Environment , 2011

Land Use and Agricultural Production in the ALR

According to the most current, available data, Surrey is home to approximately 487 farms[12], 12 of which are certified organic[13].

Berry production, forage and pasture dominate agricultural production in Surrey. Berry production is the second most common agricultural land use, occupying 12% of the ALR and almost one fifth of the ALR area used for agricultural production. Blueberries are the most common and intensively cultivated berry crop, and the success of this crop in local and international markets has a strong bearing on the overall performance of Surrey's agri-food economy. Although the BC blueberry industry has seen strong growth in the last sector, it is experiencing challenges. Rapid expansion of blueberry acreage across North America has pushed blueberry prices down locally and increased international competition.

On a smaller scale, the land also supports a variety of other crops and livestock. *Table 2: Primary Agricultural Land Use Activities in the Surrey ALR,* provides an overview of agricultural land use activities on Surrey farms in the ALR.

Table 2: Primary Agricultural Land Use Activities in the Surrey ALR

Primary Agricultural Land Use Activity	Number of Parcels	Total Parcel Area (acres)	Total Parcel Area (ha)	Percent of Surrey ALR in this Use
Forage and Pasture	226	4777	1934	22%
Berries	140	2638	1068	12%
Field Vegetables	113	2087	845	10%
Horse Farms and Stable/Riding Facilities	46	753	305	4%
Beef Cattle	45	1141	462	5%
Nurseries and Tree Farms	35	576	233	3%
Specialty Crops	23	380	154	2%
Dairy Farms	18	1126	456	5%
Poultry Farms	16	227	92	1%
Specialty Livestock	16	148	60	1%
Greenhouse Operations	15	346	140	2%
Agritourism/Crop Preparation or Processing	9	205	83	1%
Sheep/goat farms	8	82	33	0%
Total	***710***	***14487***	***5865***	***67%***

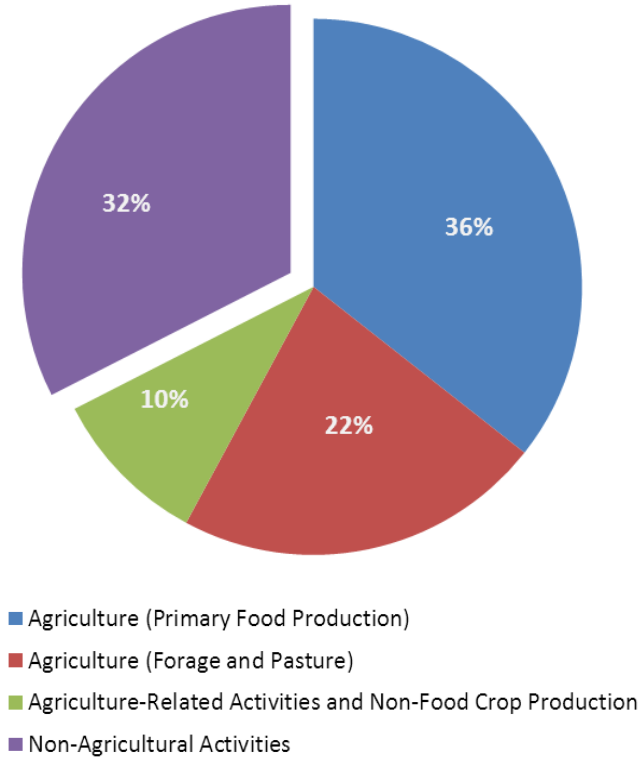
Derived from Ministry of Agriculture and Lands *City of Surrey Agricultural Land Use Inventory 2004*

[12] Ministry of Agriculture and Lands, 2009
[13] Certified Organic Associations of British Columbia, 2011

Although farming remains an important component of Surrey's municipal landscape, Statistics Canada reveals that farm numbers in the municipality are steadily declining. According to the most recent Census of Agriculture, farmers make up about 14% of Surrey's total rural population (ie: those Surrey residents living in the ALR), which totaled 10,576 people in 2006. The number of census reporting farms has dropped by approximately 30% over the past 20 years, with most losses being of small to mid-sized farms[14]. The loss of these smaller ALR parcels to agriculture and the high proportion of the rural population not engaged in agriculture are indicative of one of the key threats to agricultural viability in Surrey: the non-farm use of ALR land.

The subdivision of agricultural land is another long-standing concern for farmers and their advocates in British Columbia, the province which is considered to have "the most heavily parcelized agricultural land base in Canada"[15]. Surrey is no exception, as the "Minimum Lot Size" (MLS) zoning provisions used by municipalities to adjudicate subdivision have left it with a highly parcelized agricultural landbase with a large proportion of ALR parcels under five hectares. Small farms can be highly productive, but the land they are situated on is often converted to rural residential use. Good farmland in parcels of 20 hectares or more in the Fraser Valley costs between $50,000 and $100,000 per hectare. Add the permitted house to a small parcel and the value can escalate enormously. Soaring urban housing costs are increasing the upward pressure.

Figure 6: Primary Land Use Activities in the Surrey ALR



Although Surrey's smaller parcels are still valuable from an agricultural perspective, their relatively small size has also made them attractive to non-agriculturalist landowners. 2,827 hectares (approximately 32%) of Surrey's ALR are used for non-agricultural activities, including residential, institutional, industrial, and commercial use, hobby farm and recreational use, golf courses, and other uses. The fragmentation of farmland by these residential, commercial, and industrial lands uses increases the likelihood of urban/rural conflicts that compromise the viability of large-scale, conventional farms: in addition to vandalism, trespass, increased storm water drainage, and increased land costs, non-agriculturalist rural residents not accustomed to the smells, sounds, and slow moving traffic associated with conventional agricultural production have been known to file nuisance complaints about neighbouring farms[16]. Whether or not this negative effect also hold true for small-scale farms, however, has not been substantially investigated.

[14] Ministry of Agriculture and Lands, 2009
[15] Smith, 1998
[16] Curran & Stobbe, 2010

Surrey's Agri-Food Economy

Through its ties to both local and global food markets, Surrey's current agriculture sector generates over $153 million in gross annual revenue and over $37 million in wages paid[17]. Data from the 2006 Census of Agriculture report that approximately 4,470 people are employed on Surrey farms having average gross farm receipts of $314,971, higher than Metro Vancouver ($278,306) and BC as a whole ($133,641). Despite this high average, most Surrey farms (46%, or 226) report gross receipts of less than $10,000, reflective of the high incidence of hobby farms which contribute less to the agri-food economy than their commercial counterparts[18].

Despite the close proximity to local consumers, most of Surrey's farms market their produce through standard commodity channels, including Marketing Boards and indirect sales to wholesalers and distributors, rather than directly to the consumer through roadside stands, farmers markets, or community supported agriculture programs (under a Community Supported Agriculture [CSA] program, consumers purchase "shares" in a farm's harvest and receive a weekly box of seasonal, fresh produce for the duration of the growing season. This is widely seen as a mutually beneficial arrangement as it guarantees the farm a market for its products, provides CSA members with fresh food, allows farmers and consumers to share risk, and fosters relationships between farmer and consumer).

Surrey hosts one summer Farmers Market and only about 36 of Surrey's 487 farms have business licenses to sell their farm products directly to the consumer at the farm gate[19]. Given the growing market for high quality, local food in the Lower Mainland, direct marketing is viewed as an area with high growth potential for Surrey farmers, but one that is not likely to thrive without an increase in the availability of local, small-scale facilities for product storage and small-scale processing.

Figure 7: Surrey ALR land for sale, Summer 2011

The high price of farmland is often cited as one of the premier challenges facing both current and would-be farmers, a situation mirrored across the Lower Mainland. Today 74% of Surrey farms are owned by the farm operator while the remaining 26% are leased. Our conversations with Surrey Realtors indicate that ALR land is currently valued at up to $200,000 per acre, or up to $500,000 per acre if it is situated on the urban-rural edge.

[17] City of Surrey - Economic Development Office (N.D)
[18] BC Ministry of Agriculture and Lands, 2009
[19] City of Surrey, 2010

Surrey's Agricultural Policy Environment

Agriculture is a shared federal-provincial jurisdiction in Canada. While federal level policy and programs are important, the role of Agriculture and Agri-Food Canada and other federal bodies is oriented toward international trade, inter-provincial coordination, and subsidy regulation than local food systems and farm viability, and is not discussed further in this section of the report.

Note that this section is summarized in table format on p.41.

Key Provincial Policies and Regulations Affecting Surrey's Agri-Food System

The Local Government Act

The *Local Government Act* is the primary legislation under which the Province delegates responsibility for land use planning, zoning, and control of building and development. It also determines how new municipalities are created or expanded, the election of Councils and Boards, the assessment and collection of taxes, administration, property management and spending. Certain provisions of the Act affect agriculture, including those covering community planning, the Agricultural Land Reserve, development permit areas, zoning, nuisance regulations, the removal and deposit of soil, weed and pest control water use and drainage, and the use of land for agricultural operations. Several of these areas are discussed further below.

The Agricultural Land Commission Act

The *Agricultural Land Commission Act* is the primary tool used to protect farmland from development in BC. It applies to all land in the Agricultural Land Reserve (ALR), a provincial zone in which agriculture is recognized as the priority use, farming is encouraged and non-agricultural uses are controlled. The ALR currently comprises 11 million acres of agricultural land in British Columbia. Surrey's ALR land, at 21,470 acres (8,692 hectares), makes up less than 1% of the provincial total.

The Provincial Agricultural Land Commission (ALC) is the independent Provincial agency responsible for administering the ALR in favour of agriculture. Its three-pronged mandate is to *preserve agricultural land; to encourage farming in collaboration with other communities of interest*; *and to encourage local governments, First Nations, the government and its agents to enable and accommodate farm use of agricultural land and uses compatible with agriculture in their plans, bylaws and policies*.

> *The ALR and BC's Municipalities:*
>
> *"The planning, zoning, and service delivery functions of municipalities… will play a central and enhanced role in implementing a shared vision of our working land base… a vision founded on the ethics of resource stewardship, and the need to ensure that the business of agriculture has a secure home in BC."*
>
> *-K.B. Miller*
> *ALC Chair, 1998*

As a part of this mandate, the ALC adjudicates requests and questions decisions related to ALR land use, subdivision, and exclusion from the Reserve. All landowners require Commission approval to include or exclude land in the ALR, subdivide land in the ALR, use land in the ALR for non-farm purposes, or place fill or remove soil from land in the ALR. In a multi-staged application process, the applicant first submits their request to their local government which completes a report on the application and forwards it to the ALC along with its municipal-perspective comments and recommendations. The Commission then receives the application and, after holding meetings with the applicant and determining the potential

impact that the application may have on agriculture, decides whether it will approve or refuse the application. Although the Commission is the final arbiter of any application, the perspective of the local or regional government is taken into account and can have an impact on the final outcome of the case.

The Farm Practices Protection Act

The *Farm Practices Protection ("Right to Farm") Act* legislates the right to farm in the ALR and on land zoned for farm use, and protects farmers that are using "normal farm practices" from nuisance lawsuits and nuisance bylaws of local governments. This is a particularly important piece of legislation for Surrey farmers, who are farming in close proximity to an urban environment, as non-farm neighbours do not always understand or appreciate the realities of the sights, smells, sounds, and slow moving traffic associated with working farms.

> *"[The province] makes important linkages between **farm practices protection** and **planning for agriculture** … Local governments are encouraged to consider means within their plans and bylaws to reduce the potential for land use conflict."*
>
> -Ministry of Agriculture, 2012

The Water Act

The *Water Act* is the provincial law for managing the diversion and use of provincial water resources. Under the Act, a license from the BC Ministry of Environment is required for the use of surface water for irrigation purposes, at a rate of $100/year for an area smaller than 5 hectares (12.35 acres), $150/year for an area 5 – 50 hectares (12.35 – 123.5 acres), or $400/year to irrigate 50 hectares (123.5 acres) or more.

The Assessment Act

The *Assessment Act* establishes the framework for property assessment in British Columbia. In general, "farm class properties" are subject to lower municipal property tax rates than non-farm properties, and under the Act, land owners who farm all or part of their land must apply to BC Assessment to have their properties classified as a farm for tax purposes. Under current legislation, to be classified as a farm,

- Land smaller than 2 acres must earn $10,000 from the sale of primary agricultural products;
- Land between 2 – 10 acres must earn $2,500 from the sale of primary agricultural products;
- Land larger than 10 acres must earn $2,500 plus 5% of the actual value of any farmland in excess of 4ha from the sale of primary agricultural products.

Although the preferential tax rates set by BC municipalities for farmers help them cover their costs in near urban environments where farmland is typically valued at non-agricultural rates, it can also encourage or facilitate the use of valuable commercial farmland for hobby farm purposes. In their article, "Hobby Farms in and the Protection of Farmland in British Columbia" (2009), Stobbe, Cotteleer, and VanKooten argue that *"hobby farms benefit from BC's favourable property tax treatment of agricultural land, which sets a low threshold for obtaining tax benefits. Indeed, it is clear that potential hobby farmers seek parcels that provide them the lowest threshold for qualifying for farm class status, avoiding parcels smaller than 0.8ha that would place them into the category with the highest taxes as well as ones greater than 4.0 ha that would require them to become "serious" farmers."*

While the hobby farms can provide amenity benefits such as open space, views, and wildlife habitat, they also make valuable farmland unavailable for commercial agriculture and thus compete with small-scale agriculturalists who also seek land within the ALR.

Guidelines for Sale of Food at Temporary Markets

The BC Ministry of Health and BC's Health Authorities, develop food safety guidelines that have an impact on how farmers undertake value added processing and direct marketing. The provincial *"Guidelines for Sale of Foods at Temporary Markets"* [20] addresses food safety concerns associated with the processing of foods in home kitchens and the sale of foods at temporary food markets (including farmers markets and farm gate sales).

In general, vendors of low risk foods such as dried fruit, jam, jelly, pickles, and most baked goods, are not required to submit an application before commencing sales, while the sale of high risk foods such as prepared meals, canned vegetables or beans, juice, and processed meat, requires the vendor to contact their local Health Authority and submit an application. Higher risk foods must be processed and packaged in inspected and licensed premises, which can prove challenging for small-scale farmers who lack the economy of scale that warrants that is necessary to afford the use or construction of these facilities.

The Land Titles Act

The *Land Titles Act* is another key piece of legislation affecting local government's influence over its food system, as it gives municipalities (among other groups) the power to assess impacts of new subdivisions on farmland, and to refuse subdivisions if the development would cause "unreasonable interference with farming operations"[21]. Before subdivision approval is given, the approving officers may require adequate buffering of farmland from the subdivision or the removal of unnecessary roads directed at the ALR to ensure no unreasonable interference occurs with farm operations.

[20] BC Centre for Disease Control- Food Protection Services,, 2011
[21] Curran and Stobbe, 2010

Regional Level Policies, Tools, and Programs Affecting Surrey's Agri-Food System

Metro Vancouver Regional Food System Strategy

Metro Vancouver plays a role in supporting the food system by developing regional agriculture and food policy under the direction of the Board's Regional Planning and Agriculture Committees. In February 2011, the Metro Vancouver Board adopted a Regional Food System Strategy to address the regional interest in food issues as part of its commitment to making a sustainable region. The Strategy provides a framework for creating "a collaborative approach to a sustainable, resilient and healthy food system that will contribute to the well-being of all residents and the economic prosperity of the region while conserving our ecological legacy". The plan outlines five major goals:

- Increase capacity to produce food closer to home;
- Improve the financial viability of the food sector;
- People make sustainable food choices;
- Everyone has access to healthy, culturally diverse and affordable food; and,
- A food system consistent with ecological health Increasing local capacity to produce food

Metro Vancouver will soon start working with partners, including the City of Surrey and other municipal governments, to develop an Action Plan and identify priorities to strengthen the local food system.

> *"Regional interest in food issues is taking place at the same time research indicates that the global food system is likely to face significant changes. Food prices are rising reflecting a growing demand for food and constraints on food production, both in agriculture and fisheries. Within this context, we have an opportunity to expand the local food supply within Metro Vancouver if all levels of government, their agencies, food producers and others in the food sector … can agree to a common vision and a plan to realize it."*
>
> - Metro Vancouver Regional Food System Strategy

Municipal Policies, Tools, Programs Affecting the Surrey Agri-Food System

With the authority delegated to it under the *Local Government Act, Land Titles Act, and Agricultural Land Commission Act,* the City of Surrey has developed a number of policies and programs with the aim of protecting its agricultural land base and supporting its local agri-food system.

Official Community Plan

Surrey's Official Community Plan (OCP) is a statement of objectives and policies that is used to guide decisions on planning and land use management within the municipality. The OCP provides a long term vision for the community and, with respect to agriculture, outlines the municipality's commitment to "protecting and enhancing agriculture within the agriculturally designated areas, ensuring farm viability, strengthening the farm community, and maintaining agricultural boundaries" (p.90). In addition to this general goal, several elements in the OCP pertain to agriculture, as described below.

Issues and Policies

Sections B-8 (Promote agriculture as an economic growth sector) and F (Protect agriculture and agricultural areas) outline several key policy directions for addressing agricultural and farming issues, including: (F-1.1) promote compatibility between agricultural and non-agricultural land uses; (F-1.2)

maintain agricultural activities; (F-1.3) enhance agricultural viability; (F-1.4) coordinate farming and environmental protection; (F-1.5) manage water use and drainage; and (F-1.6) Increase agricultural awareness and community involvement.

Development Permit Areas and Residential Buffering Adjacent to the ALR

The City of Surrey has been commended by the Ministry of Agriculture, the Agricultural Land Commission, and the farm community for being the first local government in British Columbia to use Development Permit Area (DPA) provisions for the protection of farmland in their Official Community Plan. Under these provisions, all properties outside of, but abutting, agricultural zones have been designated a DPA for the purpose of protecting farming, and any proposed building and subdivision within this DPA requires the issuance of a development permit by the City of Surrey. *Map 4: Surrey's Development Permit Areas* (p.35) shows the extent of this area and its geographic relationship to the ALR. The DPA guidelines related to building location and landscape buffering allow Council to exercise discretion in granting or refusing a permit on a case by case basis.

DPA provisions have since become a key tool for the protection of farmland and farming that allow the city to control and regulate development with designated areas according to stated goals.

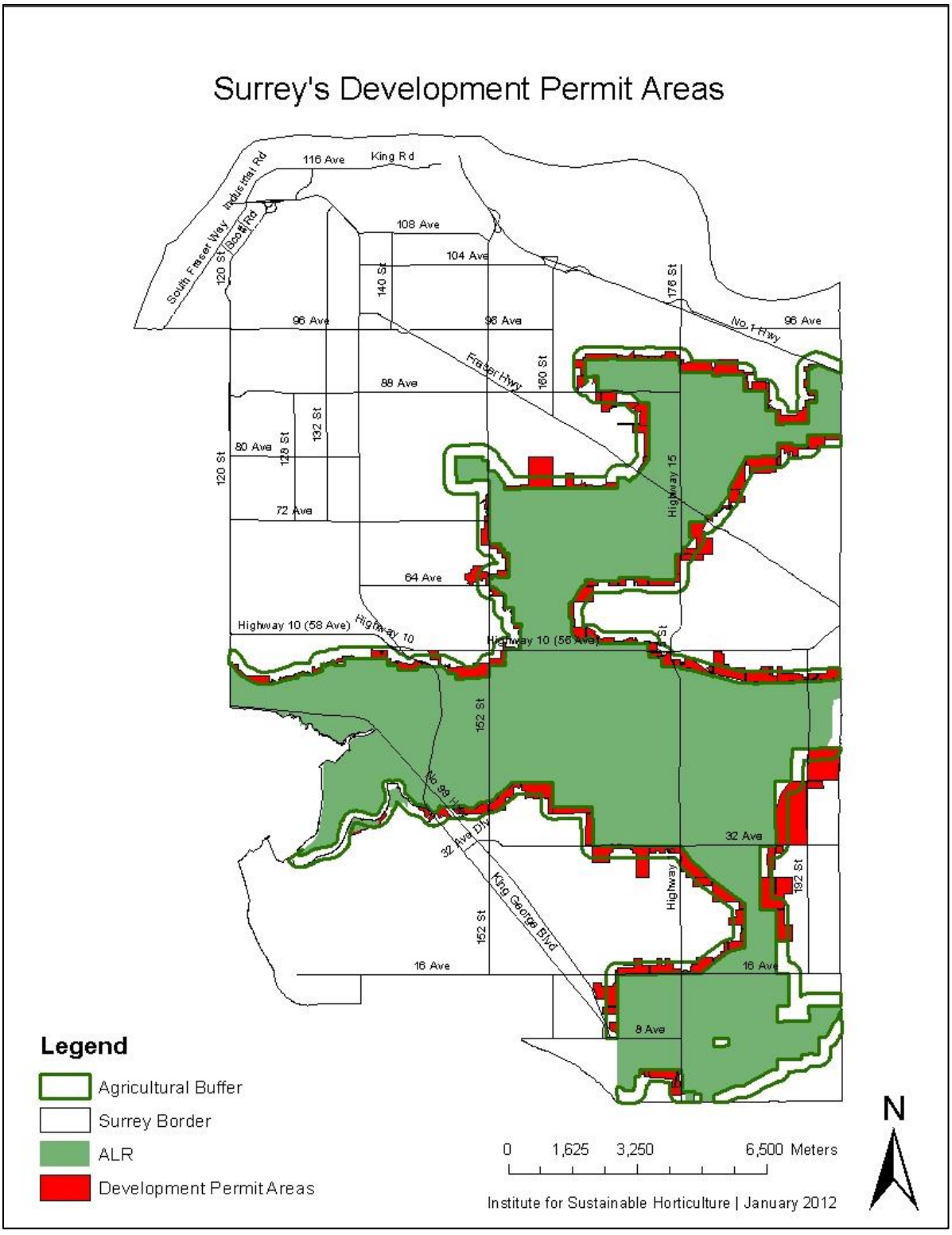
Land Use Designations and Zoning

Surrey's OCP outlines broad categories of permitted land uses within the city. These categories, called "Land Use Designations" provide the basis upon which rezoning applications, Neighbourhood Concept Plans, and Local Area Plans can be approved or rejected.

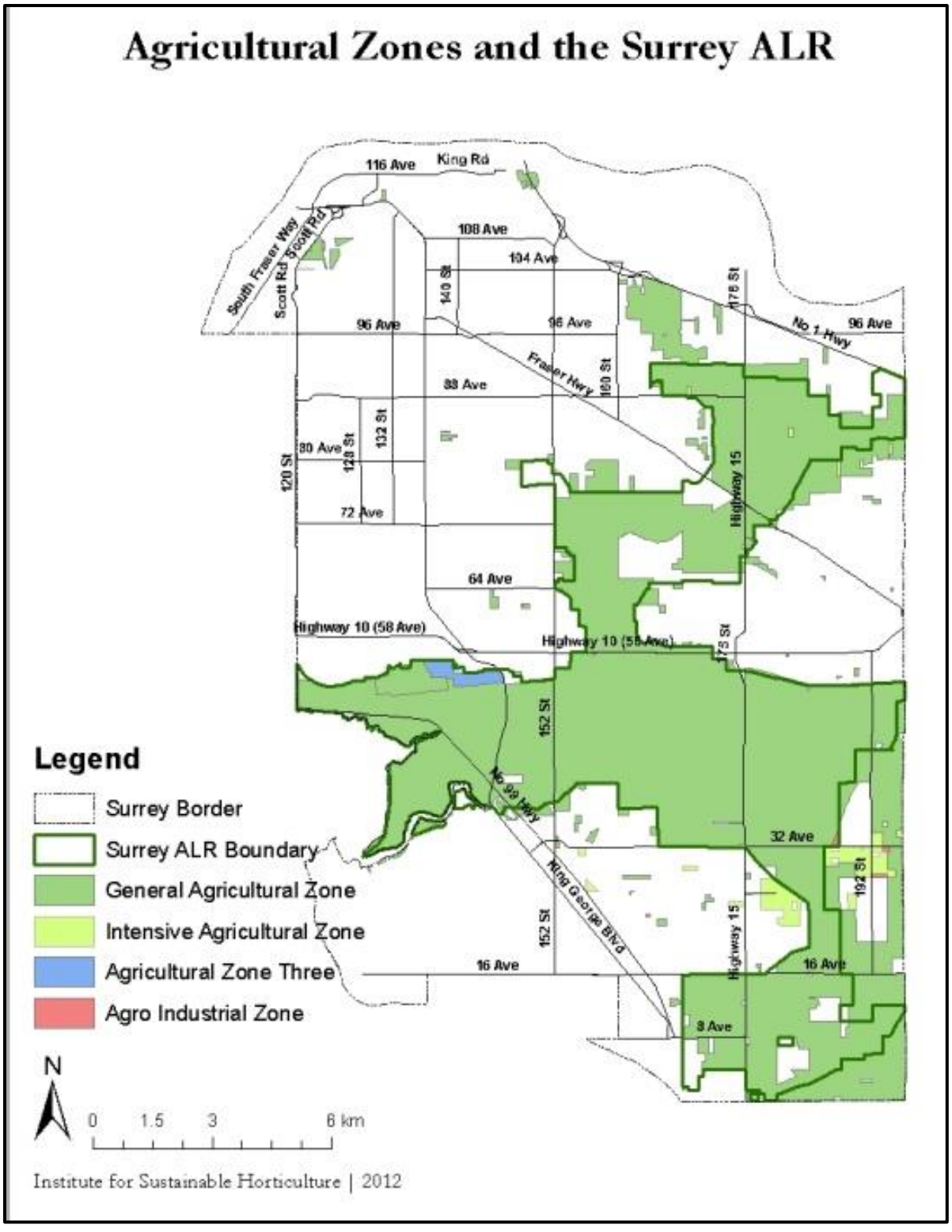
The "Agricultural" land use designation, which is intended to protect areas suitable for agriculture, covers a total area of approximately 24,700 acres (10,000 hectares or 31.5 % of the City's total land base). It is composed largely of the zones A-1 (General Agriculture Zone) and A-2 (Intensive Agriculture Zone, where mushroom growing and the production of confined poultry, livestock, or other fur bearing animals is allowed in addition to the uses permitted in the A-1 Zone), in addition to several other zones as shown in Map 5: Agricultural Zones and the Surrey AL (p.36). Note that the Agricultural land use designation encompasses, but is not exclusively composed of, the ALR.

Further discussion of the specific provisions of these zones can be found Part Six: Recommendations.

> *"Agriculture is a prominent land use in Surrey and a vital component of the local economy. Continuing growth of the City creates the potential for land use conflicts along the boundaries of Agricultural areas. By creating a Development Permit area and guidelines along boundary of the Agricultural designation, the Plan intends to minimize urban encroachment on agricultural land and farming activities."*
>
> -Surrey OCP. 227(b)



Map 4: Surrey's Development Permit Areas (2011)



Map 5: Agricultural Zones and the Surrey ALR

"In 50 years … Surrey will be a leader in the protection of its ALR and in enhancing the productivity of this land base. Surrey will promote urban agriculture and support sustainable agriculture, with most of the City's high quality food being produced locally. Fresh and healthy people will be available to people of all income levels. Food processing industries will create local jobs and incorporate a "value added' component to the local economy."

-Surrey Sustainability Charter 2008

Surrey's Sustainability Charter

In September 2008, Surrey City Council unanimously adopted the Sustainability Charter, a comprehensive framework for implementing a progressive, 50 year vision for a Sustainable City. The Sustainability Charter is a commitment by the City to place the principles of social, environmental, and economic sustainability at the foundation of all decisions that the City makes.

The Sustainability Charter includes several sustainability goals related to agriculture and the food system, including supporting food security, protecting the agricultural land base, and developing green procurement policies and sustainable land use planning and development practices. Overall, its vision, goals, and scope provide a basis upon which policy and programs to support a vibrant agriculture sector, linked to a sustainable local food system, will be developed and implemented.

City of Surrey Economic Development Strategy

Surrey's *Economic Development Strategy* (2008) characterizes the city as having a dual "urban and rural" identity, each of which are supported by Council and staff. The Strategy describes Surrey's ALR land base as playing a key role in a regional strategy for increased food self-sufficiency and long term sustainability, and acknowledges the significant investment that the City has made in enhancing the viability of the agriculture sector through diking and drainage improvements, the creation of the Agricultural Advisory Committee, and the development of the Surrey Agriculture Plan.

The Economic Development Strategy identifies eleven key actions to be led by the Planning and Development Department and Economic Development Office to continue to support Surrey agriculture, including:

- Completing and implementing an Agricultural Development Strategy;
- Designating an "agricultural ombudsman" within City staff;
- Designating representatives from Planning and Economic Development staff to serve as members of the Agricultural Advisory Committee;
- Continuing and expanding various events, programs, and agri-tourism designed to promote to local food and farming;
- Encouraging collaboration and cooperation within the farm community, and;
- Seeking additional funding to assist with agri-food planning and initiatives.

Surrey's Agriculture and Food Security Advisory Committee

To meet the challenge of ensuring farm connections to the broader community, Surrey became the first municipality in the Lower Mainland to establish an Agriculture Advisory Committee in 1995. In 2012, the Committee's terms of reference were broadened to include a mandate to advise the City on food security issues. The re-named *Agriculture and Food Security Advisory Committee* (AFSAC) is now made up of ten members, at least five of whom represent Surrey's farming community, three represent other agricultural and food sectors, one represents the Environmental Advisory Committee, and one is a City Councilor.The AFSAC has:

- Assisted with the development of agricultural policies in the Official Community Plan;
- Played an active role in Surrey's land development review process and preparation of Neighbourhood Plans;
- Supported investment in a comprehensive flood control strategy for the Nicomekl and Serpentine watersheds;
- Promoted initiatives to increase the viability and productivity of farms and the farming community;
- Implemented measures to address conflict in the rural-urban interface;
- Promoted best agricultural practices for farm operations;
- Reviewed and made recommendations to Council regarding subdivisions, re-zonings, and development applications in and adjacent to the ALR; and
- Prepared the Surrey Agricultural Plan.

City of Surrey Agricultural Plan

In 1999, Surrey released an Agricultural Plan intended to provide a comprehensive framework for addressing agricultural development issues, resolving rural-urban conflicts, and ensuring the long-term viability of agriculture within the municipality.

The plan includes baseline information about Surrey's agricultural sector and a series of recommendations for improving agricultural viability in the city. It advocates that Surrey take a proactive stance towards agricultural development by providing services, incentives, and encouragement for the farm community. Key issue areas and proposed actions, which were developed in consultation with City staff, the farm community, and the general public, include:

- *Improve agricultural viability:* increase agricultural land use efficiency, demand for and marketing of local agricultural products, and support for the agricultural sector including succession planning; and decrease rural-urban conflicts.
- *Reduce encroachment on the agricultural land base:* decrease the conversion of agricultural land to non-farm purposes and the impact of residential development in the ALR; and, investigate the impact of ownership of agricultural land by non-farmers.
- *Reduce encroachment on agricultural operations:* investigate recreational access, wildlife depredation of crops, improve drainage, irrigation, and flood control, fish habitat protection, safe farm vehicle movement; and, reduce pesticide drift and chemical usage.
- *Develop an agricultural implementation strategy*.

An implementation plan for the 1999 Agricultural Plan was never completed. The 1999 Plan is now being reviewed and the preparation of an updated plan is being considered.

Surrey Policies and Regulatory Bylaws

Farm Business Licensing

The provisions of BC's *Farm Practices Protection Act* protect agriculturalists' right to operate farm businesses. Thus, unlike all other businesses in the municipality, Surrey farmers are not required to hold business licenses for their farms. The City of Surrey does, however, require its farmers who are engaging in farm gate sales of their products to hold a business license for this enterprise. At the time of writing, the process and enforcement of these licenses was under review by the AAC and bylaw enforcement division.

Policy for Considering Applications for Exclusion of Land from the Agricultural Land Reserve (Policy 0-51)

As described previously, though the AAC is the final arbiter of any application for changes to land use in the ALR, the City of Surrey has the opportunity to provide comments and a recommendation to the AAC. This municipal perspective is taken into account and can impact the final outcome of the case.

In December 2003, Surrey adopted an aggressive set of criteria to use for the evaluation of applications received by the City to exclude land from the ALR. Most notably, the policy includes a "compensation principle." This principle ensures that the overall productive capability of Surrey's ALR lands is maintained by requiring that any exclusion of any ALR lands is offset by the *inclusion of an area within the City of Surrey that is twice as large as that being excluded*.

> *"The intention of this policy is not directed at lending support to or encouraging ALR exclusions nor is its intention to allow the ALR to be "opened up" for development. This policy is focused on maintaining the City's long-standing practice of protecting agricultural lands for agricultural purposes consistent with the OCP.*
>
> -Policy 0-51

Water: Bylaw 16337

The use of city water on agricultural parcels is regulated by Surrey's *Water Bylaw,* which states:

> *"For parcels in the agricultural land reserve, the water supplied by the City is for normal use, except for commerce and industries. Subject to the availability of water in excess of these purposes, water may also be used for other less essential, aesthetic-enhancing purposes such as lawn and garden irrigation, car washing and other cleaning processes."*

In effect, City water can only be used for residential purposes in the ALR, not crop irrigation or stock watering. Under the current policy, farming operation water needs must be met with ground or surface water, which is regulated by the Water Act as described above.

Soil Conservation and Protection Bylaw 16389

In order to protect the City's soil resource base and ensure that the placement of fill does not affect neighbouring properties, storm-water system operations, or municipal conformity with the requirements set out by the Agricultural Land Commission, Surrey requires permits to be approved before any deposition or removal of soil and/or fill from properties within the city. For properties within the ALR, applications must also be approved at the provincial level, by the ALC.

Tree Protection Bylaw 16100

Figure 8: Tree removal permit posted on ALR property, summer 2011

In recognition of the environmental and aesthetic benefits of urban forests, Surrey's Tree Protection Bylaw is intended to reduce the number of trees unnecessarily removed or damaged by builders or residential homeowners, and ensure that replacement trees are planted when trees do have to be removed. Under the bylaw, tree cutting permit applications and fees are required for the removal of any tree in the city, with penalties being enforced in instances of non-compliance.

Tree cutting on agricultural land also requires an arborist's report; a sworn affidavit by the owner declaring that the tree removal is for agricultural purposes and the agriculture cannot occur on the property unless the site is cleared; and a sworn affidavit by the owner (within the ALR) or a restrictive covenant registered on the title of the lot (outside the ALR) stating that there will be no application for subdivision, rezoning, or development of the lot for a period of five (within the ALR) or ten (outside the ALR) years. In some instances, the completion of a raptor study and or the preparation of a farm plan are also required.

Table 3: Key Policies, Tools, and Programs Affecting the Surrey Agri-Food System (Summary Table)

	Policy, Tool, or Program	Brief Description
Provincial	**Local Government Act**	The act under which the Province delegates authorities to municipalities.
	Agricultural Land Commission Act	The primary tool used to protect farmland in BC. Its passing resulted in the creation of the Agricultural Land Reserve.
	Farm Practices Protection Act	Legislates the right to farm in BC. Protects farmers using "normal farm practices".
	Water Act	Legislates the management, diversion and use of provincial water resources.
	Assessment Act	Establishes the framework for property assessment for taxation purposes.
	Guidelines for Sale of Food at Temporary Markets	Addresses food safety concerns associated with the processing of foods in home kitchens and the sale of food at temporary markets.
	Land Titles Act	Gives local governments the power refuse, new subdivisions on farmland.
Regional	**Metro Vancouver Regional Food System Strategy**	Addresses the regional interest in food issues as part of a commitment to making a sustainable region. Provides a framework for taking a collaborative approach to building a sustainable regional food system.
Municipal	**Official Community Plan**	A statement of objectives and policies used to guide decisions on planning and land use management within the city. Includes several elements pertaining directly to agriculture, including: issues and policies, development permit areas and residential buffering, and land use designations and zoning.
	Sustainability Charter	A comprehensive framework for implementing a progressive, 50 year vision for a sustinable city. Includes several sustainability goals related to agriculture.
	Economic Development Strategy	Outlines the City's goals to create job opportunities and drive investment into Surrey to create a healthy business community. Identifies eleven key actions to support agriculture.
	Agriculture and Food Security Advisory Committee	A committee appointed to establish liaison and maintain communication between the agricultural community and the City on agricultural and food security issues.
	Agricultural Plan	Intended to provide a comprehensive framework for addressing agricultural development issues, resolving rural-urban conflicts, and ensuring the long-term viability of agriculture within the municipality.
	Policy 0-51	Policy for Considering Applications for Exclusion of Land from the ALR. Requires that any exclusion of any ALR lands is offset by the inclusion of an area within the City of Surrey that is twice as large as that being excluded.
	Bylaw 16337	Water Bylaw. Regulates, among other factors, the use of city water for agricultural purposes in the Agricultural Land Reserve.
	Bylaw 16389	Soil Conservation and Protection Bylaw. Requires permits to be approved before any deposition or removal of soil and/or fill from properties within the city.
	Bylaw 16100	Tree Protection Bylaw. Intended to reduce the number of trees unnecessarily removed or damaged by builders or residential homeowners, and ensure that replacement trees are planted when trees do have to be

2.0 THE EVOLUTION OF SURREY'S ALR SINCE 1973

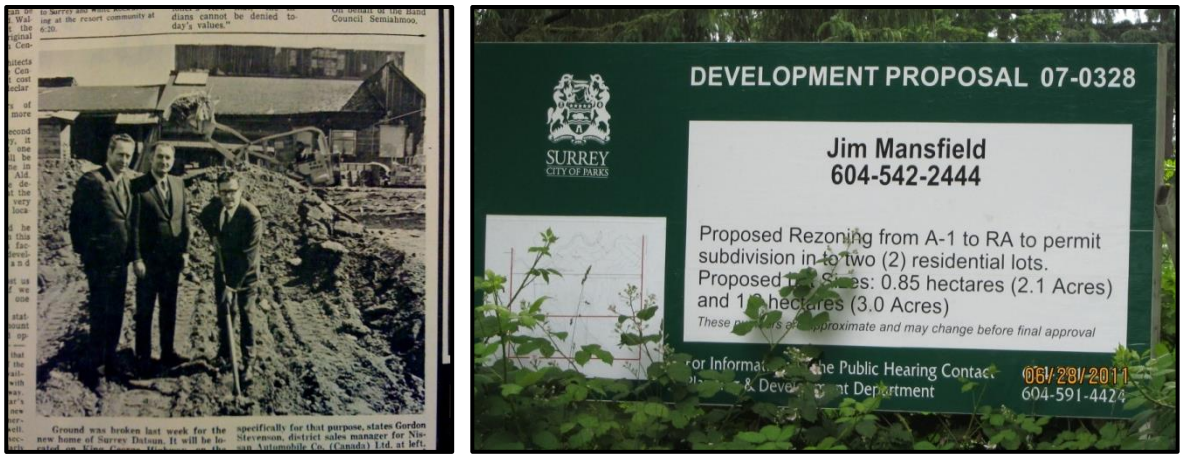


Figure 9: Historic and Modern Development of Surrey's ALR (1971 (L) and 2011 (R))

The passing of the Agricultural Land Commission Act in 1973 ushered in a new era of agricultural land protection in British Columbia as a moratorium was placed on development of agricultural land. In Surrey, where approximately 21,704 acres (8,787 Hectares) were designated as part of the provincial reserve, property owners essentially lost, overnight, their legal entitlement to develop or use their land for non-farm purposes.

Forty years later, the ALR program has undeniably slowed the rate at which agricultural land has been converted to non-agricultural use in the province. Many high profile cases of exclusion approval in urban-rural fringe areas, however, highlight the reality that the reserve is still being eroded. In some instances, the ALR has inconvenienced but not thwarted landowners and entrepreneurs willing to invest time and money into the political process necessary to have their exclusion requests approved.

Certainly, with rapid urbanization and the resultant need for municipal services, a balance between developing and preserving agricultural land has been difficult to achieve in many communities. As new research reveals the positive impacts that vital agri-food systems have on our societies, economies and environments, however, the protection of agricultural land is increasingly being viewed as critically important. In British Columbia, where agricultural land is scarce to begin with, the need to protect what remains today is particularly acute. Surrey is exemplifying progressive thinking and leadership by critically examining the issue and beginning to employ innovative and creative strategies to both manage urban growth and foster vibrant agriculture on its arable lands.

To assist Planners and policy-makers in meeting these objectives, ISH researchers undertook an examination of the loss and evolution of land in Surrey's Agricultural Land Reserve since 1973, with the specific research goals to describe the process, sequence, and extent of loss, identify trends and patterns, and discern if there has been an unintended "shadow effect" of urbanization policies and strategies on the ALR.

Historical Records Accessed

Archived documents held at the Agricultural Land Commission (ALC) were the first point of inquiry. As previously described, the ALC is an independent Provincial agency responsible for administering the ALR in favour of agriculture, and is the sole adjudicator of applications related to ALR land use, subdivision, and exclusion from the reserve. All landowners therefore require Commission approval to include or exclude land in the ALR, subdivide land in the ALR, use land in the ALR for non-farm purposes, or place fill or remove soil from land in the ALR.

In the multi-staged application process, the applicant first submits their request to their local government, which completes a report on the application and forwards it to the ALC along with its municipal-perspective comments and recommendations. The Commission then receives the application and, after holding meetings with the applicant and determining the potential impact that the application may have on agriculture, decides whether it will approve or refuse the application. Although the Commission is the final arbiter of any application, the perspective of the local government is taken into account and can have an impact on the final outcome of the case.

All records of ALR loss and (legal) land use changes are thus contained in the applications made by landowners to the ALC. These records include approved and refused applications for inclusion, exclusion, subdivision, or non-farm use within the ALR, applications to place fill or remove soil, and applications for transportation, utility and recreational trail uses in the ALR that had been submitted by land owners, development groups, local and provincial governments, or First Nations. Access to these historic records was gained in two ways.

In 2006, the ALC launched an online archive of Commission decisions on ALR applications, publicly through their website, which contains files associated with applications made for Surrey properties from 2006-2010 [22]. These included fourteen applications for non-farm use; nine applications for transportation, utility, and recreational use; six applications for subdivision; one application to deposit fill; and one joint application for exclusion and inclusion that would result in a net gain to the ALR area. Records for these applications generally included copies of ALC Staff Reports with information about the nature of the application and the subject property, minutes from the ALC meeting held to discuss and decide on the application, and a copy of the final decision letter sent to the applicant. Other supporting documentation, including the applicant's submission and rationale for making the request, was in most cases not available in these online records.

For records of applications that predate 2006, only hardcopy archive files were available. Despite our interest in applications of all types, ALC staff were only able to retrieve those archive files associated with exclusion applications from 1973 – 2005. Applications for non-farm use, to place fill or remove soil, and for transportation, utility and recreational trail uses were not available. Based on this limitation, it was only possible to complete an historical analysis of exclusion applications. Although data associated with other application types were collected through the online archive, results were not analyzed for this study.

[22] See References for URL

A total of 28 applications for exclusion were reviewed in hardcopy format at the ALC. These archive files typically included all or some of the following documents:

- The application by the landowner;
- City of Surrey reports and recommendations including an Engineering Department report describing the cost and feasibility, from an engineering standpoint, of the proposed use for the land; a Planning Department report assessing the proposal's congruence with Surrey's Official Community Plan, Zoning Bylaw, and general planning mandate; minutes from AAC meetings at which the application was discussed (in applications from 1995 or later); minutes from City Council meetings at which the application was discussed; and, City Council's recommendation to the ALC to approve or refuse the application;
- ALC reports and decisions, including ALC Staff Reports with information about the nature of the subject property (its current use, soil capability for agriculture, surrounding land use, and total size); minutes from the ALC Meeting held to discuss and decide on the application, including ALC evaluation of the parcel's agricultural suitability and the potential impact of the proposal on Surrey agriculture; and a copy of the final decision Letter to the applicant;
- Minutes from Greater Vancouver Regional District meetings at which the application was discussed;
- Letters of opinion from concerned citizens or citizens groups.

Historical City of Surrey land use inventories, zoning maps or aerial photography were also considered pertinent as they might reveal trends in agricultural and urban land management that the individual ALC applications would not. Although retrieving these documents would be useful for evaluating agricultural land loss rational and patters, it required extensive effort well beyond the means and scope of this project. Ultimately only a 1971 City of Surrey zoning map was available through the Surrey Archives.

Analysis of Records Collected

A significant challenge to the intended research, as described above, stemmed from the fact that historical maps and records related to ALR applications were either incomplete or, in the case of subdivision or non-farm use records, unavailable. From both online records and hardcopy archives, every attempt was made to collect comprehensive information related to the application, the parcel affected, the City of Surrey's recommendations, and the ALC's decision making process. In many instances, however, records were incomplete and we were thus unable to retrieve information related to all of these factors. These gaps in the data made objective analysis difficult and the identification of consistent trends impossible. As such, there is insufficient evidence to demonstrate a "shadow effect" of unintended consequences of urban land use policies on ALR lands. Likewise, without the complete data set it is impossible to comprehensively and conclusively identify the determinants of ALR land loss and change.

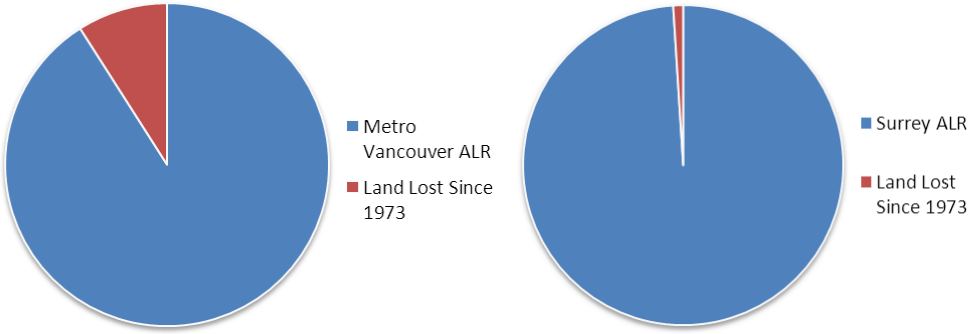
A total of 29 exclusion applications were made in Surrey over the 37 year study period, ten of which were approved and nine of which were approved in part or with conditions. Although this rate of approval (66%) is relatively high, it was noted that all applications for exclusion occurred before December 2003, the date on which Surrey's *Policy for Considering Applications for Exclusion of Land from the Agricultural Land Reserve (Policy 0-51)* (the "two for one" policy) came into effect. Since this policy was put in place, there are no records of exclusion applications being made for ALR land in Surrey. It would appear that this policy has effectively put a moratorium on the exclusion of land, though its effect on the rate of application for non-farm use, subdivision, soil deposition, transportation, or boundary adjustments cannot be measured due to a lack of data about these types of applications before the bylaw came into effect.

Table 4 summarizes the subset of applications for ALR properties in Surrey from 1973 – 2010, that the research was able to analyze.

Table 4: Historic Applications for Surrey ALR Properties, Reviewed by ISH

Application Type	1973 - 2005				2006 - 2010				Total
	Refused	Approved	Approved with Conditions / In Part	With- drawn	Refused	Approved	Approved with Conditions / In Part	With- drawn	
Exclusion	9	10	9	0	1	0	0	0	**29**
Non-Farm Use	*Records Not Available*				8	0	5	0	**13**
Subdivision					1	0	4	1	**6**
Soil Deposition					1	0	0	0	**1**
Transportation					4	2	2	1	**9**
Boundary Adjustment					0	1	0	0	**1**
Total	9	10	9	0	15	3	11	2	**59**

As a result of the 10 exclusion applications that have been approved in Surrey since 1973, a total of 233 acres (95 hectares) were lost from the ALR, representing about 1% of Surrey's total ALR landbase. Compared to the Metro Vancouver regional area, which lost 9% of its ALR landbase in approximately the same timeframe (Provincial Agricultural Land Commission, 2011), Surrey's losses via exclusion are very small.



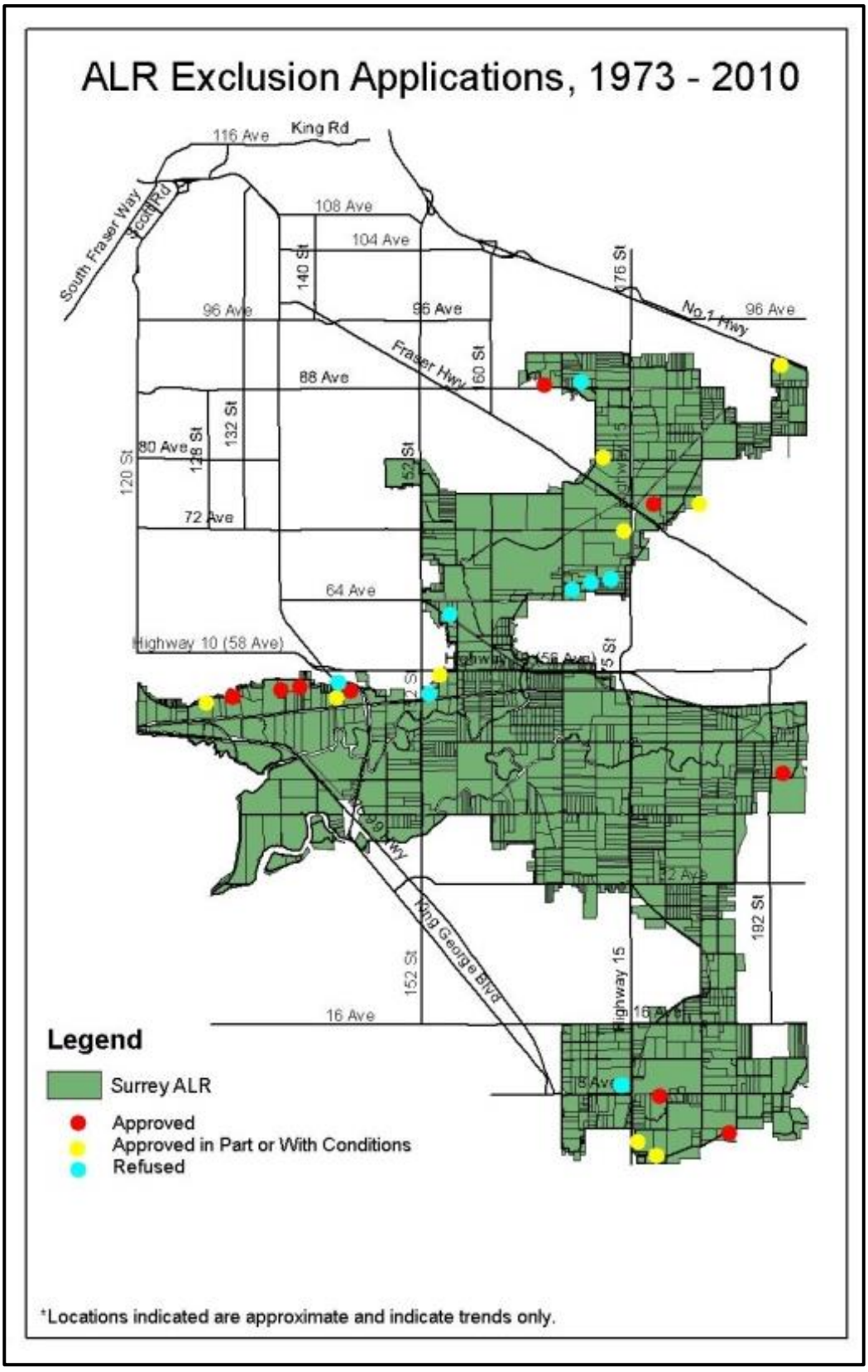
An Edge Effect

To determine the extent of change to the ALR due to exclusion from 1973-2010, the researchers sought maps of the ALR boundary at its inception in 1973. These maps, however, were unavailable from the City of Surrey or the Agricultural Land Commission. Illustrating likely boundary changes is thus only possible by mapping the location of properties for which exclusion applications were made from 1973 – 2010, as seen in *Map 6* (p.21).

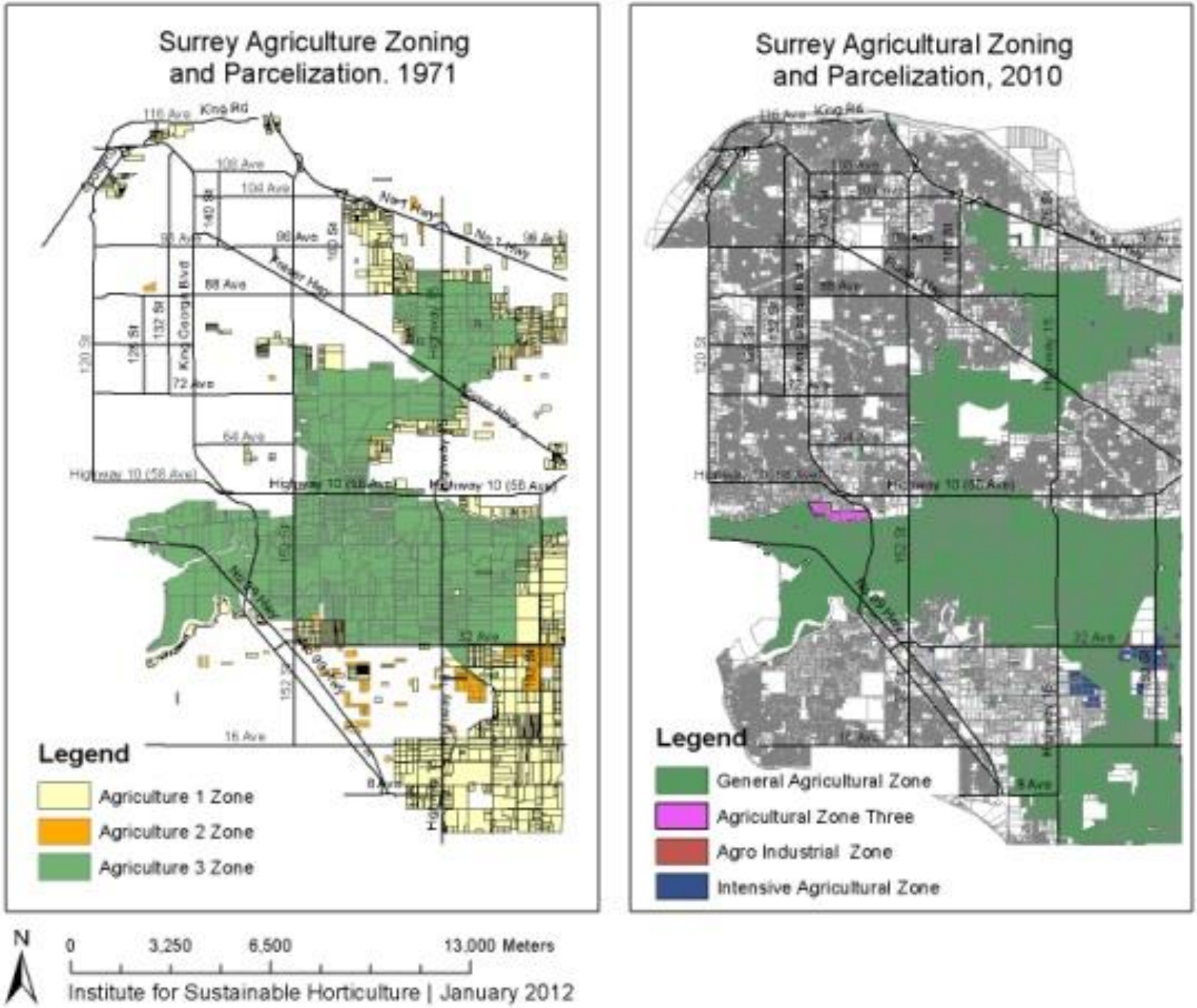
Note the significant "edge effect" that this map reveals: all historic exclusion applications (successful and unsuccessful) were found to have occurred on agricultural properties near the ALR edge. Although this suggests that the edge was historically most at risk to exclusion from the ALR, caution is required in interpreting this to suggest that it remains as such today. As described, the City's current efforts to preserve agricultural land within the ALR boundary are by all accounts successful. There has not been a single successful exclusion application made since the passing of the 2003 "two for one" by-law. Informal conversations with local realtors revealed that current land values are higher at the edge, which indicates that these properties may be subject to speculative valuation or seen as suitable sites for non-farm use, though not necessarily exclusion[23].

Map 7: Surrey's Agricultural Zoning and Parcelization, 1971-2010 (p.49) was created by ISH using current City of Surrey GIS data, and by digitizing a hardcopy Planning Department zoning map from 1971. Note that the area was already highly parcelized before creation of the ALR (1971). Although we were not able to examine ALR applications for subdivision from 1973-2005, this map, which illustrates the change in parcel sizes within Surrey's agricultural land base (and ALR) since 1971, gives some indication that the highly parcelized nature of Surrey's current ALR is not entirely a result of successful applications for subdivision.

[23] Interview with Real Estate Agents (Anonymous). (December 2011)



Map 6: ALR Exclusion Applications in Surrey, 1973 - 2010



Map 7: Surrey's Agricultural Zoning and Parcelization, 1971-2010

Discussion

The research was driven by initial thinking that an examination of the loss of Surrey's agricultural land from the ALR would be a useful line of enquiry if we were to assist Planners and policy-makers to protect and enhance the agricultural land base in the municipality. It was assumed that Surrey's ALR lands were under significant threat of exclusion from the ALR through a variety of pressures.

The investigation of historical records revealed, however, that although Surrey's ALR is vulnerable to speculation, the exclusion of these lands is not inevitable. Very few Surrey parcels have, in fact, been lost to the ALR as a result of exclusion applications since 1973. Gary Runka, former General Manger and then Chair of the Agricultural Land Commission (1973-1975) has described the ALR program as initially being introduced under the recognition that, "in the face of increasing land use pressures, local governments were unable or unwilling to hold the line against rezoning agricultural lands to purportedly 'higher and better uses'."[24] The City of Surrey, supported by the Agricultural Land Commission and the provisions of the ALC Act, has proven an exception to this rule as it has historically done an exemplary job of maintaining the borders of its agricultural land base, and is strongly positioned to continue to do so into the future.

If a significant amount of land has not been lost from the ALR, then how has its utilization evolved since 1973? This is the more pertinent question our unexpected finding led us to ask, and which is explored in greater detail in the remainder of this report.

[24] Runka, 2006

3.0 UNDERUTILIZED LAND IN THE SURREY ALR

The investigation of historical change and loss to Surrey's ALR revealed that exclusion of ALR lands poses a minor threat to the vitality of the municipality's food system and agricultural land base. It suggested, however, that the more troubling dynamic is occurring *inside* the ALR and is evidenced in the high incidence of this land's use for non-agricultural purposes. The most recent land use data available for the City of Surrey, which comes from an Agricultural Land Use Inventory completed by the Ministry of Agriculture in 2004, corroborates this notion and provided a basis from which to evaluate the extent of the problem today. Table 5: Utilized and Underutilized Parcels in the Surrey ALR, 2004***Error! Reference source not found.*** describes land uses in Surrey's ALR in 2004 and distinguishes between those parcels we considered to be "underutilized for agriculture" and "utilized for agriculture" in the context of this investigation.

Table 5: Utilized and Underutilized Parcels in the Surrey ALR, 2004

	Primary Land Use Activity (2004)	Number of Parcels	Total Area		
			Acres	Hectares	As Percent of Surrey ALR
Underutilized	Commercial/Service Use	23	481	195	2.1%
	Golf Course	26	1,272	515	5.6%
	Hobby Farm	85	450	182	2.0%
	Industrial Use	10	297	120	1.3%
	Institutional Use	6	66	27	0.3%
	Land in Transition	23	273	111	1.2%
	Mineral Extraction	1	36	15	0.2%
	Mobile Home	2	59	24	0.3%
	Not In Use	33	293	119	1.3%
	Park	47	987	400	4.3%
	Recreational Use	2	98	40	0.4%
	Residential Use	192	840	340	3.7%
	Transportation and Communications	27	122	49	0.5%
	Unknown	9	143	58	0.6%
	Unused Farmland	165	1,837	744	8.1%
	Utility	2	2	1	0.0%
	Water Management	13	15	6	0.1%
	Wildlife Management	3	229	93	1.0%
	Sub-Total (underutilized)	*669*	*7,500*	*3,037*	*32.9%*
Utilized	Agriculture	743	15,208	6,157	66.8%
	Freshwater Aquaculture	2	74	30	0.3%
	Sub-Total (utilized)	*745*	*15,282*	*6,187*	*67.1%*
	Total	*1414*	*22,783*	*9,224*	*100.0%*

*This table derived from data from the 2004 Surrey Agricultural Land Use Inventory

Inventory of Surrey's Underutilized ALR Land

To understand and assess the extent to which the underutilization of ALR land remains an issue today, we conducted an inventory of the 669 properties, covering 7,500 acres (3,035 ha) or approximately 33% of the total Surrey ALR, which had been identified as underutilized for agriculture in 2004. Over the summer of 2011, using a combination of road-side visual inspection and aerial photography interpretation, the following key data was collected for each of the 669 properties within the area:

- The parcel's 2011 primary land use, standardized into the categories: Commercial/Service Use, Golf Course, Industrial Use, Institutional Use, Not in use, Park, Residential Use, Unused Farm Land, Wood Lot, Agriculture*, Water Management, Wildlife Management, Transportation/ Communications, or Unknown.

  *Note that any parcels found to have become actively farmed since 2004 were subsequently removed from the study area as they were no longer considered to be "underutilized".

- A description of any permanent structures present on the parcels (for example: homes, garages, outbuildings, driveways and sidewalks, barns, commercial buildings, etc), and the approximate portion of the property they occupied.

- The general type of agriculture related activities the parcel had the potential to support, standardized into two categories:

  1. Soil based agriculture,
  2. Structure based agriculture (including greenhouses/hoop houses, raised beds, aquaculture, apiculture, or livestock barns), and/or food system services (those services required to support small-scale local agriculture, including production and pre-production services, post-harvest services, and distribution and supply services).

  This determination was based upon an assessment of the parcels' land cover, soil availability, proximity to major intersections, and current use(s). In general, land with an available soil resource was considered to have potential for any type of agriculture related activity, and land which was paved or had an otherwise degraded soil base was considered to have potential for structure based agriculture or food system services.

- The type of remediation necessary to make the parcel available to the selected agriculture related activities, standardized into the categories: Change of use, land clearing, structure reclamation or development, field preparation, or minimal to none. A complete description of these can be found on Page 59 (*Quality and Remediation of Underutilized Lands*).

- The portion of the parcel available for agriculture-related activities (ARAs), recorded as a percentage of the whole. Recording specifically what portion of each property would be available for ARAs, rather than simply the total size of the underutilized parcel, allowed us to make more accurate estimates of land available for future agriculture related activities in our analysis of the data collected.

For example, if a given property was composed of an unused field, a home, and a small woodlot, the unused field would be classified as available for ARAs (immediately), the woodlot as available for ARAs (after remediation), and the land base occupied by the home as unavailable for ARAs. Figure 10 represents this graphically.

Figure 10: Underutilized ALR Parcels (Outlined in Red) and Unusable Land (Outlined in Turquoise)

As the inventory was being compiled, the opportunity occasionally arose to speak informally with the owners of parcels in the study area. These conversations, which centered around their interest in small-scale agriculture, their perception of the value (agricultural or otherwise) of their land, and their opinions about development taking place on and around Surrey's ALR, contributed a qualitative understanding of the issues facing landowners in the ALR; the challenges Surrey would face if it attempted to increase the incidence of agriculture on these lands; and the potential benefits of doing so.

In addition to the inventory conducted, a survey package was delivered to the owners of all parcels in the study area. The package included of a letter notifying the land owner of the research being conducted, a six question survey designed to gather additional information about the underutilized land and its ownership, an invitation to a stakeholder focus group session to be held at Kwantlen University's Surrey campus, and a stamped, addressed envelope for respondents to mail completed surveys and focus group RSVPs back to the researchers. A copy of these documents can be found in Appendix 1 (p.104).

Where possible, the survey was delivered by hand. If this option was not available, surveys were mailed to parcel owners, whose addresses were retrieved via a BC Assessment title search performed by the City of Surrey on behalf of ISH researchers.

Findings

Land Use within the Study Area

Of the 669 parcels surveyed by ISH researchers, 30 were found to have transitioned into agriculture since the Ministry of Agriculture's survey was conducted in 2004. 83 parcels were not surveyed because we were unable to identify their discreet street address or property identification number. These parcels, classified with the primary land uses "Agriculture" and "Unknown", respectively, have been removed from our analysis as they cannot be considered "underutilized".

The field work revealed that at least 556 of the parcels which were underutilized for agriculture in 2004 remained underutilized in 2011. This amounts to 6,043 acres (2,446 ha), or 27% of Surrey's ALR.

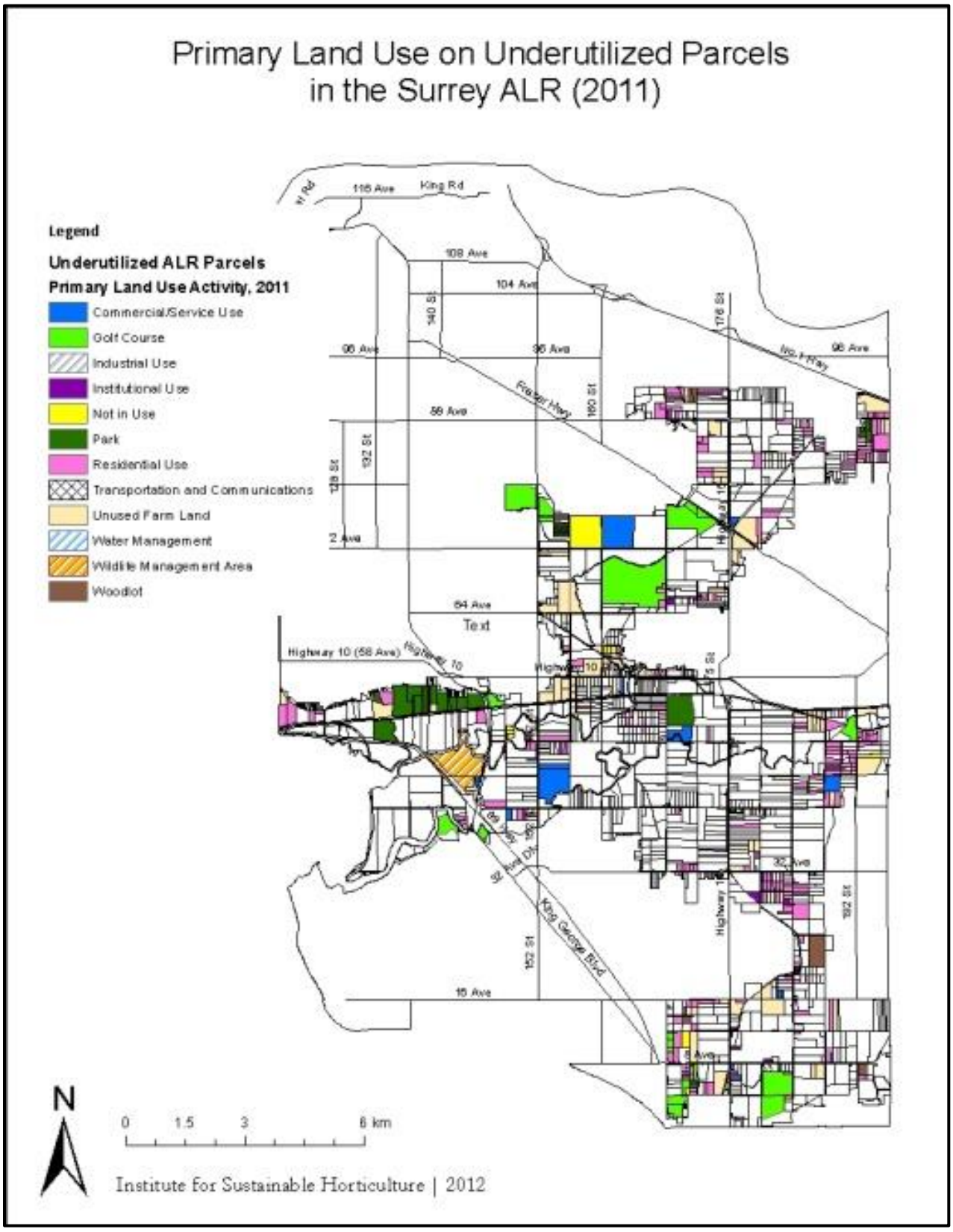
Table 6 outlines the primary land use classification assigned to the 561 underutilized parcels and Map 8: Primary Land Use Activities on Underutilized Parcels in the Surrey ALR (2011) highlights the distribution of these lands. It is significant to note that the underutilized parcels tend to cluster around ALR edges, pinch points, and nodes (areas where ALR land protrudes into non-ALR land)

Table 6: Primary Land Use and Area of Surveyed Parcels in the Surrey ALR (2011)

	Primary Land Use Activity (2011)	Number of Parcels	Total Area		
			Acres	Hectares	As Percent of Surrey ALR
UNDERUTLIZED PARCELS	**Commercial/Service Use**	21	477	193	2.1%
	Industrial Use	6	30	12	0.1%
	Institutional Use	8	76	31	0.3%
	Not in Use	31	275	111	1.2%
	Park	28	391	158	1.7%
	Residential Use	275	1,645	666	7.2%
	Unused Farmland	115	1,339	542	5.9%
	Woodlot	6	143	58	0.6%
	Golf Course	27	1,311	531	5.8%
	Water Management	11	14	6	0.1%
	Wildlife Management	3	229	93	1.0%
	Transportation and Communications	25	114	46	0.5%
	Sub-Total (underutilized)	*556*	*6,043*	*2,446*	*27%*
OTHER PARCELS**	**Agriculture**	30	567	230	2.5%
	Unknown	83	891	361	3.9%
	Sub-Total (other)	*113*	*1,458*	*590*	*6%*
	Total (all surveyed parcels)	*669*	*7,500*	*3,037*	*33%*

*Table derived from ISH field work data and Ministry of Agriculture and Lands *City of Surrey Agricultural Land Use Inventory 2004*

**Note that these "other parcels" were removed from the study area and not considered in our calculus of underutilized for agriculture in 2011



Map 8: Primary Land Use Activities on Underutilized Parcels in the Surrey ALR (2011)

Figure 12: Size of Underutilized Parcels in Surrey's ALR (2010)

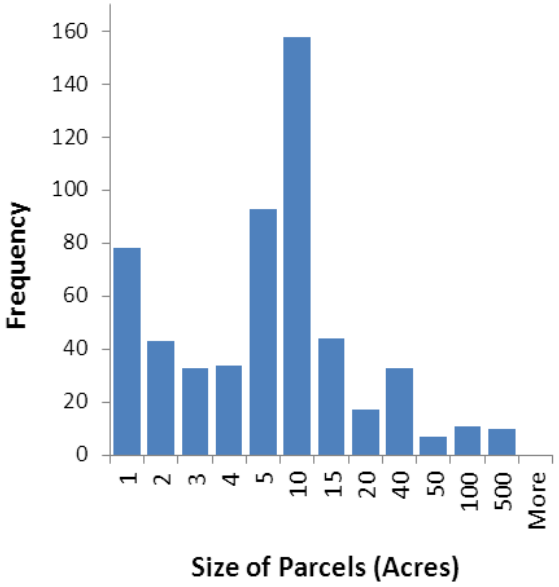
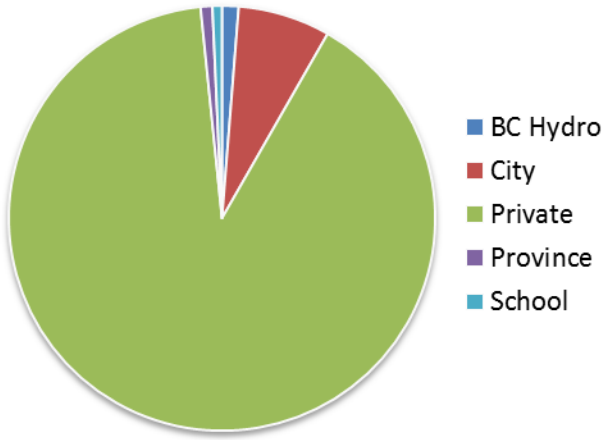


Figure 11: Ownership of Underutilized Parcels in Surrey's ALR, by Number of Parcels (2010)



Surrey's underutilized ALR parcels are typically small in size, with 50% being 5 acres (2.4 hectares) or smaller and 78% being 10 acres (5 hectares) or smaller. *Figure 12: Size of Underutilized Parcels in Surrey's ALR (2010)* illustrates the distribution of parcel size.

While the majority of underutilized parcels (approximately 90%) are privately owned, a small number are owned by public institutions including the City of Surrey, the Surrey School Board, the Provincial Government, and BC Hydro (see Figure 11: Ownership of Underutilized Parcels in Surrey's ALR, by Number of Parcels (2010)). Most of these parcels are currently public parks with varying levels of development. None of the underutilized parcels are federally owned.

Usable area of Under Utilized Lands

The field work revealed a total of 6,043 acres (2,446 ha) of currently underutilized agricultural land on 556 parcels in the Surrey ALR. Some parcels within the underutilized ALR land, including those categorized as *Woodlot, Not in Use, and Unused Farmland*, are largely undeveloped and thus usable for agriculture in their entirety. Not all parcels, however, are necessarily available or suitable for agriculture related activities in their entirety.

Figure 13: Example golf course (L) and permanent structure (R) on ALR Land

Buildings, residences, or other structures were typically found on parcels used for commercial, industrial, institutional, and residential purposes. These structures, though technically impermanent, effectively render portions of each property not amenable to agriculture or food system services in the near term future. Other property features such as driveways and ditches further reduce the amount of land available for agriculture. The portion of underutilized land occupied by structures and other features such as driveways and ditches, which was calculated to be approximately 825 acres (334 ha), was therefore subtracted from our estimation of total underutilized area[25].

Although we do not condone the use of ALR land for golf courses, based on a lack of available information about into the feasibility and cost of converting Golf Courses back into agricultural land, the 1,312 acres (531 hectares) of Surrey ALR land that is currently occupied by *Golf Courses* was subtracted from the total underutilized area.

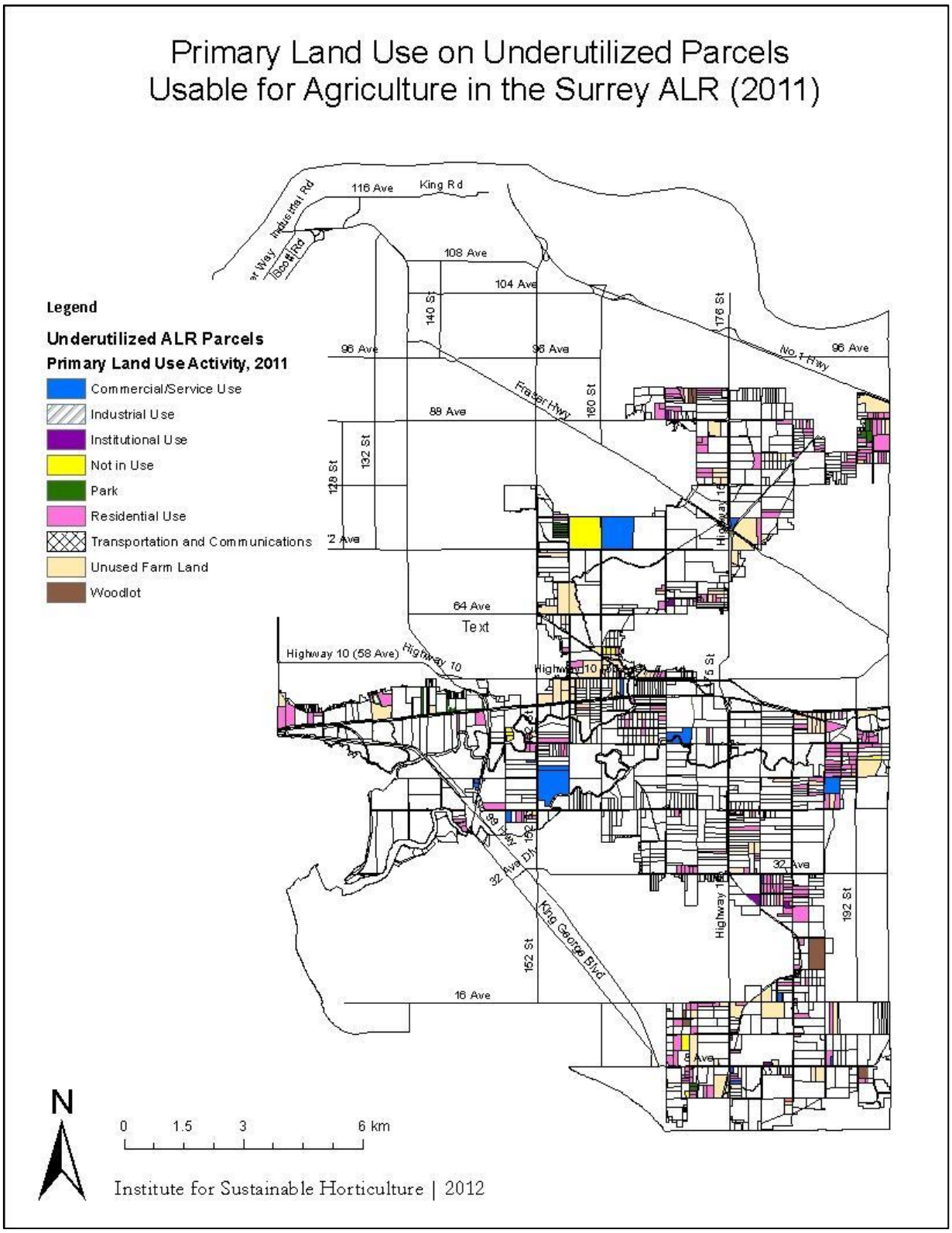
[25] This was calculated by multiplying the estimated percent of the parcel occupied by permanent structures and other features such as ditches and driveways (as recorded during the field work) by the area of the whole parcel.

Figure 14: Serpentine Fen Wildlife Management Area

Some non-agricultural land uses, including *Water Management Areas, Wildlife Management Areas, and Transportation and Communication corridors*, are unlikely to be utilized for agriculture because they support important ecosystem or infrastructure services which are essential for Surrey's urban and agricultural communities. These areas, which together constitute 357 acres (144 ha), were considered permanently alienated from agriculture and their area was also subtracted from the total underutilized area.

In conversation with the Manager of Parks Planning at the City of Surrey, it was determined that Colebrook park, which comprises a number of undeveloped city owned parcels categorized as underutilized for agriculture in 2011, was slated to be developed as per the "Panorama Lands Park Master Plan" when municipal budget came available. In this master plan, 18.5 acres (46 ha) are planned to be preserved for agricultural use while the remaining area will be developed for recreational and wildlife purposes. As such, all but 18.5 acres (46 ha) from the Colebrook Park lands were considered permanently alienated from agriculture and were subtracted from the total underutilized area.

Subtracting the parcels or parcel portions described above from the total amount of underutilized ALR land allowed us to conservatively estimate that approximately 3,339 acres (1,351 ha) of Surrey's currently underutilized ALR land could be used for agriculture. *Map 9: Primary Land Use Activities on Underutilized Parcels Usable for Agriculture in the Surrey ALR (*2011*),* on p.59, illustrates the distribution of those underutilized parcels in the Surrey ALR on which some portion or the total area of the parcel is potentially available for agriculture.



Map 9: Primary Land Use Activities on Underutilized Parcels Usable for Agriculture in the Surrey ALR (2011)

Quality and Remediation of Underutilized Lands

The assessment of agricultural potential on Surrey's underutilized ALR parcels, completed during the field work, did not include any soil sampling and was largely based on the identification of permanent structures or natural features which would prohibit future agricultural activities from taking place on the land. Based on BCLI soil surveys (see Map 2: Improved Land Capability for Agriculture, page 22) and the extensive improvements that the City of Surrey has made to agricultural lands through dyking and drainage (See "Flood Control Infrastructure" page 24), it is presumed that standard field preparation and soil building activities (for example, composting, liming, tilling, etc.) will be sufficient to bring most of the underutilized ALR land that is available for agriculture into production. These activities are standard to any agricultural enterprise and well within the economic and means of a startup farming operation.

Beyond standard field preparation and soil enhancement that would be required to bring any land into production, however, approximately 1,237 acres (500 hectares) of the underutilized land that is available for agriculture were noted during the field work to require some more intensive form of land remediation before they could be put into production[26]. Generalized categories of remediation include *change of use, land clearing,* and *structure reclamation or development*. The challenges and, if applicable, costs associated with each kind of remediation are discussed below.

Change of use

A change of use involves converting into agricultural use those portions of properties currently used for a non-agricultural purposes. The most common non-agricultural uses in this category include: hobby farms, truck parking, and residential or commercial lawns. The willingness of the landowner to engage their land in agriculture rather than its current non-agricultural use is the biggest barrier to this type of remediation taking place. For many land owners, a more feasible alternative to farming their land themselves would be leasing or licensing their land to a farmer on an annual basis. This will be discussed further below.

Figure 15: Commercial property requiring "change of use" remediation

Land clearing

Land clearing involves the remediation of once-farmed parcels which are now unmanaged and over-grown with brush and scrub, as well as the clearing of woodlots. A number of companies in the Lower Mainland and Fraser Valley provide tree cutting and land clearing services, and their cost varies from approximately $5,000 – 15,000 per acre, depending on a variety of factors including tree density and size, undergrowth density, and land access. The City of Surrey's tree cutting bylaw and tree protection bylaw would also apply to any land clearing activity taking place in the ALR. Permits would need to be obtained by the land owner before any trees were felled.

[26] Note that this land is not considered permanently alienated from agriculture and therefore the landbase it represents is included in the analysis which follows in forthcoming sections of the report.

Recognizing that existing forested areas can, if properly managed, be significant carbon sinks (natural reservoirs that accumulate and store carbon), a further investigation of the feasibility of alternative forest management practices such as agroforestry or selective logging is warranted to determine best practices for minimizing the environmental impact of land clearing on Surrey's underutilized ALR parcels.

Structure reclamation or development

Some parcels were assessed to be only suitable for food system services or structure based agriculture, because of lack of soil or soil degradation. These parcels generally would require appropriate structures such as greenhouses, hoop houses or raised beds to be built and soil imported. In some instances, pre-existing abandoned buildings on the property may be able to be re-claimed for use in a food system services capacity.

Figure 16: Land available for the development of structure based agriculture

The costs associated with this category of land remediation are highly variable and dependent upon the specific project and design implemented on the site. Successful structure based agriculture could take a form as simple as raised beds built on marginal soil, or small unheated hoophouses which cost $6,000 – 7,000, or as intensive as fully lit, heated, vented, and irrigated greenhouse which can cost many millions to establish.

Likewise, food system services infrastructure can be as simple as setting up a Farmers Market on an unused parking lot or as complex as the proposed multi-million dollar "New City Market" facility that has been proposed for Vancouver, which is planned to include a farmers market, cold storage facilities, a processing facility, food retail, and research and development facilities to support the continued development of a local food system[27].

Real Estate Value of Underutilized ALR

During course of our fieldwork we noted many parcels in the ALR for sale and represented by real estate agencies. To further understand the dynamics of ALR land valuation we queried five realtors representing five parcels, ranging from 1.35 acres to 2.2 acres (average 1.79) in size that were for sale. Asking price for these parcels ranged from $850,000 to $2,280,000, with an average price of $1,416,000, or $790,179 per acre.

These realtors reported, however, that small parcel ALR land was generally valued even higher, at $175,000 to $200,000 per acre, and that location within the ALR greatly influenced valuation. The existence of dwellings and other structures on the land was reported to increase ALR land value, although not as significantly as proximity to urban development. ALR lands near the urban- agriculture

[27] Local Food First, 2011

edge were reported to be valued far in excess of lands located deeper in the ALR, with urban- ALR interface lands, without structural improvements, reportedly valued at $500,000 or more per acre.

This level of valuation, one source noted, was not limited to very small parcels only, referencing one 4.6 acre property with a small 46 year old house listing for $2.2 million. Additionally it was relayed to us that many of Surrey's small ALR lands are bought with a 50% down payment required by most lending institutions, and as such often purchased for investment by entities with no intention of residing (or farming) there. All five realtors interviewed concurred that no small lot ALR parcel (20 acres or less) in Surrey is "bought or sold for agriculture" and agriculture-urban edge ALR land value is unequivocally based on the expectation of future exclusion from the ALR and subsequent development.

Findings - Landowner Survey and Focus Group

Forty-four of 561 surveys administered to owners of Surrey's underutilized ALR parcels were returned completed (7.6% return rate). The majority of respondents (96%) were from property owners for whom the parcel is principally a family or individual residence. Fewer than 5% of respondents indicated that the property was owned by a corporation or business, and no survey respondents indicated ownership by a government, cooperative, community trust, or developer. Therefore, while data is not representative of all types of ownership (for example we know from other sources that 11% of parcels are owned by municipal government and 4% by the Provincial Government, see Figure 11: Ownership of Underutilized Parcels in Surrey's ALR, by Number of Parcels (2010), p.56), it is likely very representative of the residential owner segment.

The survey results corroborate our field work findings that this land is highly underutilized for commercial agriculture, with respondents reporting a variety of non-agricultural uses within the categories "residential", "business-related", and "undeveloped". Most respondents who did indicate agricultural activities on their property (32%) generate under $10,000 in gross annual revenue, primarily with forage or pasture, not food crop production. The data indicate that these respondents generally lease their land to another party, and benefit from the farm class tax status that this arrangement affords.

Respondents' explanations of reasons why their property is not used for agricultural activities related to the landowners' *lack of interest or training in farming* (36%), the landowners' *lack of confidence in the economic profitability of farming* (30%), and the landowners' *belief that their land is not suitable for agriculture* (36%). These three barriers are reflective of the attitudes and perspectives that the researchers encountered when the opportunity arose to speak casually with landowners as the field work was completed.

> *36% of survey respondents (owners of underutilized parcels in the Surrey ALR) indicated that they lack the interest and/or skills necessary to farm their land.*

Despite their overall lack of knowledge of or confidence in agriculture, 39% of respondents indicated they are "likely" or "very likely" to allow the increased use of their property for agriculture (specifically, for the production of food crops), suggesting that genuine potential to bring this land into agriculture does exist. The respondent indicated that a range of potential policies, programs, or support networks would incentivize them to allow the increased use of their land for agricultural production. These include: improved tax incentives (48% support), subsidies for land remediation (30%), subsidized utility rates (25%), a network to connect landowners to land-seeking farmers (23%), municipal support for landowners entering into lease agreements with tenant farmers (18%), risk free lease with tenant farmers guaranteed by municipal government (16%), agricultural training for landowners (20%), and a mandated minimum level of agricultural activity on land zoned A1 or ALR (11%).

The focus group held at Kwantlen Polytechnic University's Surrey campus on August 17th, 2011, was attended by six owners of underutilized land in the Surrey ALR. After presenting an overview of the research questions and results to that point, these stakeholders were engaged in a discussion around the questions:

- *Are you interested in farming your land or leasing it to a farmer?*
- *What currently prevents or discourages you from farming your land or leasing it to a farmer?*

- *What would you need /what would encourage you to do agriculture on your land? What, specifically, could the City of Surrey offer that would support you?*
- *Has the evening's discussion and presentation changed your opinion on the agricultural potential of your land or interest in seeing it farming? And,*
- *Do you believe that small- lot, local-scale, direct-market agriculture sector in Surrey is possible?*

Participants represented a range of age, background, and interest in agriculture. All shared a concern for what they saw as an increasingly frequent misuse of Surrey's ALR for non-agricultural purposes including the illegal dumping of fill and parking of transport trucks. Most participants saw feasibility in the option of leasing their land to farmers, but expressed concerns related to ensuring the farmer was reliable, whether or not the rent would justify any inconveniences associated with their use of the land, and in general how they would administer the lease and their relationship with the farmer.

Two of the participants hoped to farm their land themselves in the future, but lacked the knowledge and experience of how to do so. They expressed interest in working further with ISH or the City of Surrey to implement an agricultural enterprise on their land.

For more details, tabulated survey results can be found in Appendix 2 (p.108) and Focus Group meeting minutes can be found in Appendix 3 (p.111).

Discussion

The field work revealed that there are approximately 6,043 acres (2,446 ha) of underutilized land in Surrey's ALR, 3,339 acres (1,351 ha) of which could feasibly be used for agriculture. This second figure is equivalent to approximately 15% of the municipality's total ALR land base, constitutes 1.3 times as much land as Surrey currently has in berry production, and could host 71 average sized farms if it were more spatially contiguous[28].

While this area alone is undoubtedly significant from an agricultural perspective, it notable that the field work examined only those parcels of land in Surrey's ALR that had been classified as underutilized in 2004, updating the available historic data with their current use and potential for agriculture. Not included in the survey was any land that was classified in 2004 as being used for commercial agriculture but which could have since become underutilized. While conducting the field work, researchers did notice parcels where this had occurred, but did not record the data as it was beyond the scope of the study. Additionally, as noted in the Findings section, a total of 83 parcels in the study area were not surveyed because we were unable to identify their discreet street address or property identification number. These parcels together make up an additional 890 acres (360 ha) of potentially underutilized land that was not included in our calculus.

Bringing this land into agricultural production, however, will be challenging to for a variety of reasons. As the survey and focus group, as well as informal discussions with landowners revealed, there is a high incidence of ownership of these parcels by non-agriculturalists with a wide range of interest, willingness, and ability to make their land available to farmers or take up farming themselves. On many parcels, degradation has made soil-based agriculture impossible, but the costs associated with developing structure based alternatives may be prohibitive to landowners in the short term.
That being said, the amount of land that is available represents a significant untapped resource for the City of Surrey with enormous potential from food production, economic, and job creation perspectives. While the Municipality's main planning concern historically has been the loss of ALR land *to the reserve*, our evaluation of ALR records and field analysis of underutilized ALR lands identified that the greater threat to agricultural viability in Surrey is *non-farm use of parcels within the ALR* and its valuation being much higher than that justified by agriculture.

After 40 years of the ALR programs' existence, its policies and strategies are proving effective in protecting and preserving the large parcels of agricultural land, but the smaller parcels, particularly those on the edge, are increasingly under threat of speculation, and loss to agriculture, but not necessarily to the ALR. This finding suggests that current planning strategies and policies have been inadequate or insufficient to stimulate or maintain agricultural use on the municipality's ALR lands. Addressing the issue will require a shift in the approach taken for agricultural land management and protection in which municipalities are seen as key players who are supported by, but not solely dependent on, the Agricultural Land Reserve Program, but doing could yield significant economic and community benefits.

The potential of this land, and the strategies Surrey can employ to catalyze its realization, will be explored in the following sections of this report.

[28] Average farm size in Surrey is 19.1ha, as reported by Statistics Canada in the 2006 Census of Agriculture.

4.0 AGRICULTURAL POTENTIAL OF SURREY'S UNDERUTILIZED ALR LAND

Local-Scale, Human-Intensive Agricultural Scenarios for Surrey's Underutilized ALR Lands

To convey the inherent agricultural potential of different types and conditions of Surrey small parcel ALR lands that our field study revealed, we developed five illustrative scenarios. These scenarios we designate as 1) Micro-farms, 2) Small-scale Farms, 3) Mid-scale Farms and/or Community Farms, 4) Structure- Based Agriculture and 5) Local Agri-food System Services.

Some of these scenarios are appropriate for only one parcel type while others might be appropriate for differing parcel sizes and types. We offer that all these scenarios reflect realistic, feasible ways for underutilized small lot ALR lands to contribute to the realization of a substantial local agri-food sector in Surrey, and collectively represent valuable and/or necessary elements of a local-regional agri-food system. It is noteworthy that, based on our field assessment findings, very few small parcel ALR land types cannot be matched to one or more scenario (singly or in combination) and put meaningfully to local food crop production. Finally these scenarios are not intended to be prescriptive or delimiting in any way, rather they are to suggest realistic, transformative ways for these lands to be farm lands, as they are intended and designated to be, again.

The table below provides an overview of the five scenarios and the quantitative and qualitative description of Surrey's underutilized lands that fit within each. The following sections describe each in more detail.

Agricultural Scenario	Land Size	Land Type	Number of Parcels	Total Area	
				Acres	Hectares
Micro Farm	0.5 acres or less	Arable	16	6	2
Small Scale Farm	0.5 - 2 acres	Arable	58	75	30
Mid-Scale Farm or Community Farm	Over 2 acres	Arable	334	3,230	1,307
Structure Based Agriculture or Food System Services	Any size	Non-Arable	14	29	12
Totals			*422*	*3,339*	*1,351*

Agricultural Best Practices

*"**Agriculture … is now the single greatest source of human damage to the global environment**. That damage takes a number of forms: erosion and salinization of soils; deforestation; fertilizer runoff; loss of biodiversity; fresh water scarcity; and agrochemical pollution of water and soil."*

-Richard Heinberg
"50 Million Farmers" Address, 2006

Perhaps no other field sees such a dichotomy between methods of production as agriculture. Given the intensity of this debate, the City of Surrey needs to consider carefully what type of agricultural practices it can and does promote and restrict in its policies, bylaws, and programs, especially as it relates to bringing currently underutilized ALR land into production. By strategically promotingg agricultural practices that third parties have determined minimize negative environmental impact, or in some cases even enhance ecosystem services capacity of farms, Surrey has the potential to configure this agriculture to contribute to community health and vitality, economic wealth, and its greenhouse gas emissions reductions targets.

Popular and academic literature is rich with information about agricultural practices which are the best choice for the health of consumers, the protection and enhancement of the environment, and the sustainability of food systems, and many certifications are available for farmers seeking third-party recognition approval of the on-farm practices they employ.

Further resources on these best practices can be found in the following recommended sources and guidelines:

- UN FAO Climate Smart Agriculture
- Canadian Organic Growers
- Local Food Plus
- Biodynamic Farming and Gardening Association
- Salmon Safe
- Food Alliance

Rather than describe specific recommended production techniques, the scenarios presented in this report are based only on an assumption that new farms on Surrey's underutilized ALR lands will be local scale (primarily engaged in production for the local and regional markets, rather than for national or international markets), and human intensive (more reliant on human labour, hand tools, and small machines and less on extensive and expensive mechanization) as this type of agriculture is highly compatible with small spaces and peri-urban agricultural areas.

Small Lot to Micro Farm

- *Farm Size:* Under 0.5 acres
- *Land Type:* Arable

This scenario includes the very smallest scale commercial farms, which are highly suited to urban and peri-urban locations where growing space is limited and the market is in close proximity to the farm. Best crop choices for this scale of agriculture are either a diversified mix of annual vegetable crops (including beets, herbs, leafy greens, peas, and tomatoes) or a single, high value and easily marketed annual crop (such as sprouts, salad greens, or garlic). Labour is done by hand, minimizing the need for expensive farm equipment.

This scale of agriculture is best suited to direct marketing at farmers markets, or to regular customers through a community supported agriculture program. A farmer may cultivate a single plot of this size, or choose to farm multiple small plots which together make up a larger agricultural enterprise. Either option requires little in the way of start-up capital, could employ one half to full time farmer, and can be profitable within the first year.

AGRICULTURAL POTENTIAL IN EXISTING, UNDERUTILIZED SURREY LOTS:
Approximately 16 parcels, each with fewer than half an acre of underutilized usable, arable land, currently exist in the Surrey ALR. The parcels generally include residences, hobby farms, and commercial properties. Together, they constitute over 2 hectares (6 acres) of usable underutilized agricultural land. Landowners with this amount available for agriculture may choose to farm it themselves or lease/license it to a farmer to use on a two to five year basis.

Figure 17: Before (Small Lot) and After (Micro Farm)

MICRO FARM CASE EXAMPLE: Greencity Acres – Kelowna BC
When Curtis Stone, a former Montreal musician, began farming in 2009 with no agricultural experience and little in the way of land, the Kelowna, BC resident adopted the SPIN® (Small Plot Intensive) farming method, which is "a non-technical, easy-to-learn and inexpensive-to-implement vegetable farming system that makes it possible to earn significant income from land bases under an acre in size" (What's SPIN, 2011). Stone is now growing on seven plots of urban land (most of them backyards) that together make up about three quarters of an acre of growing space. Stone grows mixed organic vegetables for sale in a CSA program, eight restaurants, and one farmers market, and generates over $50,000 per year in revenue.
http://www.greencityacres.com, http://spinfarming.com/

MICRO FARM CASE EXAMPLE: My Urban Farm – Vancouver BC
Chris Thoreau of My Urban Farm grows sunflower, buckwheat, and pea sprouts on approximately 2,000 square feet (1/20th of an acre) of leased land in the heart of Vancouver. Over a 21 week growing season, the tiny operation employs one full time and one half time staff and generates about $21,000 in revenue. Thoreau's sprouts are delivered, by bicycle, for sales at two Vancouver farmers markets, through two local produce distributors, and in several grocery stores and restaurants. http://myurbanfarm.drupalgardens.com

Large, Occupied Lot to Small-scale Farm

- *Farm Size:* 0.5 – 2 acres
- *Land Type:* Arable

At 0.5 – 2 acres, this is a common size for human intensive, organic farms producing for the local market. Best crop choices for this scale of agriculture are a diversified mix of annual vegetable crops (including beets, carrots, herbs, leafy greens, peas, garlic, and beans). With enough space, a small flock of free range laying hens can also be incorporated into the business model.

This scale of agriculture is best suited to direct marketing at farmers markets, or to regular customers through a community supported agriculture program. Most labour is done by hand, minimizing the need for expensive farm machinery. In the first few years, this scale of farm could generate between $50,000 and $100,000 in annual revenue.

AGRICULTURAL POTENTIAL IN EXISTING, UNDERUTILIZED SURREY LOTS:
Approximately 58 parcels with 0.5 – 2 acres of underutilized usable, arable land, currently exist in the Surrey ALR. They generally include residences, hobby farms, and commercial properties. Together, they constitute approximately 30 hectares (75 acres) of usable underutilized agricultural land. Landowners with this amount available for agriculture may choose to farm it themselves or lease/license it to a farmer on a two to five year basis.

Figure 18: Before (Large Lot) and After (Small Scale Farm)

SMALL SCALE FARM CASE EXAMPLE: Rootdown Farm – Pemberton, BC
Rootdown Organic Farm is a two acre organic farm located in the Pemberton Valley, BC. In addition to vegetables and eggs which are sold through a community supported agriculture program, at farmers markets in Pemberton, Squamish, and Vancouver, and to several local restaurants, Rootdown Farm also offers a "pig share" program, in which customers commit to purchasing a whole or half pig in the spring by making a deposit. The farmer can then put the deposit toward the cost of raising the pig. In the fall the remaining cost is paid when the pig is butchered and delivered. http://rootdownfarm.net/

SMALL SCALE FARM CASE EXAMPLE: Cropthorne Farm – Ladner, BC
Cropthorne Farm is run by sisters Lydia and Rachel Ryall, who lease a two and a half acre portion of their parents' seventy five acre parcel in Ladner, BC. Capitalizing on their own personal strengths and interests, Lydia manages the farm and their farm internship program, while Rachel orchestrates the marketing of their forty types of organic vegetables and free range eggs through a community supported agriculture program and at several Lower Mainland farmers markets. http://cropthornefarm.wordpress.com/

Large, Unoccupied Lot to Mid-Scale Farm or Community Farm

- *Farm Size:* Over 2 acres
- *Land Type:* Arable

At this scale (over two acres) two or more full time farmers, in addition to part time labour during harvest season, are needed to farm the land. On a privately owned farm of this scale, crop choice can include both high and mid-value vegetables, which could be complimented by a small flock of free range laying hens or other small livestock such as goats or rabbits. A small scale orchard would also be feasible at this scale. Direct sales at the farm gate or farmers markets, to local restaurants and institutions, or to regular customers through a community supported agriculture program, are all viable marketing strategies.

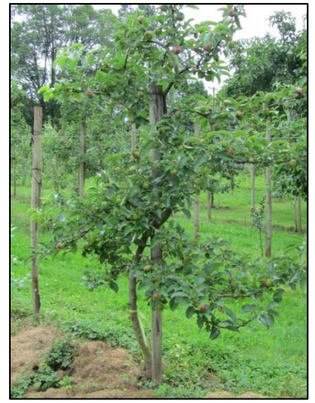
With more land available, farms of this scale could be based on the multi-functional “community farm” model where the land is held "in trust" for the community rather than owned privately. Under this model, a community group or co-operative oversees agreements governing the use of the land, and its agricultural uses are shared by a community of farmers. While monetary profit is necessary to the survival of community farms, it is not usually their main goal. Community farms work to protect and develop local farming capacity, the supply of local, sustainably produced food, and the agricultural land base. Some community farms incorporate residential development and agriculture-related elements into their design, including educational institutions, processing and storage facilities, and “incubator” farmland for new farmers to use on a short term basis as a launch-pad for their farming careers and businesses.

The Community Farms Program, which is jointly delivered by FarmFolk/CityFolk and The Land Conservancy of BC, currently supports more than 20 community farms in BC by providing information and resources for community farm stakeholders through a web page, a network, roundtable and other meetings, and personal contact. The program also brings landowners, farmers, and local communities together to form new community farms (Community Farms Program, 2009).

AGRICULTURAL POTENTIAL IN EXISTING, UNDERUTILIZED SURREY LOTS:
Approximately 334 parcels with over 2 acres of underutilized usable, arable land currently exist in the Surrey ALR. They generally include overgrown or unused fields, grounds of institutions/businesses, municipal parks, or unused areas of residential properties. Together, they constitute 1,307 hectares (3,230 acres) of usable underutilized agricultural land. Landowners with this amount available for agriculture may choose to farm it themselves or lease to a farmer on a minimum ten year basis.

Figure 19: Before (Large Lot) and After (Mid-Scale Farm or Community Farm)

MID SCALE FARM CASE EXAMPLE: Glen Valley Organics – Abbotsford, BC
Managed by farmers Chris Bodnar and Jeremy Pitchford, Glen Valley Organic farm is known for its organic fruit, vegetables, and eggs which are grown on twelve and a half acres in the Fraser Valley. With a larger farm comes the need for additional labour and equipment; Glen Valley employs two full time and five half time employees, who make use of two small tractors, a large washing station, a walk in cooler and freezer, as well as storage area for harvested crops. Bodnar and Pitchford lease the land at an annual rate of $3,500. The farm generates approximately $60,000 in annual revenue.



MID SCALE FARM CASE EXAMPLE: Apple Annie Orchard – Langley, BC
Apple Annie Orchard is a four acre orchard in Langley, BC, owned and managed by retired Professor Jim Rahe. By finding a niche market in rare and heritage apple varieties, not available in grocery stores, Rahe has successfully developed a base of regular customers who return annually to buy apples from his farm gate. Rahe and his wife put in approximately 35 hours per week of work on the orchard to generate $31,000 annually, or an hourly rate of $25 – 30 for their own labour.

COMMUNITY FARM CASE EXAMPLE: Horse Lake Community Farm Co-Op – Lone Butte, BC
Horse Lake Community Farm Co-operative is an agricultural co-op operating on 133 acres of heritage farm property in the South Caribou region of BC, where increasing development pressure is leading to the development and subdivision of agricultural land and sensitive waterfront areas. The Co-op is run by a board of directors, and the property currently leased to member farmers who have over 30 years of experience in cooperative agriculture and use the land to raise and cultivate organic vegetables, sheep, cattle, and poultry. The property is also used for retreats, agricultural workshops, and other educational and fundraising events. The Co-op's goal is "to protect and develop local farming capacity and agricultural resources, together with cultivating an ethical and high quality food supply."
http://www.horselakefarmcoop.ca/

COMMUNITY FARM CASE EXAMPLE: The Intervale Centre – Vermont, USA
The Intervale is a nationally recognized centre for sustainable agriculture and a unique community resource for farmers and residents in the Burlington, Vermont region. The Centre incorporates a "Farms Program," which leases land, equipment, greenhouses, irrigation and storage facilities to small independent farms, a two-year business planning program that helps Vermont farm operations improve their viability, a farmer-managed "Food Hub" that aggregates, markets and distributes local vegetables, fruits, meats, eggs, cheeses and specialty products, a conservation nursery growing native riparian trees and shrubs for conservation projects statewide, as well as community consulting, lands stewardship initiatives, and community outreach initiatives. Their goal is to "grow viable farms, preserve productive agricultural land, increase access to local, organic food, compost and other soil amendments, and protect water quality through organic waste management and stream bank restoration" (Intervale Centre, 2011).
http://www.intervale.org/

Non-Arable Land to Structure Based Agriculture

- *Farm Size: Any size*
- *Land Type: Non-arable*

Even in agricultural areas, some parcels have marginal soils, have been paved over, or are for other reasons no longer arable. Although these parcels are not suitable for traditional farming, they still can still play a valuable role in the local agri-food system by supporting structure-based agriculture or food system services. Under a structure-based agriculture scenario, crops are grown in raised beds, greenhouses, or hoop houses (unheated greenhouses) in imported soil. Over time, soil importation can be minimized by establishing on-site composting.

For hoop houses and greenhouses, heat loving crops such as cucumbers, eggplants, peppers, and tomatoes are the best choice. In the Lower Mainland's mild climate, farmers also have the opportunity to use agricultural structures as season extension tools which can allow them to grow and harvest fresh crops all year round. This type of agriculture is best suited to direct marketing at farmers markets or to local restaurants, institutions, or processors.

Figure 20: Before (Truck Parking Lot) and After (Hoophouse Farming)

AGRICULTURAL POTENTIAL IN EXISTING, UNDERUTILIZED SURREY LOTS:

Approximately 14 properties with underutilized non-arable land currently exist in Surrey's ALR. Together, these non-arable areas constitute they constitute 29 acres (12 hectares) of usable, underutilized agricultural land. The most common current use of these lands is vehicle or transport truck parking.

In this scenario, a truck parking lot has been converted into a structure-based agriculture site based on hoop houses growing heat-loving crops in raised beds. Higher start-up costs associated with the building of infrastructure associated with this type of agriculture lend it to be more suitable to farming by the landowner, or by a tenant farmer on a minimum seven year lease.

Non-Arable Land to Food System Services

- *Farm Size: Any size*
- *Land Type: Non-arable*

Non-arable parcels can also be used to support the range of services and infrastructure that are required to sustain an enhanced small scale local agriculture sector. These include:

- Production and pre-production services (composting, equipment sales and repair, and agricultural supplies retail);
- Post-harvest services (food processing and storage facilities; distribution and supply facilities such as terminal markets, farmers markets, and local food retail stores);
- Agriculture extension and education centres.

Some of these enterprises could be managed by an individual while others are more suited to management by a community organization, institution, or government agency.

AGRICULTURAL POTENTIAL IN EXISTING, UNDERUTILIZED SURREY LOTS:

As described above, approximately 14 properties with underutilized non-arable land currently exist in Surrey's ALR. Together, these non-arable areas constitute they constitute 29 acres (12 hectares) of usable, underutilized agricultural land. The most common current use of these lands is vehicle or transport truck parking.

In this scenario, an abandoned gas station has been converted into a local food market which sells produce from neighbouring farms. Higher start-up costs associated with this type of scenario lend it to be more suitable to be undertaken by the landowner, by a long term tenant, or by an institutional body.

Note that food system services are best suited to lands zoned for agricultural industries (I-A Agro Industrial Zone in Surrey), which are generally located in close proximity to but not on valuable farmland. In this way, services are accessible to the agricultural community but the industrial use does not compete with agriculture for scarce, arable land. Only in instances where structure-based agriculture is not an option on non-arable land should these services be established on parcels within the ALR. In this case, the site's proximity to major roadways, small size, and pre-existing structure make it more suitable to use in a food system services capacity than a structure based agriculture capacity.

STRUCUTRE BASED AGRICULTURE CASE EXAMPLE: SOLEfood Farm – Vancouver, BC

SOLEfood Farm, established in 2009 by the charitable organization United We Can, is an urban, community-based farm consisting of hundreds of planters built on an unused hotel parking lot in the heart of Vancouver's Downtown East Side. In exchange for allowing the farm to use the parking lot, the hotel owners receive a tax break on city property taxes. The farm provides training and employment opportunities to neighbourhood residents, who plant, maintain, and harvest food from the farm. The locally grown food is sold to restaurants, at farmers markets and when possible, supplied to community organizations with similar aims of improving neighbourhood food security. This farm's noteworthy success in its first three seasons has led to the planned expansion of the operation in 2012 to include two additional farm sites and expanded markets and employment. http://1sole.wordpress.com/

STRUCUTRE BASED AGRICULTURE CASE EXAMPLE: Growing Power – Milwaukee, Wisconsin

Growing Power is an American non-for-profit organization and land trust which teaches people to grow, process, market, and distribute food in a sustainable manner. Their internationally renowned "community food centre" is a two acre farm and agriculture demonstration site in Milwaukee, Wisconsin, that includes six greenhouses and nine hoop houses growing vegetables and freshwater fish in a structure-based aquaponics system. The site also incorporates an apiary with 14 beehives; three poultry hoop houses with laying hens and ducks; outdoor pens for livestock including goats and turkeys; a sophisticated composting operation including a work depository for building soil health; an anaerobic digester to produce energy from the farm's food waste; a rain water catchment system; and a retail store to sell produce, meat, worm castings, and compost to the community. Under this intensive and incredibly productive growing system, Growing Power founder Will Allen estimates that the site generates $5/square foot in revenue, or $217,800 per acre (Allen, 2011). http://www.growingpower.org/

FOOD SYSTEM SERVICES CASE EXAMPLE:
Farmers Markets

Surrey's *Urban Farmers Market* is held once a week throughout the summer. Market vendors, who directly grow, raise, create or make the items they sell, come from Surrey and other areas in Metro Vancouver or the Fraser Valley. Farmers' market success in other cities, including Vancouver which boasts five weekly summer markets and one weekly winter market, speaks to the potential for growth and expansion of the Surrey farmer's market to other areas and a longer season.
http://www.surreymarket.org/
http://www.eatlocal.org/

FOOD SYSTEM SERVICES CASE EXAMPLE:
Sustainable Agriculture Tool Lending Library – North Carolina, USA

George O'Neal and Kelly Owensby, beginner farmers in North Carolina, US, developed The Sustainable Agriculture Tool Lending Library when they realized how difficult it was for new farmers to rent or buy equipment for their farms. Together with ten other farmers, they formed a cooperative to buy farm tools together. The lending library uses a shared calendar to manage who gets what tool when, and collects annual membership fees that are used to maintain the current tool inventory and collectively purchase additional tools.

FOOD SYSTEM SERVICES CASE EXAMPLE:
The Seattle Farm Co-Op – Seattle, Washington

The Seattle Farm Co-op is a community-based project supplying urban farmers in the Seattle area. The co-op focuses on obtaining supplies such as animal feed, fertilizers, mulch, seeds, etc., from local and sustainable sources, and saving money through co-operative purchasing. The growing organization, which is currently run entirely by volunteers, aims to become a place for urban farmers and other community members to share tools, information, and resources, take classes, and more.
http://www.seattlefarmcoop.com/

5.0 ECONOMIC, JOB CREATION, and FOOD PROVISION POTENTIAL OF SURREY'S UNDERUTILIZED ALR LAND

Recent interest in local food and agriculture has sparked many investigations into the potential for re-localized food systems to make substantial contributions to the economies in which they are situated. Jeffrey O'Hara describes this potential succinctly in his 2011 study "Market Forces," in which he reports that local food systems can increase business innovation and entrepreneurship; result in sector-specific economic growth; foster regional economic development; and support employment. O'Hara identifies direct marketing channels such as farmers markets and farm-gate sales as especially critical pieces of these systems, as they allow most, if not all, of sales revenue to be retained in and multiplied through the local economy.

We developed a static analysis based on small scale, human intensive[29], direct market[30] agriculture to evaluate and illustrate the potential of Surrey's underutilized ALR lands to contribute to the local economy and satisfy Surrey residents' current consumption of some commonly consumed fruits, vegetables, and animal products.

The economic and job creation analysis consists of the following four production scenarios of small-scale, human-intensive, direct-market agriculture, which were applied across three land use alternatives: one acre of underutilized ALR land, City of Surrey owned underutilized ALR land (280 acres), and all underutilized ALR land within Surrey (3,339 acres):

- Scenario 1: Mixed Production
  The production of the following 29 fruit and vegetable crops, honey, and 2 animal products: apples, asparagus, beets, bell peppers, broccoli, Brussels sprouts, cabbage, carrots, cauliflower, Chinese cabbage, cucumbers, eggs, garlic, honey, hazelnuts, kale, lamb, lettuce, pak choy, pears, pole beans, potatoes, pumpkins, radishes, snow peas, spinach, sweet corn, table grapes, turnips, tomatoes, yellow onions, and zucchini.

Direct Marketing…
Is favoured by many small scale farmers as it allows them to capture a larger share of the "food dollar" and therefore achieve a higher return on their crop sales. Direct Marketing can be done through a variety of channels, including:

- Farm gate sales;
- Road side stands;
- U-pick operations;
- Farmers markets;
- Community supported agriculture schemes; and,
- Farm-to-institution or farm-to-restaurant programs.

[29] Human intensive refers to production methods that rely more on human labour, hand tools, and small machines and less on extensive and expensive mechanization.
[30] Direct marketing refers to the practice of farmers selling their products directly to the consumer, rather than through a broker, packing house, wholesaler, or grocer.

- Scenario 2: Labour Intensive Production
  The production of the following ten highly labour intensive crops: spinach, carrots, snow peas, turnips, tomatoes, apples, beets, garlic, radishes, bell peppers.

- Scenario 3: Highly Profitable Crop Production
  The production of the following ten highly profitable crops: spinach, pak choy, snow peas, Chinese cabbage, beets, pumpkins, cabbage, radishes, turnips, carrots.

- Scenario 4: Production Based on Consumption
  The production of the following ten highly consumed products: potatoes, eggs, apples, lettuces, onions, tomatoes, carrots, cabbage, table grapes, cucumbers

Note that the crops used in these scenarios were selected because they can be grown in Surrey soils and climate and are suitable for cultivation on small parcels of land. Furthermore, these crops are representative of a Canadian diet, and can be expected to be eaten by Surrey residents. Although these factors make the crops appropriate choices for the analysis presented herein, they do not constitute an exhaustive list of possible products that could be produced and sold by agriculturalists in Surrey.

To illustrate the potential of Surrey's underutilized ALR lands to produce fruit, vegetable, and animal products commonly consumed by Surrey and Lower Mainland residents, farm production and food consumption data were applied to a scenario of the production of 27 agricultural products for fresh food provisioning on a seasonal basis (6 months/year) on the total available underutilized lands.

The source of data and methods used in these analyses are described in the following two sections. Results and discussion follow.

Methodology Used for Calculating the Economic Potential of Underutilized Land in the Surrey ALR

Assumptions

The findings of this report are subject to misinterpretation if used outside of the context of the following underlying assumptions.

Farm Type: the analysis is based on small scale, human intensive, direct market farm businesses. Human intensive refers to production methods that rely more on human labour, hand tools, and small machines and less on extensive and expensive mechanization. Direct marketing refers to the practice of farmers selling their products directly to the consumer, rather than through a broker, packing house, wholesaler, or grocer. We assume that Owner-Operators have the skills and ability to grow, and market their food to customers.

Access to Land: Farm land is assumed to be accessed through a lease, rather than ownership. Farm businesses may use several non-aggregated parcels.

Return to Owner-Operator: Farm Owner-Operators are assumed to do all the management and marketing associated with the farm business, and garner remuneration from net farm revenue.

Agricultural Production Methods: No specific farming method such as "organic" is assumed. For further discussion on this issue, refer to the text box on page 66.

Start-Up and Capital Costs: start up and capital costs were not included because the purpose was not to present a start-up feasibility analysis. Rather, it was to present a static analysis of the potential job creation, revenue generation, and food production that could result once currently underutilized land was brought into production. Furthermore, the small scale, human intensive, direct market farm businesses that are the basis of this analysis require little in the way of start-up infrastructure.

Prices: Many supply and demand factors influence the price of local produce, including consumer preference and education, institutional purchasing, income levels, number of farmers, infrastructure, etc. It was beyond the scope of this project, however, to utilize a dynamic price model that takes into account these factors. Instead, we use a static model assuming that farmers on Surrey's underutilized ALR will sell their products through direct markets at a similar price to a retail price. Under a direct marketing system, the farmer captures 100% of the sale price of their products. Farmers may do this through channels such as consumer supported agriculture (weekly box programs), farmers' markets, delivery services, etc. Any additional costs associated with these marketing tactics would come out of the farm profits.

Estimation of Available Underutilized ALR Land: the complete methodology for estimating the amount of underutilized land potentially available for agriculture in Surrey can be found in Chapter Three of this report and should be read and understood before reading the following analysis. Important to note here is that:

- The estimation is conservative. Because we were unable to visit every parcel in the study area the figure used in this report may underestimate the amount of underutilized land potentially available for agriculture by as much as 25%. See Chapter 3 for more details.
- Land needed on farms for driveways, fencing, and structures is accounted for in the methodology of estimating available underutilized land. It is subtracted from the underutilized

land area potentially available for agriculture that is used in this analysis. See Chapter 3 for more details.

Data Used

The primary sources of data used in this analysis were:

- Agricultural enterprise budgets (both single enterprise and mixed enterprise budgets). Agricultural enterprise budgets are produced by government and agricultural extension agencies and estimate the expected inputs, expenses, yields, and revenue of various farm products.
- Price data was gathered by The Institute for Sustainable Horticulture in 2009 and 2011.

Enterprise Budgets:

The following crop-specific data was obtained from the enterprise budgets, as described in more detail below: yield, variable costs of production, fixed costs of production, and labour hours.

Every effort was made to obtain and use the most recent enterprise budgets from southwest British Columbia (BC Ministry of Agriculture's Planning for Profit series), as these were deemed most reflective of Surrey's production environment conditions. They are also the most comprehensive data sources available for farm production costs. In instances where budgets from southwest British Columbia were not available, we selected enterprise budgets from climatically-similar locations including Vancouver Island (Planning for Profit), Oregon, and Maryland (university extension publications). Where these were not available, budgets from eastern regions were used. A complete listing of the enterprise budgets consulted for each crop and animal product is provided in the references section of this report. Where enterprise budgets were used from American sources, we converted adjusted budget figures based on the annual exchange rate given by the Bank of Canada[31].

Recognizing the inherent variability in farming yields we decreased referenced enterprise budget yield values by 15% in order to have higher levels of confidence in our calculations. Similarly, we increased costs of production values by 10% from those offered in the enterprise budgets we referenced in order to have higher levels of confidence in our calculations.

Yield per Unit Area (Pounds per Acre):

- Radish yield was expressed in bunches in the enterprise budgets. We converted it to pounds using the formula: 1 bunch = 0.75 lb. based on the University of Georgia Cooperative Extension's Publication "Weights and Processed Yields of Fruit and Vegetables in Retail Containers" (2010).
- Corn yield was expressed in ears in the enterprise budgets. We converted it to pounds using the formula: 1 ear = 0.83lbs according to Purdue University's Midwest Vegetable Trial Report for 2011 ("Supersweet Sweet Corn Cultivar Evaluation for Northern Indiana — 2011").
- Yield values obtained from the literature for all crops considered in this study were reduced by 15% to arrive at a conservative estimate, as described above. Apple, pear and grape yield values obtained from the literature were decreased by an additional 50% based on observations that optimal tree fruit yields may not be attainable in the Lower Mainland.
- See Table 8 (p.82) for a full breakdown of yield values used in the analysis.

[31] Available at http://www.bankofcanada.ca/rates/exchange/exchange-rates-in-pdf/

Variable Costs of Production per Unit Area (Dollars per Acre):

- This cost category generally includes field labour (production and harvest) and crop production costs (seeds, fertilizer/lime/manure, pest management and control, fuel, machinery, repairs and maintenance, transport, irrigation, wildlife control, and packaging).
- We assume that farm Owner-Operators garner remuneration from net farm revenue.
- Variable costs of production were adjusted to 2011 dollars using the consumer price index.
- As stated above, variable cost of production values obtained from the literature were increased by 10% in order to arrive at a conservative estimate.
- See Table 8 (p.82) for a full breakdown of variable costs used in the analysis.

Labor hours calculations: Expressed as Full Time Equivalent – Field Labour (FTE-FL)

- FTE-FL is a unit of field labour, which includes only crop/product planting, tending, and harvesting. The category does not include hours spent on marketing and management of the farm business by the Owner-Operator. If production budgets included any marketing and management labour hours, we subtracted them from the total.
- Labour requirements for kale and pak choy were sourced from a Maryland enterprise budget as data on these crops was not available from British Columbia. Labour requirements for all other crop and animal products used in the analysis were sourced from Ministry of Agriculture Planning for Profit publications. Data on radishes was sourced from an Oregon enterprise budget.
- Field labour requirements were reported in a variety of formats in the enterprise budgets, some of which needed to be converted to total labour hours as follows:
    - Direct Hours: if the enterprise budget indicated the total number of hours needed to produce crop, these values were used as presented.
    - Piece Rate: if the enterprise budget reported field labour costs as piece rate, we derived the total labour hours by assuming a $12/hour base wage.
    - Labour Costs and Labour Wages: if the enterprise budget indicated total labour cost and the hourly wage, we derived the total labour hours by dividing labour costs by the hourly wage.
- Labour hours were summed for each unique scenario presented in the analysis, and converted to "FTE-FL" units is based on 40 hours of work per week for 48 work weeks per year (total of 1,920 hours per year). Note that, although the FTE-FL calculus allows comparison of the employment potential of agriculture to other industries, it does not take into account the seasonal nature of agricultural employment.
- Labour data available in the literature are likely reflective of operations with a higher level of mechanization and therefore may underestimate labor required for more human-intensive farming enterprises.
- As stated above, Owner-Operator's labour is not included in the labour hours per unit area or the FTE-FL unit, and therefore an additional unit of labour, Full Time Equivalent – Owner-Operator (FTE – OO) was derived for use in the analysis. See "derived data" in the next section, for further details.
- See Table 8 (p.82) for a full breakdown of labour hours used in the analysis.

Fixed Costs of Production per Unit Area (Dollars per Acre):

- Fixed cost values including accounting and legal, bank charges, insurance, utilities, unallocated repair and maintenance, auto expenses, office supplies and postage, telephone, and small tools and supplies, were derived from BC Ministry of Agriculture Planning for Profit "Five Acre Mixed Vegetable Operation: Full Production" by dividing the total presented in that budget by five to arrive at an estimate of fixed costs on a per acre basis, which were applied to all crops equally.
- We assume that some fixed costs (accounting and legal, bank charges, insurance, office supplies and postage, and telephone) are incurred independently of farm size, and therefore the calculation for fixed cost/acre for the 1 acre scenario is different than that for other scenarios.
- Table 7 summarizes the fixed costs included in the analysis.
- We did not include the fixed cost items "Interest on Term Debt" and "Depreciation", which are included in BC Ministry of Agriculture Planning for Profit "Five Acre Mixed Vegetable Operation: Full Production" because this is a static analysis that does not consider the startup feasibility of these operations. Furthermore, the analysis is based on a small scale, human intensive model of agriculture that requires little infrastructure, a low level of mechanization, and is done on leased land, and would therefore not be subject to these fixed costs.
- "WCB, EI, and CPP contributions" were not included because the values listed in the production budget were for the manager's salary. As stated above, in our model, we assume that farm Owner-Operators garner remuneration from net farm revenue, which would not be subject to these fees.
- A fixed cost per acre of $1,000 was included for land rent. This value is considered high in light of our conversations with small scale farmers in the region, and approximations of lease rates for comparable agriculture uses published in the document "Supporting New Small Scale Farmers in Abbotsford" (Koopmans, 2010). Using a per acre rental rate on the upper end of the scale keeps our estimates conservative.
- Fixed costs of production were adjusted to 2011 dollars using the consumer price index.
- As described above, all variable costs of production values obtained from the literature were increased by 10% in order to arrive at conservative findings.

Table 7: Summary of Fixed Costs Used in Analysis*

	Fixed Cost/Acre for Scenarios 5 Acres and Over	Fixed Cost/Acre for 1 Acre Scenario
Acounting and Legal	$ 189	$ 946
Bank Charges	$ 63	$ 315
Insurance	$ 263	$ 1,314
Rent*	$ 1,051	$ 1,051
Utilities	$ 630	$ 630
Unallocated Repairs and Maintenance	$ 210	$ 210
Auto Expenses	$ 252	$ 252
Office Supplies and Postage	$ 200	$ 998
Telephone	$ 252	$ 1,261
Small Tools and Supplies	$ 525	$ 525
Total Per Acre Fixed Costs	$ 3,636	$ 7,503
Plus 10% Adjustment	**$ 3,999**	**$ 8,253**

*Rent value derived from "Supporting New Small Scale Farmers in Abbotsford" (Koopmans 2010) and annecdotal evidence. All other values derived from "Planning for Profit: Five Acre Mixed Vegetable Operation: Full Production" (BC Ministry of Agriculture 2008) and adjusted to 2011 using the consumer price index.

Derived Data

- *Gross income per unit area*, calculated as follows:

$$Gross\ Income = \frac{Lbs.}{Acre} \times \frac{\$CAD}{Lb.}$$

- *Contribution Margin per unit area,* calculated as follows:

$$CM = Gross\ Income - Variable\ Costs$$

- *Return to Owner-Operator per unit area,* calculated as follows:

$$Return\ to\ Owner\ Operator = Gross\ Income - Variable\ Costs - Fixed\ Costs$$

- Owner-Operator hours per unit area: expressed as Full Time Equivalent – Owner-Operator (FTE-OO)

  Any small scale operation will require management hours to develop the business and oversee direct marketing. Because enterprise budgets used to estimate farm labour requirements did not always include the labour associated with this aspect of farming, farm Owner-Operator labour was added to these scenarios. Based on the demands of a human-intensive, direct market production system, it was assumed that one Full Time Equivalent – Owner-Operator would be required per five acres in production.

- Job creation potential: expressed as Full Time Equivalent Total (FTE Total) and calculated as follows:

$$FTE\ Total = FTE\ Field\ Labour + FTE\ Owner\ Operator$$

Water and Revenue Generation Potential in Surrey

Cost and availability of water for crop and stock irrigation has been identified as a significant barrier to the establishment of farms on currently underutilized ALR parcels in Surrey. The availability of City water within the ALR is currently restricted to essential residential and limited agricultural applications; and the cost of broadening its agricultural availability is significant. Further discussion of these limitations, and potential policy and programmatic solutions, can be found on page 92.

Note, however, that (with the exception of four crops: apples, hazelnuts, pears, and radishes), the cost of irrigation is included in the variable costs of production used in the forthcoming scenarios, and that the variable costs of production have been increased by 10% to account for the potentially high cost of water in Surrey.

Table 8 (p.82) offers a summary of all crop production and economic data collected from the literature, the field work, and derived for use in the analysis that follows.

Table 8: Summary of Crop Production Data Used in the Analysis

Crop or Animal Product	Labour Required (Hours/Acre)	Yield (Pounds/ Acre) [2]	Gross Revenue (Dollars/ Acre) *	Variable Cost (Dollars/ Acre) [1]*
Apple(Jonagold)	410	10,542	$ 20,873	$ 10,162
Asparagus	200	3,825	$ 19,049	$ 3,748
Beets	400	16,830	$ 48,470	$ 9,194
Bell Peppers	303	7,905	$ 31,462	$ 8,920
Broccoli	222	6,630	$ 15,647	$ 6,450
Brussels Sprouts	246	8,976	$ 17,772	$ 7,101
Cabbage	283	27,115	$ 45,553	$ 7,517
Carrots	927	20,145	$ 46,938	$ 16,892
Cauliflower	120	6,843	$ 25,112	$ 5,819
Chinese Cabbage	52	38,250	$ 64,260	$ 5,868
Cucumbers	111	12,431	$ 29,338	$ 5,000
Eggs	76	3,876	$ 23,799	$ 11,471
Garlic	356	2,916	$ 27,493	$ 14,146
Hazelnuts	104	2,125	$ 29,784	$ 2,276
Honey (One Hive/Acre)	2	85	$ 618	$ 189
Kale	140	6,375	$ 25,500	$ 2,257
Lamb	128	341	$ 2,725	$ 1,919
Lettuce	257	19,100	$ 25,020	$ 6,675
Pak Choy	175	15,300	$ 60,894	$ 3,176
Pears	208	12,800	$ 30,080	$ 4,675
Green Beans	406	5,712	$ 22,791	$ 9,268
Potatoes	299	16,703	$ 32,236	$ 7,861
Pumpkins	120	25,585	$ 43,495	$ 4,529
Radishes	348	16,830	$ 41,738	$ 7,586
Snow Peas	753	8,713	$ 69,526	$ 14,081
Spinach	930	10,965	$ 87,501	$ 16,504
Sweet Corn	99	9,524	$ 9,881	$ 4,647
Table Grapes	210	5,400	$ 16,902	$ 2,417
Tomatoes	452	19,465	$ 33,091	$ 11,468
Turnips	512	32,190	$ 39,754	$ 10,565
Yellow Onions	256	27,872	$ 30,241	$ 7,777
Zucchini	115	8,436	$ 14,342	$ 4,986

[1] Variable costs reported in this table has been increased by 10% from values found in the literature, as described in the methods section.

[2] Yields reported in this table has been decreased by 15% from values found in the literature, as described in the methods section.

*All dollar values reported in this table have been adjusted to 2011 prices, as described in the methods section.

Price Data Collected by ISH

We use a static pricing model, assuming that farmers on Surrey's underutilized ALR will sell their products through direct markets at a price similar to a retail price. We use retail rather than wholesale pricing because farmers capture 100% of the market value of the product when they sell through direct markets.

2009 data collected by ISH at several lower mainland farmers markets and 2011 data collected by ISH at Surrey grocery stores (Save-On Foods, Choices Markets and Fruiticana) were used to determine the direct market price, expressed in $CAD per pound, for each of the 29 crops and 2 animal products used in the analysis. 2009 data was adjusted to 2011 dollars using the consumer price index.

Prices used in the analysis were chosen preferentially in the following order:

1. "Farmer's market" prices were used when available.
2. Where "farmer's market" prices were not available, "local" product prices were selected.
3. Where a "local" product was not available, "local, organic" product prices were selected.
4. Where a "local, organic", product price was not available, an "organic" price was selected.

In instances where more than one preferred data point was available, (e.g. three sources for local, organic cabbage), an average was calculated and used.

Table 9 shows all of the pricing data that was collected and used for the study. Note that these prices were chosen as they are best representative of the price that farmers can achieve for high quality, local produce directly marketed. Under a direct marketing system, the farmer captures 100% of the sale price of their products.

Table 9: Crop Prices Collected and Used in Analysis

Crop		Prices Used in Analysis (1)			Prices Collected						
					Save-On-Foods		Fruiticanna		Choices Market		Farmers' Markets
		Price (2)	Type	Source	Price	Type	Price	Type	Price	Type	Price
Vegetables	Asparagus	$ 4.98	O	CM	$ 2.49	?			$ 4.98	O	
	Beets	$ 2.88	FMs	FMs	$ 1.79	L	$ 0.79	?	$ 2.98	O	$ 2.75
	Bell Peppers	$ 3.98	L, O	CM	$ 3.39	?	$ 0.99	?	$ 3.98	L, O	
	Broccoli	$ 2.36	FMs	FMs	$ 1.79	O	$ 0.98	?	$ 2.48	O	$ 2.25
	Brussel Sprouts	$ 1.98	L, O	CM	$ 2.79	?	$ 0.98	?	$ 1.98	L, O	
	Cabbage	$ 1.68	FMs	FMs	$ 0.69	O	$ 0.59	?	$ 2.50	L, O	$ 1.60
	Carrots	$ 2.33	FMs	FMs	$ 1.50	O	$ 0.59	?	$ 2.50	L, O	$ 2.23
	Cauliflower	$ 3.67	FMs	FMs	$ 2.99	L, O	$ 1.79	?	$ 3.98	O	$ 3.50
	Chinese Cabbage (3	$ 1.68	FMs	FMs	$ 0.69	O	$ 0.59	?	$ 2.50	L, O	$ 1.60
	Cucumbers	$ 2.36	FMs	FMs	$ 1.90	O	$ 1.95	?	$ 3.98	O	$ 2.25
	Garlic	$ 9.43	FMs	FMs	$ 18.61	O	$ 0.79	?	$ 14.98	L, O	$ 9.00
	Kale	$ 4.00	O	CM	$ 2.64	?			$ 4.00	L, O	
	Lettuce	$ 1.31	L, O	FMs	$ 2.99	L	$ 0.99	?	$ 2.48	L, O	$ 1.25
	Pak Choy	$ 3.98	FMs	CM	$ 1.88	?	$ 1.49	?	$ 3.98	L, O	
	Pole Beans	$ 3.99	L, O	CM	$ 2.69	?	$ 1.49	?	$ 3.99	O	
	Potatoes	$ 1.93	FMs	FMs	$ 1.99	L	$ 0.99	?	$ 2.98	L, O	$ 1.85
	Pumpkins	$ 1.70	FMs	FMs			$ 1.98	?			$ 1.63
	Radishes	$ 2.48	L, O	CM	$ 0.99	?	$ 0.75	?	$ 2.48	L, O	
	Snow Peas	$ 7.98	O	CM	$ 9.99	?			$ 7.98	O	
	Spinach	$ 7.98	O	SOF	$ 7.98	O					
	Sweet Corn	$ 1.04	?	SOF	$ 1.25	?					
	Tomatoes	$ 1.70	FMs	FMs	$ 1.24	L	$ 0.99	?	$ 1.48	L, O	$ 1.63
	Turnips	$ 1.24	Average	Average	$ 1.49	L	$ 0.59	?	$ 0.98	L	
	Yellow Onions	$ 1.09	Average	Average	$ 1.19	L	$ 0.79	?	$ 0.98	L	
Animal Products	Zucchini	$ 1.70	FMs	FMs	$ 1.69	?	$ 0.99	?	$ 1.28	L	$ 1.63
	Egg Production	$ 6.14	Average	Average	$ 6.49	L, O			$ 5.79	L, O	
	Honey	$ 7.27	L	CM	$ 8.61	L, O	$ 4.09	?	$ 7.27	L	
	Lamb	$ 8.00		[4]	$ 15.41	?			$ 19.82	?	
Fruit & Nuts	Apple	$ 1.98	FMs	FMs	$ 1.39	L	$ 0.99	?	$ 1.68	L	$ 1.89
	Hazelnuts	$ 14.02	Average	Average	$ 12.20	?			$ 15.83	?	
	Pears	$ 2.35	FMs	FMs	$ 2.49	L, O	$ 0.40	?	$ 2.48	L, O	$ 2.25
	Table Grapes	$ 3.13	FMs	FMs	$ 3.79	?	$ 0.99	?	$ 2.48	?	$ 2.99

L Indicates a price for local produce
O Indicates a price for organic produce
L, O Indicates a price for local, organic produce
? Indicates a price for produce which had unknown origin and production practices
FMs Farmers' Markets price
CM Choices Market price
SOF Save On Foods price
Average Indicates that an average price was derived based on collected data
1 Where necessary, prices used in analysis were adjusted to 2011 using the consumer price index
2 Price of eggs indicated is per dozen. All other prices indicated are prices per pound
3 Prices for cabbage were used as a proxy for Chinese Cabbage
4 The price indicated for lamb is for the cut dressed weight and was gathered in an interview with a Fraser Valley lamb producer who sells through direct marketing channels

Methodology Used for Calculating the Food Production Potential of Surrey's Underutilized ALR Land

The following methodology, developed to illustrate the magnitude of the food production potential of Surrey's underutilized land, is consistent with that used in other studies including BC MAL, 2006, Desjardins et al, 2009, and Grewal & Grewal, 2011.

Annual per-capita consumption for the 32 crops and animal products selected for the analysis was sourced from Statistics Canada and USDA food disappearance data. Surrey residents' actual consumption of these food products may differ slightly from these figures, but Surrey specific data does not exist. National figures provide a reasonable proxy for the purposes of this analysis.

To calculate the potential of the underutilized lands to satisfy Surrey residents' consumption of the crop types analyzed for 6 months of the year (the approximate growing/availability season for most of these crops in Surrey's temperate coastal climate), the following formulas were used:

$$\textbf{\textit{Total 6 Month Food Consumption in Surrey}} = [\textbf{\textit{Annual PerCapita Consumption}} \div 2] \times 465,150$$

And;

$$\textbf{\textit{Acres Needed to Satisfy}}\ 100\%\ \textbf{\textit{of Surrey's 6 Month Food Consumption}} = \frac{[\textbf{\textit{Annual PerCapita Food Consumption}} \div 2]}{\textbf{\textit{Yield/Acre}}}$$

And;

$$\textbf{\textit{Potential of Land to Satisfy Surrey's 6 Month Consumption of Selected Foods}} = \frac{\textbf{\textit{Acres of Land Available}}}{\textbf{\textit{Acres Needed to Satisfy}}\ 100\%\ \textbf{\textit{of Surrey's 6 Month Consumption of Selected Foods}}}$$

Economic Potential of One Acre of Underutilized Land

This scenario illustrates the potential income generation, job creation, and food production that could result if just one acre of Surrey's underutilized ALR land were brought into agricultural production. This scale can be thought of as a single, small-scale farm, rather than a measure of the aggregated output of many small farms (which is reported in the following two scenarios). Table 10 summarizes the results of this analysis, and crop-specific details are included in Appendix 4.

Table 10: Economic Potential of 1 Acre of Underutilized ALR Land in Surrey, BC, Under Four Cropping Alternatives

		Potential Food Produced	Potential Revenue Generated			Potential Jobs Created	
			Gross Revenue	Contribution Margin	Return to Owner Operator	FTE-FL *	FTE-OO*
**Cropping Alternative - Production Of:	29 crops and honey *(1)*	13,983 lbs Produce 85 lbs Honey	$34,779	$27,435	$19,182	0.16	1
	10 most labour intensive crops (2)	14,431 lbs Produce	$43,817	$31,831	$23,578	0.29	1
	10 most profitable crops *(3)*	21,192 lbs Produce	$54,813	$45,222	$36,968	0.23	1
	10 most highly consumed crops *(4)*	16,668 lbs Produce	$31,165	$22,697	$14,443	0.18	1

1 Apples, asparagus, beets, bell peppers, broccoli, Brussels Sprouts, cabbage, carrots, cauliflower, Chinese cabbage, cucumbers, garlic, lettuce, hazelnuts, kale, pak choy, pears, pole beans, potatoes, pumpkins, radishes, snow peas, spinach, sweet corn, table grapes, turnips, tomatoes, yellow onions, zucchini, and honey. All crops grown on 1/29th acre.

2 Tomatoes, snow peas, turnips, apples, beets, garlic, carrots, radishes, bell peppers, potatoes. All grown on 1/10th

3 Spinach, pak choy, snow peas, Chinese cabbage, beets, pumpkins, cabbage, radishes, turnips, carrots. All grown on 1/10th acre.

4 Potatoes, apples, lettuce, yellow onions, tomatoes, carrots, cabbage, table grapes, cucumbers, bell peppers. All grown on 1/10th acre.

** vegetable production.

* FTE-FL (Full Time Equivalent - Field Labour) and FTE-OO (Full Time Equivalent - Owner Operator)

According to our analysis, farms of this scale have the potential to create up to 1.29 full time equivalent jobs and generate between $31,165 and $54,813 in gross revenue, or up to $36,968 in return to Owner-Operator.

Our analysis demonstrates that crop choice greatly affects potential return to Owner-Operator at this scale of production. Potential return to Owner-Operator for the "10 most profitable crops" is more than double that of the "29 crops and honey".

The figures generated in this analysis are comparable to those collected during the research from small-scale farmers in the Surrey area.

Economic Potential of City of Surrey Owned Underutilized Land

This scenario illustrates the potential outputs that could result if all of the underutilized ALR parcels which are owned by the City of Surrey (280 acres) were brought into agricultural production. Table 11 summarizes the results of this analysis and crop-specific details are included in Appendix 5.

Table 11: Economic Potential of City Owned Underutilized ALR Lands in Surrey, BC, Under Four Cropping Alternatives (Total Area = 280 Acres)

		Potential Food Produced	Potential Revenue Generated			Potential Jobs Created	
			Gross Revenue	Contribution Margin	Return to Owner Operator	FTE-FL **	FTE-OO**
Cropping Alternative - Production Of:	29 crops, 2 animal products, and honey *(1)*	3,663,304 lbs Food* 34,987 dozen Eggs 23,800 lbs Honey	$9,454,419	$7,307,986	$6,110,457	44	56
	10 most labour intensive crops and animal products *(2)*	4,040,583 lbs Produce	$12,268,898	$8,912,669	$7,715,140	80	56
	10 most profitable crops and animal products *(3)*	5,933,816 lbs Produce	$15,347,607	$12,662,054	$11,464,525	66	56
	10 most highly consumed crops and animal products *(4)*	4,445,610 lbs Produce 108,528 dozen Eggs	$8,511,718	$6,069,027	$4,871,498	48	56

1 Apples, asparagus, beets, bell peppers, broccoli, Brussels Sprouts, cabbage, carrots, cauliflower, Chinese cabbage, cucumbers, garlic, lettuce, hazelnuts, kale, pak choy, pears, pole beans, potatoes, pumpkins, radishes, snow peas, spinach, sweet corn, table grapes, turnips, tomatoes, yellow onions, zucchini, eggs, honey, and lamb. All crops and animal products grown on 1/31th of total area.

2 Spinach, carrots, snow peas, turnips, tomatoes, apple, beets, garlic, radishes, bell peppers. All grown on 1/10th of total area.

3 Spinach, pak choy, snow peas, Chinese cabbage, beets, pumpkins, cabbage, radishes, turnips, carrots. All grown on 1/10th of total area.

4 Potatoes, eggs, apples, lettuce, yellow onions, tomatoes, carrots, cabbage, table grapes, cucumbers. All grown on 1/10th of total area.

* Includes both produce and meat

** FTE-FL (Full Time Equivalent - Field Labour) and FTE-OO (Full Time Equivalent - Owner Operator)

The analysis demonstrates that if the 280 acres of underutilized ALR lands owned by the City of Surrey were brought into agricultural production, they have the potential to contribute over $15.3 million in gross revenue to Surrey's economy. The enterprises on this land could create between 100 and 136 full time equivalent jobs.

We recognize that many competing proposals for the use of this land already exist. This analysis provides an assessment of what may be possible in the near future if the City of Surrey were to take a progressive and active role in supporting new and small-scale farmers in the municipality, and make municipally owned land available to them for agriculture.

Economic Potential of All Underutilized Land

This scenario illustrates the potential outputs that could result if all of the underutilized ALR parcels in the City of Surrey (3,339 acres) were brought into agricultural production, under the same four cropping alternatives. This includes land that is both privately owned and land owned by the City of Surrey. Table 12 summarizes the results of this analysis and crop-specific details are included in Appendix 6.

Table 12: Economic Potential of Underutilized ALR Lands in Surrey, BC, Under Four Cropping Alternatives (Total Area = 3,339 Acres)

		Potential Food Produced	Potential Revenue Generated			Potential Jobs Created	
			Gross Revenue	Contribution Margin	Return to Owner Operator	FTE-FL **	FTE-OO**
Cropping Alternative - Production Of:	29 crops, 2 animal products, and honey *(1)*	43,713,001 lbs Food* 417,483 dozen Eggs 283,815 lbs Honey	$113,440,053	$87,202,873	$72,922,342	520	668
	10 most labour intensive crops and animal products *(2)*	48,183,956 lbs Produce	$146,350,426	$106,283,573	$92,003,041	955	668
	10 most profitable crops and animal products *(3)*	70,760,756 lbs Produce	$183,075,030	$150,994,997	$136,714,466	783	668
	10 most highly consumed crops and animal products *(4)*	53,013,903 lbs Produce 1,294,196 dozen Eggs	$101,532,639	$72,373,141	$58,092,610	571	668

1 Apples, asparagus, beets, bell peppers, broccoli, Brussels Sprouts, cabbage, carrots, cauliflower, Chinese cabbage, cucumbers, garlic, lettuce, hazelnuts, kale, pak choy, pears, pole beans, potatoes, pumpkins, radishes, snow peas, spinach, sweet corn, table grapes, turnips, tomatoes, yellow onions, zucchini, eggs, honey, and lamb. All crops and animal products grown on 1/31th of total area.

2 Spinach, carrots, snow peas, turnips, tomatoes, apple, beets, garlic, radishes, bell peppers. All grown on 1/10th of total area.

3 Spinach, pak choy, snow peas, Chinese cabbage, beets, pumpkins, cabbage, radishes, turnips, carrots. All grown on 1/10th of total area.

4 Potatoes, eggs, apples, lettuce, yellow onions, tomatoes, carrots, cabbage, table grapes, cucumbers. All grown on 1/10th of total area.

* Includes both produce and meat

** FTE-FL (Full Time Equivalent - Field Labour) and FTE-OO (Full Time Equivalent - Owner Operator)

The analysis demonstrates that if all 3,339 acres of underutilized ALR land in the City of Surrey were brought into agricultural production, they would have the potential to contribute over $183 million in gross revenue to Surrey's economy. This would more than double the economic magnitude of the industry[32]. The enterprises on this land could create between 1,188 and 1,623 full time equivalent jobs.

[32] City of Surrey – Economic Development Office (N.D.)

Food Production Potential of Surrey's Underutilized ALR Land

Our analysis reveals that Surrey's underutilized land has the capacity to make significant contributions to Surrey's food supply. The analysis is not intended to prescribe what crops should be grown on the underutilized land but rather to illustrate that, despite the small scale and fragmented nature of these agricultural lands, they still hold immense value from a food production and consumption satisfaction perspective.

This scenario takes into account today's fairly limited infrastructural capacity to store and process crops for year round consumption. It illustrates the potential of underutilized ALR land to contribute to Surrey's local food supply for six months of the year, which is the approximate duration of availability of most of these crops in Surrey's temperate coastal climate. Using the methodology outlined above, our estimates suggest that Surrey's underutilized ALR lands could satisfy 100% of Surrey residents' consumption of the following 27 crops and animal products for six months of the year:

Table 13: Land Needed to Satisfy Consumption Rates for Population of Surrey, BC

Crop	Per Person Consumption at Retail	Total Consumption For Surrey	Acres Needed to produce 6 Month/Yr Supply of Crop
Asparagus	1.5 lb/yr	717,835 lb/year	94
Beets	1.4 lb/yr	656,307 lb/year	19
Bell Peppers	9.7 lb/yr	4,501,853 lb/year	285
Broccoli	6.4 lb/yr	2,963,634 lb/year	224
Brussels Sprouts	0.3 lb/yr	143,567 lb/year	8
Cabbage	11.5 lb/yr	5,332,491 lb/year	98
Carrots	15.9 lb/yr	7,373,194 lb/year	183
Cauliflower	5.7 lb/yr	2,635,481 lb/year	193
Chinese Cabbage	1.9 lb/yr	871,657 lb/year	11
Cucumbers	10.5 lb/yr	4,881,280 lb/year	196
Garlic	1.0 lb/yr	451,211 lb/year	77
Green Beans	2.1 lb/yr	984,460 lb/year	232
Honey	1.4 lb/yr	666,561 lb/year	n/a
Kale	0.3 lb/yr	139,545 lb/year	205
Lamb	2.6 lb/yr	1,199,810 lb/year	31
Lettuce	22.0 lb/yr	10,234,280 lb/year	334
Pak Choy	1.1 lb/yr	511,665 lb/year	20
Pears	4.8 lb/yr	2,245,799 lb/year	197
Pumpkins	3.7 lb/yr	1,721,055 lb/year	34
Radishes	1.4 lb/yr	646,052 lb/year	19
Snow Peas	0.7 lb/yr	317,898 lb/year	18
Spinach	1.4 lb/yr	666,561 lb/year	30
Sweet Corn	7.1 lb/yr	3,291,788 lb/year	169
Tomatoes	16.4 lb/yr	7,619,309 lb/year	196
Turnips	2.7 lb/yr	1,240,830 lb/year	19
Yellow Onions	21.6 lb/yr	10,059,949 lb/year	180
Zucchini	4.0 lb/yr	1,860,600 lb/year	110
Acres required to produce 100% of Surrey's consumption of listed crops for 6 months/year			3,183
Acres of underutilized ALR land			3,339
Percent of Surreys' 6-month/year consumption of listed crops that could be produced on underutilized ALR			**105%**

Discussion

This analysis has been done for descriptive, not prescriptive purposes. We do not mean to suggest that all of the available underutilized ALR lands necessarily "should" be brought into agricultural production. Neither do we mean to suggest that, if they were brought into agricultural production, they would generate exactly these results. Rather, our assessment, which is based on the best data available, is meant to convey that the economic and food production potential of Surrey's underutilized ALR land is not trivial. To the extent that it can be brought into agricultural production, our analysis suggests that the available underutilized ALR land in Surrey has the potential to produce substantial quantities of food, generate substantial income, and create many jobs. In light of this, the value of Surrey's underutilized ALR parcels, many of them very small in nature, should not be dismissed or overlooked by the City of Surrey or its residents.

Finally, we do not assume that these levels of food production, income generation or job creation can automatically come to be. Rather, it would require a concerted, strategic effort and a cohort of trained and committed agricultural entrepreneurs to bring forth an economic sector of this magnitude. The final chapter of this report addresses these issues, suggesting specific actions that could be taken to support the growth of agricultural enterprises on these lands.

6.0 RECOMMENDATIONS AND CONCLUSIONS

As the analysis and scenarios have demonstrated, the potential for increased local-scale, human-intensive agriculture in Surrey is substantial. Agriculturalists are astute entrepreneurs, traditionally attuned to responding to economic and regulatory signals. There is a growing recognition by agriculturalists and broader society, reinforced by many market signals, of the emerging potential in the re-localization of food systems. However, the strength and singularity of contemporary market structure and economic environments have precluded the substantial emergence of this sector. If its potential is to be fully realized, it will have to be supported and facilitated by governments through policy, regulation, and programming.

In Surrey specifically, the challenges inherent in realizing this potential are related to two broad issues: non-farmer ownership of ALR land and under-resourced and supported small-scale farmers.

Tackling these critical issues can be done in a manner which will not detriment Surrey's existing agriculture sector. It will require an integrated, systems approach that addresses economic, social, and political factors related to small-scale farmers, landowners, and the wider community in Surrey. In this section, specific strategies and recommendations to address these issues will be suggested. They are based the analysis and research results presented in this report, our discussions with landowners and farmers, and a review of the related literature.

New, Small-scale Farmers

New, small-scale farmers, those most likely to realize the potential of Surrey's small underutilized agricultural lands, currently face significant barriers to establishing and maintaining their farm businesses. Access to water, labour and land is constrained, and financing, technical support, small farm equipment, and opportunities for value added processing are limited. More broadly, the market for local foods and support for the local food and agriculture community in Surrey is underdeveloped. Bringing Surrey's available underutilized land into agricultural production will be significantly enhanced if the municipality plays supporting and enabling roles to ameliorate these challenges facing small-scale farmers.

Challenge 1.0: Water for Agricultural Operations

The ability to meet agricultural water needs (including crop irrigation, stock watering, and other uses) on new farms has been identified as a major challenge. Currently, water access for agriculture in Surrey's ALR is constrained by the BC *Water Act,* Surrey's *Waterworks Regulation and Charges Bylaw 16337, as well as infrastructural limitations*. As discussed in Part One of this report, under Bylaw 16337 the municipal water that serves parts of Surrey's ALR is allowed to be used for residential, aesthetic, and cleaning processes, and select agricultural industries, including greenhouse production (Part 3 – General Provisions, Section 14). Pending a change in this policy, therefore, future farmers on Surrey's underutilized ARL will rely on ground and surface water to fulfill their irrigation needs. Surface water, however, is constrained under the Water Act by the Ministry of Environment, currently which reports that the limited number of surface water licenses that were ever available for Surrey's watershed have already been allocated[33]. The issuance of new licenses, therefore, will only be possible in the event that current licenses are revoked or given up by their holders.

With neither City nor surface water legally available for irrigation, groundwater currently remains the only alternative for new farmers. While this is route is less restricted in terms of the legislation, however, the expense of installing new ground water wells is not one that many new farmers will be able to bear. Cost aside, recent studies indicate that ground water contamination may present additional challenges in some parts of the municipality. An exploration of this potential issue is outside the scope of this study, but warrants further investigation.

With respect to water availability and appropriateness of the legislation surrounding the use of water for agricultural purposes, the City of Surrey has the opportunity to take both direct and indirect action to support the establishment of new farms.

Specific recommendations include:

1.1 Conduct a review of *Waterworks Regulation and Charges Bylaw 16337* in light of its impact on the viability of small-scale agriculturalists and new farmers.

While any changes to the Bylaw would ultimately depend on regulatory/budgetary fit and infrastructural capacity, City staff and Council are encouraged to consider allowing exceptions to Part 3 (Section 14) and Part 11 (Sections 80, 81, and 82) to allow for small-scale agriculturalists to use city water for crop and stock irrigation purposes. Exceptions could be unconditional or based on conditions such as:

[33] Caitlin Dorward, personal communication November 2011

- The production of a "Water Smart Agricultural Plan" including (but not limited to) on-farm water conservation techniques, water conserving irrigation technology, and plant demand irrigation scheduling techniques employed on farms seeking approval for irrigating with City water; or,
- A "transitional" phase provision in which newly established farms could be granted permission to irrigate with City water for the first two to three years of operation, or until such time as the expense of installing a groundwater well could be borne by the farmer.

1.2 Collaborate with the Ministry of Environment (Water Stewardship Division) to explore opportunities to promote the sharing of existing ground and surface water resources among established and new farmers.

Suggestions include:

- Investigate the feasibility of developing shared ground-water well systems wherein farmers pool resources to develop a well system that could service multiple small agricultural parcels (overall reducing costs to individual farmers). The City could consider developing a model system on City owned land and sponsoring or subsidizing their development for privately owned underutilized parcels.
- Identify existing surface water license allocations which may not be maximizing their allowable use of surface water and could potentially share their license with neighbouring new farmers.
- Investigate the potential for or feasibility of prioritizing small-lot farmers when assigning water allocations if and when they come available.

Addressing the water access challenge is a critical and ultimately political/policy action that must be taken if Surrey is serious about retaining its agricultural character, attracting farmers to its underutilized ARL lands, and realizing the economic and food production potential inherent in them.

Challenge 2.0: Shortage of Skilled, Knowledgeable, Small-scale Farmers

Our findings indicate that the full integration of human-scale agriculture on currently underutilized ALR lands in Surrey has the potential to create over 1,500 jobs. The availability of skilled, knowledgeable farmers to fill these positions, however, is currently severely limited. Canada's last Census of Agriculture reported that the average age of farmers in this country has risen to 52 and the number of farmers under the age of 35 has steadily declined to 9.1%. Nationally, only 1.5% of our population is currently involved in agricultural production.[34]

These nation-wide trends are troubling indications of the health of the sector, but arguably unsurprising given the lack of institutionalized support and education about careers in agriculture, and especially small-lot, direct-market farming. Surrey has the opportunity to take a proactive approach to the ensuring the future viability of agriculture in the municipality by fostering the education of new farmers.

Specific recommendations include:

2.1 Publicly celebrate Surrey farmers and promote small-scale agriculture as a legitimate career path within Surrey, akin to professions such as medicine, engineering, or education.

The Surrey Board of Trade, Post-Secondary sector, and the School District are potential key partners in such an initiative.

[34] Statistics Canada, 2006

2.2 Develop and promote a "Farm School" or other formal education programs to prepare people from all walks of life for careers in agriculture.
Kwantlen Polytechnic University's *Richmond Farm School* is a successful local model that could be replicated in Surrey.

2.3 Provide support to link future or inexperienced farmers with established farms seeking interns or employees.
Develop a Surrey database or support grass roots efforts.

Challenge 3.0: Constraints to Accessing Agricultural Land for Farming

The ability of new farmers to access agricultural land is consistently identified as the greatest barrier to the establishment of new farms in this region. Surrey is no exception, as ALR land in the municipality is frequently owned by non-farmers and, when available to purchase, is so expensive as to not be economically feasible for most new farmers[35]. As described in the report, discussion with Surrey Realtors revealed that an acre of land in the ALR valued at up to $200,000 per acre, and closer to $500,000 per acre if it is situated on the urban-rural edge.

As land ownership becomes less feasible, Surrey has a role to play in supporting means by which farmers can access land under alternative tenure arrangements. Specific recommendations include:

3.1 Assist with the establishment of an independent organization or civic department which could serve to connect willing landowners to farmers seeking land.
Specific responsibilities of the organization or department could include:

- Maintaining a "land and space" inventory of available land for farming and food system services;
- Facilitating lease negotiations between farmers and land-owners by approaching owners of underutilized land to inform them of the opportunity to make it available for small-scale agriculture, or playing a "match-maker" role between landowners and farmers whose goals and priorities are compatible;
- Providing template tenure agreements for leases, licenses, profit a prendres, and memorandums of association;
- Educating farmers around "urban friendly farming" practices that are most suitable to farming in areas that have become dominated by rural residences (i.e: livestock size and number limits, manure/compost management practices, hours of operation, farm vehicle and equipment restrictions, etc.); and,
- Facilitating succession planning and land transfer agreements.

Farmland Access: Legal Agreement Types and Options*

Lease: Gives a person all of the use and occupation rights of a landowner to a property or portion of a property for a determined period of time in exchange for rent.

License: Gives a person permission to do something on or with someone else's property.

Profit a Prendre: Gives a person the right to enter another's land and take something from it (such as crops).

Memorandum of Understanding: An agreement between at least two persons that obliges each party to do or not do specified things.

*Adapted from *Gorusuch, "A Guide to Farmland Access Agreements"*

[35] Koopmans, 2010

3.2 Make city-owned land available for agriculture on a long-term basis.

Approximately 280 acres of city-owned land in the ALR is currently underutilized for agricultural production. This land could be used for the establishment of long term farm leases, as well as incubator farm land wherein new farmers can access small tracts of land, and the equipment and infrastructure required to kick-start their farm businesses for 1-3 years. Restrictive covenants registered to the title of Surrey-owned properties could be used to protect this land in perpetuity for farming.

3.3 Conduct a further, comprehensive examination into the extent of agricultural land under-utilization on *all* Surrey agricultural land (including all ALR lands and those zoned municipally for agriculture).

This study examined only the persistence and nature of underutilization of ALR land on those ALR parcels identified as underutilized in the Ministry of Agriculture and Lands 2004 Agricultural Land Use Inventory. A further, comprehensive inventory is recommended to determine whether the extent of underutilization is larger than was determined in this study.

3.4 Identify strategies to stem speculation on agricultural land.

Although the ALR program has effectively stemmed the loss of agricultural land in Surrey, it has not changed the highly speculative nature of land values for non-agricultural use of ALR land in the Reserve. Alternative mechanisms must be investigated and developed to ensure that in the future, agricultural land remains affordable for agriculture. A potential suggestion is to lobby for a third tax class which would tax un-farmed parcels in the ALR at *higher* than residential rates.

Challenge 4.0: Limited Technical Support, Equipment, and Infrastructure for New Farmers

Even after new farmers overcome the barrier of land access, they typically encounter a host of challenges in establishing their farm and ensuring its economic viability. Like all new business owners, new farmers often struggle in their early years with covering the cost of farm machinery and equipment, and perfecting their agricultural practices with limited technical experience or education.

Currently, the Provincial Ministry of Agriculture offers little in the way of technical farm extension services, particularly for small-scale farmers using organic or alternative practices on mixed-crop operations. Surrey has the opportunity to address this gap by taking a lead role in supporting new farmers with technical support, equipment, and infrastructure.

Specific recommendations include:

4.1 Establish an Agricultural Development Office, with permanent full time staff, dedicated to providing technical extension services for small-scale farmers.

The establishment of this Office could be led solely by the City of Surrey, or by the City of Surrey in partnership with neighbouring municipalities (Richmond, Delta, Langley, etc.) so that costs could be shared and staff/Extension Agents made available to provide support and coordination across the region. Potential roles of this department include:

- Undertaking a needs assessment with small-scale farmers to determine what support they require; Conducting applied research on small-scale production; and,
- Developing educational and outreach material to support small-scale farm production, processing, distribution, and sales.

4.2 Make City of Surrey owned land available for small-scale agriculture research and demonstration.

4.3 Assist with the establishment of a farm machinery and implement cooperative, or lending library, so that farm-members can pool resources to collectively own and borrow large farm equipment at an affordable cost for all.
The co-operative/library could be funded and managed by the City of Surrey or established with the City's support with the goal to ultimately become self-sustaining.

4.4 Conduct a review of Zoning By-law 12000 in light of its impact on the potential for establishing food-system services on non-arable ALR land.
Part 10 (B-9), Permitted Uses in the General Agriculture (A-1) Zone, for example, limits the ability to establish farm supplies and equipment retail stores or cooperatives. Although these services are not appropriate for arable ALR land which can support soil-based agriculture, they might be located strategically on non-arable ALR land which has become unavailable for farming after being paved or otherwise damaged. Other provisions of the by-law may be similarly limiting.

Challenge 5.0: Limited Financing Available for New Farmers

Many of the small-scale farmers entering the field today come from non-agricultural backgrounds and find themselves "starting from scratch" rather than inheriting the family farm. The high price of land, infrastructure, and other inputs is a substantial barrier, especially for young people entering careers in agriculture. Although Canada's banks do provide support and loans for farmers, few are targeted at and designed specifically for the small-scale agriculture sector. Surrey has an opportunity to take on this niche role and galvanize support from financial and other institutions to do the same.

Specific recommendations include:

5.1 Incorporate agriculture and food systems into amenity contribution categories, requiring that that new urban development supports Surrey's small-lot farms and farmers.

5.2 Explore Community Trust Farming as means to acquire land for under-capitalized farmers.
Under a Community Trust Farming model, land acquired by municipalities is legally protected for agriculture in perpetuity (via a covenant or land trust consignment) with the goal of supporting crop production for local needs, value-added processing, and educational opportunities and to provide a broad range of farmers and citizens with resources and direction to create sustainable agriculture that is integrated with the community.

5.3 Work with the financial sector to develop a mico-loans program for new small-scale farmers.

Challenge 6.0: Constraints to Value-Added Processing

Reducing barriers to value-added food processing will not only support local farmers, but also increase the year-round availability of local foods in the Lower Mainland. Food processing in BC, however, has undergone significant changes in the past twenty years and currently has "only a remnant" of its previous processing capacity[36]. Thus, while the growing local food movement has opened up opportunities for locally produced products to replace imported items, the loss of processing infrastructure and facilities, means most producers interested in adding value to their farm produce

[36] Zbeetnoff Agro-Environmental Consulting, and Lions Gate Consulting, 2008

through processing must do so in home kitchens. This severely limits the potential for local agriculture to expand and provide food to Surrey residents year round.

While this micro-scale of processing can help farm profitability by creating saleable products for off-season (winter) markets and increasing farm stand diversity during the growing season, farmers are limited in pursuing it by Health Authority regulations, ALC legislation, and City by-laws.

Specific ways that Surrey is encouraged to take action include:

6.1 Identify non-arable land on which "Agricultural Enterprise Zones" could be established to stimulate the co-location of agricultural and food system services.

6.2 Assist with the establishment of a cooperative hub for small-scale food processing and storage.
A shared-use processing facility could provide small-scale food producer-processors with the opportunity to use modern equipment for their processing needs, without high startup costs.

6.3 Conduct a review of Zoning By-law 12000 in light of its impact on the potential for small scale food processing in Surrey.
Part 10 (B-9), Permitted Uses in the General Agriculture (A-1) Zone, for example, limits the ability to establish small-scale food processing facilities. Although such facilities would not be an appropriate use of arable ALR land, which can support soil-based agriculture, they might be located strategically on non-arable ALR land which has become unavailable for farming after being paved or otherwise damaged. Other provisions of the by-law may be similarly limiting.

6.4 Lobby the Province to have the income generated from on-farm value added processing eligible as farm income for tax assessment purposes.

6.5 Encourage local health authorities to work with small-scale farmers to re-develop small-scale food processing guidelines that are appropriate for their scale.
Under the *Guidelines for the Sale of Food at Temporary Food Markets,* vendors of low risk foods such as dried fruit, jam, jelly, pickles, and most baked goods, are not required to submit an application before commencing sales. High risk foods such as prepared meals, canned vegetables or beans, juice, and processed meat, however, must be processed and packaged in inspected and licensed premises, and require the acquisition of a permit before commencing sales. These rules can prove challenging and inflexible for small-scale farmers who lack the economy of scale that warrants that is necessary to afford the use or construction of these facilities.

Challenge 7.0: Under-Developed Markets for Local Food

The models of agricultural potential presented in this report are based on small-scale (human-intensive), direct market agriculture, which is the scale of agriculture most suitable for the small parcels of underutilized land identified in the research. The success of these farms will depend on many factors, not the least of which is the demand for the products they grow or raise. Although it was beyond the scope of this study to evaluate the size or nature of the market for local food in Surrey, evidence noted during the field work and in discussion with City staff indicates that it is currently developed. Certainly, the "local food movement" has not reached the critical mass and widespread appeal that is currently being seen in other metropolitan areas, including neighbouring Vancouver.

Vancouver citizens have developed and appreciation for and culture around local food. Unlike the City of Surrey, however, Vancouver lacks the capacity to ever satisfy this demand from within its own borders. For Surrey to capitalize on its capacity for local production, it will need to foster connections to developed markets for local food and, over the longer term, promote and celebrate a culture of local food among its own residents.

Specific recommendations of how Surrey can play a role in developing local food markets and a public appreciation for Surrey farms include:

7.1 Lead by example, supporting local farmers and encouraging healthy eating at the Local Government level by:

- Developing a local food purchasing policy at the municipal level;
- Working with neighbouring municipalities, such as the City of Vancouver, encouraging them to purchase Surrey produce to fulfill their own local food purchasing mandates.
- Developing a "Buy Surrey campaign" and directory of local food and farms for Surrey consumers and institutional buyers.

7.2 Support farm gate sales in the ALR.

Specific recommendations include:

- Clarify by-laws surrounding farm gate sales in the ALR and ensure City staffs across all departments are familiar with them.

7.3 Develop a comprehensive farmers' market strategy and suite of supportive policies.

The report and strategy should:

- Identify strategic locations, including city-owned land and non-arable farmland, for seasonal outdoor farmers markets and a permanent, indoor farmers market facility; and
- Include "Farmer First Policies" which ensure that priority at farmers markets is given to Primary Producers in the local area.
- Include recommended amendments to the Surrey Zoning By-law 12000 to remove restrictions and allow the use of non-arable ALR land for outdoor farmers markets.

7.4 Investigate the feasibility of providing property or business tax benefits to retailers that devote a certain percentage of their store's floor space to local farm produce.

7.5 Foster broad-based public support and understanding for local food and agriculture.

Specific recommendations include:

- Develop material and campaigns to increase public awareness about the importance and benefits of local agriculture.
- Allocate resources to train City staff across all departments about how their work can enable and support the agri-food system.
- Foster opportunities for increased positive interface between farmers and the general public to heighten empathy and understanding of the issues facing agriculture.

Non-Farmer Landowners

Our field-based research revealed that many of the owners of Surrey's underutilized ALR lands are not agriculturalists. Their perspectives and attitudes about the agricultural potential of their land are varied. Some are interested in farming their own land but lack the impetus, knowledge, or support to do so; some are interested in having someone else farm their land; and, others have no interest in using their land for agriculture at all. Realizing the agricultural potential of this land will depend on the development of policy and programs which promote and support these landowners to work with new agriculturalists, offer incentives to those who do, and ultimately penalize those who are unwilling.

Challenge 8.0: The Non-Agricultural Use of Surrey's ALR

Our field work revealed that at least 27% of Surrey's ALR (6,043 acres) is being used for non-agricultural purposes, including rural residences with extensive ornamental lawns and gardens, commercial businesses, truck parking, and other light industrial uses. Some of these uses do not appear to comply with either Surrey City by-laws or the Agricultural Land Commission Act. Over half of this land (3,339 acres) could feasibly be used for agriculture.

A serious effort to curb non-agricultural use of Surrey ALR land will require increased enforcement of current bylaws and policies, as well as adjustments that more fully support agricultural uses and prevent non-agricultural uses, and the promotion of agricultural land uses to non-farmer landowners.

Specific recommendations include:

8.1 Consider stronger regulations around, or penalties for, non-agricultural use of Surrey's ALR land.
The zoning by-law permits the use of ALR parcels for a wide variety of non-agricultural purposes, including but not limited to commercial and hobby kennels, horse riding, training, and boarding, hunting and wilderness survival training, and golf courses. Surrey is encouraged to review the zoning bylaw in partnership with the ALC, with the intent to limit permitted use of ALR property to commercial agricultural uses only.

8.2 Limit home-plate size, scale, and placement in the ALR.
Current legislation does little to limit the size and placement of residential dwellings and associated landscapes and outbuildings on ALR property. This policy gap has allowed for the construction of estate homes that permanently alienate large swaths of ALR land from agriculture. Since recent attempts to address this issue at the regional level have not been successful, Surrey now has the opportunity to take a leadership role at the municipal level and is encouraged to set progressive policy that will serve as a clear indication of its commitment to local agriculture.

8.3 Strengthen enforcement of existing rules pertaining to permitted activities on A1, A2, A3, and other zones in the ALR.
We suspect that many of the non-farm uses seen on properties visited during the field work have not been approved by the City or are in violation of the zoning bylaw. Examples include truck and multiple vehicle parking and the dumping of fill and waste materials. The extent of this issue should be investigated by Surrey by-law enforcement.

8.4 Consider amendments to Bylaw 16337 that would restrict the use of City water for non-essential and non-agricultural uses in the ALR.
While restricting the use of City water for agricultural purposes, the Waterworks Regulation and Charges Bylaw 16337 currently allows the use of city water for normal household requirements as

well as "*less essential, aesthetic-enhancing purposes such as lawn and garden irrigation, car washing and other cleaning processes"* (Part 3, Section 14). Surrey should consider restricting the use of city water for this second category of non-essential uses as a disincentive for non-farm use of ALR lands.

8.5 Ensure BC Assessment is reviewing and monitoring Surrey residents claiming farm class status for tax assessment purposes.

Results from the mail survey administered to landowners of underutilized ALR parcels suggested that some landowners may be reaping the tax benefits associated with BC Assessment's "farm class" property status without generating the amount of farm income required to achieve it. We encourage Surrey to ensure that BC Assessment identifies properties receiving farm class status tax rates and confirms on an annual basis that the level of agricultural production on their properties warrants it.

Challenge 9.0: Landowners' Unwillingness to Allow Agricultural Use of their ALR Land

Informal discussions with landowners held while conducting the field work revealed that they have a wide range of attitudes towards the use of their properties. While some landowners expressed goals to eventually develop their own small farming operations on their land or interest in making their land available to a farmer, others made it clear that they saw no agricultural value in their property and would see it as an imposition to allow another party to farm it.

The following specific actions are recommended to realize the economic, job creation and food production potential of the land examined in this study,

9.1 Educate landowners in the ALR about the benefits of leasing land to farmer.

Many landowners are unaware that leasing their farmland can provide significant tangible and intangible benefit, including an income from the land through the collection of rent form the farmer, a reduction in costs and time associated with maintenance of their land, considerable tax-benefits, potential access to fresh produce, as well as the satisfaction of supporting a new farmer. Communicating these benefits to landowners through promotional and educational materials will raise awareness and interest among non-farmer landowners about the opportunity to make their land available to small-scale farmers.

9.2 Develop additional incentives for allowing the agricultural use of ALR land by leasing to farmers.

More work is needed to understand the array of incentives that Surrey may be able to use to encourage non-farmer landowners to make their land available to farmers. Ideas include:

- Developing group insurance schemes;
- Offering reduced residential utility rates to landowners leasing to farmers;
- Offering municipally guaranteed farmland rents to reduce the perceived risk to landowners that a farmer may default on their rent.

9.3 Lobby the Province to make changes to the Assessment Act which would encourage landowners to enter long term leases with farmers.

Achieving farm class status on land leased to a farmer currently requires that the farmer uses the land to generate income from primary agricultural production. To more fully support and protect farmers who lease land, as well as encourage landowners to make their land available to farmers on a long term or permanent basis, this legislation could be made more restrictive. Specifically, the Act could stipulate that if landowners are not farming the land themselves, they can only achieve farm class status if they:

- Enter *long term leases with tenant farmers;* or,
- Register a restrictive covenant on the title of their land, preserving it for agriculture in perpetuity.

Note that these recommendations are summarized in table form in Table 1 (page 8).

APPENDICES

Appendix 1: Survey Package

Survey Package Part A) Stakeholder Engagement Information Letter

Kwantlen POLYTECHNIC UNIVERSITY
INSTITUTE FOR SUSTAINABLE HORTICULTURE

Potential for Enhanced Small Lot, Local Scale, Direct Market Agriculture in Surrey

The Institute for Sustainable Horticulture at Kwantlen Polytechnic University is currently working with the City of Surrey to carry out a baseline analysis of the municipality's agricultural land. Research results will inform the city's goal to develop municipal policies and strategies to enhance agriculture, stimulate the local economy, and connect the small lot agriculture to local, direct markets in urban centres.

To best address the research goals, the research team is engaging with stakeholders, including landowners, to determine their values and opinions surrounding agriculture. We invite you to participate in this process by completing the enclosed short survey and attending a stakeholder forum in August, 2011.

Participation in both processes is completely voluntary and very much appreciated. Your responses will remain absolutely confidential and anonymous. Completed surveys can be mailed to the research team using the stamped, addressed envelope included in this package. An invitation to the stakeholder forum, and RSVP information, is also attached.

A project summary report will be available by November, 2011, on the ISH website (www.kwantlen.ca/ish) or in hardcopy summary form by request. For further information about this project, or to request a summary report, please contact the principle investigator:

Dr. Kent Mullinix,
Director - Sustainable Agriculture and Food Security
Institute for Sustainable Horticulture
Kwantlen Polytechnic University
12666- 72nd Ave, Surrey, BC V3W 2M8
604.612.1252
kent.mullinix@kwantlen.ca
www.kwantlen.ca/ish

Survey Package Part B) Forum Invitation

Kwantlen POLYTECHNIC UNIVERSITY
INSTITUTE FOR SUSTAINABLE HORTICULTURE

You are invited to participate in …

A Stakeholder Forum on the Potential for Enhanced Small Lot, Direct Market, Local Scale Agriculture in Surrey

August 17th 2011, 6:00 – 8:00 PM
Kwantlen Polytechnic University Conference Centre
Surrey Campus, 12666- 72nd Ave, Surrey, BC V3W 2M8

The Institute for Sustainable Horticulture at Kwantlen Polytechnic University is currently working with the City of Surrey to engage with local stakeholders, including residents and owners of Surrey's rural residential and agricultural lands to determine values and opinions surrounding agriculture and agricultural land use. We invite you to participate in our research and learn about Surrey's local food system by attending this stakeholder forum.

The forum agenda includes:

- Introductory remarks by Principle Investigator Dr. Kent Mullinix (Director, Sustainable Agriculture and Food Security, Institute for Sustainable Horticulture)
- Keynote address by an urban farmer
- Presentation of "urban friendly farming" models
- Breakout discussions and feedback

Snacks and refreshments will be provided.

Your RSVP is requested by August 1st, 2011. To RSVP, please complete the information below and mail it to us (along with your completed survey) using the stamped, addressed envelope included in this package. Alternatively, you may send your RSVP via email to:

Caitlin Dorward, Project Coordinator: caitlin.dorward@kwantlen.ca

A reminder and event updates will be sent to all registrants two weeks prior to the event.

Survey Package Part C) Survey Instrument

***Potential for Enhanced Small Lot, Local Scale, Direct Market Agriculture in Surrey*: Survey Questions**

Your response to all questions in this survey will remain absolutely confidential and anonymous. *Neither the researchers, nor the City, will publish or publicize individual responses or any information which may make it possible to single out the respondent, the property owner, this property, or any activity associated with it. All information will be reported in aggregated, generalized form. Completed surveys will be stored in a locked office and shredded following publication of the research.* ***Please submit completed surveys using the stamped, addressed envelope included in this package.***

1. [A] **Are you the owner or part owner of this property?**

   a) Yes
   b) No

   [B] **Do you reside on this property?**

   a) Yes
   b) No

   [C] **Is the property rented or leased?**

   a) Yes
   b) No

   [D] **If the property is rented or leased, at what annual rate?**

   $_____

2. **Please characterize the landowner(s):**

   ___ Individual ___ Cooperative ___ Municipal government
   ___ Family ___ Community Trust ___ Provincial government
   ___ Corporation/business ___ Developer ___ Federal government

   ___ Other, please describe: _____

3. [A] **Approximately how much gross revenue is generated from business activities taking place on the property?**

   a) $0 (no income)
   b) $1 - 4,900
   c) $5,000 – 9,999
   d) $10,000 – 19,999
   e) $20,000 – 49,999
   f) $50,000 – 999,999
   g) $100,000 – 249,999
   h) $250,000 or greater

   [B] **Approximately what proportion of this is generated through agricultural activities?** _____%

   [C] **Is this property taxed at a farm class rate?**

   a) Yes
   b) No

4. [A] **Approximately how much of this property (if any) is used for non-agricultural purposes?**

   _____hectares (or _____ % of the property)

   [B] **Please describe these non-agricultural uses (if applicable)**

   _____

   _____

Potential for Enhanced Local Scale Agriculture Survey, Page **1** of **2**

5. [A] **What proportion of the property is used for the following agricultural activities?**

Greenhouse veg. _____%	Beef cattle _____%	Crop processing _____%
Field vegetables _____%	Dairy cattle _____%	Forage and pasture _____%
Berries _____%	Poultry _____%	
Orchards _____%	Sheep, goats, or hogs _____%	

[B] **If *no* portion of the property is used for the agricultural activities listed above, please describe why (check all that apply)**

___ Owner/tenant lacks start-up capital
___ Agriculture would not be profitable
___ Land is not suitable for agriculture
___ Too many land improvements would be needed
___ Other, please describe:

___ Owner/tenant is not an agriculturalist
___ Owner/tenant is not interested in farming
___ Owner/tenant is not capable of farming

_____

6. [A] **How likely is it that the landowner would allow increased use of this property for the following agricultural activities: forage and pasture, berries, orchards, field vegetables, greenhouse vegetables, beef cattle, dairy cattle, poultry, sheep, goats, or hogs, or crop processing and preparation. Circle one.**

a) Very likely **b)** Somewhat likely **c)** Unlikely **d)** Very Unlikely **e)** Unknown

[B] **Which of the following policies, programs, or support networks would encourage the landowner to allow increased use of the property for the agricultural activities listed above (forage and pasture, berries, orchards, field vegetables, greenhouse vegetables, beef cattle, dairy cattle, poultry, sheep, goats, or hogs, or crop processing and preparation). Check all that apply.**

___ Improved tax incentives
___ Subsidies for land remediation/input costs associated with making the land arable
___ Subsidised utility rates
___ Network to connect landowners to land-seeking farmers
___ Municipal support for landowners entering into lease agreements with tenant farmers
___ Risk free lease with tenant farmers (lease guaranteed by municipal government)
___ Agricultural training for landowners
___ Mandated minimum level of agricultural activity on land zoned A1 or ALR
___ Other, please describe:

_____

_____

_____

Thank you for your participation. Completed surveys can be submitted using the stamped, addressed envelope included in this package.

Appendix 2: Tabulated Survey Results

***Potential for Enhanced Small Lot, Local Scale, Direct Market Agriculture in Surrey*: Tabulated Survey Results**

**Totals reported as percentages may not add up due to rounding.*

Total surveys administered = 586	Total completed surveys = 44 (7.5% response rate)

1. [A] **Are you the owner or part owner of this property?**

Total responses	*43*	
a) Yes	*43*	*100%*
b) No	*0*	*0%*

[B] **Do you reside on this property?**

Total responses	*43*	
a) Yes	*38*	*88%*
b) No	*5*	*12%*

[C] **Is the property rented or leased?**

Total Responses	*43*	
a) Yes	*5*	*12%*
b) No	*38*	*88%*

2. **Please characterize the landowner(s):**

Total Responses	*44*	
a) Individual	*15*	*34%*
b) Family	*27*	*61%*
c) Corporation/Business	*2*	*5%*
d) Cooperative	*0*	
e) Community Trust	*0*	
f) Developer	0	
g) Municipal Government	0	
h) Provincial Government	0	
i) Federal Government	0	

3. [A] **Approximately how much gross revenue is generated from business activities taking place on the property?**

Total Responses	*44*	
a) $0 (no income)	*26*	*59%*
b) $1 - 4,900	*10*	*23%*
c) $5,000 – 9,999	*2*	*5%*
d) $10,000 – 19,999	*2*	*5%*
e) $20,000 – 49,999	*1*	*2%*
f) $50,000 – 999,999	*0*	
g) $100,000 – 249,999	*0*	
h) $250,000 or greater	*3*	*7%*

[B] **Approximately what proportion of this is generated through agricultural activities? _____%**

Total Responses	*43*	
n/a	*26*	*60%*
0%	*3*	*7%*
1 – 5%	*2*	*5%*
6 – 10%	*2*	*5%*
11 – 25%	*0*	
26 – 50%	*1*	*2%*
51 – 75%	*0*	
76 – 99%	*0*	
100%	*9*	*21%*

[C] **Is this property taxed at a farm class rate?**

Total Responses	*44*	
a) Yes	*14*	*32%*
b) No	*30*	*68%*

4. [A] **Approximately how much of this property (if any) is used for non-agricultural purposes?**

0%		
1 – 5%		
6 – 10%		
11 – 25%		
26 – 50%		
51 – 75%		
76 – 99%		
100%		

[B] **Please describe these non-agricultural uses (if applicable)**

Total Responses	*43*	
Indicated residential-related use	*25*	*58%*
Indicated business-related use	*6*	*14%*
Indicated the property was undeveloped	*4*	*9%*
Indicated natural or non-agricultural landscaping	*12*	*28%*
Left blank	*4*	*9%*
**Some responses included in multiple categories, totals thus do not add up to 43.*		

5. [A] **What proportion of the property is used for the following agricultural activities?**

Total Responses	*22*				
Greenhouse veg.	*1*	*5%*	Poultry	*2*	*9%*
Field vegetables	*6*	*27%*	Sheep, goats, hogs	*3*	*14%*
Berries	*3*	*14%*	Crop processing	*1*	*5%*
Orchards	*3*	*14%*	Forage and pasture	*8*	*36%*
Beef cattle	*1*	*5%*	Dairy cattle	*0*	*0%*
**Some responses included in multiple categories, totals thus do not add up to 43.*					

[B] **If *no* portion of the property is used for the agricultural activities listed above, please describe why (check all that apply)**

Total Responses	44	
Owner/tenant lacks start-up capital	7	16%
Agriculture would not be profitable	11	25%
Land is not suitable for agriculture	14	32%
Owner/tenant is not an agriculturalist	12	27%
Owner/tenant is not interested in farming	7	16%
Owner/tenant is not capable of farming	7	16%
Too many land improvements would be needed	11	25%
**Some responses included in multiple categories, totals thus do not add up to 43.*		

6. [A] **How likely is it that the landowner would allow increased use of this property for the following agricultural activities: forage and pasture, berries, orchards, field vegetables, greenhouse vegetables, beef cattle, dairy cattle, poultry, sheep, goats, or hogs, or crop processing and preparation. Circle one.**

Total Responses	43	
a) Very likely	10	23%
b) Somewhat likely	7	16%
c) Unlikely	9	21%
d) Very Unlikely	15	35%
e) Unknown	2	5%

[B] **Which of the following policies, programs, or support networks would encourage the landowner to allow increased use of the property for the agricultural activities listed above (forage and pasture, berries, orchards, field vegetables, greenhouse vegetables, beef cattle, dairy cattle, poultry, sheep, goats, or hogs, or crop processing and preparation). Check all that apply.**

Total Responses	44	
Improved tax incentives	21	48%
Subsidies for land remediation/input costs associated with making the land arable	13	30%
Subsidised utility rates	11	25%
Network to connect landowners to land-seeking farmers	10	23%
Municipal support for landowners entering into lease agreements with tenant farmers	8	18%
Risk free lease with tenant farmers (lease guaranteed by municipal government)	7	16%
Agricultural training for landowners	9	20%
Mandated minimum level of agricultural activity on land zoned A1 or ALR	5	11%
**Some responses included in multiple categories, totals thus do not add up to 43.*		

Appendix 3: Stakeholder Focus Group Minutes

Potential for Enhanced Small Scale Agriculture: Stakeholder Focus Group MINUTES

Wednesday, August 17th, 2011, 6:00 – 8:00pm
Office of Research and Scholarship, Room A2400
Coast Capital Savings Library, Arbutus Building
Kwantlen Polytechnic University, 12666 – 72nd ave, Surrey

6:00pm **Introductory remarks by Principle Investigator Dr. Kent Mullinix (Director, Sustainable Agriculture and Food Security, Institute for Sustainable Horticulture)**

- Introductions to research team and focus group participants
- Institute for Sustainable Horticulture focus on small scale sustainable agriculture
- Project overview; Surrey's interest in and concerns about the ALR

6:30pm **Discussion of agricultural potential of unused ALR land in Surrey**

- Overview of field work methods and findings
- 3500 acres of underutilized land (16% of total ALR)
- Four generalized types:

1 – Market (< 0.5 acres) – Green City Acres (Curtis Stone) farms on 0.75 acres, SPIN (small plot intensive), organic vegetable and micro greens, CSA model and restaurants, earns over $50 000.
2 - Micro (0.5-2 acres) – Cropthorne Famer (Ladner, BC) farm on 2.5 acres on leased residential land, free range eggs and organic vegetables, sell at farmers markets and CSA, 2 farm managers and 1 summer intern
3 - Small (over 2 acres) – Glen Valley Organics (Abbotsford, BC) – leasing 12.5 acres 4 full time and 1 half time employees, free range eggs and organic vegetables
4 - Non-arable land (structure based agriculture or pre and post farming services) – SOLEfood Farm, Vancouver BC, hundreds of planers built on unused hotel parking lot, sell to farmers market, subscription customers

- Introduction to case example small scale farms

7:00pm **Break for snacks and refreshments, and browsing of farm model displays**

7:15pm **Facilitated discussion on key project questions**

- **Are you interested in farming your land or leasing it to a farmer? Why or why not?**
- **What currently prevents or discourages you from farming your land or leasing it to a farmer?**

- No, too old to farm the land. In terms of leasing, I can't trust people these days. Don't want a whole bunch of people coming on the land. Is there help to supervise it all.

- Very interested in farming – reclaim the land on a hobby farm. The hobby farm was bought by family to help feed 6 six kids. Why not? Security – there are kids on the property.

- Would like to do farming but work full time. Leasing – the area available is bit difficult to access.

- Having a second driveway where leasers could get in and out without clogging the main drive way.

- Have an organization help with leasing, security issues, liability issue, that exist.

- Knowledge necessary, time consuming, property tax (scaled to the size of the land), equipment,

- For how much can you lease the land out for? What would make it worth while? Depends on what it would cost the land owner? $400 per acre per year – cost more in liability insurance. Per month maybe but not per year. The stress of people, vehicles coming and going. But, by changing from agriculture to residential you could save $$ in taxes.

- Farm sales? Can you see right from your lane or do you need to go to a market? Preference to sell right off the farm. You are allowed to on A1 but you need to get a business license to sell at the farm gate. There are bylaws of what you can sell. Do you need to have parking or washroom available for the customer.

- **What would you need /what would encourage you to do agriculture on your land? What, specifically, could the City of Surrey offer that would support you?**

- Stay out of the way!

- Issue of what people are growing (mushroom farmers growing weed) – need for watchdog. Conditions: time (when are these people showing up? 4 am?), are they committed farmers (what is their true intent), farmers would have to be serious,

- Incentives? Decreased utility rates, regulations,

- Property tax is low for agricultural land. Capital gain for farmers.

- Grants from City to help people start up – education and courses.

- Advice on what is best to grow on their land (extension).

- Have students/university go to land to prune the trees.

- Couple with an educational program (apprenticeships).

- **Has the evening's discussion and presentation changed your opinion on the agricultural potential of your land or interest in seeing it farming?**

- This has not really changed my mind but has given new ideas.

- Very informative

- **Do you believe that small lot, local scale, direct market agriculture sector in Surrey is possible?**

- Unsure due the logistics of how the land would be grown and taken off the land. Worried about lots of people coming to and from the land.

- Yes absolutely possible to sell to markets or supermarkets.

- **Would any of you be interested in piloting this on your land?**

- Two participants are very interested

OTHER ITEMS

Shared Stories:

In Germany, towns provided land where people could build small huts to spend their time in the evenings or weekends to grow food and to socialize. Community garden, small holdings. Community bathrooms

Problems Addressed:

Organic certification – quality control.

Truck parking on ARL land – as long as people have permit in than truck parking is permitted. Right on dykes to the river (buildings need to stay 50 m). Trailers/containers used as office space because they are not considered building.

Water and Drainage: water usage, water rights to creeks, upgrades to sewers, need to do these updates to get these up and running. Well water

Chemical Use on Farms – contaminates water

Bylaws – lack of enforcement

7:50pm Closing remarks, END OF SESSION.

Appendix 4: Economic Potential of One Acre of Underutilized Land in the Surrey, BC

Production of 10 Most Profitable Crops on 1 acre
*Assume each crop grown on 1/10th of the total area available (0.1 Acre)

Crop	Yield/ Acre	Yield/ 0.1 acres	Labor/ Acre	Labour / 0.1 Acres	Gross Revenue / Acre	Gross Revenue / .1 Acre	Contribution Margin / Acre	Contribution Margin / 0.1 Acres
Spinach	10,965	1,097 lbs	930	93.00 hours	$ 87,501	$ 8,750	$ 70,997	$ 7,100
Pak Choy	15,300	1,530 lbs	175	17.50 hours	$ 60,894	$ 6,089	$ 57,718	$ 5,772
Snow Peas	8,713	871 lbs	753	75.33 hours	$ 69,526	$ 6,953	$ 55,445	$ 5,544
Chinese Cabbage	38,250	3,825 lbs	52	5.20 hours	$ 64,260	$ 6,426	$ 58,392	$ 5,839
Beets	16,830	1,683 lbs	400	40.00 hours	$ 48,470	$ 4,847	$ 39,277	$ 3,928
Pumpkins	25,585	2,559 lbs	120	12.02 hours	$ 43,495	$ 4,349	$ 38,965	$ 3,897
Cabbage	27,115	2,712 lbs	283	28.27 hours	$ 45,553	$ 4,555	$ 38,036	$ 3,804
Radishes	16,830	1,683 lbs	348	34.78 hours	$ 41,738	$ 4,174	$ 34,152	$ 3,415
Turnips	32,190	3,219 lbs	512	51.18 hours	$ 39,754	$ 3,975	$ 29,189	$ 2,919
Carrots	20,145	2,015 lbs	927	92.72 hours	$ 46,938	$ 4,694	$ 30,046	$ 3,005
TOTALS		***21,192 lbs***		*450.00 hours* ***0.23 FTE-FL*** ***Plus 1 FTE-OO***	**Total Gross Revenue**	**$ 54,813**	*CM Total* *(Less Fixed Costs)* ***Total Return to Owner/Operator***	*$ 45,222* *$ 8,253* *$ 36,968*

Production of 10 Most Labour Intensive Crops on 1 acre
*Assume each crop grown on 1/10th of the total area available (0.1 Acre)

Crop	Yield/ Acre	Yield/ 0.1 acres	Labor/ Acre	Labour / 0.1 Acres	Gross Revenue / Acre	Gross Revenue / .1 Acre	Contribution Margin / Acre	Contribution Margin / 0.1 Acres
Spinach	10,965	1,097 lbs	930	93.00 hours	$ 87,501	$ 8,750	$ 70,996.70	$ 7,100
Carrots	20,145	2,015 lbs	927	92.72 hours	$ 46,938	$ 4,694	$ 30,045.95	$ 3,005
Snow Peas	8,713	871 lbs	753	75.33 hours	$ 69,526	$ 6,953	$ 55,444.60	$ 5,544
Turnips	32,190	3,219 lbs	512	51.18 hours	$ 39,754	$ 3,975	$ 29,188.95	$ 2,919
Tomatoes	19,465	1,947 lbs	452	45.17 hours	$ 33,091	$ 3,309	$ 21,622.70	$ 2,162
Apple (Jonagold)	10,542	1,054 lbs	410	40.97 hours	$ 20,873	$ 2,087	$ 10,711.41	$ 1,071
Green Beans	5,712	571 lbs	406	40.60 hours	$ 22,791	$ 2,279	$ 13,523.30	$ 1,352
Beets	16,830	1,683 lbs	400	40.00 hours	$ 48,470	$ 4,847	$ 39,276.64	$ 3,928
Garlic	2,916	292 lbs	356	35.58 hours	$ 27,493	$ 2,749	$ 13,347.07	$ 1,335
Radishes	16,830	1,683 lbs	348	34.78 hours	$ 41,738	$ 4,174	$ 34,152.27	$ 3,415
TOTALS		***14,431 Lbs***		*549.33 hours* ***0.29 FTE-FL*** ***Plus 1 FTE-OO***	**Total Gross Revenue**	**$ 43,817**	*CM Total* *(Less Fixed Costs)* ***Total Return to Owner/Operator***	*$ 31,831* *$ 8,253* ***$ 23,578***

Production of 10 Most Highly Consumed Crops on 1 acre
*Assume each crop grown on 1/10th of the total area available (0.1 Acre) Eggs are not included on a small site.

Crop	Yield/ Acre	Yield/ 0.1 acres	Labor/ Acre	Labour / 0.1 Acres	Gross Revenue / Acre	Gross Revenue / .1 Acre	Contribution Margin / Acre	Contribution Margin / 0.1 Acres
Potatoes	16,703	1,670 lbs	299	29.93 hours	$ 32,236	$ 3,224	$ 24,374.34	$ 2,437
Apple (Jonnagold)	10,542	1,054 lbs	410	40.97 hours	$ 20,873	$ 2,087	$ 10,711.41	$ 1,071
Lettuce	19,100	1,910 lbs	257	25.73 hours	$ 25,020	$ 2,502	$ 18,345.78	$ 1,835
Yellow Onions	27,872	2,787 lbs	256	25.58 hours	$ 30,241	$ 3,024	$ 22,463.96	$ 2,246
Tomatoes	19,465	1,947 lbs	452	45.17 hours	$ 33,091	$ 3,309	$ 21,622.70	$ 2,162
Carrots	20,145	2,015 lbs	927	92.72 hours	$ 46,938	$ 4,694	$ 30,045.95	$ 3,005
Cabbage	27,115	2,712 lbs	283	28.27 hours	$ 45,553	$ 4,555	$ 38,035.79	$ 3,804
Table Grapes	5,400	540 lbs	210	21.01 hours	$ 16,902	$ 1,690	$ 14,485.09	$ 1,449
Cucumbers	12,431	1,243 lbs	111	11.14 hours	$ 29,338	$ 2,934	$ 24,338.15	$ 2,434
Bell Peppers	7,905	791 lbs	303	30.25 hours	$ 31,462	$ 3,146	$ 22,541.97	$ 2,254
TOTALS		***16,668 Lbs produce***		*350.74 hours* ***0.18 FTE-FL*** ***Plus 1 FTE-OO***	**Total Gross Revenue**	**$ 31,165**	*CM Total* *(Less Fixed Costs)* ***Total Return to Owner/Operator***	*$ 22,697* *$ 8,253* ***$ 14,443***

Production of All Crops on 1 acre *Assume each crop grown on 1/29th of the total area available (0.034), except honey, which is produced at a rate of one hive per acre								
Crop	Yield / Acre	Yield/ 0.034 acres	Labor/ Acre	Labour/ 0.034 Acres	Gross Revenue / Acre	Gross Revenue / 0.034 Acre	Contribution Margin / Acre	Contribution Margin / 0.034 Acres
Apple(Jonagold)	10,542	364 lbs	410	14.13 hours	$ 20,873	$ 710	$ 10,711	$ 369.36
Asparagus	3,825	132 lbs	200	6.90 hours	$ 19,049	$ 648	$ 15,301	$ 527.61
Beets	16,830	580 lbs	400	13.79 hours	$ 48,470	$ 1,648	$ 39,277	$ 1,354.37
Bell Peppers	7,905	273 lbs	303	10.43 hours	$ 31,462	$ 1,070	$ 22,542	$ 777.31
Broccoli	6,630	229 lbs	222	7.66 hours	$ 15,647	$ 532	$ 9,197	$ 317.14
Brussels Sprouts	8,976	310 lbs	246	8.48 hours	$ 17,772	$ 604	$ 10,672	$ 367.99
Cabbage	27,115	935 lbs	283	9.75 hours	$ 45,553	$ 1,549	$ 38,036	$ 1,311.58
Carrots	20,145	695 lbs	927	31.97 hours	$ 46,938	$ 1,596	$ 30,046	$ 1,036.07
Cauliflower	6,843	236 lbs	120	4.13 hours	$ 25,112	$ 854	$ 19,293	$ 665.27
Chinese Cabbage	38,250	1,319 lbs	52	1.79 hours	$ 64,260	$ 2,185	$ 58,392	$ 2,013.52
Cucumbers	12,431	429 lbs	111	3.84 hours	$ 29,338	$ 997	$ 24,338	$ 839.25
Garlic	2,916	101 lbs	356	12.27 hours	$ 27,493	$ 935	$ 13,347	$ 460.24
Hazelnuts	2,125	73 lbs	104	3.59 hours	$ 29,784	$ 1,013	$ 27,508	$ 948.56
Honey (One Hive/	85	85 lbs	2	1.74 hours	$ 618	$ 618	$ 429	$ 429
Kale	6,375	220 lbs	140	4.83 hours	$ 25,500	$ 867	$ 23,243	$ 801.49
Lettuce	19,100	659 lbs	257	8.87 hours	$ 25,020	$ 851	$ 18,346	$ 632.61
Pak Choy	15,300	528 lbs	175	6.03 hours	$ 60,894	$ 2,070	$ 57,718	$ 1,990.27
Pears	12,800	441 lbs	208	7.16 hours	$ 30,080	$ 1,023	$ 25,405	$ 876.02
Green Beans	5,712	197 lbs	406	14.00 hours	$ 22,791	$ 775	$ 13,523	$ 466.32
Potatoes	16,703	576 lbs	299	10.32 hours	$ 32,236	$ 1,096	$ 24,374	$ 840.49
Pumpkins	25,585	882 lbs	120	4.14 hours	$ 43,495	$ 1,479	$ 38,965	$ 1,343.64
Radishes	16,830	580 lbs	348	11.99 hours	$ 41,738	$ 1,419	$ 34,152	$ 1,177.66
Snow Peas	8,713	300 lbs	753	25.98 hours	$ 69,526	$ 2,364	$ 55,445	$ 1,911.88
Spinach	10,965	378 lbs	930	32.07 hours	$ 87,501	$ 2,975	$ 70,997	$ 2,448.16
Sweet Corn	9,524	328 lbs	99	3.42 hours	$ 9,881	$ 336	$ 5,235	$ 180.50
Table Grapes	5,400	186 lbs	210	7.24 hours	$ 16,902	$ 575	$ 14,485	$ 499.49
Tomatoes	19,465	671 lbs	452	15.57 hours	$ 33,091	$ 1,125	$ 21,623	$ 745.61
Turnips	32,190	1,110 lbs	512	17.65 hours	$ 39,754	$ 1,352	$ 29,189	$ 1,006.52
Yellow Onions	27,872	961 lbs	256	8.82 hours	$ 30,241	$ 1,028	$ 22,464	$ 774.62
Zucchini	8,436	291 lbs	115	3.95 hours	$ 14,342	$ 488	$ 9,355	$ 322.60
TOTAL		***13,983 lbs Produce***		*312.53 hours*	**Total Gross**		*CM Total*	*$ 27,435*
		85 lbs honey		***0.16 FTE-FL***	**Revenue**	**$ 34,779**	*(Less Fixed Costs)*	*$ 8,253*
							Total Return to	
TOTALS				***Plus 1 FTE-OO***			***Owner/Operator***	***$ 19,182***

Appendix 5: Economic Potential of City-Owned Underutilized Land in Surrey, BC

Production of 10 Most Profitable Crops on City of Surrey Owned Underutilized Land (280 Acres)
*Assume each crop grown on 1/10th of the total area available (28 Acres)

Crop	Yield/ Acre	Yield / 28 acres	Labor/ Acre	Labour / 28 Acres	Gross Revenue / Acre	Gross Revenue / 28 Acres	Contribution Margin / Acre	Contribution Margin / 28 Acres
Spinach	10,965	307,020 lbs	930	26,040 hours	$ 87,501	$ 2,450,020	$ 70,997	$ 1,987,907
Pak Choy	15,300	428,400 lbs	175	4,900 hours	$ 60,894	$ 1,705,032	$ 57,718	$ 1,616,096
Snow Peas	8,713	243,950 lbs	753	21,093 hours	$ 69,526	$ 1,946,721	$ 55,445	$ 1,552,449
Chinese Cabbage	38,250	1,071,000 lbs	52	1,456 hours	$ 64,260	$ 1,799,280	$ 58,392	$ 1,634,979
Beets	16,830	471,240 lbs	400	11,200 hours	$ 48,470	$ 1,357,171	$ 39,277	$ 1,099,746
Pumpkins	25,585	716,380 lbs	120	3,365 hours	$ 43,495	$ 1,217,846	$ 38,965	$ 1,091,034
Cabbage	27,115	759,220 lbs	283	7,915 hours	$ 45,553	$ 1,275,490	$ 38,036	$ 1,065,002
Radishes	16,830	471,240 lbs	348	9,740 hours	$ 41,738	$ 1,168,675	$ 34,152	$ 956,263
Turnips	32,190	901,306 lbs	512	14,331 hours	$ 39,754	$ 1,113,113	$ 29,189	$ 817,291
Carrots	20,145	564,060 lbs	927	25,960 hours	$ 46,938	$ 1,314,260	$ 30,046	$ 841,287
		5,933,816 Lbs Produce		125,999 hours	Total Gross		CM Total	$ 12,662,054
				66 FTE-FL	Revenue	***$ 15,347,607***	*Less Fixed Costs*	*$ 1,197,529*
							Total Return to	
TOTALS				***plus 56 FTE-OO***			***Owner/Operator***	***$ 11,464,525***

Production of 10 Most Labour Intensive Crops on City of Surrey Owned Underutilized Land (280 Acres)
*Assume each crop grown on 1/10th of the total area available (28 Acres)

Crop	Yield/ Acre	Yield / 28 acres	Labor/ Acre	Labour / 28 Acres	Gross Revenue / Acre	Gross Revenue / 28 Acres	Contribution Margin / Acre	Contribution Margin / 28 Acres
Spinach	10,965	307,020 lbs	930	26,040 hours	$ 87,501	$ 2,450,020	70,997	$ 1,987,907
Carrots	20,145	564,060 lbs	927	25,960 hours	$ 46,938	$ 1,314,260	30,046	$ 841,287
Snow Peas	8,713	243,950 lbs	753	21,093 hours	$ 69,526	$ 1,946,721	55,445	$ 1,552,449
Turnips	32,190	901,306 lbs	512	14,331 hours	$ 39,754	$ 1,113,113	29,189	$ 817,291
Tomatoes	19,465	545,020 lbs	452	12,647 hours	$ 33,091	$ 926,534	21,623	$ 605,436
Apple (Jonagold)	10,542	295,177 lbs	410	11,471 hours	$ 20,873	$ 584,451	10,711	$ 299,919
Green Beans	5,712	159,936 lbs	406	11,368 hours	$ 22,791	$ 638,145	13,523	$ 378,652
Beets	16,830	471,240 lbs	400	11,200 hours	$ 48,470	$ 1,357,171	39,277	$ 1,099,746
Garlic	2,916	81,634 lbs	356	9,963 hours	$ 27,493	$ 769,809	13,347	$ 373,718
Radishes	16,830	471,240 lbs	348	9,740 hours	$ 41,738	$ 1,168,675	34,152	$ 956,263
		4,040,583 Lbs Produce		*153,813 hours*	Total Gross		*CM Total*	*$ 8,912,669*
				80 FTE-FL	Revenue	***$ 12,268,898***	*(Less Fixed Costs)*	*$ 1,197,529*
							Total Return to	
TOTALS				***plus 56 FTE-OO***			***Owner/Operator***	***$ 7,715,140***

Production of 10 Most Consumed Crops on City of Surrey Owned Underutilized Land (280 Acres)
*Assume each crop grown on 1/10th of the total area available (28 Acres)

Crop	Yield/ Acre	Yield / 28 acres	Labor/ Acre	Labour / 28 Acres	Gross Revenue / Acre	Gross Revenue / 28 Acres	Contribution Margin / Acre	Contribution Margin / 28 Acres
Potatoes	16,703	467,670 lbs	299	8,379 hours	$ 32,236	$ 902,603	$ 24,374.34	$ 682,481
Apple (Jonnagold)	10,542	295,177 lbs	410	11,471 hours	$ 20,873	$ 584,451	$ 10,711.41	$ 299,919
Organic Egg Producti	3,876	108,528 doz	76	2,128 hours	$ 23,799	$ 666,362	$ 12,327.77	$ 345,178
Lettuce	19,100	534,786 lbs	257	7,203 hours	$ 25,020	$ 700,570	$ 18,345.78	$ 513,682
Yellow Onions	27,872	780,402 lbs	256	7,163 hours	$ 30,241	$ 846,736	$ 22,463.96	$ 628,991
Tomatoes	19,465	545,020 lbs	452	12,647 hours	$ 33,091	$ 926,534	$ 21,622.70	$ 605,436
Carrots	20,145	564,060 lbs	927	25,960 hours	$ 46,938	$ 1,314,260	$ 30,045.95	$ 841,287
Cabbage	27,115	759,220 lbs	283	7,915 hours	$ 45,553	$ 1,275,490	$ 38,035.79	$ 1,065,002
Table Grapes	5,400	151,200 lbs	210	5,881 hours	$ 16,902	$ 473,256	$ 14,485.09	$ 405,583
Cucumbers	12,431	348,075 lbs	111	3,120 hours	$ 29,338	$ 821,457	$ 24,338.15	$ 681,468
		4,445,610 Lbs produce		*91,867 hours*	Total Gross		*CM Total*	*$ 6,069,027*
		108,528 Doz eggs		***48 FTE-FL***	Revenue	***$ 8,511,718***	*(Less Fixed Costs)*	*$ 1,197,529*
							Total Return to	
TOTALS				***plus 56 FTE-OO***			***Owner/Operator***	***$ 4,871,498***

Production of Alll Crops on City of Surrey Owned Underutilized Land (280 Acres) *Assume each crop grown on 1/31nd of the total area available (9 Acres), except honey, which is produced at a rate of one hive per acre								
Crop	Yield / Acre	Yield/ 9 acres	Labor/ Acre	Labour / 9 Acres	Gross Revenue / Acre	Gross Revenue / 9 Acres	Contribution Margin / Acre	CM on 9 Acres
Apple(Jonagold)	10,542	95,157 lbs	410	3,698 hours	$ 20,873	$ 187,859	$ 10,711	$ 96,686
Asparagus	3,825	34,526 lbs	200	1,805 hours	$ 19,049	$ 171,437	$ 15,301	$ 138,112
Beets	16,830	151,915 lbs	400	3,611 hours	$ 48,470	$ 436,234	$ 39,277	$ 354,529
Bell Peppers	7,905	71,354 lbs	303	2,731 hours	$ 31,462	$ 283,157	$ 22,542	$ 203,474
Broccoli	6,630	59,845 lbs	222	2,005 hours	$ 15,647	$ 140,821	$ 9,197	$ 83,017
Brussels Sprouts	8,976	81,021 lbs	246	2,221 hours	$ 17,772	$ 159,952	$ 10,672	$ 96,328
Cabbage	27,115	244,752 lbs	283	2,551 hours	$ 45,553	$ 409,979	$ 38,036	$ 343,328
Carrots	20,145	181,838 lbs	927	8,369 hours	$ 46,938	$ 422,441	$ 30,046	$ 271,208
Cauliflower	6,843	61,763 lbs	120	1,080 hours	$ 25,112	$ 226,008	$ 19,293	$ 174,145
Chinese Cabbage	38,250	345,262 lbs	52	469 hours	$ 64,260	$ 578,340	$ 58,392	$ 527,074
Cucumbers	12,431	112,210 lbs	111	1,006 hours	$ 29,338	$ 264,040	$ 24,338	$ 219,687
Eggs	3,876	34,987 doz	76	686 hours	$ 23,799	$ 214,188	$ 12,328	$ 111,276
Garlic	2,916	26,317 lbs	356	3,212 hours	$ 27,493	$ 247,438	$ 13,347	$ 120,477
Hazelnuts	2,125	19,181 lbs	104	940 hours	$ 29,784	$ 268,056	$ 27,508	$ 248,302
Honey (One Hive/Acı	85	23,800 lbs	2	487 hours	$ 618	$ 173,026	$ 429	$ 120,109
Kale	6,375	57,544 lbs	140	1,264 hours	$ 25,500	$ 229,500	$ 23,243	$ 209,805
Lamb	341	3,075 lbs	128	1,152 hours	$ 2,725	$ 24,529	$ 806	$ 7,278
Lettuce	19,100	172,401 lbs	257	2,322 hours	$ 25,020	$ 225,183	$ 18,346	$ 165,597
Pak Choy	15,300	138,105 lbs	175	1,580 hours	$ 60,894	$ 548,046	$ 57,718	$ 520,986
Pears	12,800	115,539 lbs	208	1,873 hours	$ 30,080	$ 270,720	$ 25,405	$ 229,313
Green Beans	5,712	51,559 lbs	406	3,665 hours	$ 22,791	$ 205,118	$ 13,523	$ 122,067
Potatoes	16,703	150,764 lbs	299	2,701 hours	$ 32,236	$ 290,122	$ 24,374	$ 220,014
Pumpkins	25,585	230,942 lbs	120	1,085 hours	$ 43,495	$ 391,451	$ 38,965	$ 351,720
Radishes	16,830	151,915 lbs	348	3,140 hours	$ 41,738	$ 375,646	$ 34,152	$ 308,274
Snow Peas	8,713	78,643 lbs	753	6,800 hours	$ 69,526	$ 625,732	$ 55,445	$ 500,468
Spinach	10,965	98,975 lbs	930	8,395 hours	$ 87,501	$ 787,506	$ 70,997	$ 640,848
Sweet Corn	9,524	85,970 lbs	99	896 hours	$ 9,881	$ 88,933	$ 5,235	$ 47,249
Table Grapes	5,400	48,743 lbs	210	1,896 hours	$ 16,902	$ 152,118	$ 14,485	$ 130,749
Tomatoes	19,465	175,700 lbs	452	4,077 hours	$ 33,091	$ 297,815	$ 21,623	$ 195,176
Turnips	32,190	290,557 lbs	512	4,620 hours	$ 39,754	$ 357,786	$ 29,189	$ 263,473
Yellow Onions	27,872	251,581 lbs	256	2,309 hours	$ 30,241	$ 272,165	$ 22,464	$ 202,770
Zucchini	8,436	76,149 lbs	115	1,035 hours	$ 14,342	$ 129,075	$ 9,355	$ 84,447
		3,663,304 Lbs food		*83,678 hours*	Total Gross		*CM Total*	*$ 7,307,986*
		34,987 Doz eggs		***44 FTE-FL***	Revenue	***$ 9,454,419***	*(Less Fixed Costs)*	*$ 1,197,529*
							Total Return to	
TOTAL		***23,800 Lbs Honey***		***plus 56 FTE-OO***			***Owner/Operator***	***$ 6,110,457***

Appendix 6: Economic Potential of All Underutilized ALR Land

Production of 10 Most Profitable Crops on All Underutilized Land (3,339 acres)
*Assume each crop grown on 1/10th of the total area available (333.9 Acres)

Crop	Yield / Acre	Yield / 334 acres	Labor / Acre	Labour / 334 Acres	Gross Revenue/ Acre	Gross Revenue / 334 Acres	Contribution Margin / Acre	Contribution Margin / 334 Acres
Spinach	10,965	3,661,214 lbs	930	310,527 hours	$ 87,501	$ 29,225,234	$ 70,997	$ 23,705,797
Pak Choy	15,300	5,108,670 lbs	175	58,433 hours	$ 60,894	$ 20,338,596	$ 57,718	$ 19,271,946
Snow Peas	8,713	2,909,104 lbs	753	251,538 hours	$ 69,526	$ 23,221,601	$ 55,445	$ 18,512,953
Chinese Cabbage	38,250	12,771,675 lbs	52	17,363 hours	$ 64,260	$ 21,462,840	$ 58,392	$ 19,497,130
Beets	16,830	5,619,537 lbs	400	133,560 hours	$ 48,470	$ 16,189,114	$ 39,277	$ 13,114,470
Pumpkins	25,585	8,542,832 lbs	120	40,124 hours	$ 43,495	$ 14,527,163	$ 38,965	$ 13,010,575
Cabbage	27,115	9,053,699 lbs	283	94,382 hours	$ 45,553	$ 15,214,769	$ 38,036	$ 12,700,152
Radishes	16,830	5,619,537 lbs	348	116,146 hours	$ 41,738	$ 13,940,626	$ 34,152	$ 11,403,442
Turnips	32,190	10,748,074 lbs	512	170,896 hours	$ 39,754	$ 13,277,847	$ 29,189	$ 9,746,190
Carrots	20,145	6,726,416 lbs	927	309,575 hours	$ 46,938	$ 15,677,242	$ 30,046	$ 10,032,344
TOTALS		***70,760,756 Lbs food***		1,502,544 Total Hou ***783 FTE -FL*** ***plus 668 FTE-OO***	Total Gross Revenue	***$ 183,075,030***	Total CM *Less Fixed Costs* ***Total Return to Owner/Operator***	$ 150,994,997 *$ 14,280,531* ***$ 136,714,466***

Production of 10 Most Labour Intensive Crops on All Underutilized Land (3,339 Acres)
*Assume each crop grown on 1/10th of the total area available (334 Acres)

Crop	Yield / Acre	Yield / 334 acres	Labor / Acre	Labour / 334 Acres	Gross Revenue/ Acre	Gross Revenue / 334 Acres	Contribution Margin / Acre	Contribution Margin / 334 Acres
Spinach	10,965	3,661,214 lbs	930	310,527 hours	$ 87,501	$ 29,225,234	70,997	$ 23,705,797
Carrots	20,145	6,726,416 lbs	927	309,575 hours	$ 46,938	$ 15,677,242	30,046	$ 10,032,344
Snow Peas	8,713	2,909,104 lbs	753	251,538 hours	$ 69,526	$ 23,221,601	55,445	$ 18,512,953
Turnips	32,190	10,748,074 lbs	512	170,896 hours	$ 39,754	$ 13,277,847	29,189	$ 9,746,190
Tomatoes	19,465	6,499,364 lbs	452	150,812 hours	$ 33,091	$ 11,052,227	21,623	$ 7,219,821
Apple (Jonagold)	10,542	3,519,989 lbs	410	136,788 hours	$ 20,873	$ 6,971,666	10,711	$ 3,576,540
Green Beans	5,712	1,907,237 lbs	406	135,563 hours	$ 22,791	$ 7,612,154	13,523	$ 4,515,430
Beets	16,830	5,619,537 lbs	400	133,560 hours	$ 48,470	$ 16,189,114	39,277	$ 13,114,470
Garlic	2,916	973,485 lbs	356	118,813 hours	$ 27,493	$ 9,182,717	13,347	$ 4,456,586
Radishes	16,830	5,619,537 lbs	348	116,146 hours	$ 41,738	$ 13,940,626	34,152	$ 11,403,442
TOTALS		***48,183,956 Lbs***		1,834,218 hours ***955 FTE -FL*** ***plus 668 FTE-OO***	Total Gross Revenue	***$ 146,350,426***	Total CM *(Less Fixed Costs)* ***Total Return to Owner/Operator***	$ 106,283,573 *$ 14,280,531* ***$ 92,003,041***

Production of 10 Most Highly Consumed Crops on All Underutilized Land (3,339 Acres)
*Assume each crop grown on 1/10th of the total area available (334 Acres)

Crop	Yield / Acre	Yield / 334 acres	Labor / Acre	Labour / 334 Acres	Gross Revenue/ Acre	Gross Revenue / 334 Acres	Contribution Margin / Acre	Contribution Margin / 334 Acres
Potatoes	16,703	5,576,965 lbs	299	99,920 hours	$ 32,236	$ 10,766,766	24,374	$ 8,138,591
Apple (Jonnagold)	10,542	3,519,989 lbs	410	136,788 hours	$ 20,873	$ 6,971,666	10,711	$ 3,576,540
Organic Egg Produc	3,876	1,294,196 doz	76	25,376 hours	$ 23,799	$ 7,948,746	12,328	$ 4,116,242
Lettuce	19,100	6,377,323 lbs	257	85,896 hours	$ 25,020	$ 8,356,795	18,346	$ 6,125,657
Yellow Onions	27,872	9,306,294 lbs	256	85,415 hours	$ 30,241	$ 10,100,353	22,464	$ 7,500,715
Tomatoes	19,465	6,499,364 lbs	452	150,812 hours	$ 33,091	$ 11,052,227	21,623	$ 7,219,821
Carrots	20,145	6,726,416 lbs	927	309,575 hours	$ 46,938	$ 15,677,242	30,046	$ 10,032,344
Cabbage	27,115	9,053,699 lbs	283	94,382 hours	$ 45,553	$ 15,214,769	38,036	$ 12,700,152
Table Grapes	5,400	1,803,060 lbs	210	70,136 hours	$ 16,902	$ 5,645,268	14,485	$ 4,836,571
Cucumbers	12,431	4,150,794 lbs	111	37,209 hours	$ 29,338	$ 9,798,809	24,338	$ 8,126,508
TOTALS		***53,013,903 Lbs produce*** ***1,294,196 Doz eggs***		1,095,508 hours ***571 FTE -FL*** ***plus 668 FTE-OO***	Total Gross Revenue	***$ 101,532,639***	CM Total *(Less Fixed Costs)* ***Total Return to Owner/Operator***	$ 72,373,141 *$ 14,280,531* ***$ 58,092,610***

Production of All Crops on All Underutilized Land (3,339 Acres)

*Assume each crop grown on 1/31nd of the total area available (108 acres), except honey, which is produced at a rate of one hive per acre

Crop	Yield / Acre	Yield / 108 acres	Labor/ Acre	Labour / 334 Acres	Gross Revenue/ Acre	Gross Revenue / 108 Acres	Contribution Margin / Acre	Contribution Margin / 108 Acres
Apple(Jonagold)	10,542	1,135,480 lbs	410	44,125 hours	$ 20,873	$ 2,254,311	$ 10,711	$ 1,153,723
Asparagus	3,825	411,990 lbs	200	21,542 hours	$ 19,049	$ 2,057,238	$ 15,301	$ 1,648,047
Beets	16,830	1,812,754 lbs	400	43,084 hours	$ 48,470	$ 5,234,803	$ 39,277	$ 4,230,474
Bell Peppers	7,905	851,445 lbs	303	32,582 hours	$ 31,462	$ 3,397,885	$ 22,542	$ 2,427,989
Broccoli	6,630	714,115 lbs	222	23,922 hours	$ 15,647	$ 1,689,854	$ 9,197	$ 990,618
Brussels Sprouts	8,976	966,802 lbs	246	26,497 hours	$ 17,772	$ 1,919,428	$ 10,672	$ 1,149,454
Cabbage	27,115	2,920,548 lbs	283	30,446 hours	$ 45,553	$ 4,919,746	$ 38,036	$ 4,096,823
Carrots	20,145	2,169,811 lbs	927	99,863 hours	$ 46,938	$ 5,069,288	$ 30,046	$ 3,236,240
Cauliflower	6,843	737,003 lbs	120	12,887 hours	$ 25,112	$ 2,712,093	$ 19,293	$ 2,078,012
Chinese Cabbage	38,250	4,119,895 lbs	52	5,601 hours	$ 64,260	$ 6,940,080	$ 58,392	$ 6,289,397
Cucumbers	12,431	1,338,966 lbs	111	12,003 hours	$ 29,338	$ 3,168,477	$ 24,338	$ 2,621,454
Eggs	3,876	417,483 doz	76	8,186 hours	$ 23,799	$ 2,570,253	$ 12,328	$ 1,327,820
Garlic	2,916	314,028 lbs	356	38,327 hours	$ 27,493	$ 2,969,262	$ 13,347	$ 1,437,608
Hazelnuts	2,125	228,883 lbs	104	11,220 hours	$ 29,784	$ 3,216,673	$ 27,508	$ 2,962,909
Honey (One Hive/A	85	283,815 lbs	2	5,810 hours	$ 618	$ 2,063,335	$ 429	$ 1,432,303
Kale	6,375	686,649 lbs	140	15,079 hours	$ 25,500	$ 2,754,000	$ 23,243	$ 2,503,529
Lamb	341	36,695 lbs	128	13,744 hours	$ 2,725	$ 294,348	$ 806	$ 86,842
Lettuce	19,100	2,057,201 lbs	257	27,708 hours	$ 25,020	$ 2,702,197	$ 18,346	$ 1,976,018
Pak Choy	15,300	1,647,958 lbs	175	18,849 hours	$ 60,894	$ 6,576,552	$ 57,718	$ 6,216,757
Pears	12,800	1,378,684 lbs	208	22,350 hours	$ 30,080	$ 3,248,640	$ 25,405	$ 2,736,312
Green Beans	5,712	615,238 lbs	406	43,730 hours	$ 22,791	$ 2,461,415	$ 13,523	$ 1,456,590
Potatoes	16,703	1,799,021 lbs	299	32,232 hours	$ 32,236	$ 3,481,469	$ 24,374	$ 2,625,352
Pumpkins	25,585	2,755,752 lbs	120	12,943 hours	$ 43,495	$ 4,697,406	$ 38,965	$ 4,196,960
Radishes	16,830	1,812,754 lbs	348	37,467 hours	$ 41,738	$ 4,507,747	$ 34,152	$ 3,678,530
Snow Peas	8,713	938,421 lbs	753	81,141 hours	$ 69,526	$ 7,508,781	$ 55,445	$ 5,971,920
Spinach	10,965	1,181,037 lbs	930	100,170 hours	$ 87,501	$ 9,450,076	$ 70,997	$ 7,647,031
Sweet Corn	9,524	1,025,854 lbs	99	10,690 hours	$ 9,881	$ 1,067,192	$ 5,235	$ 563,809
Table Grapes	5,400	581,632 lbs	210	22,624 hours	$ 16,902	$ 1,825,416	$ 14,485	$ 1,560,184
Tomatoes	19,465	2,096,569 lbs	452	48,649 hours	$ 33,091	$ 3,573,774	$ 21,623	$ 2,328,975
Turnips	32,190	3,467,121 lbs	512	55,128 hours	$ 39,754	$ 4,293,436	$ 29,189	$ 3,143,932
Yellow Onions	27,872	3,002,030 lbs	256	27,553 hours	$ 30,241	$ 3,265,982	$ 22,464	$ 2,419,586
Zucchini	8,436	908,666 lbs	115	12,350 hours	$ 14,342	$ 1,548,896	$ 9,355	$ 1,007,676
		43,713,001 Lbs food		998,502 hours	Total Gross		CM Total	$ 87,202,873
		417,483 Doz eggs		***520 FTE -FL***	Revenue	***$ 113,440,053***	*(Less Fixed Costs)*	*$ 14,280,531*
							Total Return to	
TOTALS		***283,815 lbs honey***		***plus 668 FTE-OO***			***Owner/Operator***	***$ 72,922,342***

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