

5 Outdoor Lighting

5.1 Outdoor Lighting Overview

The City of Langley's outdoor lighting required 5,046 GJ of electricity (1,401,713 kWh) in 2008, resulting in the production of 39 tonnes of CO₂e at a cost of \$108,797 (Table 5.1.1).

Table 5.1.1 – Summary of Outdoor Lighting Sector Emissions (2008)

Sector	Energy Type & Units		Total Use	Total Energy (GJ)	Total Costs	Total CO ₂ e (t)
Lighting	Electricity	kWh	1,401,713	5,046	\$108,797	39.2
Totals				5,046	\$108,797	39

Ornamental lighting accounts produced the majority of the lighting sector's GHG emissions (90 percent). Traffic signals generated the second highest volume of GHGs (8 percent) followed by sign lighting (3 percent; Figure 5.1.1)

Figure 5.1.1 – GHG Emissions in the Outdoor Lighting Subsectors (2008)

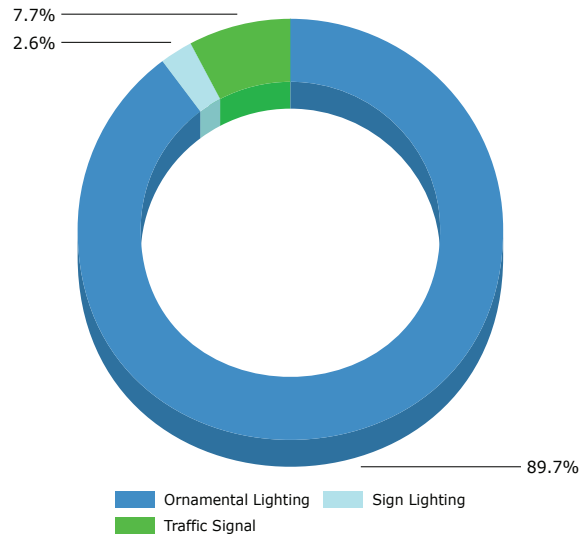


Table 5.1.2 ranks the top 10 lighting accounts by their GHG emissions. Ornamental street lighting was the single largest emitter of GHGs in the outdoor lighting sector, consuming 3,266 GJ of energy and producing 25 tonnes CO₂e. (Note that this account represents numerous lighting assets).

Table 5.1.2 – Outdoor Lighting Ranked by Energy Consumption (2008)

2008 Rank	Account	Energy	Costs	CO ₂ e
1	Ornamental Street Lighting 1 - Various Locations	3,266 GJ	\$67,195	25.4 t
2	Decorative Lighting - 5494 Salt Lane Ltg	162 GJ	\$3,720	1.3 t
3	M O L - 20300 Douglas Crs	154 GJ	\$3,530	1.2 t
4	Ornamental Street Lighting 12 - 20875 Fraser Hwy	127 GJ	\$2,914	1.0 t
5	Downtown Lighting - 5525 Salt Ln	126 GJ	\$2,906	1.0 t
6	Ornamental Street Lighting 7 - 20500 Douglas Crs	124 GJ	\$2,869	1.0 t
7	Landfill Kiosk - 4425 206th St	90 GJ	\$2,089	0.7 t
8	Ornamental Street Lighting 2 - 19620 48th Ave	87 GJ	\$2,005	0.7 t
9	Ornamental Street Lighting 6 - 5500 207th St	87 GJ	\$2,010	0.7 t
10	Ornamental Street Lighting 8 - 20600 Douglas Crs	69 GJ	\$1,618	0.5 t

5.2 Outdoor Lighting Forecast

Since the City has not identified any plans to add new ornamental or field lighting during the project period, no growth has been assigned to the forecast. Table 5.2.1 provides a forecast of projected energy consumption, energy costs and GHG emissions to 2018.

Table 5.2.1 – Forecast of Lighting Consumption

Sector	2008 (Base Year)			Change % Increment	2018 (Forecast Year)		
	Consumption	Cost	Emissions (t CO ₂ e)		Consumption	Cost	Emissions (t CO ₂ e)
Lighting							
Electricity	1,401,713 kWh	\$108,797	39.2	0%	1,401,718 kWh	\$210,257	39.2
	5,046 GJ	\$108,797	39.2			\$210,257	39.2

While energy consumption and GHG emissions in the lighting sector will remain stable over the project period, energy costs are expected to double. Rising energy prices will give impetus to further energy conservation measures in the lighting section.

5.3 Reduction Initiatives

Ornamental streetlights consume the most energy in this sector. Due to the small number of accounts and minimal energy consumed, this sector contains few energy reduction options.

Table 5.3 summarizes the estimated reductions in energy use, energy costs and GHG emissions for the proposed reduction initiatives (as approved by Council on an annual basis).

An estimated 1,646 GJ of energy can be saved by implementing outdoor lighting retrofits, which would lead to approximately \$37,000 in savings and a 13 tonnes reduction in CO₂e emissions.

Table 5.3.1 – Summary of Proposed Reduction Initiatives for the Outdoor Lighting Sector

Lighting		Reductions		
		Consumption	Costs	CO ₂ e (t)
SUBTOTALS	Electricity	457,203 kWh	\$37,010	3 t
TOTAL THIS SECTOR:		1,646 GJ	\$37,010	3 t

With the exception of ornamental streetlighting (e.g., streetlights in residential neighborhoods), the City's outdoor lighting is highly efficient: Seasonal decorative lighting is already LED technology, all traffic signals have been converted to LED technology, and flashing lights consume an insignificant amount of energy (e.g., ~3,000 kWh).

Overhead Streetlights

LED technology is advancing at a rapid rate. According to manufacturers, LEDs consume 30-40 percent less electricity than other available technology. With better optics and brighter LEDs, this technology could reduce electrical consumption from streetlights even further. BC Hydro is offering incentives for adaptive streetlight management. However, since LED technology should be reasonably priced within the 10 year project period, the City's ornamental light consumption is too low to justify a short-term adaptive management solution in lieu of a longer term with the LED project. GHG emissions savings from this initiative would be approximately 6 tonnes/year.

Sign Lighting

The lights within the existing Langley City Welcome sign could be replaced with LED lights, although an LED retrofit may be prohibitively expensive (e.g., \$3,000 for both signs). This initiative could save approximately 100 kg/year in GHG emissions.



6 Water and Wastewater

6.1 Water & Wastewater Overview

The City of Langley's 9 water and wastewater facilities consumed 1,835 GJ of electricity (Figure 6.1.1). These facilities include 1 major potable water reservoir, 3 remote valve chambers, 4 liquid waste stations and 1 sewage treatment lagoon. Overall, the water and wastewater sector cost \$36,948 and released 14 tonnes of CO₂e (Table 6.1.1). For a geographical representation of energy consumption, costs and GHG emissions, see Appendix II.

Table 6.1.1 – Summary of Water and Wastewater Sector Emissions (2008)

Sector	Energy Type & Units		Total Use	Total Energy (GJ)	Total Costs	Total CO ₂ e (t)
Water & Wastewater	Electricity	kWh	509,588	1,835	\$36,948	14.3
Totals				1,835	\$36,948	14

The City's potable water reservoir produced 79 percent of emissions, while liquid waste lift stations accounted for 21 percent (Figure 6.1.2). The remote valve chambers and lagoon pumps produced an insignificant amount of emissions.

Figure 6.1.1 – Aerial photo of City-Owned Water and Wastewater Infrastructure that Consume Energy

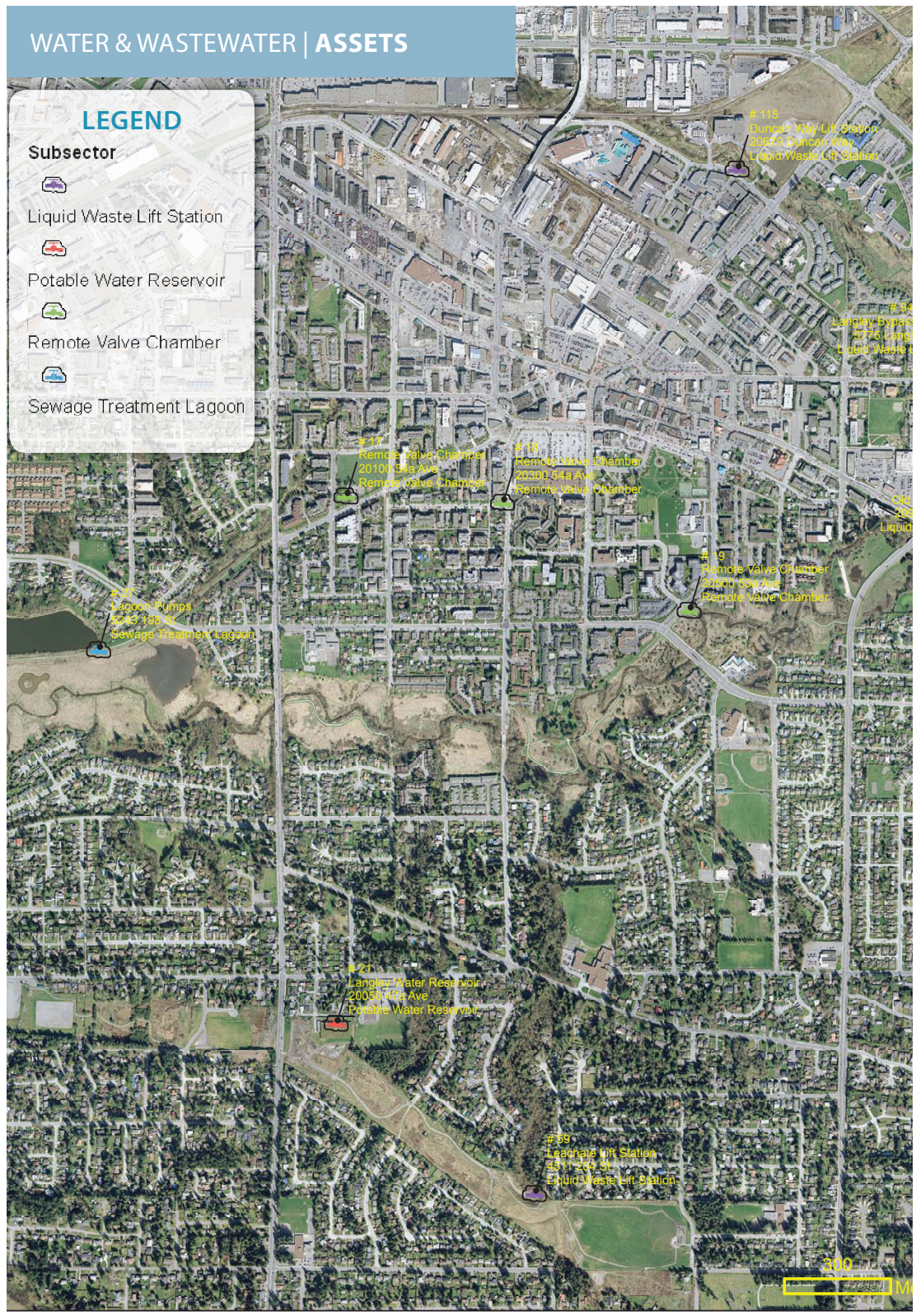


Figure 6.1.2 – GHG Emissions in the Water and Wastewater Subsectors (2008)

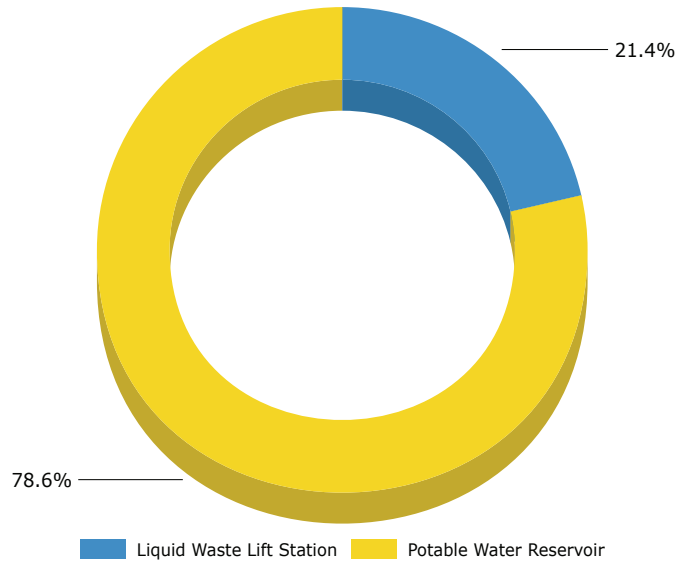


Table 6.1.2 rank the top 5 water and wastewater accounts by GHG emissions. The Langley Water Reservoir is the City's largest source of GHG emissions in the sector, producing 11 tonnes CO₂e in the 2008 inventory year. In total, the City's liquid waste lift stations contribute little (~3 tonnes CO₂e) to overall GHGs.

Table 6.1.2 – Water and Wastewater Ranked by Energy Consumption (2008)

2008 Rank	Account	Energy	Costs	CO ₂ e
1	Langley Water Reservoir - 20050 47a Ave	1,403 GJ	\$26,719	10.9 t
2	Duncan Way Lift Station - 20679 Duncan Way	148 GJ	\$3,395	1.2 t
3	Langley Bypass Liftstation - 5775 Langley Byp	123 GJ	\$2,846	1.0 t
4	Old Yale Lift Station - 20918 Old Yale Rd	84 GJ	\$1,944	0.7 t
5	Leachate Lift Station - 4511 204 St	53 GJ	\$1,253	0.4 t

6.2 Water and Wastewater Forecast

Since there are no plans to expand the City's water and wastewater infrastructure, the sector's energy consumption and GHG emissions should remain stable (Table 5.2.1). However, energy costs will likely double over the project period (Table 6.2.2).

Table 6.2.2 – Forecast of Water and Wastewater Consumption

Sector	2008 (Base Year)			Change % Increment	2018 (Forecast Year)		
	Consumption	Cost	Emissions (t CO ₂ e)		Consumption	Cost	Emissions (t CO ₂ e)
Water & Wastewater							
Electricity	509,588 kWh	\$36,948	14.3	0%	509,585 kWh	\$76,438	14.3
	1,835 GJ	\$36,948	14.3			\$76,438	14.3

6.3 Reduction Initiatives

Reductions in the water and wastewater sector are difficult to quantify, since small reductions occur as older motors are replaced with more efficient models. No other quantitative reduction initiatives can be applied to this sector because the opportunities are limited and the payback period for new motors is generally 15-25 years, depending on the motor's duty cycle and the volume of water pumped. The longer payback of replacing a pump makes it difficult for City Staff to justify replacing a pump before its life ends.

Proposed Reduction Measures, Reduction Quantity, and Capital Costs

Table 6.3.1 summarizes the estimated reductions in energy use, energy costs and GHG emissions for the proposed reduction initiatives (as approved by Council on an annual basis).

Implementing retrofits can save an estimated ~300 GJ of energy, or about \$6,000, and reduce CO₂ emissions by approximately 2 tonnes. These savings will emerge as motors are replaced over the project period (under the City's scheduled replacement program).

Table 6.3.1 – Summary of Proposed Reduction Initiatives for the Water and Wastewater Sector

Water & Wastewater		Reductions		
		Consumption	Costs	CO ₂ e (t)
SUBTOTALS	Electricity	81,108 kWh	\$5,986	1 t
TOTAL THIS SECTOR:		292 GJ	\$5,986	1 t

The following reduction initiatives are proposed:

- i. Install meters in all corporate facilities to account for water use and eliminate water loss. Meters vary in cost from \$400-\$800;
- ii. Continue and consider tightening lawn-watering restrictions;
- iii. Increase water conservation awareness (e.g. through school campaigns and public awareness programs);
- iv. Conduct industrial/commercial water audits and implement residential water audits to reduce demand on potable water pumps and conserve water. Costs vary and must be further explored;
- v. Upon failure, replace water appliances with low-flow toilets, dual flush toilets, waterless urinals, tankless urinals, tap sensors and other water-saving devices in corporate buildings. These measures save on water expenses but do not reduce energy consumption in the City because potable water delivery is gravity-fed;
- vi. Discourage garburators in new developments and urge residents to remove existing garburators. This will reduce demand on the wastewater treatment plants and on sanitary pump stations;
- vii. Continue to replace old motors and pumps with high-efficiency models. Costs vary depending on whether the motor needs replacing/rewinding or the entire pump assembly requires replacement.

Though difficult to calculate, these initiatives could cut approximately 2 tonnes of CO₂e from the water and wastewater sector.



7 Vehicle Fleet

7.1 Vehicle Fleet Overview

The vehicle fleet includes all 51 motorized vehicles and equipment operated by the City of Langley. In 2008, these vehicles consumed 5,100 GJ of energy, cost \$172,373 in fuel and produced 366 tonnes of CO₂e.

Table 7.1.1 summarizes vehicle fleet emissions by fuel type. The fleet's main fuel source was diesel fuel, with diesel vehicles and equipment using 87,747 litres of fuel and generating 244 tonnes of CO₂e. Gasoline was the second largest source of emissions, at 118 tonnes of CO₂e. Stationary and mobile propane generated approximately 4 tonnes of CO₂e. For a complete list of vehicle fleet accounts, see Appendix I.

Table 7.1.1 – Summary of Vehicle Fleet Sector Emissions (2008)

Sector	Energy Type & Units		Total Use	Total Energy (GJ)	Total Costs	Total CO ₂ e (t)
Vehicle Fleet	Propane	litres	2,489	63	\$2,489	3.8
	Gasoline	litres	47,367	1,642	\$56,055	118.3
	Diesel Fuel	litres	87,747	3,394	\$113,763	243.9
	Mbl Propane	litres	66	2	\$66	0.1
Totals				5,100	\$172,373	366

The fleets' largest GHG emitters were diesel fuel dump trucks and medium to heavy trucks, each producing 20% of total emissions. Diesel fuel tractors, graders & backhoes generated 17 percent of emissions followed by diesel fuel fire department vehicles (13 percent) and diesel fuel sweepers, packers & flushers (12 percent). Gasoline light trucks, vans and SUVs produced 9 percent of the sectors' emissions; the volume of GHGs from other gasoline vehicles was insignificant (Figure 7.1.1).

Figure 7.1.1 – Emissions for Vehicle Fleet Subsectors (2008)

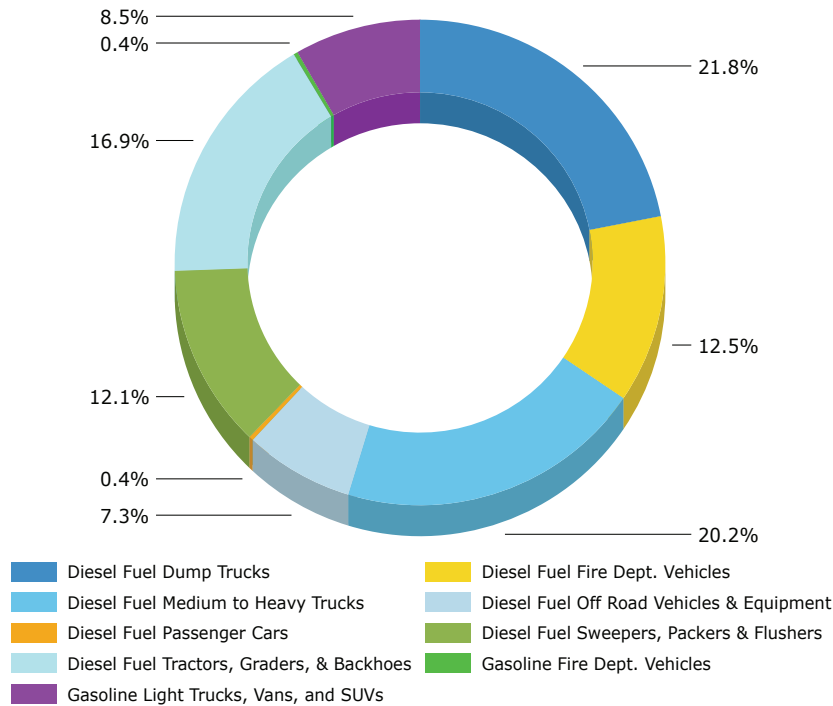


Table 7.1.2 ranks the top 10 vehicles by GHGs emitted. The greatest generator was the 2004 Johnston Sweeper (30 tonnes of CO₂e) followed by the 2006 Volvo Dumptruck (26 tonnes of CO₂e) and the fire department's Engine E-1. Other high consumption accounts are large diesel fuel vehicles such as backhoes and bucket trucks, which are typical used by local governments.

Table 7.1.2 – Ranking of Vehicle Fleet (2008)

2008 Rank	Account	Energy	Costs	CO ₂ e
1	2004 Johnston Sweeper - 208	416 GJ	\$14,180	29.9 t
2	2006 Volvo Dumptruck - 213	360 GJ	\$11,404	25.9 t
3	E-1, Engine 1 8042fs - 235	330 GJ	\$11,109	23.7 t
4	2007 Volvo Dumptruck - 218	281 GJ	\$9,121	20.2 t
5	2006 John Deere Backhoe 2526jt - 214	262 GJ	\$8,573	18.8 t
6	Various - -	232 GJ	\$8,385	16.7 t
7	2002 Gruhman Olson (Bucket Truck) - 190	167 GJ	\$4,649	12.0 t
8	1998 Gmc One Ton 2315mj - 171	156 GJ	\$5,272	11.2 t
9	2002 Ford F250 - 194	154 GJ	\$5,408	11.1 t
10	2008 Ford F450 2464kn - 221	155 GJ	\$5,142	11.1 t

6.2 Vehicle Fleet Forecast

Based on the fleet's expansion and vehicle replacements during the project period, fleet growth should not exceed 1 percent from the inventory year. Staff identified one new vehicle for building inspection duties above and beyond regular replacement (Table 7.2.1).

Table 7.2.1 – Predicted Growth in the Vehicle Fleet Sector

Sector	Deletions and Additions from 2008 to 2018	Forecast Percent (2018)
Vehicle Fleet	Addition of one building inspection vehicle estimated to use ~1,000 litres of gasoline a year.	<1%

The uncertainty of fuel prices is an important factor towards forecasting energy costs and fuel consumption (Table 7.2.2). The most unpredictable fuel prices are gasoline and diesel. A reputable source (Nesbitt Burns Oil & Gas Research - Oil & Gas Weekly) conservatively estimates \$2.50/litre of gasoline and \$2.25/litre of diesel fuel by 2018.

Forecasts of fuel prices largely depend on local and world economies and politics in oil-producing countries. From late 2008 to early 2009, fuel prices paralleled the declining global economy. Though the current economic downturn is unlikely to last to the end of the project period (10 years), there could be a rise in gasoline and diesel fuel prices in the near future. Fuel costs in 2008, at \$169,373, are expected to rise to \$318,404 by 2018, while GHGs may increase nominally by ~3 tonnes CO₂e (Table 7.2.2).

Table 7.2.2 – Forecast of Vehicle Fleet Consumption

Sector	2008 (Base Year)			Change		2018 (Forecast Year)		
	Consumption	Cost	Emissions (t CO ₂ e)	%	Increment	Consumption	Cost	Emissions (t CO ₂ e)
Vehicle Fleet								
Propane	2,489litres	\$2,489	3.8	0%		2,489 litres	\$2,489	3.8
Gasoline	47,367litres	\$56,055	118.3	0%	1,000	48,366 litres	\$118,418	121.1
Diesel Fuel	87,747litres	\$113,763	243.9	0%		87,746 litres	\$197,430	244.1
Mobile	66 litres	\$66	0.1	0%		66 litres	\$66	0.1
	5,100 GJ	\$172,373	366.1				\$318,404	369.0

6.3 Reduction Initiatives

Since the City operates only a small fleet, reduction initiatives are limited to driver behaviour, education, and the replacement of old models with fuel efficient vehicles.

Initiatives Completed and/or Underway

Reduction measures in the vehicle fleet sector are difficult to track from year to year since vehicle use (as indicated by kilometres travelled per year by an individual vehicle) depends on unknown factors (such as the number of projects undertaken by staff, proximity of projects to home base, etc.). The following initiatives are completed and/or underway:

- i. Public works vehicles have auxiliary power units to run lights and equipment without idling the vehicle engine;
- ii. Tier 3 emissions control equipment is specified on the purchase of diesel fuel vehicles;
- iii. Tire audits are conducted on a regular basis;

- iv. Integration of pool vehicles across departments relieves pressure for additional vehicles;
- v. Like-for-like vehicle replacement and downsizing, where appropriate, is undertaken as part of vehicle selection process; and,
- vi. Replacement schedules are well established for vehicle classes and maintenance costs are tracked to ensure the apt disposal of vehicles.

Proposed Reduction Initiatives

Table 6.3.1 summarizes the estimated reductions in energy use, energy costs and GHG emissions for proposed initiatives (as approved by Council on an annual basis).

Table 6.3.1 – Proposed Reduction Initiatives in the Vehicle Fleet Sector

Vehicle Fleet		Annual Savings		
		Consumption	Costs	CO ₂ e (t)
SUBTOTALS	Diesel Fuel	9,348 L	\$12,203	26 t
	Gasoline	3,228 L	\$3,887	8 t
TOTAL THIS SECTOR:		486 GJ	\$16,090	34 t

The following reduction initiatives are proposed:

- i. When purchasing vehicles, consider more than just the life-cycle costs and end residual value. Select fuel efficient vehicles (given the rising cost of fuel) that are sized appropriately for their given use. The fleet manager must adjust the weighting of price point so that vehicle equipment and fuel efficiency are carefully balanced according to specific vehicle use (equipment, number of crew, ancillary equipment, towing capabilities, etc.);
- ii. Establish regular and accurate fuel consumption and fuel efficiency reporting to ensure that staff understand their vehicles' performance and the effect of their driving on fuel efficiency;
- iii. Provide driver training for new and existing staff;
- iv. Adopt an Idle Free Policy to discourage unnecessary vehicle idling across all departments, including personal vehicle use while on city business;
- v. Ensure that all new passenger vehicles are as fuel efficient as possible for their assigned use. All new light trucks and utility vehicles without heavy load requirements should also be fuel efficient and,
- vi. Implement biodiesel fuel in 2012 (e.g., diesel fuel suppliers will be providing Biodiesel 5 in 2012 as per the Provincial *Renewable and Low Carbon Fuel Requirement Regulation*).

Proposed Reduction Initiatives

These reduction initiatives would save approximately 486 GJ of energy (e.g., ~9,000 litres of diesel fuel and 3,000 litres of gasoline), or about \$16,000 (calculated at 2008 costs for gasoline and diesel fuel). Estimated energy reductions would eliminate 34 tonnes of CO₂e.

The reduction estimate includes various measures already applied to classes of similar vehicles, as presented in the following subsections.

Diesel Fuel Dump Trucks

Switching to biodiesel in 2012 (note: federal regulation), the idle-free policy, and driver education could reduce 11 tonnes of CO₂e from this vehicle class. The total reductions in energy consumption, costs, and CO₂e (t) are in the table below.

DIESEL FUEL DUMP TRUCKS		Reductions		
		Consumption	Costs	CO ₂ e (t)
FUEL SWITCH				
	DIESEL	2,093 L	\$2,727	5.8 t
ENABLES MEASURES THROUGH ADMINISTRATIVE/POLICY CHANGE				
	DIESEL	1,364 L	\$1,800	3.8 t
VOLUNTARY INITIATIVE, CHALLENGE, OR THROUGH EDUCATION				
	DIESEL	390 L	\$514	1.1 t
SUBTOTALS	Diesel Fuel	3,847 L	\$5,041	11 t
TOTAL THIS SUBSECTOR:		149 GJ	\$5,041	11 t

Diesel Fuel Medium to Heavy Trucks

This class could reduce nine tonnes of CO₂e through educating drivers, instating an idle-free policy, and switching to biodiesel in 2012. Lessons on energy and fuel awareness, trip reductions, nitrogen tire inflation and tire audits would cut approximately 14 tonnes of CO₂e from diesel fuel consumption. Total reductions in consumption, costs, and CO₂e (t) are in the table below.

DIESEL FUEL MEDIUM TO HEAVY TRUCKS		Reductions		
		Consumption	Costs	CO ₂ e (t)
EFFICIENT TECHNOLOGY				
	DIESEL	414 L	\$537	1.2 t
FUEL SWITCH				
	DIESEL	2,816 L	\$3,648	7.8 t
EFFECTIVE MANAGEMENT/AUDITS				
	DIESEL	0 L	\$0	0.0 t
ENABLES MEASURES THROUGH ADMINISTRATIVE/POLICY CHANGE				
	DIESEL	1,491 L	\$1,931	4.1 t
VOLUNTARY INITIATIVE, CHALLENGE, OR THROUGH EDUCATION				
	DIESEL	331 L	\$429	0.9 t
SUBTOTALS	Diesel Fuel	5,052 L	\$6,545	14 t
TOTAL THIS SUBSECTOR:		195 GJ	\$6,545	14 t

Diesel Fuel Fire Department Vehicles

Reductions in the diesel fuel fire fleet are limited to idle-free policies (exempting vehicles in emergency calls), for a modest one tonne reduction in CO₂e. The table below provides total reductions in consumption, costs, and CO₂e (t).

DIESEL FUEL FIRE DEPT. VEHICLES		Reductions		
		Consumption	Costs	CO ₂ e (t)
ENABLES MEASURES THROUGH ADMINISTRATIVE/POLICY CHANGE				
DIESEL		225 L	\$308	0.6 t
VOLUNTARY INITIATIVE, CHALLENGE, OR THROUGH EDUCATION				
DIESEL		225 L	\$308	0.6 t
SUBTOTALS	Diesel Fuel	449 L	\$617	1 t
TOTAL THIS SUBSECTOR:		17 GJ	\$617	1 t

Gasoline Light Trucks, Vans, and SUVs

Initiatives in this vehicle class include an idle free policy, driver training for energy and fuel awareness, and trip reduction measures. Total reductions in energy consumption, costs, and CO₂e (t) are provided in the table below.

GASOLINE LIGHT TRUCKS, VANS, AND SUVs		Reductions		
		Consumption	Costs	CO ₂ e (t)
ENABLES MEASURES THROUGH ADMINISTRATIVE/POLICY CHANGE				
GASOLINE		1,959 L	\$2,412	4.9 t
VOLUNTARY INITIATIVE, CHALLENGE, OR THROUGH EDUCATION				
GASOLINE		560 L	\$689	1.4 t
SUBTOTALS	Gasoline	2,519 L	\$3,101	6 t
TOTAL THIS SUBSECTOR:		97 GJ	\$3,101	6 t

Gasoline Passenger Cars

Reduction initiatives for gasoline passenger cars involve trip reductions, an idle free policy, energy aware driver training, and fuel consumption awareness. Total reductions in energy consumption, costs, and CO₂e (t) are in the table below.

GASOLINE PASSENGER CARS		Reductions		
		Consumption	Costs	CO ₂ e (t)
ENABLES MEASURES THROUGH ADMINISTRATIVE/POLICY CHANGE				
GASOLINE		240 L	\$287	0.6 t
VOLUNTARY INITIATIVE, CHALLENGE, OR THROUGH EDUCATION				
GASOLINE		53 L	\$64	0.1 t
SUBTOTALS	Gasoline	293 L	\$351	1 t
TOTAL THIS SUBSECTOR:		11 GJ	\$351	1 t

Gasoline Fire Department Vehicles

Reductions in the gasoline fire fleet are limited to idle-free policies for non-emergencies, which could eliminate an estimated one tonne of CO₂e. For total reductions in energy consumption, costs, and CO₂e (t) see the table below.

GASOLINE FIRE DEPT. VEHICLES		Reductions		
		Consumption	Costs	CO ₂ e (t)
ENABLES MEASURES THROUGH ADMINISTRATIVE/POLICY CHANGE				
GASOLINE		324 L	\$338	0.8 t
VOLUNTARY INITIATIVE, CHALLENGE, OR THROUGH EDUCATION				
GASOLINE		93 L	\$97	0.2 t
SUBTOTALS	Gasoline	417 L	\$435	1 t
TOTAL THIS SUBSECTOR:		16 GJ	\$435	1 t



8 Corporate Solid Waste

8.1 Overview

The City of Langley's solid waste facilities generated 186 tonnes of CO₂e in 2008, or 18 percent of the City's emissions. Total CO₂e for corporate solid waste is a rough estimate based on the volume of waste bins and solid waste in the landfill. Please note that solid waste is presented here as a requirement for PCP inventories, but is not included in the calculation for provincial carbon neutral accounting.

8.2 Forecast

Since no new buildings or park facilities are proposed, the volume of solid waste is unlikely to increase substantially over the project period.

In future, the Province of BC may require that local governments (particularly Climate Action Charter signatories) track emissions from unrecycled paper. Accordingly, city staff could begin tracking their paper consumption in all facilities.

8.1 Reduction Initiatives

To reduce corporate solid waste in buildings, city staff can implement the following measures:

- i. Expand recycling and compost facilities for staff and the public in city-owned buildings;
- ii. Conduct a waste composition study and accurately track the volume and/or waste tonnage from corporate facilities;
- iii. Ensure all paper and cardboard are deposited in the appropriate recycling receptacle;
- iv. Ensure recycling containers are near all workstations. Department heads must include recycling containers for staff in their annual budgets;
- v. Increase recycling of #4 plastic (e.g., plastic films such as plastic wrapping);
- vi. Convert to paperless systems when possible and practical;
- vii. Use network printers and double-sided copying and printing; and,
- viii. Supplement these initiatives with employee education.

These initiatives could result in a reduction of 7 tonnes of CO₂e. This estimate is primarily based on paperless systems and double-sided copying and printing.



9 Summary & Conclusions

In 2008, the buildings sector ranked first in total energy consumed, energy costs and GHG emissions, followed by the vehicle fleet sector. A summary of overall emissions is provided in Table 9.1.1.

Table 9.1.1 – Inventory Summary

Parameter	2008
Energy Consumption	25,342 GJ
Energy Costs	\$504,717
Emissions	1,051 tonnes CO ₂ e

Summary of Corporate Emission Reductions

There are many opportunities for new GHG reductions within the City of Langley operations. By implementing the initiatives described in Sections 3 - 7 and the Technical Compendium of Reduction Initiatives, the City of Langley would reduce GHG emissions by 12 percent. Table 9.1.2 provides a summary of potential reductions from each corporate sector.

Table 9.1.2 – Summary of Estimated Impact of Reduction Measures on the Corporate Sectors

Sector	2008 Base Year Quantity (tonnes CO ₂ e)	2018 Emissions Projection (tonnes CO ₂ e)	Potential Reductions (2010-2018 implementation)	Emissions after Reductions (2018)	Overall % Reduction (2018)
Buildings	446	448	78	370	-17%
Outdoor Lighting ¹	39	39.2	13	26	-33%
Water and Wastewater	14	14.3	2	12	-12%
Vehicle Fleet	366	369	34	335	-8%
Corporate Solid Waste ²	186	186	7	179	-4%
Totals	1,051	1,057	134	923	-12%

¹ Lighting includes all outdoor streetlights owned by the City of Langley, sportsfield lighting, parking lots, etc.

² Solid waste from all City of Langley facilities

Reduction Target Statement:

The City of Langley can reduce 134 tonnes of GHG emissions or 12 percent of its 2008 base year emissions quantity by 2018.

Glossary of Terms (IPCC 2006)

CARBON DIOXIDE (CO₂):

A naturally occurring gas; also a byproduct of burning fossil fuels and biomass, as well as land use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1.

CLIMATE CHANGE:

A statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.

Note that the Framework Convention on Climate Change (UNFCCC), in its Article 1, defines "climate change" as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods." The UNFCCC thus makes a distinction between "climate change" attributable to human activities altering the atmospheric composition and "climate variability" attributable to natural causes.

EQUIVALENT CO₂ (CO₂E):

The concentration of CO₂ that would cause the same amount of radiative forcing as a given mixture of CO₂ and other greenhouse gases.

GJ (GIGAJOULES):

A Canadian unit of heating value equivalent to 943,213.3 Btu. The standard gas unit in Canada is the gigajoule pursuant to GISB under

Order 587-A (1997). A gigajoule (GJ) is a metric term used for measuring energy use. For example, 1 GJ is equal to 277.8 kWh of electricity, 26.9 m³ of natural gas, 25.9 litres of heating oil. Similar to the energy released when burning a million wooden matches, a gigajoule of gas will cook over 2500 hamburgers, and a gigajoule of electricity will keep a 60-watt bulb continuously lit for six months.

GREENHOUSE GAS:

Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. This property of greenhouse gases causes the greenhouse effect. Water vapour (H₂O), carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄) and ozone (O₃) are the primary greenhouse gases in the Earth's atmosphere. Moreover, there are a number of entirely human-made greenhouse gases in the atmosphere, such as the halocarbons and other chlorine- and bromine-containing substances, dealt with under the Montreal Protocol. Besides CO₂, N₂O, and CH₄, the Kyoto Protocol deals with the greenhouse gases sulphur hexafluoride (SF₆), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs).

KYOTO PROTOCOL TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC):

The Kyoto Protocol was adopted at the Third Session of the Conference of the Parties (COP) to the UNFCCC in 1997 in Kyoto, Japan. It contains legally binding commitments in addition to those included in the UNFCCC. Countries included in Annex B of the Protocol (Organisa-

tion for Economic Co-operation and Development countries and countries with economies in transition) agreed to reduce their anthropogenic greenhouse gas emissions (CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆) by at least 5% below 1990 levels in the commitment period 2008 to 2012. The Kyoto Protocol entered into force on February 16, 2005.

METHANE (CH₄):

An odorless, colorless, flammable gas, CH₄, the major constituent of natural gas, that is used as a fuel and is an important source of hydrogen and a wide variety of organic compounds.

NITROUS OXIDE (N₂O):

A powerful greenhouse gas with a global warming potential most recently evaluated at 310. Major sources of nitrous oxide include soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC):

The Convention was adopted on May 9, 1992, in New York and signed at the 1992 Earth Summit in Rio de Janeiro by more than 150 countries and the European Community. Its ultimate objective is the "stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." It contains commitments for all parties. Under the Convention, parties included in Annex I aim to return greenhouse gas emissions not controlled by the Montreal Protocol to 1990 levels by the year 2000. The convention entered into force in March 1994. See: Kyoto Protocol.



Langley City
Corporate Energy & Greenhouse Gas Emissions Inventory: 2008

Account & Address	Account Consumption & Costs by Energy Type						Account Subtotal	
	Type	Consumption	Energy	Costs	CO ₂ e	Energy	Costs	CO ₂ e
2008								
BUILDINGS								
Administration Offices								
CITY HALL AND LIBRARY - 20399 DOUGLAS CRIS	Electricity	599,385 kWh	2,158 GJ	\$35,347	16.8 t	3,337 GJ	\$50,500	77.1 t
	Natural Gas	1,179 GJ	1,179 GJ	\$15,153	60.3 t			
Administration Offices Subtotal		599,385 kWh	2,158 GJ	\$35,347	16.8 t	3,337 GJ	\$50,500	77.1 t
	Natural Gas	1,179 GJ	1,179 GJ	\$15,153	60.3 t			
Community Centre								
DOUGLAS RECREATION CENTRE - 20550 DOUGLAS CRIS	Electricity	84,867 kWh	306 GJ	\$6,948	2.4 t	911 GJ	\$14,950	33.3 t
	Natural Gas	605 GJ	605 GJ	\$8,002	31.0 t			
NICOMERK MULTI PURPOSE ROOM - 20050 53RD AVE	Electricity	1,820 kWh	7 GJ	\$209	0.1 t	7 GJ	\$209	0.1 t
TIMMS COMMUNITY CENTRE - 20355 DOUGLAS CRIS	Electricity	99,815 kWh	359 GJ	\$8,222	2.8 t	952 GJ	\$15,984	33.1 t
	Natural Gas	592 GJ	592 GJ	\$7,762	30.3 t			
Community Centre Subtotal		186,503 kWh	671 GJ	\$15,379	5.2 t	1,869 GJ	\$31,143	66.5 t
	Natural Gas	1,197 GJ	1,197 GJ	\$15,764	61.3 t			
Fire Services								
FIRE HALL - 5785 203RD ST	Electricity	269,967 kWh	972 GJ	\$19,369	7.6 t	1,921 GJ	\$31,726	56.1 t
	Natural Gas	949 GJ	949 GJ	\$12,356	48.6 t			
Fire Services Subtotal		269,967 kWh	972 GJ	\$19,369	7.6 t	1,921 GJ	\$31,726	56.1 t
	Natural Gas	949 GJ	949 GJ	\$12,356	48.6 t			
Historic Site								

2008 Energy & Greenhouse Gas Emissions Inventory

18/11/2009



Energy & Emissions Monitoring and Reporting System™ v.3.01

Langley City Corporate Energy & Greenhouse Gas Emissions Inventory: 2008

Account & Address	Account Consumption & Costs by Energy Type						Account Subtotal	
	Type	Consumption	Energy	Costs	CO ₂ e	Energy	Costs	CO ₂ e
INNES CORNERS PLAZA - 20399 FRASER HWY	Electricity	75,146 kWh	271 GJ	\$6,163	2.1 t	271 GJ	\$6,163	2.1 t
	Staff to confirm account. Consumption seems high for this asset.							
Historic Site Subtotal	Electricity	75,146 kWh	271 GJ	\$6,163	2.1 t	271 GJ	\$6,163	2.1 t
Outdoor Pools								
ANDERSON MEMORIAL POOL - 4949 207TH ST	Electricity	140,443 kWh	506 GJ	\$12,064	3.9 t	3,039 GJ	\$19,908	133.5 t
	Natural Gas	2,533 GJ	2,533 GJ	\$7,844	129.6 t			
Outdoor Pools Subtotal	Electricity	140,443 kWh	506 GJ	\$12,064	3.9 t	3,039 GJ	\$19,908	133.5 t
	Natural Gas	2,533 GJ	2,533 GJ	\$7,844	129.6 t			
Parks & Playing Fields								
BRIDGON PARK - 5353 198 ST	Electricity	8,172 kWh	29 GJ	\$719	0.2 t	29 GJ	\$719	0.2 t
	Washroom							
CITY PARK - 20695 48TH AVE	Electricity	104 kWh	0 GJ	\$77	0.0 t	0 GJ	\$77	0.0 t
CITY PARK - 4897 207TH ST	Electricity	7,722 kWh	28 GJ	\$688	0.2 t	28 GJ	\$688	0.2 t
	Washroom							
CONDOR PARK - 19810 50TH AVE	Electricity	7,423 kWh	27 GJ	\$662	0.2 t	27 GJ	\$662	0.2 t
	Washroom							
CONDOR PARK - 19850 50TH AVE	Electricity	549 kWh	2 GJ	\$53	0.0 t	2 GJ	\$53	0.0 t
LINDWOOD PARK - 5470 201ST ST	Electricity	20,483 kWh	74 GJ	\$1,718	0.6 t	74 GJ	\$1,718	0.6 t
	Washroom							
PORTAGE PARK - 5151 204TH ST	Electricity	3,843 kWh	14 GJ	\$371	0.1 t	14 GJ	\$371	0.1 t
	Washroom							
ROTARY CENTENNIAL PARK - 5514 208TH ST	Electricity	23,551 kWh	85 GJ	\$1,966	0.7 t	85 GJ	\$1,966	0.7 t
SENDALL GARDENS - 20166 50TH AVE	Electricity	31,602 kWh	114 GJ	\$2,212	0.9 t	757 GJ	\$10,412	33.8 t
	Natural Gas	644 GJ	644 GJ	\$8,201	32.9 t			
	This location has two natural gas accounts.							

Langley City Corporate Energy & Greenhouse Gas Emissions Inventory: 2008

Account & Address	Account Consumption & Costs by Energy Type				Account Subtotal																																																																																																																																																																																										
	Type	Consumption	Energy	Costs	CO ₂ e	Energy	Costs	CO ₂ e																																																																																																																																																																																							
Parks & Playing Fields Subtotal	Electricity	103,449 kWh	372 GJ	\$8,466	2.9 t	1,016 GJ	\$16,666	35.8 t																																																																																																																																																																																							
	Natural Gas	644 GJ	644 GJ	\$8,201	32.9 t				Public Works Bldgs & Yards									OPERATIONS CENTRE - 5713 198TH ST	Electricity	141,222 kWh	508 GJ	\$12,660	4.0 t	1,890 GJ	\$30,491	74.6 t		Natural Gas	1,382 GJ	1,382 GJ	\$17,831	70.7 t	Public Works Bldgs & Yards Subtotal	Electricity	141,222 kWh	508 GJ	\$12,660	4.0 t	1,890 GJ	\$30,491	74.6 t		Natural Gas	1,382 GJ	1,382 GJ	\$17,831	70.7 t				Buildings Subtotal		Consumption	Energy	Costs	CO ₂ e	13,343 GJ	\$186,598	445.7 t		Electricity	1,516,114 kWh	5,458 GJ	\$109,448	42.5 t					Natural Gas	7,884 GJ	7,884 GJ	\$77,151	403.3 t				LIGHTING									Flashing Warning Lights									FLASHERS - 4950 200TH ST	Electricity	2,768 kWh	10 GJ	\$287	0.1 t	10 GJ	\$287	0.1 t	FLASHERS - 20800 GRADE CRIS	Electricity	196 kWh	1 GJ	\$84	0.0 t	1 GJ	\$84	0.0 t	Flashing Warning Lights Subtotal	Electricity	2,964 kWh	11 GJ	\$372	0.1 t	11 GJ	\$372	0.1 t	Ornamental Lighting									DECORATIVE LIGHTING - 5494 SALT LANE LTG	Electricity	45,130 kWh	162 GJ	\$3,720	1.3 t	162 GJ	\$3,720	1.3 t	DOWNTOWN LIGHTING - 5525 SALT LN	Electricity	35,082 kWh	126 GJ	\$2,906	1.0 t	126 GJ	\$2,906	1.0 t	M O L - 20300 DOUGLAS CRIS	Electricity	42,722 kWh	154 GJ	\$3,530	1.2 t	154 GJ	\$3,530	1.2 t	ORNAMENTAL STREET LIGHTING 1 - - VARIOUS LOCATIONS	Electricity	907,106 kWh	3,266 GJ	\$67,195	25.4 t	3,266 GJ	\$67,195	25.4 t	ORNAMENTAL STREET LIGHTING 10 - 5755 203RD ST	Electricity	16,815 kWh	61 GJ	\$1,425	0.5 t	61 GJ	\$1,425	0.5 t	ORNAMENTAL STREET LIGHTING 11 - 20875 FRASER HWY	Electricity	2,788 kWh	10 GJ	\$289	0.1 t	10 GJ	\$289	0.1 t	ORNAMENTAL STREET LIGHTING 12 - 20875 FRASER HWY	Electricity	35,192 kWh	127 GJ	\$2,914	1.0 t
Public Works Bldgs & Yards																																																																																																																																																																																															
OPERATIONS CENTRE - 5713 198TH ST	Electricity	141,222 kWh	508 GJ	\$12,660	4.0 t	1,890 GJ	\$30,491	74.6 t																																																																																																																																																																																							
	Natural Gas	1,382 GJ	1,382 GJ	\$17,831	70.7 t				Public Works Bldgs & Yards Subtotal	Electricity	141,222 kWh	508 GJ	\$12,660	4.0 t	1,890 GJ	\$30,491	74.6 t		Natural Gas	1,382 GJ	1,382 GJ	\$17,831	70.7 t				Buildings Subtotal		Consumption	Energy	Costs	CO ₂ e	13,343 GJ	\$186,598	445.7 t		Electricity	1,516,114 kWh	5,458 GJ	\$109,448	42.5 t					Natural Gas	7,884 GJ	7,884 GJ	\$77,151	403.3 t				LIGHTING									Flashing Warning Lights									FLASHERS - 4950 200TH ST	Electricity	2,768 kWh	10 GJ	\$287	0.1 t	10 GJ	\$287	0.1 t	FLASHERS - 20800 GRADE CRIS	Electricity	196 kWh	1 GJ	\$84	0.0 t	1 GJ	\$84	0.0 t	Flashing Warning Lights Subtotal	Electricity	2,964 kWh	11 GJ	\$372	0.1 t	11 GJ	\$372	0.1 t	Ornamental Lighting									DECORATIVE LIGHTING - 5494 SALT LANE LTG	Electricity	45,130 kWh	162 GJ	\$3,720	1.3 t	162 GJ	\$3,720	1.3 t	DOWNTOWN LIGHTING - 5525 SALT LN	Electricity	35,082 kWh	126 GJ	\$2,906	1.0 t	126 GJ	\$2,906	1.0 t	M O L - 20300 DOUGLAS CRIS	Electricity	42,722 kWh	154 GJ	\$3,530	1.2 t	154 GJ	\$3,530	1.2 t	ORNAMENTAL STREET LIGHTING 1 - - VARIOUS LOCATIONS	Electricity	907,106 kWh	3,266 GJ	\$67,195	25.4 t	3,266 GJ	\$67,195	25.4 t	ORNAMENTAL STREET LIGHTING 10 - 5755 203RD ST	Electricity	16,815 kWh	61 GJ	\$1,425	0.5 t	61 GJ	\$1,425	0.5 t	ORNAMENTAL STREET LIGHTING 11 - 20875 FRASER HWY	Electricity	2,788 kWh	10 GJ	\$289	0.1 t	10 GJ	\$289	0.1 t	ORNAMENTAL STREET LIGHTING 12 - 20875 FRASER HWY	Electricity	35,192 kWh	127 GJ	\$2,914	1.0 t	127 GJ	\$2,914	1.0 t																					
Public Works Bldgs & Yards Subtotal	Electricity	141,222 kWh	508 GJ	\$12,660	4.0 t	1,890 GJ	\$30,491	74.6 t																																																																																																																																																																																							
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Buildings Subtotal		Consumption	Energy	Costs	CO ₂ e	13,343 GJ	\$186,598	445.7 t																																																																																																																																																																																							
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Ornamental Lighting																																																																																																																																																																																															
DECORATIVE LIGHTING - 5494 SALT LANE LTG	Electricity	45,130 kWh	162 GJ	\$3,720	1.3 t	162 GJ	\$3,720	1.3 t																																																																																																																																																																																							
DOWNTOWN LIGHTING - 5525 SALT LN	Electricity	35,082 kWh	126 GJ	\$2,906	1.0 t	126 GJ	\$2,906	1.0 t																																																																																																																																																																																							
M O L - 20300 DOUGLAS CRIS	Electricity	42,722 kWh	154 GJ	\$3,530	1.2 t	154 GJ	\$3,530	1.2 t																																																																																																																																																																																							
ORNAMENTAL STREET LIGHTING 1 - - VARIOUS LOCATIONS	Electricity	907,106 kWh	3,266 GJ	\$67,195	25.4 t	3,266 GJ	\$67,195	25.4 t																																																																																																																																																																																							
ORNAMENTAL STREET LIGHTING 10 - 5755 203RD ST	Electricity	16,815 kWh	61 GJ	\$1,425	0.5 t	61 GJ	\$1,425	0.5 t																																																																																																																																																																																							
ORNAMENTAL STREET LIGHTING 11 - 20875 FRASER HWY	Electricity	2,788 kWh	10 GJ	\$289	0.1 t	10 GJ	\$289	0.1 t																																																																																																																																																																																							
ORNAMENTAL STREET LIGHTING 12 - 20875 FRASER HWY	Electricity	35,192 kWh	127 GJ	\$2,914	1.0 t	127 GJ	\$2,914	1.0 t																																																																																																																																																																																							

Langley City Corporate Energy & Greenhouse Gas Emissions Inventory: 2008

Account & Address	Account Consumption & Costs by Energy Type						Account Subtotal	
	Type	Consumption	Energy	Costs	CO ₂ e	Energy	Costs	CO ₂ e
ORNAMENTAL STREET LIGHTING 15 - 20151 FRASER HWY	Electricity	4,626 KWh	17 GJ	\$437	0.1 t	17 GJ	\$437	0.1 t
ORNAMENTAL STREET LIGHTING 16 - ORNAMENTAL STREET LTG	Electricity	8,006 KWh	29 GJ	\$621	0.2 t	29 GJ	\$621	0.2 t
ORNAMENTAL STREET LIGHTING 2 - 19620 48TH AVE	Electricity	24,158 KWh	87 GJ	\$2,005	0.7 t	87 GJ	\$2,005	0.7 t
ORNAMENTAL STREET LIGHTING 3 - 5475 206TH ST	Electricity	1,396 KWh	5 GJ	\$282	0.0 t	5 GJ	\$282	0.0 t
ORNAMENTAL STREET LIGHTING 5 - 20400 FRASER HWY	Electricity	18,408 KWh	66 GJ	\$1,554	0.5 t	66 GJ	\$1,554	0.5 t
ORNAMENTAL STREET LIGHTING 6 - 5500 207TH ST	Electricity	24,074 KWh	87 GJ	\$2,010	0.7 t	87 GJ	\$2,010	0.7 t
ORNAMENTAL STREET LIGHTING 7 - 20500 DOUGLAS CRIS	Electricity	34,550 KWh	124 GJ	\$2,869	1.0 t	124 GJ	\$2,869	1.0 t
ORNAMENTAL STREET LIGHTING 8 - 20600 DOUGLAS CRIS	Electricity	19,208 KWh	69 GJ	\$1,618	0.5 t	69 GJ	\$1,618	0.5 t
ORNAMENTAL STREET LIGHTING 9 - 20655 FRASER HWY	Electricity	13,813 KWh	50 GJ	\$1,182	0.4 t	50 GJ	\$1,182	0.4 t
Ornamental Lighting Subtotal	Electricity	1,233,075 KWh	4,439 GJ	\$94,559	34.5 t	4,439 GJ	\$94,559	34.5 t
Parking Lot Lighting (open)								
PARKING LOT LIGHTS - 20376 56TH AVE	Electricity	1,535 KWh	6 GJ	\$153	0.0 t	6 GJ	\$153	0.0 t
Parking Lot Lighting (open) Subtotal	Electricity	1,535 KWh	6 GJ	\$153	0.0 t	6 GJ	\$153	0.0 t
Parks & Playing Fields								
CITY PARK BALL PARK LIGHTING - 20600 51ST AVE	Electricity	10,800 KWh	39 GJ	\$1,746	0.3 t	39 GJ	\$1,746	0.3 t
CITY PARK UNIDENTIFIED (FIELD LIGHTING?) - 4897 207TH ST LTS	Electricity	1,975 KWh	7 GJ	\$226	0.1 t	7 GJ	\$226	0.1 t
		Staff to confirm.						
Parks & Playing Fields Subtotal	Electricity	12,775 KWh	46 GJ	\$1,972	0.4 t	46 GJ	\$1,972	0.4 t
Seasonal Decorative Outdoor Lighting								
CHRISTMAS LIGHTING - 20151 FRASER HWY	Electricity	1,701 KWh	6 GJ	\$201	0.0 t	6 GJ	\$201	0.0 t
ELECTRICAL OUTLET - 203A ST SOUTH OF LOGAN	Electricity	8,206 KWh	30 GJ	\$728	0.2 t	30 GJ	\$728	0.2 t
Seasonal Decorative Outdoor Lighting Subtotal	Electricity	9,907 KWh	36 GJ	\$929	0.3 t	36 GJ	\$929	0.3 t

Langley City

Corporate Energy & Greenhouse Gas Emissions Inventory: 2008

Account & Address	Account Consumption & Costs by Energy Type						Account Subtotal		
	Type	Consumption	Energy	Costs	CO ₂ e	Energy	Costs	CO ₂ e	
Sign Lighting									
LANDFILL KIOSK - 4425 206TH ST	Electricity	24,955 KWh	90 GJ	\$2,089	0.7 t	90 GJ	\$2,089	0.7 t	
SIGN - 20500 MCBURNEY LN	Electricity	15,439 KWh	56 GJ	\$1,311	0.4 t	56 GJ	\$1,311	0.4 t	
Sign Lighting Subtotal		40,394 KWh	145 GJ	\$3,400	1.1 t	145 GJ	\$3,400	1.1 t	
Traffic Signal									
RAILWAY CROSSING - 19925 FRASER HWY	Electricity	2,250 KWh	8 GJ	\$245	0.1 t	8 GJ	\$245	0.1 t	
TRAFFIC SIGNAL - 4600 200TH ST	Electricity	241 KWh	1 GJ	\$17	0.0 t	1 GJ	\$17	0.0 t	
TRAFFIC SIGNAL - 4602 208TH ST	Electricity	878 KWh	3 GJ	\$63	0.0 t	3 GJ	\$63	0.0 t	
TRAFFIC SIGNAL - 4800 208TH ST	Electricity	2,514 KWh	9 GJ	\$182	0.1 t	9 GJ	\$182	0.1 t	
TRAFFIC SIGNAL - 4800 200TH ST	Electricity	2,538 KWh	9 GJ	\$183	0.1 t	9 GJ	\$183	0.1 t	
TRAFFIC SIGNAL - GRADE CRS 200TH ST	Electricity	2,587 KWh	9 GJ	\$187	0.1 t	9 GJ	\$187	0.1 t	
TRAFFIC SIGNAL - 200TH ST 53RD AVE	Electricity	2,947 KWh	11 GJ	\$213	0.1 t	11 GJ	\$213	0.1 t	
TRAFFIC SIGNAL - 5600 206TH ST	Electricity	2,394 KWh	9 GJ	\$173	0.1 t	9 GJ	\$173	0.1 t	
TRAFFIC SIGNAL - 20400 53RD AVE	Electricity	2,166 KWh	8 GJ	\$156	0.1 t	8 GJ	\$156	0.1 t	
TRAFFIC SIGNAL - 20500 53RD AVE	Electricity	9,578 KWh	34 GJ	\$692	0.3 t	34 GJ	\$692	0.3 t	
TRAFFIC SIGNAL - 20298 GRADE CRS	Electricity	2,683 KWh	10 GJ	\$194	0.1 t	10 GJ	\$194	0.1 t	
TRAFFIC SIGNAL - 203RD ST 53RD AVE	Electricity	2,274 KWh	8 GJ	\$164	0.1 t	8 GJ	\$164	0.1 t	
TRAFFIC SIGNAL - MICHAUD CRS 200TH ST	Electricity	2,731 KWh	10 GJ	\$197	0.1 t	10 GJ	\$197	0.1 t	
TRAFFIC SIGNAL - DOUGLAS CRS 203 ST 56 AVE	Electricity	3,995 KWh	14 GJ	\$289	0.1 t	14 GJ	\$289	0.1 t	
TRAFFIC SIGNAL - DOUGLAS CRS 204 ST	Electricity	2,358 KWh	8 GJ	\$170	0.1 t	8 GJ	\$170	0.1 t	
TRAFFIC SIGNAL - 20800 FRASER HWY	Electricity	1,473 KWh	5 GJ	\$106	0.0 t	5 GJ	\$106	0.0 t	
TRAFFIC SIGNAL - 20800 51B AVE	Electricity	2,286 KWh	8 GJ	\$165	0.1 t	8 GJ	\$165	0.1 t	

Langley City Corporate Energy & Greenhouse Gas Emissions Inventory: 2008

Account & Address	Account Consumption & Costs by Energy Type						Account Subtotal	
	Type	Consumption	Energy	Costs	CO ₂ e	Energy	Costs	CO ₂ e
TRAFFIC SIGNAL - 20700 51 st AVE	Electricity	1,949 kWh	7 GJ	\$141	0.1 t	7 GJ	\$141	0.1 t
TRAFFIC SIGNAL - GLOVER RD EASTLEIGH CIRS	Electricity	2,276 kWh	8 GJ	\$164	0.1 t	8 GJ	\$164	0.1 t
TRAFFIC SIGNAL - GLOVER RD KWANTLEN COLLEGE ENTRANCE	Electricity	1,952 kWh	7 GJ	\$141	0.1 t	7 GJ	\$141	0.1 t
TRAFFIC SIGNAL - GLOVER RD DUNCAN WAY	Electricity	2,036 kWh	7 GJ	\$147	0.1 t	7 GJ	\$147	0.1 t
TRAFFIC SIGNAL - 200 th St PRODUCTION WAY LOGAN AVE	Electricity	3,381 kWh	12 GJ	\$244	0.1 t	12 GJ	\$244	0.1 t
TRAFFIC SIGNAL - 56 th AVE 201 st ST	Electricity	2,298 kWh	8 GJ	\$166	0.1 t	8 GJ	\$166	0.1 t
TRAFFIC SIGNAL - 200 th St 56 th AVE	Electricity	3,080 kWh	11 GJ	\$223	0.1 t	11 GJ	\$223	0.1 t
TRAFFIC SIGNAL - 20000 FRASER HWY	Electricity	3,405 kWh	12 GJ	\$246	0.1 t	12 GJ	\$246	0.1 t
TRAFFIC SIGNAL - GLOVER RD LOGAN AVE	Electricity	2,373 kWh	9 GJ	\$172	0.1 t	9 GJ	\$172	0.1 t
TRAFFIC SIGNAL - 20400 LOGAN AVE	Electricity	719 kWh	3 GJ	\$52	0.0 t	3 GJ	\$52	0.0 t
TRAFFIC SIGNAL - 20300 FRASER HWY	Electricity	2,346 kWh	8 GJ	\$170	0.1 t	8 GJ	\$170	0.1 t
TRAFFIC SIGNAL - 20150 FRASER HWY	Electricity	2,659 kWh	10 GJ	\$192	0.1 t	10 GJ	\$192	0.1 t
TRAFFIC SIGNAL - 19900 FRASER HWY	Electricity	1,757 kWh	6 GJ	\$127	0.0 t	6 GJ	\$127	0.0 t
TRAFFIC SIGNAL - 203 rd St SOUTH OF MICHAUD CIRS	Electricity	818 kWh	3 GJ	\$59	0.0 t	3 GJ	\$59	0.0 t
TRAFFIC SIGNAL - FRASER HWY 56 th AVE	Electricity	1,516 kWh	5 GJ	\$110	0.0 t	5 GJ	\$110	0.0 t
TRAFFIC SIGNAL - 20900 FRASER HWY	Electricity	2,851 kWh	10 GJ	\$206	0.1 t	10 GJ	\$206	0.1 t
TRAFFIC SIGNAL - LANGLEY B/P 56 AVE	Electricity	3,054 kWh	11 GJ	\$221	0.1 t	11 GJ	\$221	0.1 t
TRAFFIC SIGNAL - 20300 LOGAN AVE	Electricity	2,502 kWh	9 GJ	\$181	0.1 t	9 GJ	\$181	0.1 t
TRAFFIC SIGNAL - 20300 GRADE CIRS	Electricity	2,250 kWh	8 GJ	\$245	0.1 t	8 GJ	\$245	0.1 t
TRAFFIC SIGNAL - 56 AVE 208 St	Electricity	2,479 kWh	9 GJ	\$168	0.1 t	9 GJ	\$168	0.1 t
TRAFFIC SIGNAL - 204 St PARK AVE	Electricity	2,538 kWh	9 GJ	\$172	0.1 t	9 GJ	\$172	0.1 t
TRAFFIC SIGNAL - 51 st AVE 206 St	Electricity	2,045 kWh	7 GJ	\$139	0.1 t	7 GJ	\$139	0.1 t

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Langley City

Corporate Energy & Greenhouse Gas Emissions Inventory: 2008

Account & Address	Account Consumption & Costs by Energy Type						Account Subtotal		
	Type	Consumption	Energy	Costs	CO ₂ e	Energy	Costs	CO ₂ e	
TRAFFIC SIGNAL - 56 AVE GLOVER RD	Electricity	2,358 kWh	8 GJ	\$160	0.1 t	8 GJ	\$160	0.1 t	
TRAFFIC SIGNAL - 53 AVE 51B ST	Electricity	1,709 kWh	6 GJ	\$116	0.0 t	6 GJ	\$116	0.0 t	
TRAFFIC SIGNAL - 206 ST DOUGLAS CRIS	Electricity	818 kWh	3 GJ	\$55	0.0 t	3 GJ	\$55	0.0 t	
Traffic Signal Subtotal		101,064 kWh	364 GJ	\$7,413	2.8 t	364 GJ	\$7,413	2.8 t	
Lighting Subtotal		Consumption	Energy	Costs	CO ₂ e	5,046 GJ	\$108,797	39.2 t	
	Electricity	1,401,713 kWh	5,046 GJ	\$108,797	39.2 t				
WATER & WASTEWATER									
Liquid Waste Lift Station									
DUNCAN WAY LIFT STATION - 20679 DUNCAN WAY	Electricity	41,107 kWh	148 GJ	\$3,395	1.2 t	148 GJ	\$3,395	1.2 t	
LANGLEY BYPASS LIFTSTATION - 5775 LANGLEY BYP	Electricity	34,289 kWh	123 GJ	\$2,846	1.0 t	123 GJ	\$2,846	1.0 t	
LEACHATE LIFT STATION - 4511 204 ST	Electricity	14,678 kWh	53 GJ	\$1,253	0.4 t	53 GJ	\$1,253	0.4 t	
OLD YALE LIFT STATION - 20918 OLD YALE RD	Electricity	23,252 kWh	84 GJ	\$1,944	0.7 t	84 GJ	\$1,944	0.7 t	
Liquid Waste Lift Station Subtotal		113,325 kWh	408 GJ	\$9,438	3.2 t	408 GJ	\$9,438	3.2 t	
Potable Water Reservoir									
LANGLEY WATER RESERVOIR - 20050 47A AVE	Electricity	389,621 kWh	1,403 GJ	\$26,719	10.9 t	1,403 GJ	\$26,719	10.9 t	
Potable Water Reservoir Subtotal		389,621 kWh	1,403 GJ	\$26,719	10.9 t	1,403 GJ	\$26,719	10.9 t	
Remote Valve Chamber									
REMOTE VALVE CHAMBER - 20100 54A AVE	Electricity	2,214 kWh	8 GJ	\$241	0.1 t	8 GJ	\$241	0.1 t	
REMOTE VALVE CHAMBER - 20300 54A AVE	Electricity	2,259 kWh	8 GJ	\$244	0.1 t	8 GJ	\$244	0.1 t	
REMOTE VALVE CHAMBER - 20500 53A AVE	Electricity	2,169 kWh	8 GJ	\$237	0.1 t	8 GJ	\$237	0.1 t	
Remote Valve Chamber Subtotal		6,642 kWh	24 GJ	\$723	0.2 t	24 GJ	\$723	0.2 t	

Langley City Corporate Energy & Greenhouse Gas Emissions Inventory: 2008

Account & Address	Account Consumption & Costs by Energy Type				Account Subtotal			
	Type	Consumption	Energy	Costs	CO ₂ e	Energy	Costs	CO ₂ e
Sewage Treatment Lagoon								
LAGOON PUMPS - 5243 198 ST				\$69			\$69	0.0 t
Sewage Treatment Lagoon Subtotal								
				\$69			\$69	0.0 t
Water & Wastewater Subtotal								
	Electricity	509,588 kWh	1,835 GJ	\$36,948	14.3 t	1,835 GJ	\$36,948	14.3 t
VEHICLE FLEET								
Diesel Fuel Dump Trucks								
1999 FORD DUMP 6505CH - 168	Gasoline	106 litres	4 GJ	\$142	0.3 t	41 GJ	\$1,529	3.0 t
	Diesel Fuel	975 litres	38 GJ	\$1,387	2.7 t			
2006 FORD F550 DUMP 9856KY - 225	Diesel Fuel	1,934 litres	75 GJ	\$2,633	5.4 t	75 GJ	\$2,633	5.4 t
2006 Volvo DUMPTRUCK - 213	Diesel Fuel	9,319 litres	360 GJ	\$11,404	25.9 t	360 GJ	\$11,404	25.9 t
2007 Volvo DUMPTRUCK - 218	Diesel Fuel	7,257 litres	281 GJ	\$9,121	20.2 t	281 GJ	\$9,121	20.2 t
Diesel Fuel Dump Trucks Subtotal								
	Gasoline	106 litres	4 GJ	\$142	0.3 t	757 GJ	\$24,687	54.4 t
	Diesel Fuel	19,484 litres	754 GJ	\$24,545	54.2 t			
Diesel Fuel Fire Dept. Vehicles								
E-1, ENGINE 1 8042ES - 235	Propane	32 litres	1 GJ	\$32	0.0 t	330 GJ	\$11,109	23.7 t
	Gasoline	358 litres	12 GJ	\$427	0.9 t			
	Diesel Fuel	8,199 litres	317 GJ	\$10,650	22.8 t			
E-11, ENGINE 11 0160WX - 236	Gasoline	168 litres	6 GJ	\$216	0.4 t	54 GJ	\$1,812	3.9 t
	Diesel Fuel	1,237 litres	48 GJ	\$1,595	3.4 t			
E-12, ENGINE 12 2290MJ - 237	Gasoline	100 litres	3 GJ	\$122	0.2 t	24 GJ	\$816	1.7 t
	Diesel Fuel	528 litres	20 GJ	\$695	1.5 t			
R-1, RESCUE 1 3785AP - 238	Gasoline	28 litres	1 GJ	\$38	0.1 t	17 GJ	\$591	1.2 t
	Diesel Fuel	420 litres	16 GJ	\$553	1.2 t			

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Langley City Corporate Energy & Greenhouse Gas Emissions Inventory: 2008

Account & Address	Account Consumption & Costs by Energy Type				Account Subtotal			
	Type	Consumption	Energy	Costs	CO ₂ e	Energy	Costs	CO ₂ e
TW-1, TOWER 1 2289MJ - 239	Gasoline Diesel Fuel	6 litres 849 litres	0 GJ 33 GJ	\$8 \$1,150	0.0 t 2.4 t	33 GJ	\$1,158	2.4 t
Diesel Fuel Fire Dept. Vehicles Subtotal	Propane Gasoline Diesel Fuel	32 litres 661 litres 11,233 litres	1 GJ 23 GJ 434 GJ	\$32 \$811 \$14,643	0.0 t 1.7 t 31.2 t	458 GJ	\$15,486	32.9 t
Diesel Fuel Medium to Heavy Trucks								
1991 FREIGHTLINER AN4645 - 137	Diesel Fuel	900 litres	35 GJ	\$976	2.5 t	35 GJ	\$976	2.5 t
1992 GMC FLATDECK 5680BJ - 142	Diesel Fuel	1,506 litres	58 GJ	\$1,875	4.2 t	58 GJ	\$1,875	4.2 t
1996 F-4450 FLATDECK 7408AA - 158	Diesel Fuel	1,378 litres	53 GJ	\$1,566	3.8 t	53 GJ	\$1,566	3.8 t
1996 FORD F450 - 161	Diesel Fuel	1,846 litres	71 GJ	\$2,490	5.1 t	71 GJ	\$2,490	5.1 t
1998 GMC ONE TON 2315MJ - 171	Diesel Fuel	4,031 litres	156 GJ	\$5,272	11.2 t	156 GJ	\$5,272	11.2 t
2002 FORD F350 FLATDECK - 195	Gasoline Diesel Fuel	2,935 litres 501 litres	102 GJ 19 GJ	\$3,550 \$622	7.3 t 1.4 t	121 GJ	\$4,172	8.7 t
		Staff to confirm vehicle fuel type.						
2002 FORD F450 - 189	Diesel Fuel	839 litres	32 GJ	\$1,132	2.3 t	32 GJ	\$1,132	2.3 t
2002 GRUJMAN OLSON (BUCKET TRUCK) - 190	Gasoline Diesel Fuel	4,568 litres 231 litres	158 GJ 9 GJ	\$4,227 \$423	11.4 t 0.6 t	167 GJ	\$4,649	12.0 t
		Staff to confirm vehicle fuel type.						
2007 FORD F450 CUBE VAN 2309MJ - 222	Propane Gasoline Diesel Fuel	17 litres 132 litres 2,172 litres	0 GJ 5 GJ 84 GJ	\$17 \$200 \$2,905	0.0 t 0.3 t 6.0 t	89 GJ	\$3,122	6.4 t
2008 FORD F450 2464AN - 221	Gasoline Diesel Fuel	115 litres 3,891 litres	4 GJ 151 GJ	\$155 \$4,988	0.3 t 10.8 t	155 GJ	\$5,142	11.1 t
2009 FORD F350 SERVICE TRUCK - 202	Gasoline Diesel Fuel	2,144 litres 817 litres	74 GJ 32 GJ	\$2,704 \$1,156	5.4 t 2.3 t	106 GJ	\$3,860	7.6 t
		Staff to confirm vehicle fuel type.						

Langley City Corporate Energy & Greenhouse Gas Emissions Inventory: 2008

Account & Address	Account Consumption & Costs by Energy Type						Account Subtotal		
	Type	Consumption	Energy	Costs	CO ₂ e	Energy	Costs	CO ₂ e	
Diesel Fuel Medium to Heavy Trucks Subtotal	Propane Gasoline Diesel Fuel	17 litres 9,895 litres 18,113 litres	0 GJ 343 GJ 701 GJ	\$17 \$10,835 \$23,405	0.0 t 24.7 t 50.3 t	1,044 GJ	\$34,256	75.1 t	
Diesel Fuel Off Road Vehicles & Equipment									
1995 Bobcat - 157	Propane Gasoline Diesel Fuel	107 litres 1,302 litres 308 litres	3 GJ 45 GJ 12 GJ	\$107 \$1,606 \$300	0.2 t 3.3 t 0.9 t	60 GJ	\$2,013	4.3 t	
Staff to confirm vehicle fuel type.									
VARIOUS - -	Diesel Fuel	6,001 litres	232 GJ	\$8,385	16.7 t	232 GJ	\$8,385	16.7 t	
Diesel Fuel Off Road Vehicles & Equipment Subtotal	Propane Gasoline Diesel Fuel	107 litres 1,302 litres 6,309 litres	3 GJ 45 GJ 244 GJ	\$107 \$1,606 \$8,686	0.2 t 3.3 t 17.5 t	292 GJ	\$10,399	21.0 t	
Diesel Fuel Passenger Cars									
2006 SMART CAR 373 JPK - 219	Gasoline Diesel Fuel	17 litres 294 litres	1 GJ 11 GJ	\$26 \$384	0.0 t 0.8 t	12 GJ	\$409	0.9 t	
Diesel Fuel Passenger Cars Subtotal	Gasoline Diesel Fuel	17 litres 294 litres	1 GJ 11 GJ	\$26 \$384	0.0 t 0.8 t	12 GJ	\$409	0.9 t	
Diesel Fuel Sweepers, Packers & Flushers									
2004 JOHNSTON SWEEPER - 208	Diesel Fuel	10,743 litres	416 GJ	\$14,180	29.9 t	416 GJ	\$14,180	29.9 t	
Diesel Fuel Sweepers, Packers & Flushers Subtotal	Diesel Fuel	10,743 litres	416 GJ	\$14,180	29.9 t	416 GJ	\$14,180	29.9 t	
Diesel Fuel Tractors, Graders, & Backhoes									
1990 JOHN DEERE GRADER 2316MU - 120	Diesel Fuel	771 litres	30 GJ	\$896	2.1 t	30 GJ	\$896	2.1 t	
1998 JOHN DEERE BACKHOE 6520CH - 169	Diesel Fuel	568 litres	22 GJ	\$625	1.6 t	22 GJ	\$625	1.6 t	
2006 JOHN DEERE 710G BACKHOE - 223	Diesel Fuel	3,744 litres	145 GJ	\$5,113	10.4 t	145 GJ	\$5,113	10.4 t	
2006 JOHN DEERE BACKHOE 2526DT - 214	Diesel Fuel	6,774 litres	262 GJ	\$8,573	18.8 t	262 GJ	\$8,573	18.8 t	

Langley City Corporate Energy & Greenhouse Gas Emissions Inventory: 2008

Account & Address	Account Consumption & Costs by Energy Type						Account Subtotal		
	Type	Consumption	Energy	Costs	CO ₂ e	Energy	Costs	CO ₂ e	
2007 NEW HOLLAND ENCL. TRACTOR - 228	Gasoline	106 litres	4 GJ	\$149	0.3 t	126 GJ	\$4,571	9.0 t	
	Diesel Fuel	3,152 litres	122 GJ	\$4,423	8.8 t				
Diesel Fuel Tractors, Graders, & Backhoes Subtotal		106 litres	4 GJ	\$149	0.3 t	584 GJ	\$19,778	42.0 t	
	Diesel Fuel	15,008 litres	581 GJ	\$19,630	41.7 t				
Gasoline Fire Dept. Vehicles									
2007 ASST CHIEF DODGE DAKOTA - 18	Gasoline	58 litres	2 GJ	\$86	0.1 t	4 GJ	\$140	0.3 t	
	Diesel Fuel	51 litres	2 GJ	\$54	0.1 t				
2007 DODGE DAKOTA - 230	Gasoline	1,140 litres	40 GJ	\$1,441	2.8 t	43 GJ	\$1,577	3.1 t	
	Diesel Fuel	101 litres	4 GJ	\$136	0.3 t				
2007 DODGE DAKOTA - 231	Gasoline	1,526 litres	53 GJ	\$1,575	3.8 t	60 GJ	\$1,803	4.3 t	
	Diesel Fuel	130 litres	5 GJ	\$161	0.4 t				
	Mbl Propane	66 litres	2 GJ	\$66	0.1 t				
2007 DODGE DAKOTA - 232	Gasoline	1,320 litres	46 GJ	\$1,042	3.3 t	48 GJ	\$1,111	3.4 t	
	Diesel Fuel	50 litres	2 GJ	\$69	0.1 t				
CW-1, COMMAND 1 7688CX - 233	Propane	49 litres	1 GJ	\$49	0.1 t	19 GJ	\$649	1.3 t	
	Gasoline	507 litres	18 GJ	\$601	1.3 t				
UTILITY TRUCK - 240	Gasoline	83 litres	3 GJ	\$96	0.2 t	3 GJ	\$96	0.2 t	
Gasoline Fire Dept. Vehicles Subtotal		49 litres	1 GJ	\$49	0.1 t	176 GJ	\$5,375	12.7 t	
	Gasoline	4,635 litres	161 GJ	\$4,840	11.6 t				
	Diesel Fuel	332 litres	13 GJ	\$420	0.9 t				
	Mbl Propane	66 litres	2 GJ	\$66	0.1 t				
Gasoline Light Trucks, Vans, and SUVs									
1990 SW SWENSON SAND SPREADER - 197	Gasoline	114 litres	4 GJ	\$134	0.3 t	4 GJ	\$134	0.3 t	
1993 CHEV PICKUP 1029BR - 146	Propane	2,207 litres	56 GJ	\$2,207	3.4 t	71 GJ	\$2,683	4.5 t	
	Gasoline	364 litres	13 GJ	\$410	0.9 t				
	Diesel Fuel	77 litres	3 GJ	\$67	0.2 t				
1996 FORD CUBE VAN 2309JM - 160	Gasoline	67 litres	2 GJ	\$85	0.2 t	2 GJ	\$85	0.2 t	

Langley City Corporate Energy & Greenhouse Gas Emissions Inventory: 2008

Account & Address	Account Consumption & Costs by Energy Type						Account Subtotal		
	Type	Consumption	Energy	Costs	CO ₂ e	Energy	Costs	CO ₂ e	
1997 E250 FORD VAN - 164	Gasoline Diesel Fuel	2,858 litres 96 litres	99 GJ 4 GJ	\$3,285 \$146	7.1 t 0.3 t	103 GJ	\$3,431	7.4 t	
1998 CHEV PICKUP 6500CH - 167	Gasoline Diesel Fuel	1,033 litres 1,077 litres	36 GJ 42 GJ	\$1,306 \$1,168	2.6 t 3.0 t	77 GJ	\$2,474	5.6 t	
1999 CHEV PICKUP - 176	Gasoline Diesel Fuel	1,810 litres 112 litres	63 GJ 4 GJ	\$2,292 \$165	4.5 t 0.3 t	67 GJ	\$2,456	4.8 t	
1999 CHEV PICKUP 7045DD - 175	Gasoline Diesel Fuel	1,429 litres 211 litres	50 GJ 8 GJ	\$1,754 \$288	3.6 t 0.6 t	58 GJ	\$2,042	4.2 t	
1999 PICKUP - 173	Gasoline	1,589 litres	55 GJ	\$2,006	4.0 t	55 GJ	\$2,006	4.0 t	
2001 CHEVY PICKUP BUDGET RENTAL - 204	Gasoline Diesel Fuel	174 litres 2,248 litres	6 GJ 87 GJ	\$231 \$2,959	0.4 t 6.2 t	93 GJ	\$3,190	6.7 t	
								Staff to confirm vehicle fuel type.	
2002 FORD F250 - 187	Gasoline Diesel Fuel	2,538 litres 210 litres	88 GJ 8 GJ	\$3,073 \$231	6.3 t 0.6 t	96 GJ	\$3,305	6.9 t	
2002 FORD F250 - 192	Gasoline Diesel Fuel	1,643 litres 196 litres	57 GJ 8 GJ	\$2,126 \$280	4.1 t 0.5 t	65 GJ	\$2,405	4.6 t	
2002 FORD F250 - 193	Propane Gasoline Diesel Fuel	77 litres 2,969 litres 297 litres	2 GJ 103 GJ 12 GJ	\$77 \$3,713 \$348	0.1 t 7.4 t 0.8 t	116 GJ	\$4,138	8.4 t	
2002 FORD F250 - 194	Gasoline Diesel Fuel	3,914 litres 481 litres	136 GJ 19 GJ	\$4,837 \$571	9.8 t 1.3 t	154 GJ	\$5,408	11.1 t	
2004 FORD F150 BSW - 212	Gasoline Diesel Fuel	707 litres 172 litres	25 GJ 7 GJ	\$695 \$218	1.8 t 0.5 t	31 GJ	\$1,114	2.2 t	
2004 FORD F250 - 206	Gasoline Diesel Fuel	1,742 litres 567 litres	60 GJ 22 GJ	\$2,336 \$792	4.4 t 1.6 t	82 GJ	\$3,128	5.9 t	
2004 JEEP LIBERTY - 207	Gasoline	1,439 litres	50 GJ	\$1,462	3.6 t	50 GJ	\$1,462	3.6 t	

Langley City

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Account & Address	Account Consumption & Costs by Energy Type						Account Subtotal		
	Type	Consumption	Energy	Costs	CO ₂ e	Energy	Costs	CO ₂ e	
2007 FORD ECON VAN 8598AJ - 220	Gasoline	3,594 litres	125 GJ	\$4,509	9.0 t	139 GJ	\$4,993	10.0 t	
	Diesel Fuel	372 litres	14 GJ	\$484	1.0 t				
Gasoline Light Trucks, Vans, and SUVs Subtotal						1,264 GJ	\$44,455	90.4 t	
Gasoline Passenger Cars									
2001 FORD TAURUS - 183	Gasoline	538 litres	19 GJ	\$654	1.3 t	23 GJ	\$808	1.7 t	
	Diesel Fuel	113 litres	4 GJ	\$154	0.3 t				
2001 FORD TAURUS - 185	Gasoline	949 litres	33 GJ	\$1,164	2.4 t	33 GJ	\$1,164	2.4 t	
2008 NISSAN VERSA Hb - 226	Gasoline	1,174 litres	41 GJ	\$1,376	2.9 t	41 GJ	\$1,376	2.9 t	
NEW BY-LAW VEHICLE -									
Gasoline Passenger Cars Subtotal						97 GJ	\$3,347	7.0 t	
Vehicle Fleet Subtotal		Consumption	Energy	Costs	CO₂e	5,100 GJ	\$172,373	366.1 t	
	Propane	2,489 litres	63 GJ	\$2,489	3.8 t				
	Gasoline	47,367 litres	1,642 GJ	\$56,055	118.3 t				
	Diesel Fuel	87,747 litres	3,394 GJ	\$113,763	243.9 t				
	Mbl Propane	66 litres	2 GJ	\$66	0.1 t				
SOLID WASTE									
Administration Offices									
CITY HALL AND LIBRARY - 20399 DOUGLAS CRS	Solid Waste		312 cu. yds	46.80	24.8 t			24.8 t	
Administration Offices Subtotal			312 cu. yds	46.80	24.8 t			24.8 t	
Community Centre									
DOUGLAS RECREATION CENTRE - 20550 DOUGLAS CRS	Solid Waste		156 cu. yds	23.40	12.4 t			12.4 t	
NICOMBEK MULTI PURPOSE ROOM - 20050 53RD AVE	Solid Waste		78 cu. yds	11.70	6.2 t			6.2 t	

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Langley City Corporate Energy & Greenhouse Gas Emissions Inventory: 2008

Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Estimation Method	Volume	Mass	CO ₂ e	Energy	Costs	CO ₂ e
TIMMS COMMUNITY CENTRE - 20355 DOUGLAS CRIS	Solid Waste		78 cu. yds	11.70	6.2 t			6.2 t
Community Centre Subtotal	Solid Waste		312 cu. yds	46.80	24.8 t			24.8 t
Fire Services								
FIRE HALL - 5785 203RD ST	Solid Waste		312 cu. yds	46.80	24.8 t			24.8 t
Fire Services Subtotal	Solid Waste		312 cu. yds	46.80	24.8 t			24.8 t
Outdoor Pools								
ANDERSON MEMORIAL POOL - 4949 207TH ST	Solid Waste		78 cu. yds	11.70	6.2 t			6.2 t
Outdoor Pools Subtotal	Solid Waste		78 cu. yds	11.70	6.2 t			6.2 t
Parks & Playing Fields								
BRYDON PARK - 5353 198 ST	Solid Waste Washroom		78 cu. yds	11.70	6.2 t			6.2 t
CITY PARK - 20695 48TH AVE	Solid Waste		156 cu. yds	23.40	12.4 t			12.4 t
CONDOR PARK - 19810 50TH AVE	Solid Waste Washroom		78 cu. yds	11.70	6.2 t			6.2 t
CONDOR PARK - 19850 50TH AVE	Solid Waste		78 cu. yds	11.70	6.2 t			6.2 t
LINDWOOD PARK - 5470 201 ST	Solid Waste Washroom		78 cu. yds	11.70	6.2 t			6.2 t
PORTAGE PARK - 5151 204TH ST	Solid Waste Washroom		78 cu. yds	11.70	6.2 t			6.2 t
ROTARY CENTENNIAL PARK - 5514 208TH ST	Solid Waste		78 cu. yds	11.70	6.2 t			6.2 t
SENDALL GARDENS - 20166 50TH AVE	Solid Waste		78 cu. yds	11.70	6.2 t			6.2 t
Parks & Playing Fields Subtotal	Solid Waste		702 cu. yds	105.30	55.8 t			55.8 t
Public Works Bldgs & Yards								

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Account & Address	Account Consumption & Costs by Energy Type						Account Subtotal		
	Type	Estimation Method	Volume	Mass	CO ₂ e	CO ₂ e	Energy	Costs	CO ₂ e
OPERATIONS CENTRE - 5713 198TH ST	Solid Waste		624 cu. yds	93.60		49.6 t			49.6 t
Public Works Bldgs & Yards Subtotal	Solid Waste		624 cu. yds	93.60		49.6 t			49.6 t
Solid Waste Subtotal	Solid Waste		Volume 2,340 cu. yds	Mass 351.00 t		CO ₂ e 186.0 t			186.0 t
Total	Type	Consumption	Energy	Costs		CO ₂ e			CO ₂ e
	Electricity	3,427,415 kWh	12,339 GJ	\$255,193		96.0 t			
	Natural Gas	7,884 GJ	7,884 GJ	\$77,151		403.3 t			
	Propane	2,489 litres	63 GJ	\$2,489		3.8 t			
	Gasoline	47,367 litres	1,642 GJ	\$56,055		118.3 t			
	Diesel Fuel	87,747 litres	3,394 GJ	\$113,763		243.9 t			
	Mbl Propane	66 litres	2 GJ	\$66		0.1 t			
	Solid Waste		Volume 2,340 cu. yds	Mass 351.00 t		CO ₂ e 186.0 t			
							25,324 GJ	\$504,717	1,051.4 t









Appendix II

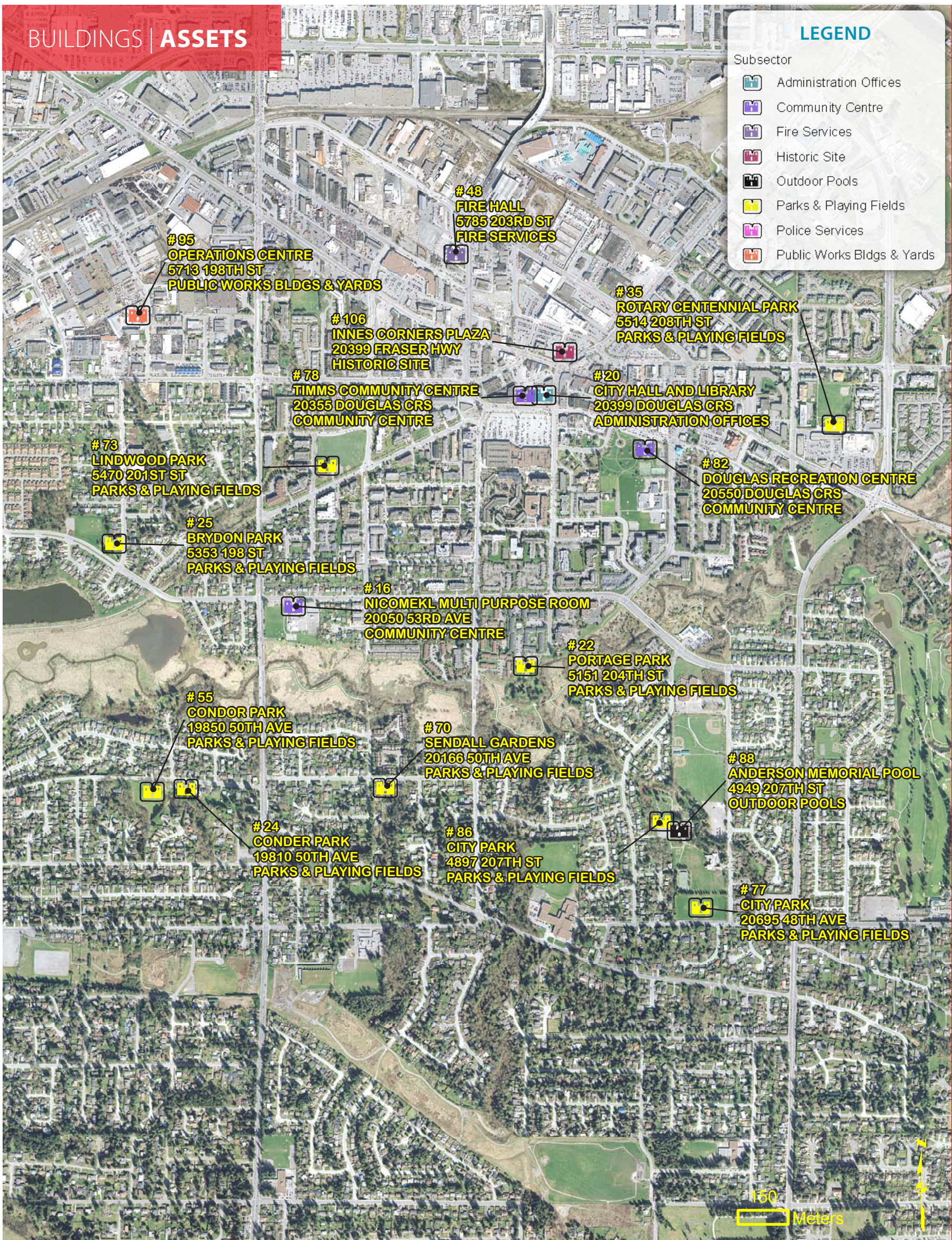
Graphical Representation of Energy Consumption, Costs for Energy, and GHG Emissions for Buildings and Water & Wastewater Infrastructure



LEGEND

Subsector

-  Administration Offices
-  Community Centre
-  Fire Services
-  Historic Site
-  Outdoor Pools
-  Parks & Playing Fields
-  Police Services
-  Public Works Bldgs & Yards

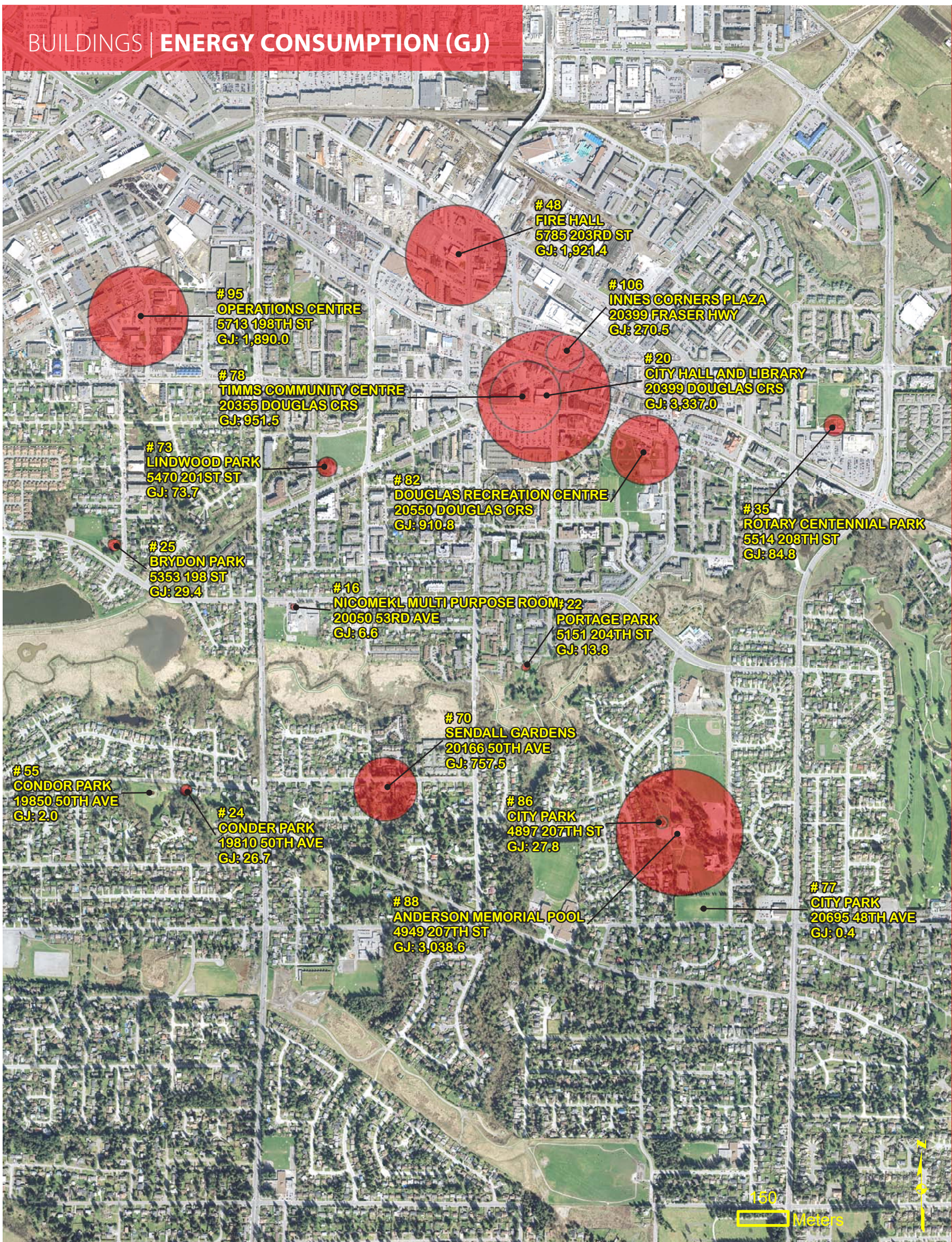


Map Key	Account Description	Account Address
MapKey	AccountDesc	AccountAddress
20	City Hall And Library	20399 Douglas Crs
78	Timms Community Centre	20355 Douglas Crs
82	Douglas Recreation Centre	20550 Douglas Crs
16	Nicomekl Multi Purpose Room	20050 53rd Ave
48	Fire Hall	5785 203rd St
106	Innes Corners Plaza	20399 Fraser Hwy
88	Anderson Memorial Pool	4949 207th St
77	City Park	20695 48th Ave
73	Lindwood Park	5470 201st St
86	City Park	4897 207th St
24	Conder Park	19810 50th Ave
25	Brydon Park	5353 198 St
22	Portage Park	5151 204th St
35	Rotary Centennial Park	5514 208th St
70	Sendall Gardens	20166 50th Ave
55	Condor Park	19850 50th Ave
34	Community Police Office	20408 Douglas Crs 100
95	Operations Centre	5713 198th St



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BUILDINGS | ENERGY CONSUMPTION (GJ)

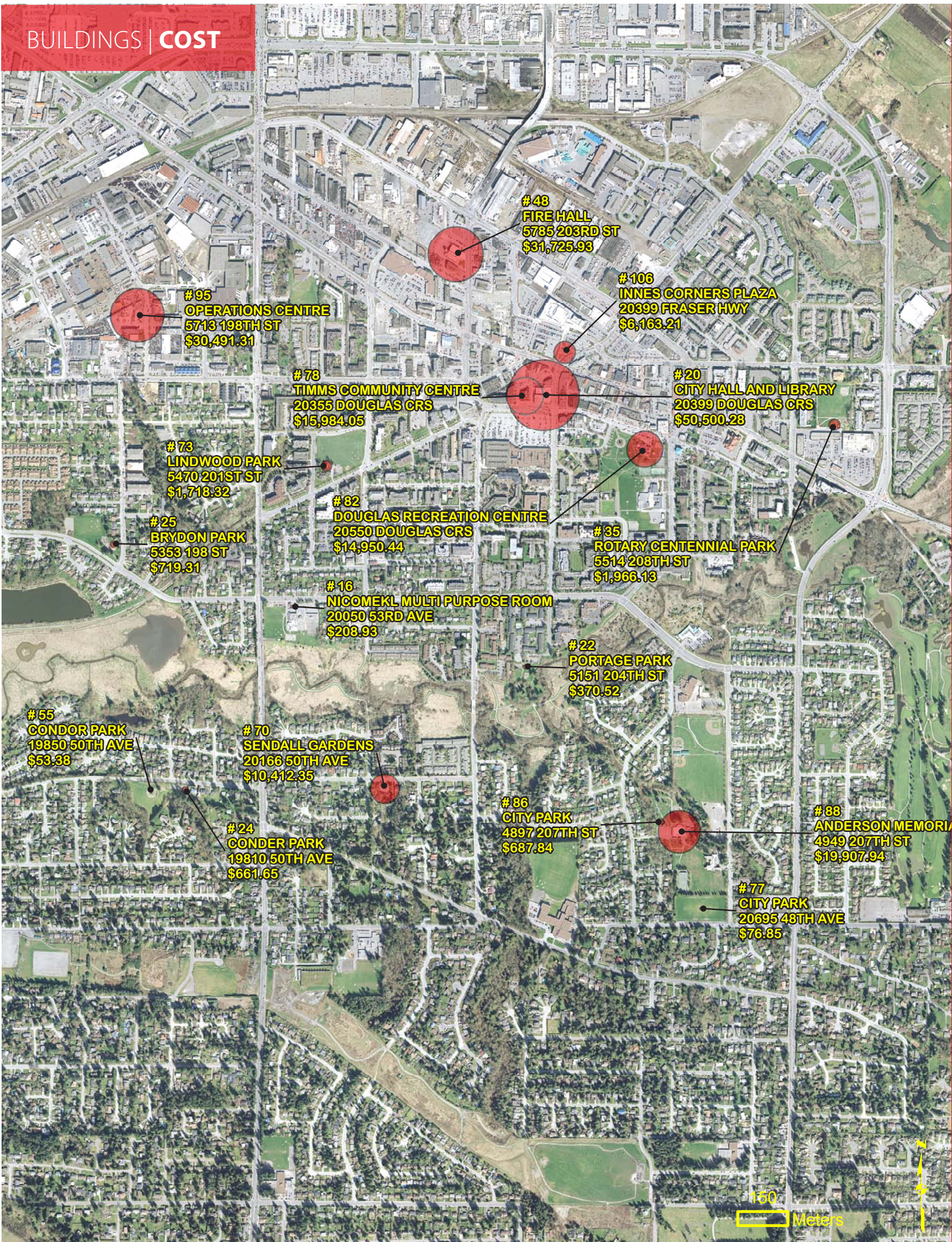


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BUILDINGS | COST

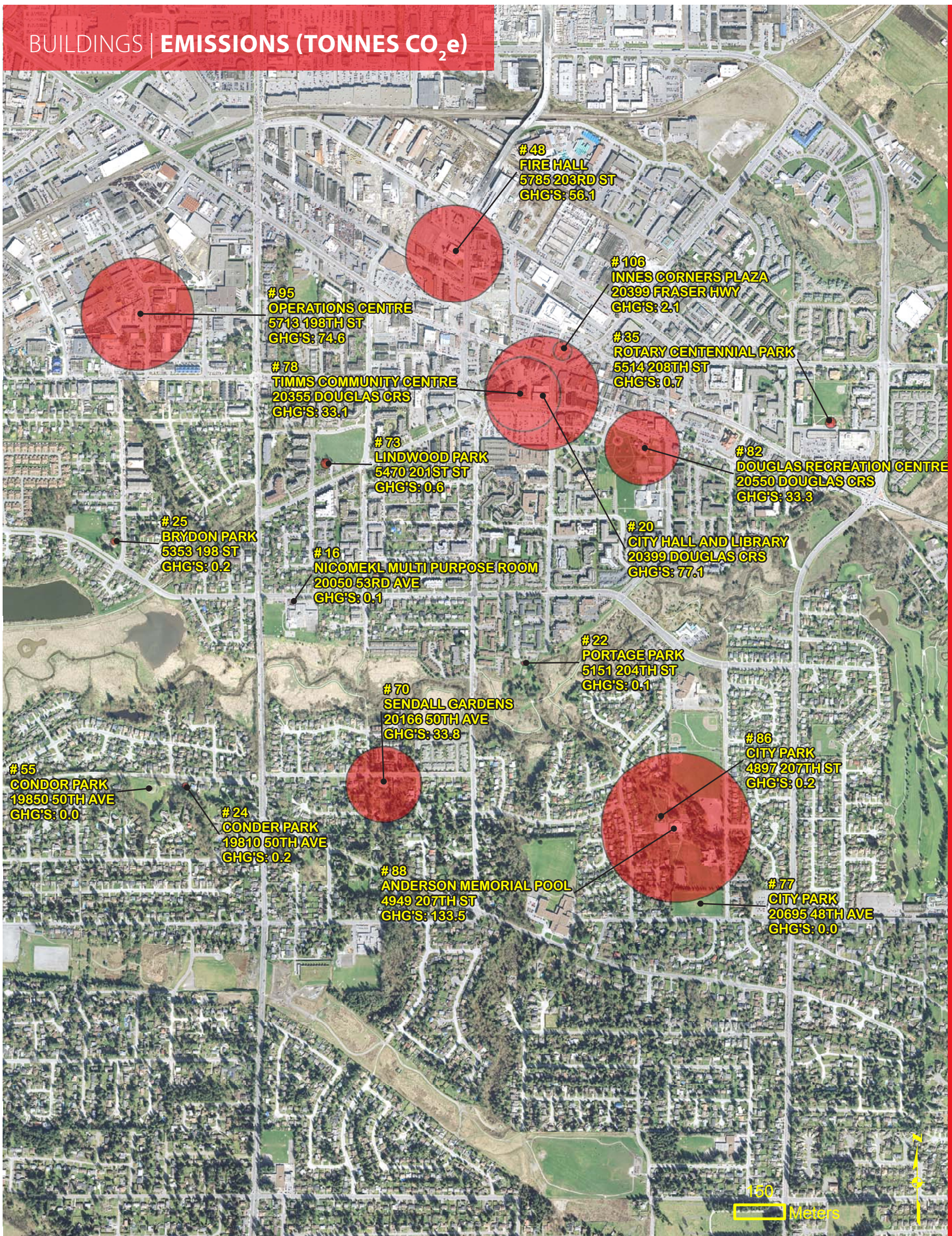


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BUILDINGS | EMISSIONS (TONNES CO₂e)



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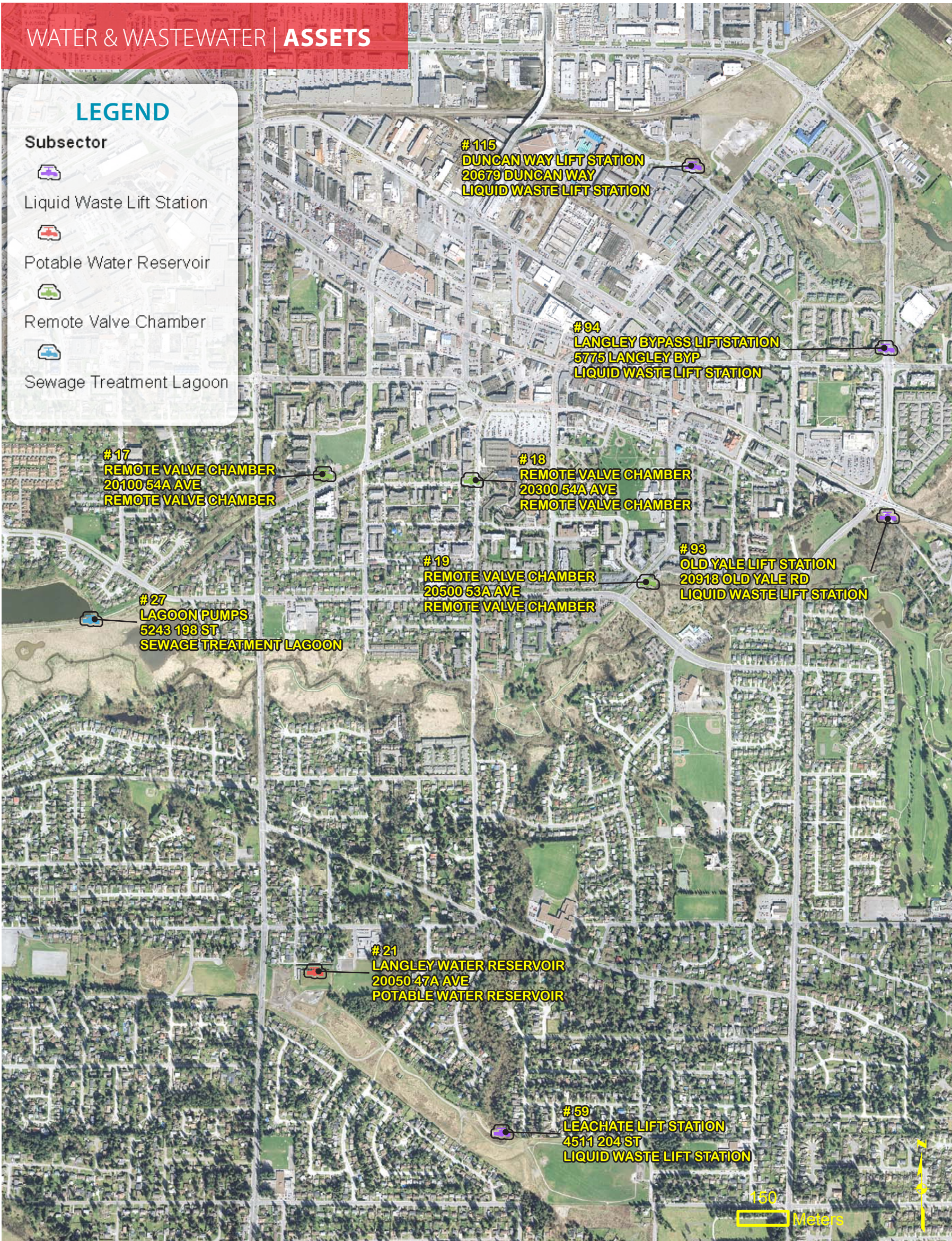


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LEGEND

Subsector

-  Liquid Waste Lift Station
-  Potable Water Reservoir
-  Remote Valve Chamber
-  Sewage Treatment Lagoon



#17
REMOTE VALVE CHAMBER
 20100 54A AVE
 REMOTE VALVE CHAMBER

#27
LAGOON PUMPS
 5243 198 ST
 SEWAGE TREATMENT LAGOON

#21
LANGLEY WATER RESERVOIR
 20050 47A AVE
 POTABLE WATER RESERVOIR

#19
REMOTE VALVE CHAMBER
 20500 53A AVE
 REMOTE VALVE CHAMBER

#18
REMOTE VALVE CHAMBER
 20300 54A AVE
 REMOTE VALVE CHAMBER

#115
DUNCAN WAY LIFT STATION
 20679 DUNCAN WAY
 LIQUID WASTE LIFT STATION

#94
LANGLEY BYPASS LIFTSTATION
 5775 LANGLEY BYP
 LIQUID WASTE LIFT STATION

#93
OLD YALE LIFT STATION
 20918 OLD YALE RD
 LIQUID WASTE LIFT STATION

#59
LEACHATE LIFT STATION
 4511 204 ST
 LIQUID WASTE LIFT STATION

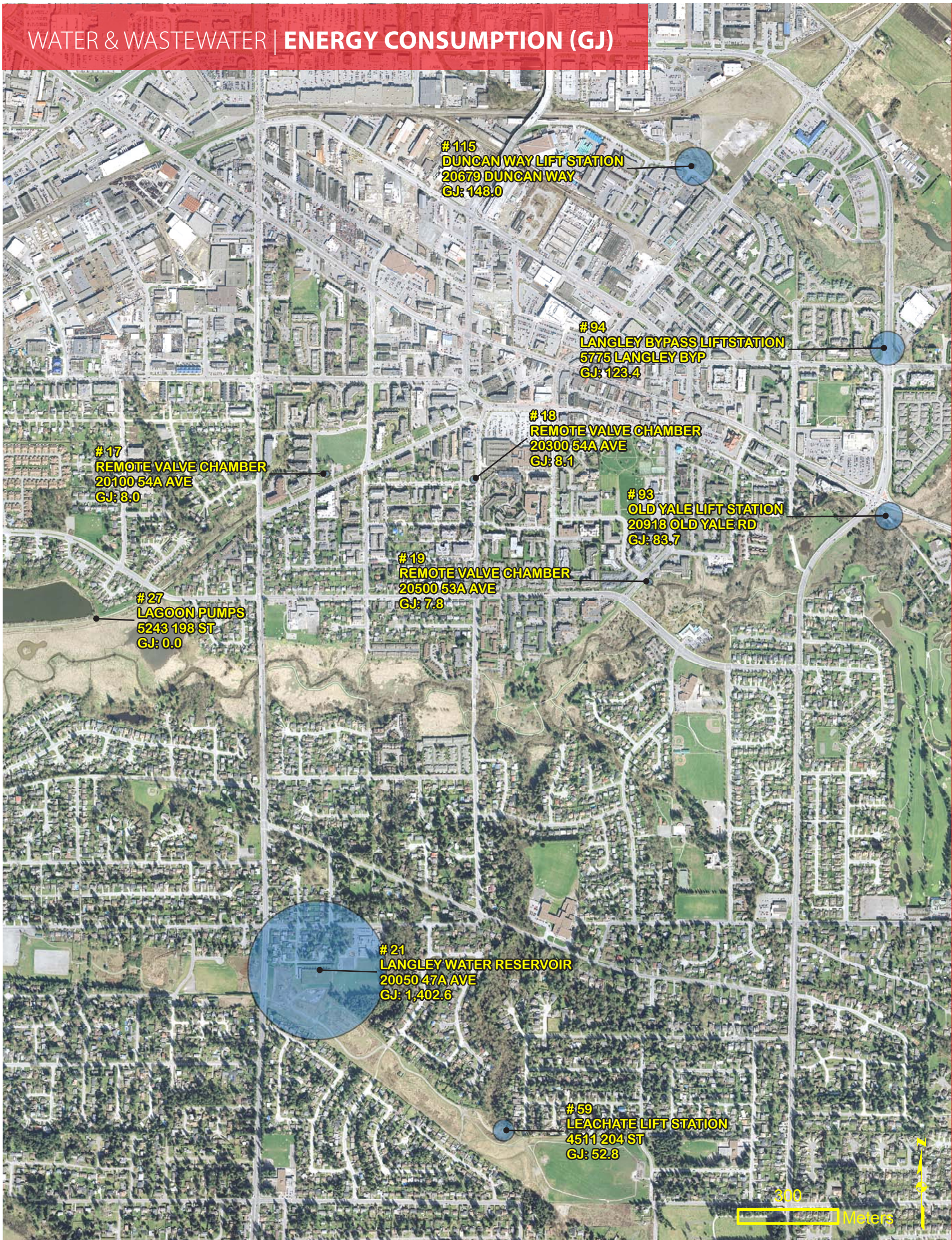
150
 Meters

Map Key	Account Description	Account Address
MapKey	AccountDesc	AccountAddress
17	Remote Valve Chamber	20100 54a Ave
18	Remote Valve Chamber	20300 54a Ave
19	Remote Valve Chamber	20500 53a Ave
21	Langley Water Reservoir	20050 47a Ave
27	Lagoon Pumps	5243 198 St
59	Leachate Lift Station	4511 204 St
93	Old Yale Lift Station	20918 Old Yale Rd
94	Langley Bypass Liftstation	5775 Langley Byp
115	Duncan Way Lift Station	20679 Duncan Way



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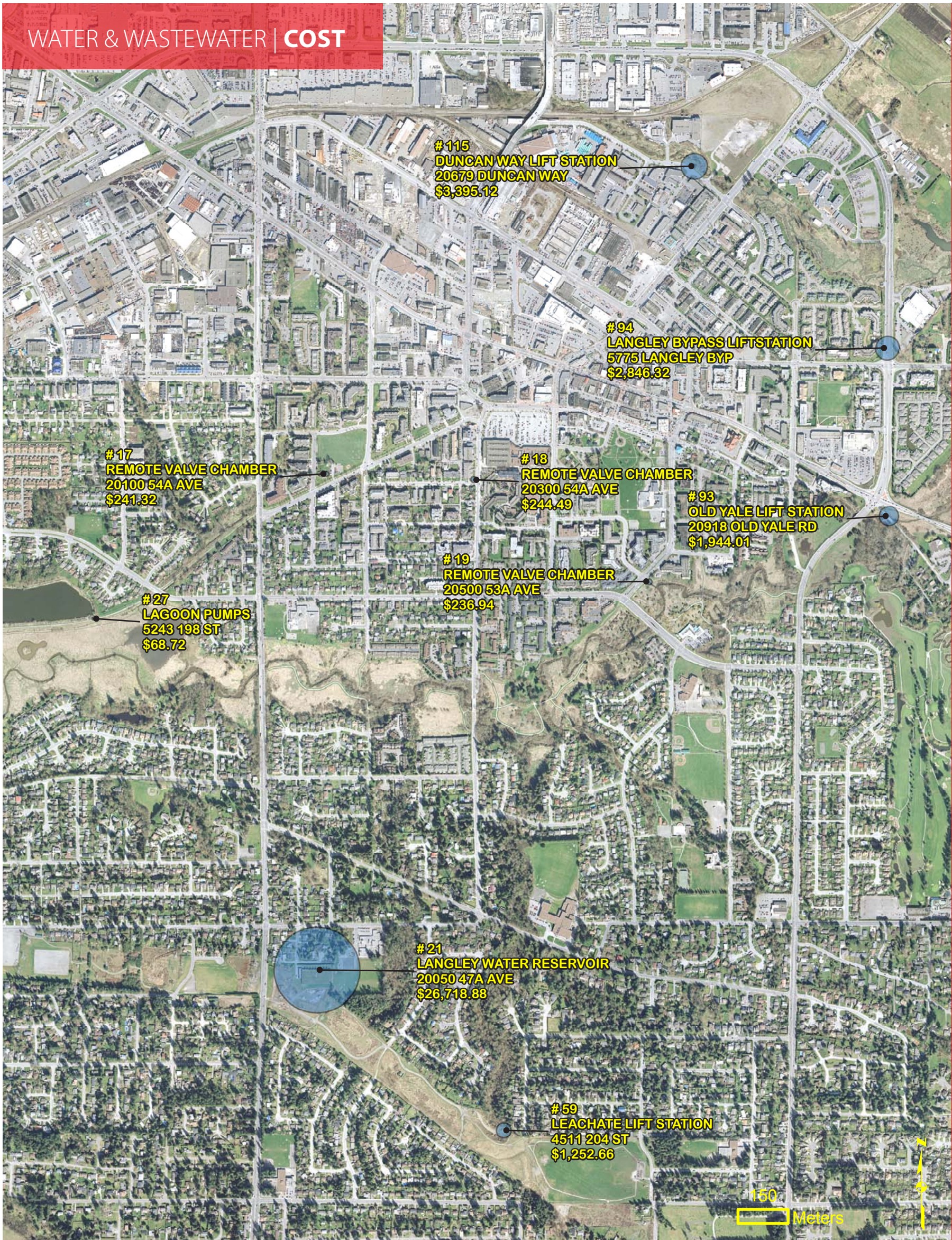
WATER & WASTEWATER | ENERGY CONSUMPTION (GJ)



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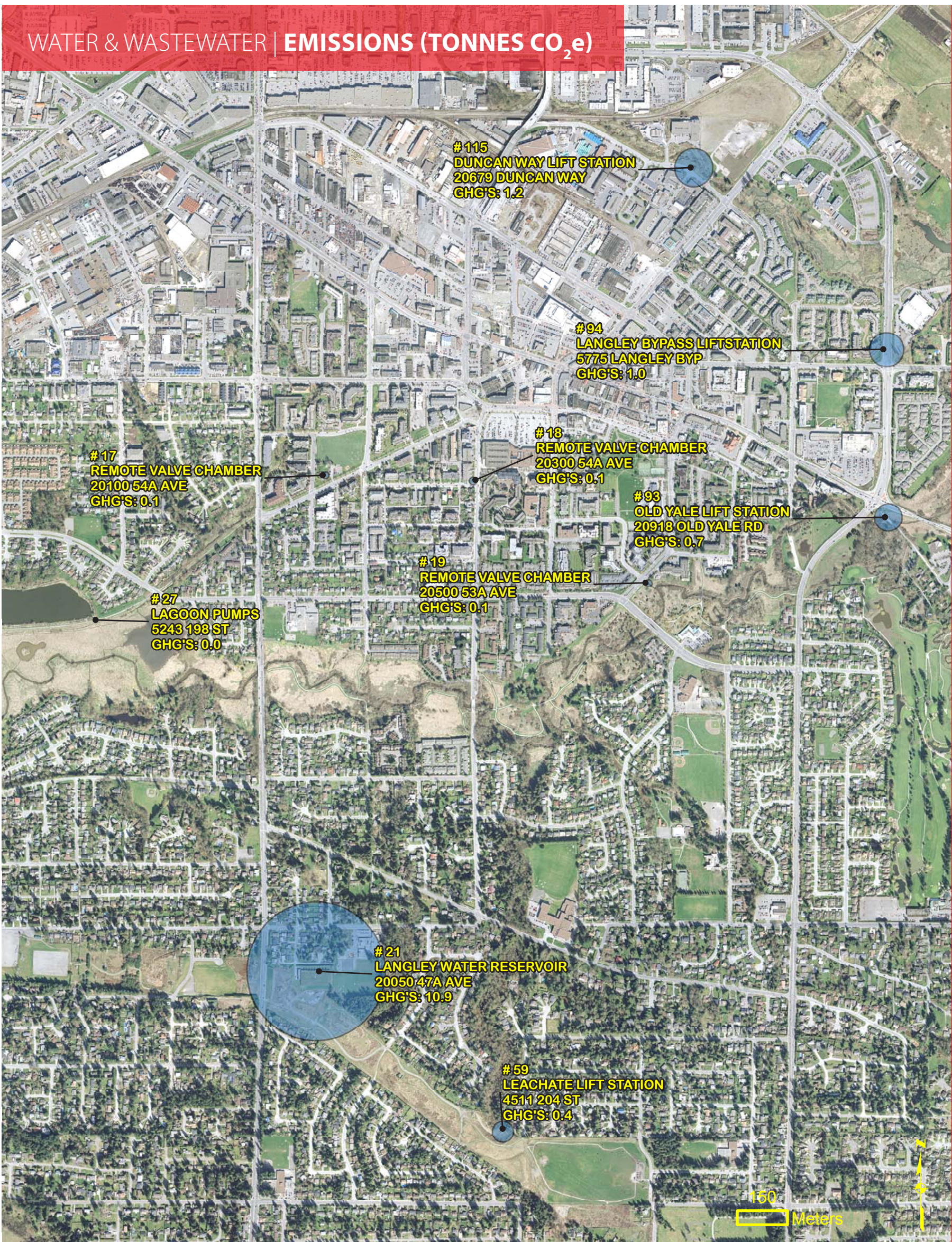


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WATER & WASTEWATER | EMISSIONS (TONNES CO₂e)



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