

Grand Erie District School Board
Annual Energy Consumption and Greenhouse Gas
Emission Reporting:
O. Reg 507/18 Reporting 2017-2018



Table of Contents

Background	4
Report Data and Variables	5
Example of variable: Age of Building & Performance	8
Grand Erie's Top 10 Performing Buildings	9
Grand Erie's Bottom 10 Performing Buildings	9
Energy Demand and Conservation	10
Summary	11
Appendix A: Energy Consumption and Greenhouse Gas Emissions Reporting - for FY2018.	12
Appendix B: Electricity Consumption per Site (kWh/sqft).....	14
Appendix C: Natural Gas & Propane Consumption per Site (ekWh/sqft).....	15
Appendix D: Energy Intensity per Site (ekWh/sqft).	16

Table of Figures

Table 1: Energy Intensity: All Sites	5
Table 2: Energy Intensity: Elementary	6
Table 3: Energy Intensity: Secondary	6
Table 4: Energy Intensity: Administration.....	7
Table 5: Consumption VS. Age of Building	8
Table 6: Consumption by Utilities 2014-2015 through 2017-2018	9
Table 7: Top 10 Performing Sites	9
Table 8: Bottom 10 Performing Sites	9

Background:

In late 2018, Ontario Regulation 507/18: Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans was introduced replacing Ontario Regulation 397/11. Similarly to the previous regulation, O. Reg 507/18 requires public agencies such as municipalities, school boards, universities, colleges and hospitals to report annually on their energy consumption and greenhouse gas (GHG) emissions. O. Reg. 507/18 outlines the reporting requirements to be completed by July 1st annually and must report on the previous fiscal year.

Each school board is required to report the total consumption of all energy types for all facilities. The use of electricity, natural gas and all other energy sources for each building must be identified within the report. All data must be uploaded onto the Ministry of Energy's reporting module. From the reporting module, a report is generated using the Ministry of Energy's reporting template. **Please refer to Appendix A: Energy Consumption and Greenhouse Gas Emissions Reporting - for FY2018.** This is referred to as Grand Erie's 2017-2018 Consumption report in the remainder of this report.

The annual report must include the following information:

- Name of site and building type (i.e. school, administration, etc).
- Full Address
- Gross floor area
- Hours of operation per week
- Whether or not the school has a pool
- Number of portables on site
- Electricity (kWh) consumption for fiscal year
- Natural gas (m³) consumption for fiscal year, if applicable
- Other energy sources consumption (i.e. propane) for fiscal year, if applicable
- Total greenhouse gas emissions (kg) for each site
- Total ekWh/sq ft (equivalent kilowatt hours per square feet) for each site.

Grand Erie District School Board's 2017-2018 Energy Report was successfully completed, uploaded and available as of May 23, 2019 on the Ministry of Energy's BPS Portal. For the purpose of the report, Grand Erie reports on Branlyn and Notre Dame while the BHNCD SB reports on St. Basils and Walter Gretzky.

As additional requirement under O. Reg 507/18 requires school boards to create and post an Energy Conservation and Demand Management Plan (CDM).

As per O. Reg. 507/18, Boards are required to submit their completed consumption report to the Ministry of Energy, post both reports on both the internet and intranet sites and provide a hard copy at their office to any interested member of the public.

Report Data and Variables:

The report provides readers with an insight and overview into the energy consumption and performance of sites within Grand Erie District School Board.

The most informative figures within the report are the Energy Intensity figures located in the last column. Energy Use Intensity (EUI), measured in equivalent kilowatt hours per square feet (ekWh/sqft), is the base unit used by energy managers for comparison purposes. This metric is developed by first establishing natural gas consumption which is reported as cubic metres (m³) or gigajoules (GJ). Propane consumption reported in litres are also reported. These consumptions are then converted to equivalent kilowatt hours (ekWh). Total energy consumption is calculated by adding ekWh of gas and propane use to electrical consumption, already reported in kWh. Determining intensity involves accounting for square footage of all facilities in our inventory. This produces the EUI measured in ekWh/sq ft. **Please refer to Appendix D: Energy Intensity per Site (ekWh/sqft), Appendix B: Electricity Consumption per Site (kWh/sqft) and Appendix C: Natural Gas & Propane Consumption per Site (ekWh/sqft).**

Natural Resources Canada have established a benchmark for Ontario schools of 23.69 ekWh/sq ft within their National Energy Performance Report. Within Grand Erie's 2017-2018 Consumption report, the average EUI was 18.49 ekWh/sq ft. All values below within this report use raw data and not weather-normalized data.

All Sites:

Outlined below is Grand Erie District School Board's average and median energy use intensity figures from the current and previous two Consumption reports. This represents all Grand Erie DSB-owned properties including administration sites. Overall, our energy use intensity has been decreasing year over year with the exception of 2017-2018 where we experienced an increase in natural gas but a slight decrease in electricity.

Table 1.

Energy Use Intensity (ekWh/sq foot)	2015-2016	2016-2017	2017-2018
Average	17.54	17.21	18.49
Median	16.72	16.34	18.20

Elementary:

The chart below outlines the average and median energy use intensity (ekWh/sq ft) for Grand Erie's Elementary sites separated by hydro, natural gas and total energy as per the 2017-2018 Consumption Report. All figures are in ekWh/sq ft.

Table 2.

Energy Use Intensity (ekWh/sq foot)	Hydro	Natural Gas	Total Energy
Average	4.97	12.39	18.09
Median	4.85	12.56	17.40

Secondary:

The chart below outlines the average and median energy use intensity (ekWh/sq ft) for Grand Erie's Secondary sites separated by hydro, natural gas and total energy as per the 2017-2018 Consumption Report. All figures are in ekWh/sq ft. This includes all secondary school locations and Grand Erie Learning Alternatives on Rawdon.

Table 3.

Energy Use Intensity (ekWh/sq foot)	Hydro	Natural Gas	Total Energy
Average	5.32	14.12	20.43
Median	4.65	14.02	19.39

Administration:

The chart below outlines the average and median energy use intensity (ekWh/sq ft) for Grand Erie's Administration sites separated by hydro, natural gas and total energy as per the 2017-2018 Consumption Report. All figures are in ekWh/sq ft. Average and median wasn't provided for administration sites due to small quantity of sites.

Table 4.

Energy Use Intensity (ekWh/sq foot)	Hydro	Natural Gas	Total Energy
Education Centre/Facility Services	12.27	13.94	15.23
Joseph Brant Learning Centre	8.3	16.20	16.12
Teachers Resource Centre	18.32	11.23	20.77

Energy intensity is driven by energy consumption at each site. This is impacted by a number of variables that must be considered. It is important to note that some variables are beyond the control of the school board itself. For example, both community growth and Ministry-driven expectations require additional space and extended hours at a facility which would increase energy demand and consumption. Examples of other facility variables include:

- Year of construction and building design, including Building Automation Systems (BAS), building envelope, etc.
- Building area, including renovations, additions, portables, etc.
- HVAC equipment on site, including system type, system age, lifecycle considerations, areas with air conditioning and vented spaces.
- Site use/Facility Type – elementary, secondary, administrative or maintenance facility
- Shared use schools, including libraries, literacy centres, sports fields, childcare facilities and other third party partnerships.
- Hours of operations and specialty programming, including before and after school programs, community use, summer school, etc.

Other variables which greatly impact the energy consumption at a site include:

- Weather as colder or hotter weather conditions drive energy demand
- Location and topography of the site (lake effect, wind, etc.)
- Occupancy behaviour

Example of variable: Age of Building & Performance:

Below is an example of one of the variables. The age of the facility plays a large role in the energy performance of a building. Newer facilities include air conditioning, additional fans and pumps to draw in outside air, and were built based on different standards compared to our older facilities. As you can see, newer facilities use more hydro than schools over 100 years old, however, they use much less natural gas. All figures are in ekWh/sq ft.

Table 5.

Energy Use Intensity (ekWh/sq foot)	Hydro	Natural Gas	Total Energy
1-24 years old: 3 SCHOOLS	Average: 6.48 Median: 5.89	Average: 8.45 Median: 7.05	Average: 15.19 Median: 12.93
25-49 years old: 12 SCHOOLS	Average: 7.09 Median: 6.6	Average: 11.45 Median: 11.69	Average: 18.89 Median: 19.73
50-74 years old: 43 SCHOOLS	Average: 4.59 Median: 4.48	Average: 13.19 Median: 13.18	Average: 18.04 Median: 17.62
75-99 years old: 8 SCHOOLS	Average: 4.13 Median: 4.07	Average: 13.16 Median: 12.96	Average: 17.68 Median: 17.81
100 years +: 7 SCHOOLS	Average: 4.98 Median: 5.15	Average: 13.23 Median: 13.83	Average: 18.61 Median: 19.4

Note: this does not include administration facilities as they use energy differently.

It is important to note when reviewing this information that budget and actual expenses cannot be compared directly year over year as a metric for operational efficiencies. Consumption is weather dependent and costs are market dependent. Market pricing can greatly fluctuate due to weather, demand, storage and other variables. As a strategy, The Grand Erie DSB purchases energy sources (electricity, natural gas and propane) in bulk as a commodity, when available, through a consortium.

Outlined below is Grand Erie District School Board's total utility consumptions from previous Consumption reports. Values below are raw data.

Table 6.

Energy Consumed	2015-2016	2016-2017	2017-2018
Total Electricity (kWh)	23,741,079	21,316,732	21,242,880
Total Natural Gas (m3)	4,132,805	4,196,534	4,758,286
Total Propane (L)	24,913	26,234	25,671

Grand Erie's Top 10 Performing Buildings:

Outlined below is Grand Erie's top 10 performing buildings based on the total energy use intensity alone (hydro + natural gas intensity) for the 2017-2018 Consumption Reporting Year.

Table 7.

Site:	Energy Use Intensity:
Houghton Annex	8.8
Brantford CI & VS	12.01
Hagersville Elementary	12.37
Walsh PS	12.81
Branlyn Community School	12.83
Cobblestone ES	12.88
Ryerson Heights ES	12.93
Major Ballachey PS	13.07
JL Mitchener PS	13.46
Central PS	13.64

Grand Erie's Bottom 10 Performing Buildings:

Outlined below is Grand Erie's bottom 10 performing buildings based on the total energy use intensity alone (hydro + natural gas intensity) for the 2017-2018 Consumption Reporting Year.

Table 8.

Site:	Energy Use Intensity:
Prince Charles PS	23.73
Onondaga Brant PS	24.36
Hagersville Secondary	24.93
Joseph Brant Learning Centre	24.99
Echo Place	25.22
Paris Central PS	25.76

Board Office	26.63
McKinnon Park SS	26.91
Tollgate Technological Skills	28.71
Teachers Resource Centre	29.89

Energy Demand and Conservation:

As the Grand Erie District School Board continues to monitor energy consumption and performance data under O. Reg 507/18, energy management initiatives and strategies will continue to be implemented and developed. These initiatives and strategies can be categorized into three categories.

1. Design/Construction/Retrofit
2. Operations and Maintenance
3. Occupant Behaviour

The design, construction and retrofits encompass the original and ongoing intent of how a building and its systems are to perform as a whole. This includes but is not limited to: lighting retrofits and upgrades, HVAC upgrades, Building Automation System expansion and upgrades, and building envelope upgrades. Grand Erie DSB has begun the process of retrofitting all existing lighting to LED. This includes the replacement of all light tubes, ballasts and a number of fixtures. This also includes the extensive work which is taking place on our masonry, windows and roofs which will improve our buildings energy performance and conservation.

The Operations and Maintenance includes the strategies which are used to ensure that existing buildings and equipment perform at peak efficiency. This includes but is not limited to: preventative maintenance, energy audits, policy and planning, and real-time monitoring.

Finally, an efficient building requires educated occupants. The occupant behaviour strategies will assist in educating occupants, including staff, students, community users and the wider community, in changing specific behaviours in order to reduce our energy consumption. This includes but is not limited to: staff and student conference, Building Automation training, energy workshops, Ontario EcoSchools program, partnerships with outside organizations (i.e. Conservation Authorities), and energy monitoring and dashboard.

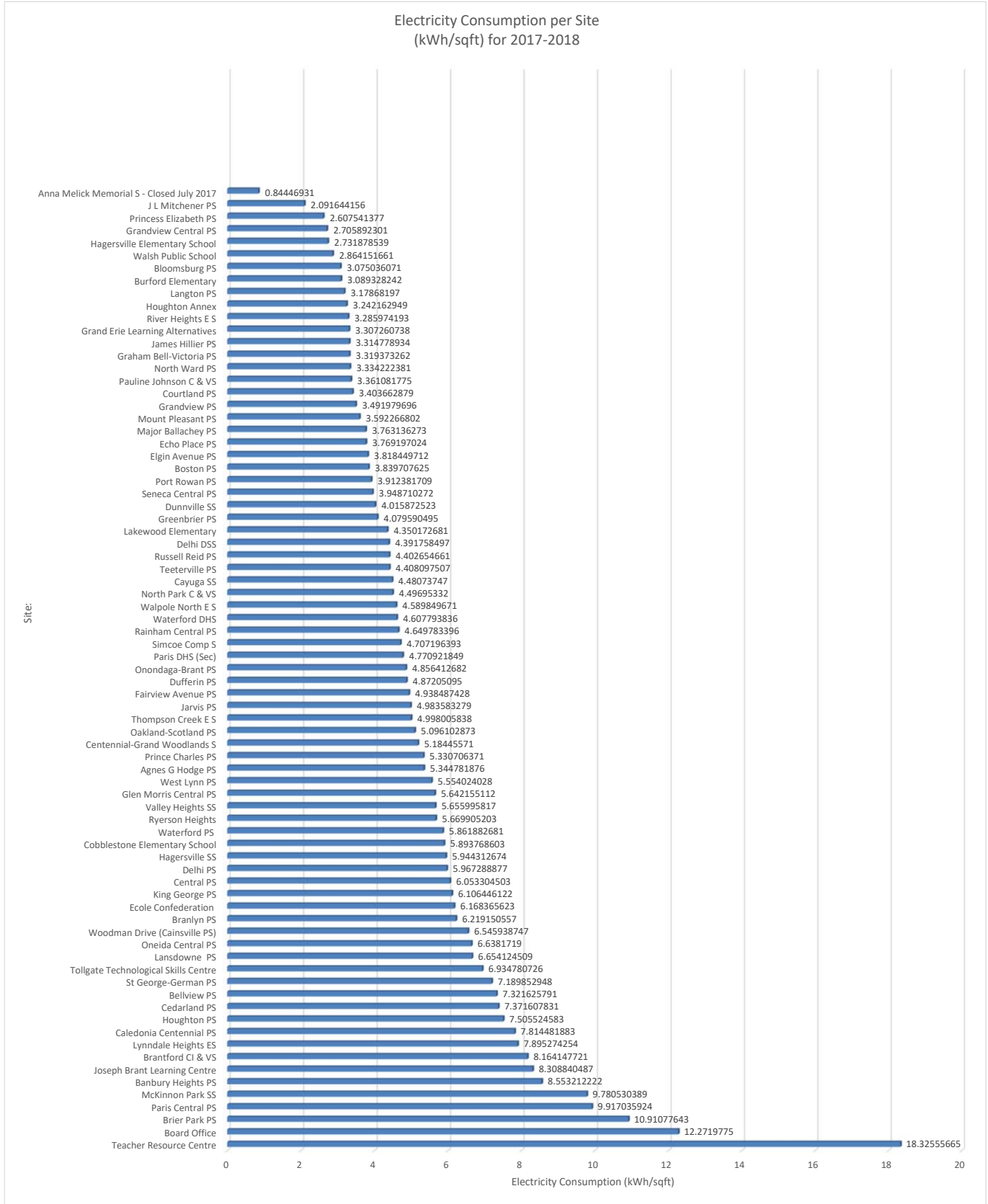
Summary:

This report was created in order to outline the Green Energy Act's Ontario Regulation 507/18 requirements for Ontario school boards including Grand Erie District School Board. It has hopefully provided readers with a better understanding and insight into energy consumption and performance of our sites. The Grand Erie District School Board will continue to expand and improve its energy and environmental conservation initiatives for the betterment of our students, staff, school community, and the environment.

Valley Heights SS	School	2561 #59 Highway	Langton	N0E 1G0	110,141.29 Square feet	80	No		622,958.68 kWh	160,632.45 Cubic Meter	0.00 Litre	No	314,471.98818	21.15577
Walpole North E S	School	1895 Regional Rd. #55, R.R. #5	Hagersville	N0A 1H0	20,637.35 Square feet	80	No	1	94,722.33 kWh	27,925.05 Cubic Meter	0.00 Litre	No	54,434.36139	18.97063
Walsh Public School	School	933 St. John's Road West ,RR#2	Simcoe	N3Y 4K1	39,052.72 Square feet	80	No	3	111,852.91 kWh	36,559.22 Cubic Meter	0.00 Litre	No	71,054.67883	12.81335
Waterford DHS	School	227 Main St., South	Waterford	N0E 1Y0	123,794.72 Square feet	80	No		570,420.55 kWh	155,381.69 Cubic Meter	0.00 Litre	No	303,635.95090	17.94732
Waterford PS (Formally A.B. Massecar)	School	100 East Church St	Waterford	N0E 1Y0	26,086.06 Square feet	80	No	3	152,913.42 kWh	41,781.48 Cubic Meter	0.00 Litre	No	81,638.28380	22.88416
West Lynn PS	School	18 Parker Dr	Simcoe	N3Y 1A1	29,041.31 Square feet	80	No		161,296.13 kWh	41,102.48 Cubic Meter	0.00 Litre	No	80,499.55163	20.59563
Woodman Drive (Cainsville PS)	School	51 Woodman Dr	Brantford	N3S 4K3	26,173.05 Square feet	80	No	4	171,327.18 kWh	24,857.15 Cubic Meter	0.00 Litre	No	49,959.22357	16.63939



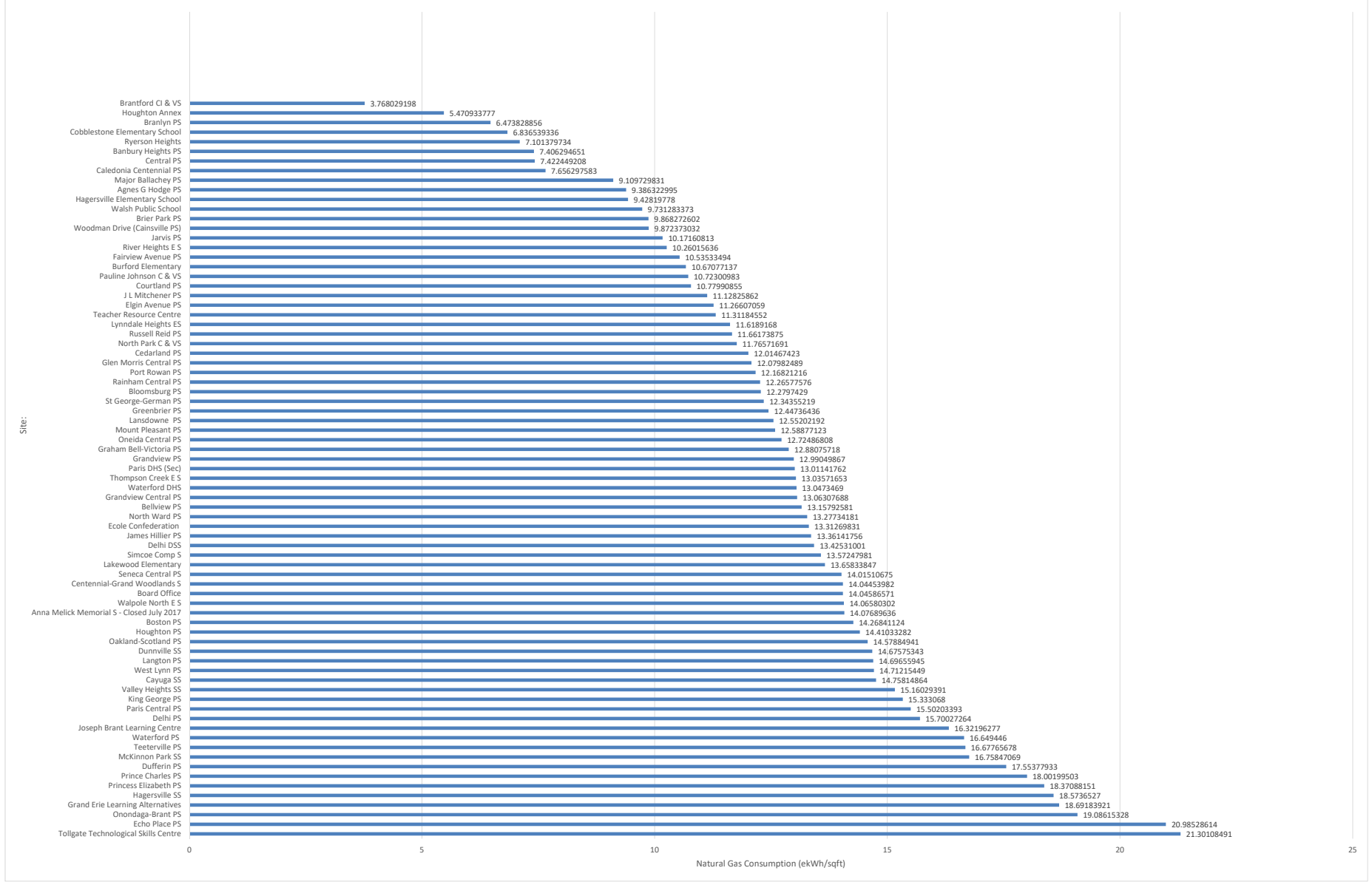
Appendix B: Electricity Consumption per Site (kWh/sqft)





Appendix C: Natural Gas & Propane Consumption per Site (ekWh/sqft)

Natural Gas Consumption & Propane per Site (ekWh/sqft for 2017-2018)



Appendix D: Energy Intensity per Site (ekWh/sqft)

