

West Vancouver Schools Long Range Facilities Plan (LRFP) 2021

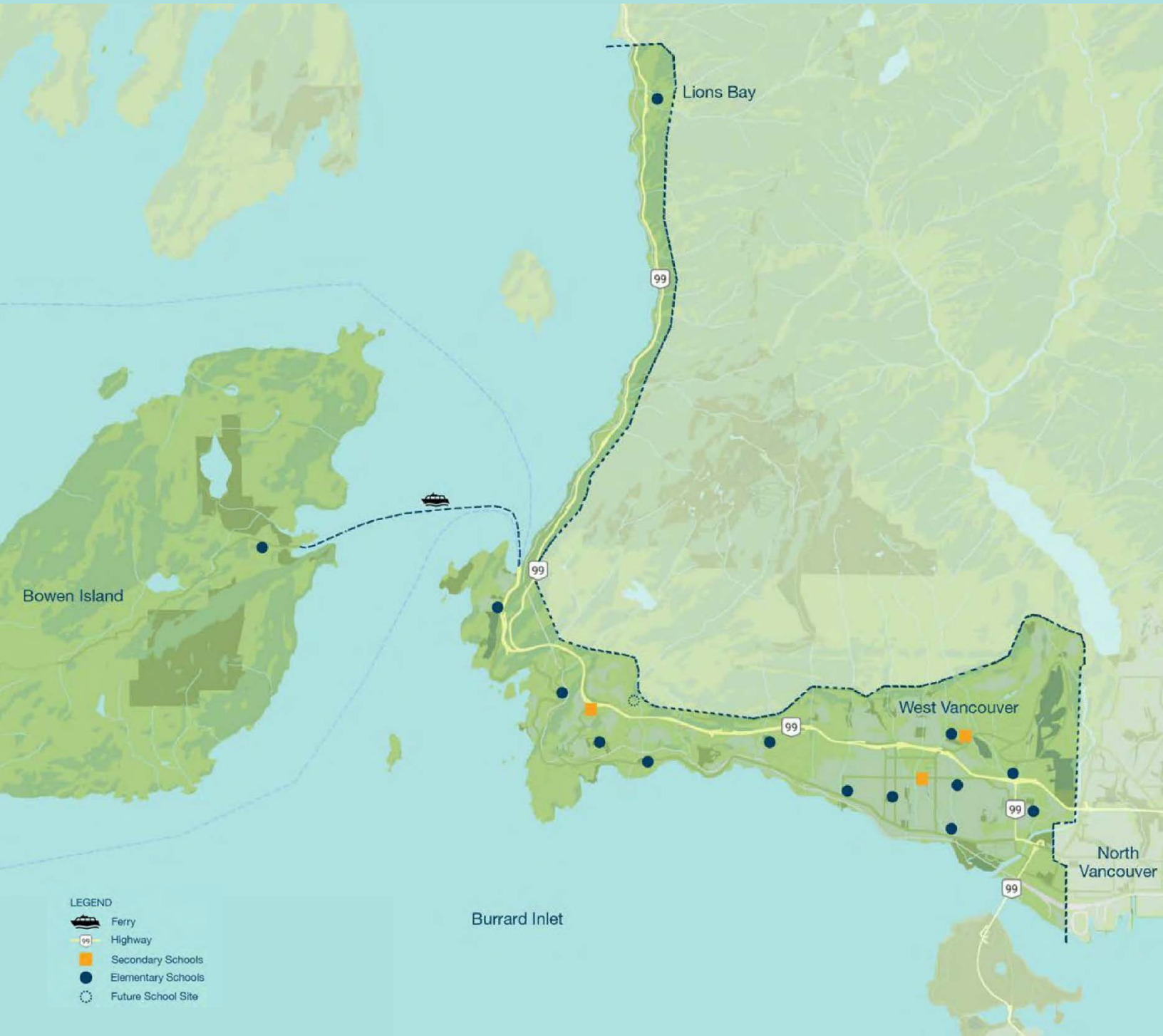




Photo credit: West Vancouver Schools

We are grateful to our First Nations, Métis and Inuit friends and families who have guided this journey and shared their thoughts about the importance of healthy partnerships to help our students achieve their best and to foster wellness of spirit, body and mind throughout their lives.

Chen kw'en mantúmi

Covid-19 statement

At the time of this report, the world is still dealing with the covid-19 pandemic. Schools in the district have reopened. We are in uncharted territory and it is virtually impossible to predict how long we will be in this situation. This report has been written based on the assumption that at some point in the near future, the use of facilities will revert back to pre-covid times.

Process

We would like to thank everyone from West Vancouver Schools who participated in informing this LRFP. Due to the Covid-19 pandemic, the process to develop the LRFP consisted of virtual meetings.

How to use this plan

This plan was completed in Fall 2021.

Executive Summary

Built on a tradition of academic excellence, West Vancouver Schools (WVS) is one of the highest performing public-school districts in BC. With 3 primary, 11 elementary and 4 secondary schools and close to 7,000 learners, WVS provides a broad range of programs and academies that extend beyond the bounds of the core curriculum. We celebrate the potential of every student and seek to empower and engage them in their learning as they acquire the necessary knowledge and skills needed to persevere in our complex and fast-changing world.

The district serves the communities of West Vancouver, Lions Bay and Bowen Island, and draws students from throughout the Lower Mainland. Our out-of-district enrolment has allowed us to adjust to fluctuations in local enrolment, keeping most of our facilities at or over capacity.

While Rockridge Secondary, the newest school in the district, was constructed in 1994 (25 years ago) and Lions Bay Primary in 1977 (44 years ago), the rest of our schools were built between 1912 and 1966. The district has done an outstanding job of maintaining and upgrading these facilities, stretching limited capital dollars to cover annual mechanical, electrical and building envelope upgrades, but our district average facility condition index (FCI) is 0.5., and most contain significant building systems at the end of their life cycle.

In addition to its ongoing preventative maintenance programs, the current capital plan focus is, and has been for the past decade, the completion of the Seismic Mitigation Program (SMP). Sentinel Secondary is the last site in the district still rated as high risk (H3), due to the unsecured concrete block interior wall construction throughout the building. In addition, this site has the highest FCI in the district, of 0.58, indicating it has the largest amount of deferred maintenance. A seismic upgrade project for Sentinel would not only eliminate the high seismic risk for students and staff but could also create an opportunity to upgrade the deteriorating infrastructure, including mechanical, electrical and building envelope issues in those areas affected by the seismic work.

Key priorities over the next 10-20 years are:

- Maintain top levels of achievement including high graduation rates and post-secondary transitions
- Integrate diversity, inclusivity and equity into every aspect of our work and play
- Continue to foster a deeply collaborative relationship with our indigenous neighbours, ensuring that our indigenous students receive the support and resources they need to thrive in our schools
- Continue to provide innovative programs across the curriculum spectrum, to equip our students to meet the demands of a constantly changing future

- Obtain funding for the seismic mitigation work necessary at Sentinel Secondary
- Continue to provide safe and healthy buildings for our students and staff via a thoughtful preventative maintenance program
- Optimize our 5-Year-Capital-Plans to obtain funding for mechanical, electrical and building envelope upgrade work throughout the district
- Continue our innovative teaching practices by improving access to technology, including an IT infrastructure upgrade at all sites, in addition to maintaining and replacing teacher devices and classroom technology as needed
- Continue and expand our physical literacy initiative in the district, improving opportunities for indoor and outdoor physical activities, and incorporating physical literacy into the school curriculum at all grade levels
- Work with partner groups and government agencies to redevelop the failing track at West Vancouver Secondary, transforming it into a multi-use, year-round sports facility

The top risks that the district faces over the next 10-20 years can be identified as follows:

- Lack of government capital funding to support the infrastructure required to drive the necessary integration of technology into the way we teach and learn
- An Annual Facilities Grant that does not keep pace with either inflation or the growing cost of maintaining aging buildings
- Capital maintenance funding that is based on the size of the district, and not necessarily on the age of the facilities
- Lack of available land that could be sold to create local capital and support building replacements
- With an aging facilities portfolio, and despite excellent preventative maintenance, the district will start to see its facilities experience major failures over the next 10-20 years, and must start planning for replacement projects over the next 5-10 years
- With an aging infrastructure, adaptations of the existing facilities to modern day learning initiatives and technologies are restricted by the existing shells they are housed in and the existing systems that they are served by. These constraints will impose limitations on future upgrades.

Despite many challenges, WVS continues to lead innovative education practice in the province, the country, and indeed the world. We value excellence throughout every layer of our organization, from our education leaders to our skilled facilities and operations staff. With the support and partnership of the Ministry of Education, WVS will continue to provide the finest educational experience for the benefit of our children, our employees and our community.

Purpose of the LRFP

The Long-Range Facilities Plan (LRFP) is an important tool for school districts to manage their facilities, outline their vision, and form the basis of submissions of capital plan requests by the school district and for investment decisions by the BC Ministry of Education. It serves multiple purposes:

- It provides a vision of how the district would like to manage its assets over the next 10 years in a way that best fits the Board of Education's Strategic Plan.
- It aligns the district's capital and facilities planning and activity with the Ministry of Education's Framework for Enhanced Student Learning (FESL) policy requirements
- It provides an overview of the existing facilities, their conditions, and capacity utilization.
- It demonstrates that facilities are being managed in an effective, economic, and efficient way in support of the district's FESL goals.
- It forms the basis for the school district's capital investment decisions, and other programming and operating decisions.
- It forms the basis for investment decisions by the BC Ministry of Education.
- It examines projections of population and enrolment over a 10-year period.
- It identifies current programming offered and forecasted future changes in the delivery of educational curriculum; and
- It identifies recommendations and proposed implementation strategies for capital investments for the next 5-10 years.

The LRFP will identify the existing facilities, programs, and enrolment, and compare this with future changes in enrolment and educational delivery. Based on future challenges, it will then proceed to provide recommendations and a proposed implementation strategy for those recommendations for the next five years.



Photo credit: West Vancouver Schools



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School District Organization and Programming

1

Part 1: School District Organization and Programming

1.1 School District’s Vision, Values and Goals

The objective for the LRFP is to create a strategic document that serves WVS in delivering education to its students, according to the districts’ Mission, Vision, Values, and Guiding Principles, as defined in the Board of Education’s 2019-2022 Strategic Plan:

Our Vision

We aspire to provide the finest educational experience in the country for the benefit of our children, our employees, our community and the world.

Our Values

EXCELLENCE	We pursue excellence in everything we do.
INCLUSIVENESS	We treat everyone fairly. We respect, reflect and appreciate the diversity in our community.
ACCOUNTABILITY	We strive to be approachable and to make our processes and decisions as open and transparent as possible.
AUTHENTICITY	We provide meaningful and relevant learning experiences.
INNOVATION	We pursue innovation by encouraging curiosity and a spirit of inquiry.
COMMUNITY ENGAGEMENT	We forge connections with our community and welcome their input.
HAPPINESS	We seek happiness in the way we learn and work.

Our Strategic Goals

1. Educational Excellence
2. Visionary Leadership
3. Successful Transitions

1.2 District Background and Unique Attributes

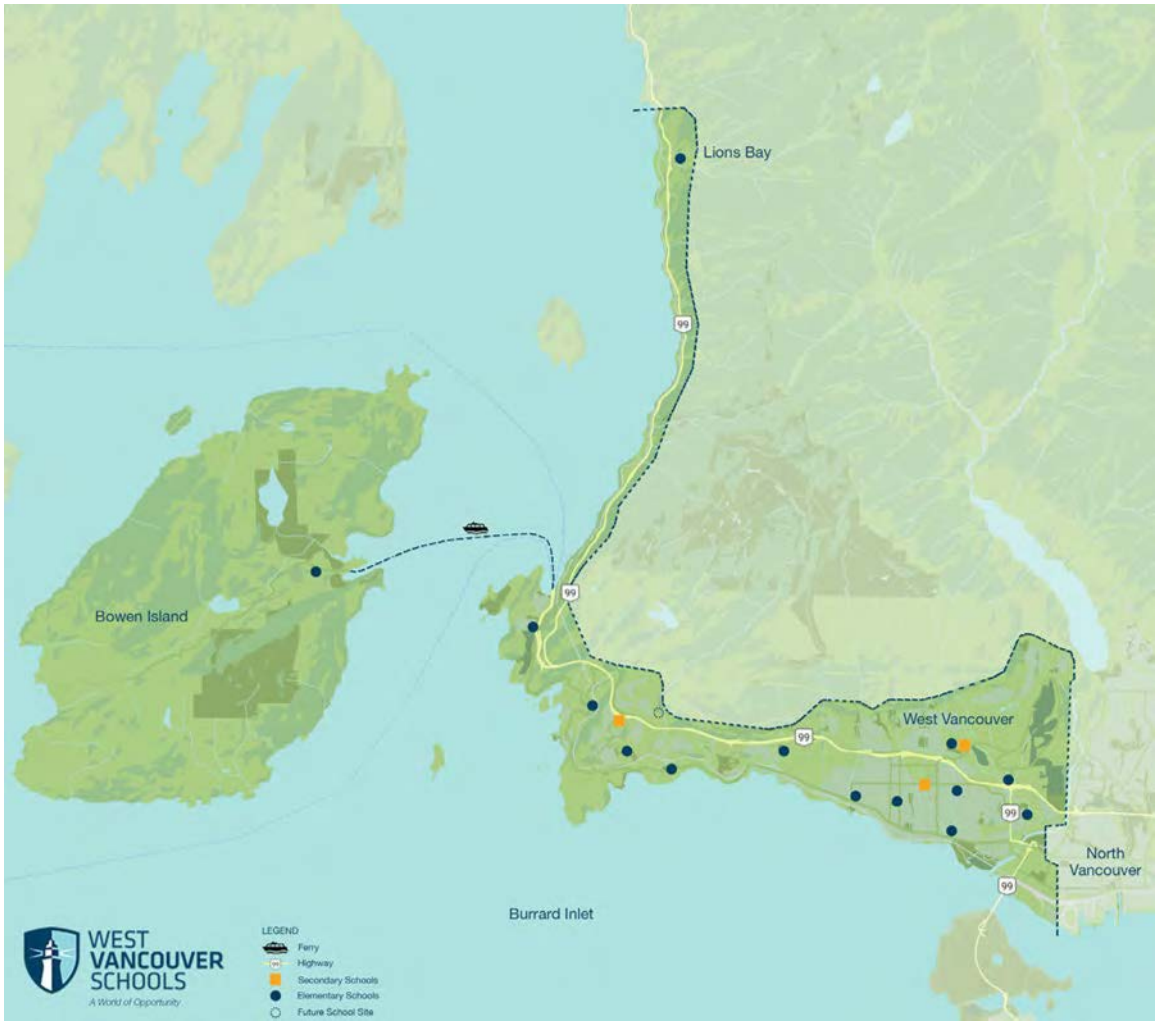
West Vancouver Schools (WVS) is a Learning Community of approximately:

- 7,200 students
- 18 schools: 3 primary, 11 elementary, and 4 secondary schools; and
- 1200 staff (including teachers, teachers teaching on call, senior staff and support staff)

The community includes learners from Bowen Island, Village of Lions Bay, District of West Vancouver, and Squamish Nation lands.

The district has exceptionally high levels of achievement: WVS has one of the highest Dogwood completion rates in the province, and a graduation rate of 97-98% each year. 87% of graduating students proceed to post-secondary education. It offers a learning experience designed to educate the ‘wholechild’ through academics, athletics, citizenship and the arts.

In addition to the regular education stream, the district offers a wide variety of programs for all learners including Premier Choice programs, and Premier Academies.





1.3 Educational Programming

Aside from the regular stream curriculum, WVS offers District programs, premier programs, and premier Academies.

District Programs

PROGRAM	WHAT IT IS	OFFERED AT
Advanced Placement	The Advanced Placement (AP) Program allows students to pursue college-level studies while still in secondary school.	Ecole Sentinel Secondary Rockridge Secondary
Early Learning	Early Learning encompasses social, emotional, physical and academic programming for 0-8 year old children in West Vancouver Schools. It includes: <ul style="list-style-type: none">• Welcome to Kindergarten program (all schools)• Strongstart	Hollyburn Elementary Eagle Harbour Montessori Chartwell Elementary
Elementary Band	At the elementary level, all children from Kindergarten to Grade 7 are provided with a comprehensive and sequenced music education taught by specialist music teachers. In addition to the regular classroom program, the elementary schools offer Beginner and Intermediate Band Programs for Grade 6 and 7 students.	All elementary schools
English Language Learners	This program provides assistance for students who need additional learning support for students to become proficient in Academic English.	Available for all students

French Immersion	Early French Immersion Late French immersion Secondary French Immersion	Ecole Cedardale Ecole Pauline Johnson Sentinel Secondary
IDEC (Inquiry Based Digitally Enhanced Community)	This innovative, inclusive program is for students from Kindergarten to Grade 7. It aligns three emerging themes in education: digital immersion, inquiry-based learning and Soft Skills (including self-regulation, collaboration and creative thinking). The framework ensures that individual student learning processes are supported by digital tools and current pedagogy. The IDEC program is unique among school districts in Metro Vancouver.	Caulfeild Elementary
Inglewood Secondary	Inglewood Secondary is West Vancouver Schools' Alternate Graduation Program for senior secondary students. This unique small-scale school, located on the campus of West Vancouver Secondary School specializes in providing personalized learning for students in grades 10-12.	West Vancouver Secondary/ Inglewood Annex
International Baccalaureate	IB Primary IB Middle IB Diploma	West Bay Elementary Cypress Park Primary Ecole Cedardale Rockridge Secondary West Vancouver Secondary
Montessori	With an emphasis on independence, freedom within limits, and respect for a child's natural psychological development, Eagle Harbour Montessori School offers 5 to 12 year-olds with the British Columbia Ministry of Education curriculum delivered in the traditional approach developed by Italian physician and educator Maria Montessori.	Eagle Harbour Montessori
Properties Family Hub	The Properties Family Hub Society (PFHS) contributes to positive human and economic development by offering multi-generational, flexible community health and education programs for families, seniors, singles and children residing in and near the British Properties.	Chartwell Elementary
Pursuit	Pursuit is a non-credit timetabling option for senior students, Grades 10-12, designed to accommodate specifically provincially and nationally-ranked athletes or for performing artists who are competing at the highest level for their age group	All secondary schools
Summer Learning	West Vancouver Schools Summer Learning programs provide rich learning opportunities for students over the summer months. Summer Learning programs range from elementary to secondary and include a range of different course options.	Hollyburn Elementary Ecole Pauline Johnson West Vancouver Secondary

Premier Programs

PROGRAM	WHAT IT IS	OFFERED AT
Art West 45	<p>Art West 45 is a broad-based comprehensive arts program open to students in grades 10-12 with a strong interest in visual arts and design.</p> <p>Students spend 1–3 blocks of one day in the studio, allowing them to pursue more advanced art techniques and uninterrupted creative time, including work with life models. Original work may be used to build a strong personal portfolio for post-secondary education opportunities and employment following graduation.</p> <p>Students receive up to 16 credits towards graduation.</p>	Open to all grade 10-12 students in the district
Fashion Industry	<p>West Vancouver Schools Premier Fashion Industry Program is a broad-based program open to students Grades 10-12 who have a strong interest in all aspects of Fashion.</p> <p>Students will have the opportunity to develop a portfolio that will explore concepts of fashion production incorporating industry techniques and design.</p>	Open to all grade 10-12 students in the district, meets every week at West Vancouver Secondary
First Aid Swim Training (FAST)	<p>FAST is a young lifeguard education program that will allow students to develop the essential skills to be successful and confident lifeguards. At the completion of the FAST program students will have obtained all of the required certification prerequisites necessary to enroll in the National Lifeguard Course, which students can take independently when they are 16 years of age or older.</p>	Open to students 13 years and older, takes place at the West Vancouver Aquatic centre
Great Bots of Fire 8	<p>Great Bots of Fire 8 is a new program designed for Grade 8 students (boys & girls) who are interested in participating in the area of mechatronics robotics.</p> <p>This after-school program provides students the ability to build robots in a team environment, while learning a variety of skills.</p>	West Vancouver Secondary
Honour Choir	<p>District Honour Choir is a mixed and treble choir course that offers an opportunity to challenge and extend the learning of West Vancouver Schools' finest young singers in Grades 8-12. The course provides the potential for up to 5 years of credited music elective towards graduation.</p>	Open to all students grades 8-12, West Vancouver Secondary School
Ignite your passion	<p>One of the most important transitions in a student's career is the move from elementary to secondary school. The Ignite Your Passion program is designed to support students in that transition. This series of courses provides exciting opportunities, introducing students to areas of interest that they may continue to pursue once they arrive to their secondary school of choice.</p> <p>The sessions run weekly and outside of regular school hours.</p>	Open to all students in grades 6,7 and 8, hosted at West Vancouver Secondary

PROGRAM	WHAT IT IS	OFFERED AT
IB Diploma Programme	<p>The IB DP is an internationally recognized program that encourages students to broaden their intellectual, social and cultural horizons in a rigorous learning environment. The IB DP is widely recognized and graduates of the program attend university in Canada, the US, the UK, Europe and Asia.</p>	West Vancouver Secondary
Outdoor Recreation	<p>This program offers Physical Health and Education beyond the walls of the gym and explores the local environment through outdoor challenges and pursuits. Students will receive 8 credits with the combination of Physical and Health Education or Active Living with Outdoor Education which weaves together personal development, community, environmental stewardship, preparedness and leave no trace principles with physical literacy.</p>	Open to all students at Sentinel, Rockridge, and West Vancouver Secondary
200 hour yoga teacher training	<p>This course is for students who are interested in teaching yoga as well as for students who are interested in learning more about yoga to enhance their own personal practice. The goal of the 200-Hour Yoga Teacher Training is to make students comfortable teaching a basic all levels yoga class. At the completion of the 200-Hour Yoga Teacher Training students will be qualified yoga teachers.</p>	West Vancouver secondary
Young entrepreneurship and leadership launchpad	<p><u>Youth Entrepreneurship Leadership Launchpad (YELL)</u> Canada has teamed up with Simon Fraser University (SFU)'s <u>Chang Institute for Entrepreneurship (CIE)</u> to develop and deliver a unique initiative for aspiring entrepreneurs in high school looking to get a head start with their SFU education. Students graduating from YELL with a B or higher will receive high school credit and are eligible to apply for SFU university credit</p>	Open to all grade 11 and 12 students, hosted at West Vancouver Secondary
Youth train in trades	<p>The Youth Train In Trades (YTT) Carpentry Program provides training for Grade 11 and 12 students interested in a career in carpentry and related trades. Based at West Vancouver Secondary, students receive training every second day, while attending their own secondary school for core academic subjects.</p>	Open to all students across the North Shore, hosted at West Vancouver Secondary school

Premier Academies

ACADEMY	WHAT IT IS
Badminton	Open to students of all the districts secondary schools
Baseball	This program offers young baseball players the opportunity to complete their academic requirements in the mornings and then the ability for students to participate in baseball skill development training in the afternoons, all during schools hours.
Basketball	This high performance, elite training opportunity is open to male and female students entering Grades 9 – 12 from within and outside the West Vancouver School District.
Fencing	The Premier Fencing Academy in the West Vancouver School District is the only one of its kind in British Columbia. Launched in 2014 and coached by Canada’s National Fencing Team Champion, Igor Gantsevich, the program is open to students registered in Grades 8-12 at any one of the three public secondary schools: Rockridge Secondary, Ecole Sentinel Secondary, or West Vancouver Secondary School.
Field Hockey	<p>This program offers young Field Hockey players the opportunity to complete their academic requirements in the mornings and participate in Field Hockey development training in the afternoons, every second day, all during school hours.</p> <p>Students registered full time in schools out-of-district will be accommodated pending availability.</p>
Mechatronics Robotics	<p>The Premier Mechatronics Robotics Academy is a choice program offered to students who are registered full-time at West Vancouver Secondary, Ecole Sentinel Secondary, or Rockridge Secondary schools.</p> <p>This program offers students the opportunity to explore their potential in Competitive Robotics as a way of using STEM (Science, Technology, Engineering, Math) skills in a practical and hands-on environment.</p> <p>Students work in design teams, in a variety of roles, to research, design, build, program and test robots, ultimately competing in robotics competitions, locally, provincially, and internationally.</p>
Rugby	<p>This program offers young rugby players the opportunity to complete their academic requirements in the mornings and participate in rugby skill development training in the afternoons, every second day, all during school hours.</p> <p>The Premier Rugby Academy is a choice program offered to both boys and girls, Grades 8-12.</p>
Soccer	The West Vancouver Schools’ Premier Soccer Academy is a program for the student who wants to develop his/her potential as a high performance athlete or just simply wants to learn and enjoy playing the game. Students enrolled full time at WVSS, Rockridge or École Sentinel Secondary Schools have the opportunity to pursue the passion of playing soccer, while continuing to receive an excellent education.
Tennis	<p>The primary goal of this program is to provide a formal tennis training program within the academic setting, to allow for achievement and excellence in sport and education.</p> <p>West Vancouver Schools Premier Tennis Academy is a sports program within the public school system that offers young tennis players the opportunity not only to participate in a unique training schedule, but also to complete their academic course requirements.</p> <p>This program is strictly supplementary to the existing programs run by various tennis clubs.</p>
Volleyball	The Premier Volleyball Academy provides a consistent training program for girls, Grades 8-12 to experience and play quality Volleyball through high level training and exposure to competition

PREMIER ACADEMIES OFFERED AT: Learning takes place at all three secondary schools, training takes place at various locations in the community.



Photo credit: West Vancouver Schools



Student
Enrolment

2

Part 2: Student Enrolment

Enrolment in the district has been very steady over the years, at around 7,000 students. The 10-year projection predicts a marginal growth of approximately 300 in-district students over 10 years.

WVS attracts a considerable number of students from out of catchment; 1539 in 2017, 1650 in 2018, 1644 students in 2019, 1593 in 2020, and 1570 in 2021. In order to prioritize in-catchment student placement, the school district maintains a fall registration date for in-catchment students, with an out-of-catchment registration date after the winter break, where out-of-catchment students are allowed to register, providing there is space available.

There are international students at every one of the three secondary schools, as well as many of the elementary schools. International students are accepted where space within the school allows it.

The school district manages to capture approximately 80% of the students that live within the district. The remaining 20% attend private schools within the district, such as Collingwood and Mulgrave. The percentage of students attending public school has increased from 75% to 80% over the past few years, due to continuing efforts by the district.

	Historical Headcount					Current Headcount	Estimated Headcount				
School Year	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Total Funded Enrolment	6,723	6,804	6,910	6,973	6,898	6,773	6,780	6,787	6,800	6,850	6,900





Photo credit: West Vancouver Schools

Existing Facilities, School Capacities, and Utilization

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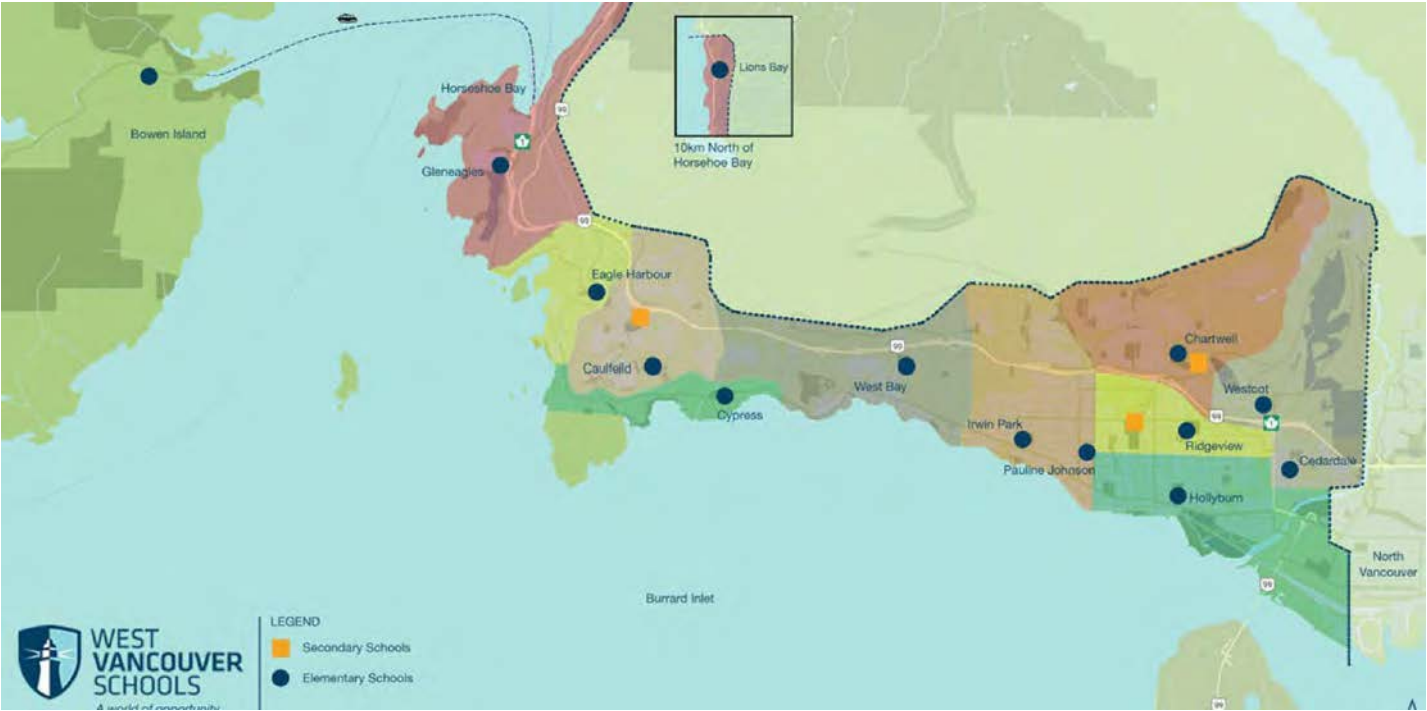
Part 3: Existing Facilities, School Capacities, and Utilization

WVS operates most schools close to or over 100% average utilization rate (not including international students), which is exceptionally high. As previously noted, the district is doing an excellent job of providing exceptionally high levels of education, and a wide variety of innovative programming. This combination attracts a number of out-of-district students, coming from SD#44 North Vancouver, SD#48 Sea to Sky and SD#39 Vancouver, and further afield.

The schools operating over capacity are meeting space needs by using specialty spaces within the schools, and with the use of portables.

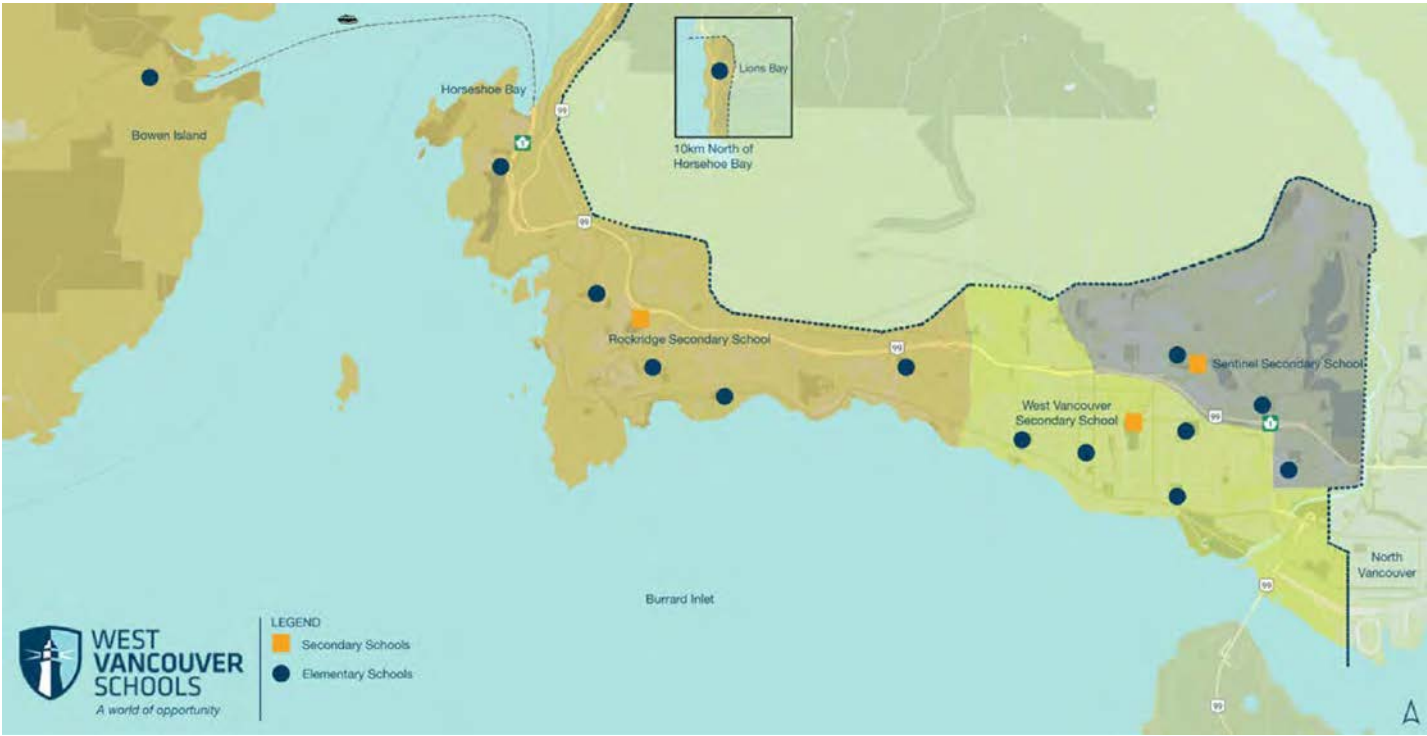


Photo credit: West Vancouver Schools



3.1 Elementary School Capacities

Elementary Schools	NominalCapacity of School Building (excluding portables)	Operating Capacity 2021/22 (Excluding Int'l)	Utilization (Projected / Operating)	Portables General Instruction
Bowen Island Community School	267	289	108%	1
Caulfeild Elementary	438	353	81%	
Ecole Cedardale	279	288	103%	1
Chartwell Elementary	252	247	98%	1
Cypress Park Primary	82	73	89%	
Eagle Harbour Montessori	40	54	135%	
Gleneagles Ch'axáy Elementary	252	261	103%	
Hollyburn Elementary	252	231	92%	
Irwin Park Elementary	322	381	118%	1
Ecole Pauline Johnson	368	415	113%	2
Ridgeview Elementary	298	371	116%	2
West Bay Elementary	317	400	125%	2
Westcot Elementary	275	405	151%	2
Lions Bay Community School	82	33	40%	0
Totals / Average	3,224	3,614	112%	12



3.2 Secondary School Capacities

Secondary Schools	Nominal Capacity of School Building (Excluding Portables)	Operating Capacity 2021/22 (Excluding Int'l)	Utilization (Projected / Operating)	Portables General Instruction
Rockridge Secondary	700	809	116%	4
Ecole Sentinel Secondary	900	1,165	129%	3
West Vancouver Secondary	1,450	1,027	71%	0
Inglewood Secondary	60	15	25%	0
Totals / Average	3,110	3,016	97%	7

3.3 Total

Facility - Facility Name	Nominal Capacity	Operating Capacity 2021/22 (Excluding Int'l)	Utilization (Projected / Operating)	Portables General Instruction
Totals / Average	6,334	6,630	105%	19

In addition to sites having portables for general instruction purposes, many sites have portables used by third party providers for childcare.

3.4 Childcare / Strong Start Portables

Facility - Facility Name	Portable Use	Total #
Ecole Cedardale Elementary	Childcare	1
Chartwell Elementary	Childcare and Property Family Hub	1
Eagle Harbour Montessori	Childcare and Strong Start	1
Gleneagles Ch'axáy Elementary	Childcare	1
Irwin Park Elementary	Childcare	1
Ecole Pauline Johnson	Childcare	2
Ridgeview Elementary	Childcare	1
West Bay Elementary	Childcare	1
Westcot Elementary	Childcare	1
Totals / Average		9



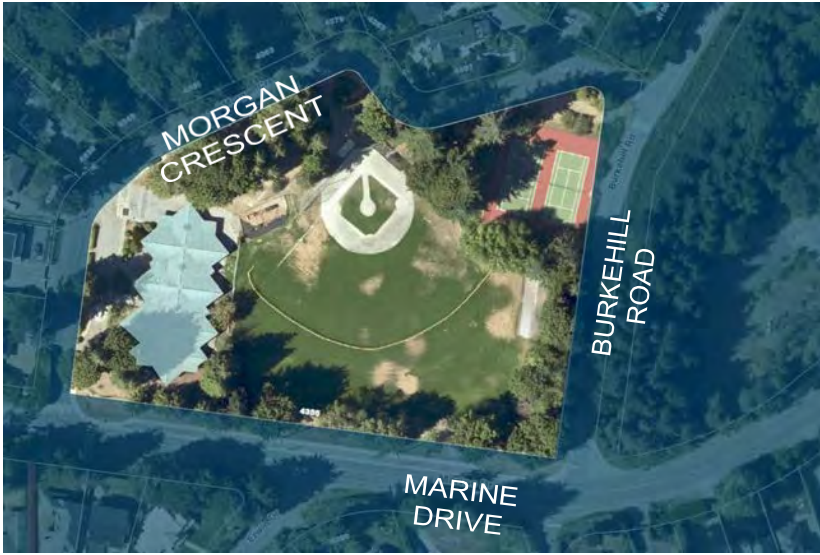
Bowen Island Community School

Nominal Capacity:	267
2021/22 Enrollment:	289
Utilization (Nominal/Enrollment):	108%
General Instruction Portables:	1



Caulfeild Elementary

Nominal Capacity:	438
2021/22 Enrollment:	353
Utilization (Nominal/Enrollment):	81%
General Instruction Portables:	0



Cypress Park Elementary

Nominal Capacity:	82
2021/22 Enrollment:	73
Utilization (Nominal/Enrollment):	89%
General Instruction Portables:	0



Ecole Cedardale

French Immersion	
Nominal Capacity:	279
2021/22 Enrollment:	288
Utilization (Nominal/Enrollment):	103%
General Instruction Portables:	1

Eagle Harbour Montessori

Nominal Capacity:	40
2021/22 Enrollment:	54
Utilization (Nominal/Enrollment):	135%
General Instruction Portables:	0





Gleneagles Ch'axáý Elementary	
Nominal Capacity:	252
2021/22 Enrollment:	261
Utilization (Nominal/Enrollment):	103%
General Instruction Portables:	0



Lions Bay Community School	
K-3	
The Village of Lions Bay	
Nominal Capacity:	82
2021/22 Enrollment:	33
Utilization (Nominal/Enrollment):	40%
General Instruction Portables:	0



Hollyburn Elementary	
Nominal Capacity:	252
2021/22 Enrollment:	231
Utilization (Nominal/Enrollment):	92%
General Instruction Portables:	0



Ecole Pauline Johnson	
French Immersion	
Nominal Capacity:	368
2021/22 Enrollment:	415
Utilization (Nominal/Enrollment):	113%
General Instruction Portables:	2



Irwin Park Elementary	
Nominal Capacity:	322
2021/22 Enrollment:	381
Utilization (Nominal/Enrollment):	118
General Instruction Portables:	1



West Bay Elementary	
Nominal Capacity:	317
2021/22 Enrollment:	400
Utilization (Nominal/Enrollment):	125%
General Instruction Portables:	2



Westcot Elementary	
Nominal Capacity:	275
2021/22 Enrollment:	405
Utilization (Nominal/Enrollment):	151
General Instruction Portables:	2%



Chartwell Elementary School	
Nominal Capacity:	252
2021/22 Enrollment:	247
Utilization (Nominal/Enrollment):	98%
General Instruction Portables:	1



Ridgeview Elementary	
Nominal Capacity:	298
2021/22 Enrollment:	371
Utilization (Nominal/Enrollment):	116%
General Instruction Portables:	2



Ecole Sentinel Secondary	
Nominal Capacity:	900
2021/22 Enrollment:	1165
Utilization (Nominal/Enrollment):	129%
General Instruction Portables:	3

West Vancouver Secondary	
Nominal Capacity:	1,450
2021/22 Enrollment:	1,027
Utilization (Nominal/Enrollment):	71%
General Instruction Portables:	0



Rockridge Secondary	
Nominal Capacity:	700
2021/22 Enrollment:	807
Utilization (Nominal/Enrollment):	116%
General Instruction Portables:	4

Inglewood Learning Centre	
Nominal Capacity:	60
2021/22 Enrollment:	15
Utilization (Nominal/Enrollment):	25%

3.5 Condition of Existing Facilities

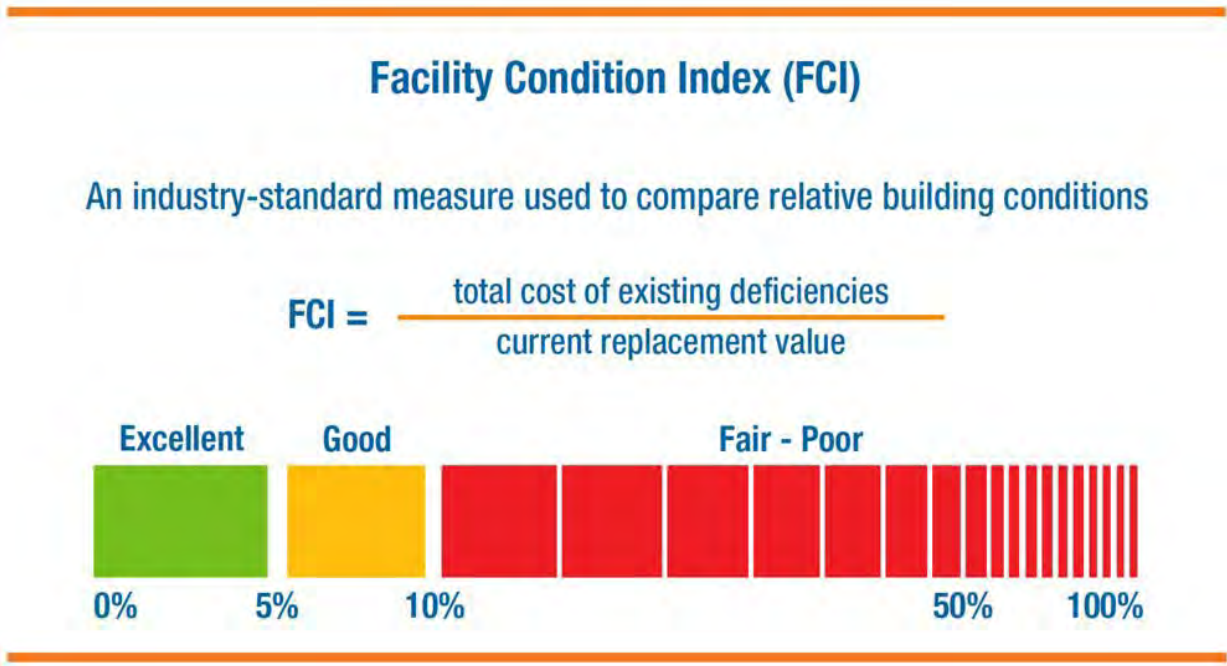
Facility Condition

The BC Ministry of Education has a Capital Asset Management System (myCAPS) for all school facilities in the province of BC.

Part of myCAPS is the Facility Condition audits, which the ministry has contracted out to VFA Inc., which was recently acquired by Accruent (www.accruent.com). The audit includes structural, architectural, mechanical, electrical, plumbing, fire protection, equipment and furnishings and life safety, as well as site conditions.

These audits result in a Facility Condition Index for each school, which is the ratio of deferred maintenance dollars to replacement dollars and provides a straightforward comparison of all the school district's estate assets to each other, as well as to other schools in the province.

To calculate the FCI for a building, divide the total estimated cost to complete deferred maintenance projects for the building by its estimated replacement value. The lower the FCI, the lower the need for remedial or renewal funding relative to the facility's value. For example, an FCI of 0.1 signifies a 10 percent deficiency, which is generally considered low, and an FCI of 0.7 means that a building needs extensive repairs or replacement. The average FCI for all schools in the Province of BC sits around 0.32.



Source: <https://www.accruent.com/solutions/capital-planning/facility-condition-assessments-vfa>

The Ministry of Education uses the FCI to determine funding priorities for capital projects across the province of BC. Generally, a school will not be considered for replacement or renovation unless the FCI > 0.60. The detailed meaning of the FCI levels is as follows:

FCI RATING		DEFINITION
0.05 (0-5%)	Excellent	Near new condition. Meets present and foreseeable future requirements.
0.05 - 0.15 (5-15%)	Good	Good condition. Meets all present requirements.
0.15 – 0.30 (15-30%)	Average	Has significant deficiencies but meets minimum requirements. Some significant building system components nearing the end of their normal life cycle.
0.30 – 0.60 (30-60%)	Poor	Does not meet requirements. Immediate attention required to some significant building systems. Some significant building systems at the end of their life cycle. Parts may no longer be in stock or very difficult to obtain. High risk of failure of some systems.
>0.60 (60-100%)	Very Poor	Does not meet requirements. Immediate attention required to most of the significant building systems. Most building systems at the end of their life cycle. Parts may no longer be in stock or very difficult to obtain. High risk of failure of some systems.

Notes regarding myCAPS/VFA evaluations:

The MOE strives to have audits performed every 3-5 years. SD45's most recent audit occurred in the 2017 fiscal year. The audit data is limited to a high-level review of sites; current deficiencies arising between audits will not be reflected and recent improvements may not have been considered. Additionally:

- The audits assume typical life span of systems and materials: any accelerated wear and tear may not be accounted for.
- The audits only 'score' the existing facilities: neither missing items (for example an elevator for handicapped accessible purposes) nor Code deficiencies are included in the score; and
- myCAPS only considers the physical state of the building; it does not reflect user complaints, functional and educational deficiencies, modernization needs, accessibility concerns or CEPTED and other safety concerns.

As such, the myCAPS evaluation should be seen as one part of a larger review of facilities.

The current average FCI for all facilities in the district, as reported in myCAPS, is 0.52, which is well over the provincial average of 0.33.

Facility - Facility Name	Facility - Address (Mailing)	Facility - Area - Gross Area (m²)	Facility FCI*
Bowen Island Community School	1041 Mount Gardner Rd	3,018.0	0.38
Caulfeild Elementary	4685 Keith Rd	4,026.7	0.52
Ecole Cedardale	595 Burley Dr	2,072.5	0.56
Chartwell Elementary	1300 Chartwell Dr	2,968.0	0.61
Cypress Park Primary	4355 Marine Dr	1,228.0	0.55
District Maintenance Facility	3850 Cypress Bowl Road	2,165.0	0.40
Eagle Harbour Montessori	5575 Marine Dr	1,633.4	0.48
Gleneagles Ch'axáy Elementary	6350 Marine Dr	2,752.6	0.56
Hollyburn Elementary	1329 Duchess Ave	3,634.0	0.51
Irwin Park Elementary	2455 Haywood Ave	3,649.0	0.68
Lions Bay Community School	250 Bayview Rd	948.0	0.42
Ecole Pauline Johnson	1150 22nd St	3,344.2	0.54
Ridgeview Elementary	1250 Mathers Ave	3,514	0.52
Rockridge Secondary	5350 Headland Dr	8,687.3	0.53
Ecole Sentinel Secondary	1250 Chartwell Dr	13,554.0	0.65
West Bay Elementary	3175 Thompson Pl	3,313.0	0.50
West Vancouver School Board Office	1075 21st St	946.4	0.47
West Vancouver Secondary	1750 Mathers Ave	18,540.8	0.50
Westcot Elementary	760 Westcot Rd	3,180.0	0.58
Overall District Average			0.52

**Based on fiscal year 2019 audit*

Facility Assessments

In 2018, WVS engaged envelope, mechanical, and electrical engineering consultants to assess the existing conditions of the schools within the district with the purpose of providing a broad view of the conditions and assist with budget planning of maintenance, repairs, and system replacements required of all schools.

The original date of construction of schools within the district range from 1912 to 1994, with the majority of schools (and additions to existing schools) occurring between the late 1940s-1960s. the newest three schools were constructed in 1977, 1979 and 1994.

Mechanical Assessment

SMcN Consulting was retained by WVS in 2018 to assess the condition of mechanical infrastructure at all 17 school facilities in the district. This assessment included a review of drawings of each school, as well as a physical assessment of mechanical infrastructure where visible.

Most major mechanical equipment as well as some ductwork and pipes situated on roofs and within mechanical rooms were able to be assessed visually. As the majority of ductwork and pipes are concealed within walls and structure, assessments are made for these components based on date of installation and typical expected service life.

Based on multiple industry standards, any mechanical infrastructure pre-dating 1980 is considered to be beyond useful service life expectancy. While this equipment can remain in use, it should be expected that there could be a full or partial failure of this equipment at any time. All but one school within the district was constructed prior to 1980.

General findings of the mechanical assessment of the 17 schools in WVS include:

- Piping concealed below grade and behind walls, and originally installed equipment that are still in service date back to the original construction of the schools and do not comply with current building codes and standards.
- 2 out of 17 schools within the district do not have any ventilation whatsoever.
- 7 out of the 17 schools in the district have received ventilation upgrades between 2001-2021.
- 7 out of 17 of the schools in the district have received Boiler Replacements between 2008-2021.
- Three schools have been identified as needing immediate remediation, relating to the fact that each school has a sprinkler system without backflow protection to protect the potable water supply of the schools and municipal water system.
- 17 out of 17 schools have multiple mechanical equipment and/or infrastructure with an estimated 0-years of serviceable life left.
- 17 out of 17 schools have a magnitude of work that requires remediation within the next 1-5 years; these items are placed in this category in the recognition that funding of this amount may not be available in the short term.

See mechanical report attached in the appendix for more information. The report outlines in detail the remaining life expectancy of existing systems, as well as work to be addressed for each school in the next 1-5 years, 6-10 years, 11-15 years and beyond.

Building Envelope Assessment

Herold Engineering was retained by WVS in 2018 to assess the condition of the visible components of building envelope systems at all school facilities in the district. This assessment included 16 of the 17 schools within the district: Irwin Park Elementary was under a mechanical and building envelope renewal at the time of this investigation and as such was excluded from the report.

Estimated useful service life is assessed based on a variety of industry standards, guidelines, and warranties, however all systems and components are also subject to a wide variety of factors that affect their life expectancy and current condition, including quality of installation, quality of materials used, weather conditions, and degree and quality of maintenance and upkeep. As a result, some systems and components will outlive their expected service life, and others may require replacement sooner than expected.

The report provides a detailed assessment of the condition of each school including estimated remaining serviceable life, recommendations, and urgency of remediation required within four major categories: (1) at grade assemblies; (2) exterior walls, (3) windows, doors and skylights; and (4) roofing.

General findings of the report include:

At-Grade Assemblies:

- 10 out of 16 schools require immediate remediation, 3 out of 16 schools require short-term remediation, and 5 out of 16 schools require long-term remediation.
- Examples of immediate and short-term work include replacement of cladding, regrading and clearing vegetation, regrading to remediate buried cladding, remediating tripping hazards, providing waterproofing detailing, and replace flashing.

Exterior Wall infrastructure:

- 7 out of 16 schools require immediate remediation, 13 out of 16 schools require short-term remediation, 4 out of 16 schools require medium-term remediation, and 14 out of 16 schools require long-term remediation.
- Examples of immediate and short-term work include repair envelope cladding, full and partial replacement of cladding systems and provide exterior insulation and new sheathing membrane in some cases, repair cracking in masonry and concrete walls, provide concrete waterproofing, repainting, and replacement of deteriorated / damaged trims.

Windows, Doors and Skylights:

- 7 out of 16 schools require immediate remediation, 13 out of 16 schools require short-term remediation, 3 out of 16 schools require medium-term remediation, and 3 out of 16 schools require long-term remediation.
- Examples of immediate short-term work include replacement of broken glass, replacement of glazing stop, replacement of windows, replacement of doors, and provide overhangs over exposed doors.

Roofing:

- None of the 16 schools require immediate remediation on Roofing infrastructure, 2 out of 16 schools require short-term remediation, 2 out of 16 schools require medium-term remediation, and all 16 schools require long-term remediation.
- Examples of immediate short-term work include replace roof membrane, add rigid insulation, clean debris and vegetation off roofing, and remediate rainwater leaders.

Electrical Assessment

WVS engaged RB Engineering in 2018 to assess the visible existing electrical systems and components within the district. This assessment included all 17 schools.

This report assessed the condition of electrical systems within four major categories: Electrical Distribution, Lighting, Fire Alarm, and Life Safety.

The findings of this report include:

Distribution Systems:

- Main switchgear / service-disconnect have an expected lifespan of 40 years. Many of the schools have the original switchgear from original construction and date back to the 1950s to 1960s. 12 out of 17 schools have Main switchgear / service-disconnect near or beyond the end of serviceable life.
- 2 out of 17 schools have transformers located within the building, which is no longer standard practice. It is unclear when these transformers were last serviced by BC Hydro.
- 16 out of 17 schools have some or all distribution equipment and panels that are beyond the end of serviceable life.
- Only 1 out of 17 schools has all electrical service and distribution systems in good condition, with replacement for various equipment estimated between 6-10 or 16-20 years.

Lighting Systems:

- All lighting systems within schools are a combination of fluorescent fixtures and lamps, ballasts, HID fixtures and lamps, and LED lighting.
- All schools could benefit from replacement of existing fluorescent and ballast lighting to LED lighting which will reduce energy usage and minimize regular replacement required of fluorescent and ballast lighting.
- Note: all lighting systems in the district were replaced with LED in 2019.

Fire Alarm Systems:

- Fire alarm panels in 15 out of 17 schools have recently been replaced and are in good condition. Replacement is recommended within 12-15 years.
- Fire alarm panels in 2 out of 17 schools have never been replaced and will need to be replaced in 3-5 years.
- Bells and pull stations in all schools are in good condition, and in 15 out of 17 schools will require replacement in 8-10 years; one school will require replacement in 10-12 years.
- Fire alarms detectors for all schools require replacement within the next 3-8 years.

Life Safety Systems:

- 1 out of 17 schools do not have emergency lighting whatsoever and 2 schools have insufficient coverage. Emergency lighting should be added to these schools to ensure safe exit in case of power outage.
- Emergency Lights in 11 out of 17 schools require replacement within 6-10 years; 4 schools require replacement in 10-15 years and 1 school requires replacement in 17-20 years.
- Exit signs in all schools within the district have a service life of 6-10 years remaining, however they do not meet current building code regulations.

3.6 Transportation

The Ministry of Education provides grants with respect to the transportation of students living beyond walk limits, to the nearest public school in which there is a grade for the student. The intention of the Ministry guidelines is not to provide busing for every student, but to ensure that students who cannot safely walk to the nearest school shall be assured of safe transportation. The authority to establish rules and procedures within the school district rests with the West Vancouver Board of Education.

At WVS, students that are eligible to receive transportation services are defined as:

- Students residing within their neighbourhood school catchment area and whose homes are beyond the walk limits of the catchment school.
Walk limits are as follows:
Kindergarten to Grade 3: 4.0 km from school
Grades 4-12: 4.8 km from school
- Schools supported by bus transportation are limited to: Rockridge Secondary School, Bowen Island Community School and Gleneagles Elementary
- Bowen Island students receive additional bus service in recognition of the limitation of municipal infrastructure on the island. As there are no sidewalks, and on many roads non-existent or minimal shoulders, bus service is provided to elementary students attending BICS, even though they may live within provincial walk limits of the school.
- While many school districts in BC have their own bus fleets, most metro Vancouver districts do not, and historically WVS has always outsourced its busing. For many years the bus service was subbed out to the District of West Vancouver. With changes in legislation and regulations implemented over the past fifteen years however this service is no longer available, and the district's busing is outsourced to school bus companies. Busing contracts are tendered every 3-5 years. The school district has considered adding their own bus fleet; however, this option has been determined to be not cost effective.

Part 4: Challenges and Aspirations

As part of the LRFP, WVS has identified key challenges and aspirations for the district and its facilities. They are listed in no particular order.

The key challenges and aspirations are unique to the district, and signify areas of improvement, in which the district may be limited by the state of its current facilities.



Photo credit: West Vancouver Schools

A. (Completion of the) Seismic Mitigation Program

WVS has one school remaining to complete its Seismic Mitigation Program: Sentinel Secondary School is classified as an H3 Seismic Risk. The areas at risk are comprised of the four blocks from the original construction in 1962 with additions in 1967 and 1969.

BLOCK	STATUS	RISK RATING	LAST ASSESSED
1962 2 Storey North Wing. 1969 Addition.	Structural Upgrade Required	H3	October 22, 2012
1962 3 Storey South Wing w. 1967 Addition	Structural Upgrade Required	H3	October 22, 2012
1962 Gym and 1969 Addition	Structural Upgrade Required	H3	October 22, 2012
1962 Cafeteria Wing	Structural Upgrade Required	H3	October 22, 2012



Renovations and upgrades in 1995 attempted to fix some of the structural issues; however, they were responding to older code requirements. A 2011 Seismic Program Identification Report (SPIR) calls for upgrading unrestrained concrete block interior walls throughout the entire structure. In addition to requiring seismic upgrade work, Sentinel Secondary School also has the very high FCI rating 0.65. The seismic upgrade of Sentinel Secondary is the ongoing number 1 priority in the district's 5-year Capital Plan.

B. Adapting to Modern Learning Initiatives/Environments

The BC Curriculum has been completely redesigned over the past five years. Two of the five highlights of the redesign, as featured on the Ministry’s website, include:

- “Personalized Learning: The redesign of BC’s curriculum provides flexibility to inspire the personalization of learning and addresses the diverse needs and interests of BC students.”
- “Learning Environments: BC’s redesigned curriculum provides teachers with great flexibility in creating learning environments that are relevant, engaging, and novel. Flexible learning environments give consideration to local contexts and place-based learning.”

Delivering these critical components of the new curriculum occurs through teacher training and programming, and also through facilities that have appropriate spaces to meet the new demands of the curriculum. When looking at space requirements, the development of the whole student must be considered, including both their academic growth and their social and emotional wellbeing.

Space requirements that the district will consider on an on-going basis when undertaking repairs or renovations include:

- Flexibility: spaces designed for the intention of learning
- Technology: movement away from fixed computer labs, increased wireless access, and use of technology for innovative programming.
- Outdoor learning and Urban Agriculture: Most of the district’s schools have active garden sites; additionally, several sites have outdoor classroom structures, and the district would like to see this trend continue.
- De-Institutionalizing of the environment: attention to spaces supporting wellness, more quiet places, modern aesthetic, artful environments.
- Spaces that promote Physical Literacy.

Over the past few years, the school district has maximized any opportunity in its schools to convert spaces into innovative teaching spaces, robotics labs, and personalized learning spaces. Unfortunately, even with these adaptations the opportunities for self-directed learning, flexible and personalized learning, and group work, are limited by the lack of spaces available within existing school buildings for these activities. Some of the challenges the district has encountered:

- Most schools are near or over 100% capacity, leaving very few vacant spaces to be converted into specialized learning environments

- The current MoE funding model does not allow for adaptations/renovations of existing space to the new curriculum; and
- Capital funding for replacements, expansions and new schools follows the Area Standards from 2012, which do not include any modern learning initiative spaces such as breakout spaces, spaces for group work, or teacher prep spaces.

In the face of this challenge, WVS’s focus has been on promoting and supporting its teaching staff in developing innovative teaching and learning strategies, with great success. Support has also been provided for refreshing academic resources and the necessary training associated with them.

For more information on BC’s new curriculum, see: <https://curriculum.gov.bc.ca/>

C. Technology

WVS has been an early adopter of technology which is used to support its highly successfully and innovative district programs. The district has moved away from fixed computer labs and towards flexible use of technology with wireless access. The district has supported technology by modernizing communication equipment in every classroom and providing a personal device to every teacher. Bring Your Own Device (BYOD) is mandatory for grades 4-12. One of the district’s strategic goals from their 2019/2020 strategic plan is to successfully transition technologies, curricula, learning spaces, learning methods and reporting systems. It plans towards future proofing its organization with investments in emerging technologies in their schools. (Virtual Reality, Data Analytics, Mobile Computing, Robotics, Cyber and Artificial Intelligence).

WVS has adopted technology in several innovative programs. Its Premier Mechatronics Robotics Academy is a well-recognized program that allows students to work in design teams, in a variety of roles, to research, build, program and test robots, ultimately competing in robotic competitions, locally provincially, and internationally.

A major challenge and impediment to the advancement of these programs are the aging buildings in the district, which include aging IT infrastructure. During COVID-19 the school district’s investment in technology was critical in supporting students, teachers and educators. As the Ministry’s capital program does not provide funding for IT projects, a significant proportion of government support regarding covid was allocated to upgrading the district’s wireless infrastructure. This project began in 2020/21, and the district has allocated some of its internal reserves to continue the project throughout the 2021/22 year.



SD#45 WVS – Long Range Facility Plan 2020

Photo credit: West Vancouver Schools

D. Physical Health and Education- Physical Literacy -Community space/gym space/physical educationspace/fields

Physical Literacy is the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities (Whitehead, 2016).

WVS has an ambitious physical literacy initiative that integrates movement into the everyday curriculum. The program started in 2015 and is now available for all students from K to grade 12. Physical Literacy teaches kids basic movement skills that allow them to gain confidence and translates to better performance.

The goal is to create competent, confident and motivated movers, and to integrate movement into all lessons throughout the day. Through the delivery of this program, the school district places as much importance on physical literacy as it does on literacy and numeracy. It has been proved that physical literacy translates to improvements in cognition, emotional sensibility, physical and mental health. The district has made physical literacy a key part of its physical health and education curriculum, from everyday programming to premier sports academies.

The district's facilities supporting physical literacy require outdoor and indoor spaces that are clear from obstructions and allow for movement. To support its physical literacy program, the district relies on technology for media-tech delivery and ease of access to media tech systems is crucial to the program delivery. As physical literacy is differentiated from physical education students require spaces separate from the gym. Classrooms can often be too small to support space for physical literacy education and the weather outdoors or playfield conditions may be unsuitable. The district's aging facilities were designed for a different era of teaching and have made it challenging to accommodate the flexible spaces needed for physical literacy.



In addition to needing classroom space for its physical literacy program, the school district has limited facilities for its premier sports academies and relies on partnerships with private and public facilities. The district has partnered with West Vancouver Community and Aquatic Centre, Hollyburn Country Club, West Vancouver Field Hockey Club, and West Vancouver Tennis Club. All West Vancouver's sports facilities are concentrated in one area and thus, many schools do not have access to facilities or need to travel far for access. The Upper Levels/Trans-Canada Highway divides the British Properties and Upper Lands from the rest of the municipality, making connections and shared use of facilities challenging. The only community centre in West Vancouver is south of the highway.

The Capital Branch of the Ministry of Education does not provide capital funding for the renovation, upgrading, or expansion of athletic facilities. A key example of this is the athletic track and field at West Vancouver Secondary School: located on school district owned land, the track is the only athletic track in the entire municipality. It is in poor shape, with the track surface in urgent need of replacement. The school district, in collaboration with the District of West Vancouver and many community groups, has been trying to raise funds for the upgrade of this track and field for multiple years.



Photo credit: West Vancouver Schools

E. Resiliency Adapting to the Natural Environment

WVS has a unique geographical layout with its location between steep mountainsides and the oceanfront, spanning the north shore from Lions Bay to the shores of Burrard Inlet and including Bowen Island. WVS and the District of West Vancouver are part of the North Shore Emergency Management group that is working towards a disaster resilient North Shore. Earthquakes, floods, tsunami's, avalanches and forest fires are the main threats to the West Vancouver area.

A couple of challenges for the district that arise from these natural conditions should be highlighted:

CONSIDERATION OF THE USE OF SCHOOLS AS EMERGENCY RECEPTION CENTRES

Emergency preparedness is key.

As important public buildings within the community, schools could be designated as community centres during an emergency, as required, however it should be noted that none of the schools in the district currently have any official designation as an emergency reception area.

What the District can do to mitigate this challenge:

- For major capital projects, enter early discussions with the municipality on the potential role of new or upgraded schools as emergency reception centres. This could require certain parts of the building to be constructed to post-disaster standards.

RISING SEA LEVELS

With the threat of climate change comes the need to adapt to rising sea levels. The District of West Vancouver has established a 2m coastal flood plain zone. Fortunately, none of the district's schools are located within this zone.



What the district can do to mitigate this challenge:

- Be aware of the coastal flood plain zone when planning for any futuresites

SCHOOL SITES WITH CREEKS RUNNING THROUGH THEM OR NEARBY

Many of West Vancouver's school sites have creeks running through the property or on neighbouring properties. The risk of flooding from these creeks is small but should be noted. A bigger impact on any of these sites is that the District of West Vancouver's Zoning Bylaw requires an Environmental Development Permit for any work within 15 meters of the top of bank for any stream. This type of development permit can add time, costs, and additional requirements to any project, even one as small as placing a portable or expanding a parking area. School sites that have streams running through them are:

- Eagle Harbour Montessori School - Wood Creek
- Caufield Elementary School - Claymore Creek West (Piccadilly Creek)
- West Vancouver Secondary School - Vinson Creek (east side) and Lawson Creek (west side)
- West Bay Elementary School - Pipe Creek (east side) and Westmount Creek (west side)
- Ridgeview Elementary School -Vinson Creek
- Westcot Elementary School - Brothers Creek
- Chartwell Elementary School and Sentinel Secondary - Vinson Creek (west) and Brothers Creek (east)

What the district can do to mitigate these challenges:

- For any minor and major capital projects moving forward, be aware of potential challenges and limitations for the above-mentioned sites
- Monitor the streams on school district property for yearly high-water levels



Photo credit: West Vancouver Schools

RISK OF FOREST FIRES AND FIRE PROTECTION BYLAWS

With several consecutive years of record forest fire seasons throughout the province, including a large fire in Lions Bay in 2019, the need for active planning to guard public assets against forest fires, and how to escape them, is at the forefront of people’s minds. WVS is surrounded by forests to the north (and east side in Lions Bay) and Bowen Island is heavily treed, with only a voluntary firefighting service in place.

In 2004, the District of West Vancouver implemented its Fire Protection and Emergency Response Bylaw, which includes requirements that are more stringent than the 2018 British Columbia Building Code. The Fire Limit Area requires fire sprinklers to be installed on all institutional buildings or structures, including outdoor covered classrooms and storage buildings. In addition, the municipality promotes fire smart designs using fire resistant or fire-retardant exterior materials and roofing. Keeping sites clear of dead vegetation is another widely used principle.

Over the past few years, the school district has updated all its fire safety plans and all school buildings are sprinklered. However, many of the school sites are heavily treed, and covering the ongoing cost of tree and vegetation management is a constant challenge.

What the district can do to mitigate this challenge:

- Have up-to-date emergency plans in place that include escape route planning and scenarios for evacuation.
- Include tree and vegetation management in its annual grounds planning budget
- Follow FireSmart Design Guidelines for all existing and new facilities and building envelope upgrades in the district:
 - » Managing existing vegetation to create defensible space around buildings
 - » Rated roofing
 - » Use of fire retardant or fire-resistant exterior envelope materials
 - » Design and maintain landscaping around facilities with fire protection in mind: plan for fuel thinning, plan for excellent fire fighter access

More information on the District of West Vancouver Firesmart Community program can be found here:

<https://westvancouver.ca/home-building-property/emergency-preparedness/fire-rescue/firesmart#:~:text=what%20to%20do-,FireSmart%20Community,fire%20hazards%20in%20their%20neighbourhood.>

More information on Firesmart BC can be found here:

<https://firesmartbc.ca/>

Appendix A

Facility Assessments:
Structural, Mechanical, Electrical





**WEST VANCOUVER
SCHOOL DISTRICT**

The premier place for learning.

**SCHOOL DISTRICT 45
MECHANICAL INFRASTRUCTURE
FACILITY REVIEWS**

Prepared For:

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
1075 – 21st Street
West Vancouver, BC
V7V 4A9**

Prepared By:



CONSULTING INC

JANUARY 2019



EXECUTIVE SUMMARY

In July 2017 SMcN Consulting Inc. was retained by West Vancouver School District (SD45) to review and assess the condition of mechanical equipment and infrastructure at all seventeen (17) operating school facilities in the district. SMcN Consulting reviewed drawings of each school and physically assessed components where visible.

Physical inspection was possible for almost all major mechanical equipment, such as boilers, pups, air handling units and entering water services, which typically are situated in mechanical service rooms or on the roof. Some ductwork and pipe was also visually inspected. The majority of duct and pipe is concealed, however, and for these components judgements made on condition are linked to date of installation, which in turn can be compared to typical expected service life.

The term expected useful serviced life is based on industry standard experience, manufacturer's literature and primarily tables published by the American Society of Heating, Refrigeration and Air Conditioning Engineers Society. (ASHRAE). ASHRAE Standards are one of the primary reference standards in the building mechanical industry and are referenced within the British Columbia Building Code.

Based on these standards, essentially any mechanical infrastructure pre-dating 1975 is beyond useful service life expectancy. Which isn't to say such equipment cannot remain in use, but there should be expectation of partial or full failure of components at any time. Which really is the basis of this exercise. To identify and quantify equipment upgrades within 5-year windows ranging between 'Immediate' and up to 15 years into the future, providing a broad view basis to assist with budget planning and development of a long-term maintenance and renewal plan.

The schools vary in age of construction. The oldest being Hollyburn Elementary, dating to 1912, and Pauline Johnson Elementary in 1922. The newest three are Rockridge Secondary 1994, Bowen Island School (1979) and Lions Bay Primary (1977). The predominant era of construction is from the latter half of the 1940's, the 1950's and 1960's, which includes numerous additions and renovations completed after the original construction dates.

From the perspective of mechanical systems and equipment a substantial amount of system renewal has taken place since 2001, including the following schools that were provided with good quality new equipment still well within expected useful service life:

Ventilation Upgrades:

- 2001 Gleneagles Elementary
- 2002 West Bay Elementary
- 2008 Hollyburn Elementary
- 2008 Pauline Johnson Elementary (partial upgrades in 20018 and 2013)
- 2014 Cypress Park Primary
- 2017 Irwin Park Elementary

Boiler Replacements:

- 2008 Hollyburn Elementary
- 2013 West Bay Elementary
- 2014 Cypress Park Primary
- 2014 West Vancouver Secondary
- 2017 Irwin Park Elementary



At the other end of the scale are items such as piping (concealed behind walls and below grade) that date to original construction of the schools, originally installed equipment still in service and issues of not cloying to current building codes and standards such as very old science fume hoods, shop exhaust equipment and complete lack of any ventilation whatsoever at Caulfield Elementary, Eagle Harbour Primary and Lions Bay Primary.

In general, there is a substantial amount of upgrade recommended in the near future. For the purposes of this report I have placed almost all of this into the 'one-to-five 1-5 year' category in recognition that funding of this magnitude will not be available in the very short term.

The \$25,000 identified as in the 'Immediate' category at three schools, Caulfield, Hollyburn and Irwin Park relates to the fact each of these ha sprinkler systems with no backflow protection provided to protect the potable water supply of the schools and in fact the overall municipal water system.

Mechanical Report Prepared by:

A handwritten signature in black ink, appearing to read 'SMcN', is written over a thick, horizontal black line.

Stephen McNicholls, P.Eng., LEED® AP
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e-mail: stephen@smcn.ca

DISCLAIMER OF LIABILITY

The material in this report reflects our professional opinion based on information made available to us, visual observations of accessible mechanical equipment and building operator's comments. No physical testing of HVAC systems or equipment was conducted, nor evaluation of equipment capacities to ascertain such equipment is adequately sized to meet the building's HVAC requirements.

Any use a third party makes of this report or reliance on decisions made based on it, is the responsibility of such third parties. SMcN Consulting Inc. accepts no responsibility for damages suffered by any third party as a result of decisions made or actions taken based on this report.

SCHOOL DISTRICT 45 (WEST VANCOUVER)
LONG RANGE FACILITY PLAN
MECHANICAL SYSTEMS COST SUMMARY

							ESTIMATED REPLACEMENT COST (2018 Baseline)					
							Total for 0-15 Years	Immediate	1-5 Years	6-10 Years	11-15 Years	Future
							\$26,055,000	\$75,000	\$15,100,000	\$5,135,000	\$5,745,000	\$21,080,000
WEST VANCOUVER	SEC											
Main & Industrial Ed Buildings		1950					\$2,605,000	\$0	\$835,000	\$1,385,000	\$385,000	\$3,085,000
Inglewood (East Annex)		1946					\$270,000	\$0	\$155,000	\$95,000	\$20,000	\$1,175,000
South Campus		1946					\$565,000	\$0	\$385,000	\$40,000	\$140,000	\$375,000
ROCKRIDGE	SEC	1994					\$2,505,000	\$0	\$285,000	\$535,000	\$1,685,000	\$2,885,000
SENTINEL	SEC	1961	1967	1969	1974		\$3,530,000	\$0	\$1,460,000	\$835,000	\$1,235,000	\$1,985,000
BOWEN ISLAND	ELEM	1979	1990	1998			\$1,370,000	\$0	\$1,040,000	\$260,000	\$70,000	\$950,000
CAULFIELD	ELEM	1957	1959	1962	1964	1999	\$2,270,000	\$25,000	\$1,950,000	\$235,000	\$60,000	\$550,000
CEDARDALE	ELEM	1954	1965	1966	2015		\$1,420,000	\$0	\$1,200,000	\$60,000	\$160,000	\$770,000
CHARTWELL	ELEM	1966	1976				\$1,420,000	\$0	\$1,200,000	\$60,000	\$160,000	\$770,000
GLENEAGLES	ELEM	1950	1957	1966			\$1,165,000	\$0	\$425,000	\$185,000	\$555,000	\$675,000
HOLLYBURN	ELEM	1912	1956	1959	1963	1967	\$700,000	\$25,000	\$95,000	\$520,000	\$60,000	\$1,170,000
IRWIN PARK	ELEM	1955	1964	1966	1996		\$305,000	\$25,000	\$75,000	\$165,000	\$40,000	\$2,100,000
PAULINE JOHNSON	ELEM	1922	1943	1949	1992		\$1,405,000	\$0	\$1,110,000	\$235,000	\$60,000	\$1,050,000
RIDGEVIEW	ELEM	1948	1964	1965			\$1,855,000	\$0	\$1,635,000	\$60,000	\$160,000	\$475,000
WEST BAY	ELEM	1952	1962	1965			\$870,000	\$0	\$95,000	\$185,000	\$590,000	\$975,000
WESTCOTT	ELEM	1956	1959	1964	1965		\$1,810,000	\$0	\$1,590,000	\$60,000	\$160,000	\$475,000
CYPRESS PARK	PRIM	1966					\$225,000	\$0	\$140,000	\$65,000	\$20,000	\$675,000
EAGLE HARBOUR	PRIM	1967					\$1,185,000	\$0	\$965,000	\$60,000	\$160,000	\$475,000
LIONS BAY	PRIM	1977					\$1,045,000	\$0	\$460,000	\$95,000	\$25,000	\$465,000

WEST VANCOUVER SECONDARY SCHOOL

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
				Immediate	1-5 Years	6-10 Years	11-15 Years	Future	
OVERALL ESTIMATED COSTS		\$5,690,000		\$0	\$835,000	\$1,385,000	\$385,000	\$3,085,000	
HEATING SYSTEM									
BOILER PLANT	3 @ VIESSMANN VITOCROSSAL Stainless Steel Heat Exchanger Forced Draft	2014	20-25					\$300,000	Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe) All upgraded as part of 2018 HVAC upgrade
HYDRONIC HEATING SYSTEM	STEEL PIPE (OUTSIDE BOILER ROOM)	1950-1970	0-10			\$500,000			
	SPACE HEATING ELEMENTS	1950-1970	0-10			\$150,000			
VENTILATION SYSTEMS									
GYMNASIUM	Old AHU Hydronic Heating Coil located in roof level fan room	1950's	0		\$200,000				
ADMINISTRATION / CLASSROOMS	Old AHU serving West end of Classroom block	1950's	0		\$250,000			\$250,000	Ductwork upgraded in 1992 and 2002 upgrades Costs are for AHU to be replaced in short term and ductwork in 15-20 years
	Haakon AHU serving East end of Classroom block and Admin	1992	10-20				\$250,000	\$250,000	
THEATRE	AHU with hydronic heating coil in mezzanie fan room	1980's	0-10		\$100,000	\$200,000		\$200,000	Costs are for AHU to be replaced in short term and ductwork in 15-20 years Immedaite need is for cooling system to be added
THEATRE SUPPORT AREAS	2 AHU's with hydronic heating coils in basement fan room	2005	20-25					\$250,000 \$250,000	Long term projected replacement cost for AHU's Long term projected replacement cost for ductwork
WOODSHOP DUST EXTRACTION		1980	0		\$50,000	\$400,000			System requires upgrade including some safety upgrades required
SHOP PROCESS HOODS		1950's	0-10		\$100,000				Overhead hoods are not compliant ot current code fume removal standards (overhead exhaust)
EXHAUST FANS	Fans (Roof Mounted)	1950's to 1980's			\$10,000	\$10,000	\$10,000	\$60,000	

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
CONTROLS SYSTEM									
DIGITAL CONTROLS	ESC AUTOMATION				\$25,000	\$25,000	\$25,000	\$500,000	All upgraded as part of 2018 HVAC upgrade Anticipated complete system renewal in 20 years
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$25,000	\$25,000	\$25,000	\$250,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (100-mm SERVICE)	1980	20						
DOMESTIC WATER PIPE	COPPER PIPE	Various	0		\$25,000	\$25,000	\$25,000	\$250,000	Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$25,000	\$25,000	\$25,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (150-mm SERVICE)								
SPRINKLER PIPE AND DEVICES	STEEL PIPE				\$25,000	\$25,000	\$25,000	\$500,000	No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 years

INGLEWOOD SECONDARY (EAST ANNEX)

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
				Immediate	1-5 Years	6-10 Years	11-15 Years	Future	
OVERALL ESTIMATED COSTS		\$1,445,000		\$0	\$155,000	\$95,000	\$20,000	\$1,175,000	
HEATING SYSTEM									
BOILER PLANT	2 @ IBC INDUSTRIES Stainless Steel Heat Exchanger Forced Draft	2018	25					\$300,000	Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe) All upgraded as part of 2018 HVAC upgrade
HYDRONIC HEATING SYSTEM	STEEL PIPE (OUTSIDE BOILER ROOM)	2018	40					\$150,000	All upgraded as part of 2018 HVAC upgrade
	SPACE HEATING ELEMENTS	2018	40					\$50,000	All upgraded as part of 2018 HVAC upgrade
VENTILATION SYSTEMS									
ADMINISTRATION / CLASSROOMS	APOLLO 11 Unit Ventilators all with hydronic coils	2018	25-30					\$495,000	22 Apollo Unit Ventilators with new ductwork All upgraded as part of 2018 HVAC upgrade
EXHAUST FANS	Fans (Roof Mounted)	2018	20					\$30,000	All upgraded as part of 2018 HVAC upgrade
CONTROLS SYSTEM									
DIGITAL CONTROLS	ESC AUTOMATION				\$10,000	\$10,000	\$10,000	\$75,000	All upgraded as part of 2018 HVAC upgrade Anticipated complete system renewal in 20 years
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$5,000	\$5,000	\$5,000	\$50,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (50-mm SERVICE)	1946	0		\$25,000				Very old water service should be upgraded
DOMESTIC WATER PIPE	COPPER PIPE	1946	0		\$10,000	\$75,000			Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 5-10 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$5,000	\$5,000	\$5,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (150-mm SERVICE)				\$25,000				Building not currently sprinklered
SPRINKLER PIPE AND DEVICES	STEEL PIPE				\$75,000				costs are to provide new fire protection system

WVSS SOUTH CAMPUS (GYM)

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
				Immediate	1-5 Years	6-10 Years	11-15 Years	Future	
OVERALL ESTIMATED COSTS		\$940,000		\$0	\$385,000	\$40,000	\$140,000	\$375,000	
HEATING SYSTEM									
BOILER PLANT	1 @ BURNHAM Cast Iron Construction Atmospherically Vented	1996	5		\$75,000				Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe) Expansion tank appears undersized
HEATING PIPE OUTSIDE BOILER ROOM	STEEL PIPE (OUTSIDE BOILER ROOM)	1946	0		\$60,000				
	SPACE HEATING ELEMENTS	1946	0		\$20,000				
VENTILATION SYSTEMS									
GYMNASIUM	AHU in Indoor fan room	1946	0		\$150,000				
EXHAUST FANS	Fans (Roof Mounted)	1946	0		\$40,000				
CONTROLS SYSTEM									
DIGITAL CONTROLS SYSTEM	ESC AUTOMATION				Included with Ventilation Upgrade(s)	\$10,000	\$10,000	\$50,000	No identified deficiencies. Costs are for hardware and software updates Anticipated complete system renewal in 20 years
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$10,000	\$10,000	\$10,000	\$100,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (50-mm SERVICE)	1946	0						50-mm copper service size not compliant to current BC Plumbing code requirements. Water service upgrade should be disucssed with DWV
DOMESTIC WATER PIPE	COPPER PIPE	1946	0		\$10,000		\$100,000		Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$10,000	\$10,000	\$10,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (100-mm SERVICE)								No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 year5
SPRINKLER PIPE AND DEVICES	STEEL PIPE				\$10,000	\$10,000	\$10,000	\$200,000	

SENTINEL SECONDARY SCHOOL

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
				Immediate	1-5 Years	6-10 Years	11-15 Years	Future	
OVERALL ESTIMATED COSTS		\$5,515,000		\$0	\$1,460,000	\$835,000	\$1,235,000	\$1,985,000	
HEATING SYSTEM									
BOILER PLANT	2 @ THERMAL SOLUTIONS Copper Fin Construction Power Vented Vented	1999	0-5		\$400,000				Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe)
HYDRONIC HEATING SYSTEM	STEEL PIPE (OUTSIDE BOILER ROOM)	1961-1970	0-10			\$500,000			
	SPACE HEATING ELEMENTS	1961-1970	0-10			\$200,000			
VENTILATION SYSTEMS									
GYMNASIUM	located under Gym Bleachers	1961	0		\$150,000		\$150,000		Costs are for AHU to be replaced in short term and ductwork in 15-20 years
NORTH WING	located under Gym Bleachers	1961	0		\$250,000		\$400,000		
SOUTH WING	located in Basement level fan room	1961	0		\$250,000		\$400,000		
CHANGE ROOMS	located in Basement level fan room	1961	0		\$50,000		\$50,000		
SOUTH-EAST WING	located in roof level fan room	1967	0		\$75,000		\$100,000		
WOODSHOP DUST EXTRACTION		2008	20		\$50,000			\$400,000	Dust extraction system upgraded 2008 Some safety upgrades required
SHOP PROCESS HOODS		1961	0-10		\$100,000				Overhead hoods are not compliant ot current code fume removal standards (overhead exhaust)
EXHAUST FANS	Fans (Roof Mounted)	1961-1980			\$10,000	\$10,000	\$10,000	\$60,000	
CONTROLS SYSTEM									
DIGITAL CONTROLS	ESC AUTOMATION				\$25,000	\$25,000	\$25,000		Anticipated complete system renewal in 20 years
								\$500,000	

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$25,000	\$25,000	\$25,000	\$250,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (75-mm SERVICE)	1961	10-15						
DOMESTIC WATER PIPE	COPPER PIPE	Various	0-15		\$25,000	\$25,000	\$25,000	\$250,000	Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$25,000	\$25,000	\$25,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (100-mm SERVICE)								
SPRINKLER PIPE AND DEVICES	STEEL PIPE				\$25,000	\$25,000	\$25,000	\$500,000	No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 years

ROCKRIDGE SECONDARY SCHOOL

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST						COMMENTS
			(2018 Baseline)						
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
OVERALL ESTIMATED COSTS		\$5,390,000	\$0	\$285,000	\$535,000	\$1,685,000	\$2,885,000		
HEATING SYSTEM									
BOILER PLANT	2 @ BRYAN Steel Tube Construction Power Vented Vented	1994	5-15				\$400,000		Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe)
HYDRONIC HEATING SYSTEM	STEEL PIPE (OUTSIDE BOILER ROOM)	1994	10-20				\$400,000	\$400,000	
	SPACE HEATING ELEMENTS	1994	10-20				\$150,000	\$150,000	
VENTILATION SYSTEMS									
GYMNASIUM CLASSROOM SYSTEMS	located in mezzanine fan room	1994	10-20				\$150,000	\$150,000	Costs are for AHU to be replaced in short term and ductwork in 15-20 years
	3 large units located in Basement level fan room	1994	10-20				\$450,000	\$600,000	
WOODSHOP DUST EXTRACTION		1994	5-10		\$50,000	\$400,000			Dust extraction system upgraded 2008 Some safety upgrades required
SHOP PROCESS HOODS		1994	0-10		\$100,000				Overhead hoods are not compliant ot current code fume removal standards (overhead exhaust)
EXHAUST FANS	Fans (Roof Mounted)	1994			\$10,000	\$10,000	\$10,000	\$60,000	
CONTROLS SYSTEM									
DIGITAL CONTROLS	ESC AUTOMATION				\$25,000	\$25,000	\$25,000	\$500,000	Anticipated complete system renewal in 20 years

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$25,000	\$25,000	\$25,000	\$250,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (75-mm SERVICE)	1994	10-15						
DOMESTIC WATER PIPE	COPPER PIPE	1994	0-15		\$25,000	\$25,000	\$25,000	\$250,000	Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE	1994			\$25,000	\$25,000	\$25,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (100-mm SERVICE)	1994							
SPRINKLER PIPE AND DEVICES	STEEL PIPE	1994			\$25,000	\$25,000	\$25,000	\$500,000	No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 years

BOWEN ISLAND COMMUNITY SCHOOL

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
OVERALL ESTIMATED COSTS		\$2,320,000	\$0	\$1,040,000	\$260,000	\$70,000	\$950,000		
HEATING SYSTEM									
BOILER PLANT	NONE							\$250,000	No boiler system currently installed Future conversion to hydronic heating system
HYDRONIC HEATING SYSTEM	NONE								
VENTILATION SYSTEMS									
GYMNASIUM	AHU with Electric Heat	1980	5-10			\$75,000		\$75,000	Replacement of AHU in 6-10 years Replacement of ductwork in 10-20 years. AHU is located indoors and will need to be delivered in sections
ADMINISTRATION/CLASSROOMS	AHU with Electric Heat serving original area of school	1980	5-10			\$75,000		\$75,000	Replacement of AHU in 6-10 years Replacement of ductwork in 10-20 years. AHU is located indoors and will need to be delivered in sections
CLASSROOMS - 1990 / 1998 ADDITIONS	Classroom additions in 1990 and 1998 have space heat only -- no ventilation	NONE			\$1,000,000				No ventilation currently provided to Classrooms Not in compliance with BC Building Code / Worksafe BC requirements
EXHAUST FANS	Fans (Roof Mounted)	1980-1997	5-10			\$40,000			Unit replacement only. Ductwork can be retained in service.
CONTROLS SYSTEM									
DIGITAL CONTROLS SYSTEM	ESC AUTOMATION				Included with Ventilation Upgrade(s)	\$30,000	\$30,000	\$150,000	No identified deficiencies. Costs are for hardware and software updates Anticipated complete system renewal in 20 years

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$10,000	\$10,000	\$10,000	\$100,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (50-mm SERVICE)	1979	0						
DOMESTIC WATER PIPE	COPPER PIPE	1957	0		\$10,000	\$10,000	\$10,000	\$75,000	Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$10,000	\$10,000	\$10,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (100-mm SERVICE)								
SPRINKLER PIPE AND DEVICES	STEEL PIPE				\$10,000	\$10,000	\$10,000	\$200,000	No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 years

CAULFIELD ELEMENTARY SCHOOL

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
				Immediate	1-5 Years	6-10 Years	11-15 Years	Future	
OVERALL ESTIMATED COSTS		\$2,820,000		\$25,000	\$1,950,000	\$235,000	\$60,000	\$550,000	
HEATING SYSTEM									
BOILER PLANT	2 @ THERMAL SOLUTIONS Copper Fin Construction Power Vented Vented	2006	8		\$300,000				Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe)
HYDRONIC HEATING SYSTEM	STEEL PIPE (OUTSIDE BOILER ROOM)	1957	0 - 10		\$150,000				
	SPACE HEATING ELEMENTS	1957	0 - 10		\$60,000				
VENTILATION SYSTEMS									
GYMNASIUM	TRI-METAL INDUSTRIES Hydronic Heating Coil Indoor Unit	2014	25			\$75,000		\$75,000	Ductwork is original construction. Replacement in 6-10 years. AHU replacement in 20-25 years. AHU is located indoors and will ned to be delivered in sections
ADMINISTRATION		NONE			\$75,000				No ventilation currently provided Not in compliance with BC Building Code / Worksafe BC requirements
CLASSROOMS		NONE			\$1,215,000				No ventilation currently provided to any Classrooms Not in compliance with BC Building Code / Worksafe BC requirements
EXHAUST FANS	Fans (Roof Mounted)	1957			\$60,000				Unit replacement only. Ductwork can be retained in service.
CONTROLS SYSTEM									
DIGITAL CONTROLS SYSTEM	ESC AUTOMATION				Included with Ventilation Upgrade(s)	\$30,000	\$30,000	\$150,000	No identified deficiencies. Costs are for hardware and software updates Anticipated complete system renewal in 20 years

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$10,000	\$10,000	\$10,000	\$100,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (50-mm SERVICE)	1957	0		\$25,000				50-mm service size not adequate for current BC Plumbing code requirements. Service upgrade should be discussed with DWV
DOMESTIC WATER PIPE	COPPER PIPE	1957	0		\$10,000	\$100,000			Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$10,000	\$10,000	\$10,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (75-mm SERVICE)			\$25,000	\$25,000				No backflow device installed. Should be provided immediately for health reasons 75-mm service size not adequate for current sprinkler coverage requirements. Service upgrade should be discussed with DWV
SPRINKLER PIPE AND DEVICES	STEEL PIPE				\$10,000	\$10,000	\$10,000	\$200,000	No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 years

CEDARDALE ELEMENTARY SCHOOL

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
				Immediate	1-5 Years	6-10 Years	11-15 Years	Future	
OVERALL ESTIMATED COSTS		\$2,190,000		\$0	\$1,200,000	\$60,000	\$160,000	\$770,000	
HEATING SYSTEM									
BOILER PLANT	4 @ MULTI-TEMP HYDROTHERM Cast Iron Construction Atmospherically Vented	1993	5		\$300,000				Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe) Expansion tank appears undersized
HEATING PIPE OUTSIDE BOILER ROOM	STEEL PIPE (OUTSIDE BOILER ROOM)	1953	0 - 10		\$150,000				Lower Floor space hreating elements installed as part of 2015 Addition
	SPACE HEATING ELEMENTS - UPPER FLOOR	1953	0 - 10		\$50,000				
	SPACE HEATING ELEMENTS - LOWER FLOOR	2015	25					\$25,000	
VENTILATION SYSTEMS									
GYMNASIUM	Hydronic Heating Coil Indoor Unit	1967	0		\$150,000				AHU and Ductwork are original construction. AHU located indoors and will need to be delivered in sections. Supply and return air ductwork located below gym floor
ADMINISTRATION/UPPER CLASSROOMS	Hydronic Heating Coil Indoor Unit serving Upper Floor	1953	0		\$450,000				AHU located in fan room on lower floor
LOWER FLOOR CLASSROOMS	MAX AIR UNIT VENTILATORS Hydronic Heating Coils Indoor Units (6) serving Lower Floor	2015	25					\$270,000	Unit Ventilators installed as part of 2015 Addition
EXHAUST FANS	Fans (Roof Mounted)	1953			\$60,000				Unit replacement only. Ductwork can be retained in service.
CONTROLS SYSTEM									
DIGITAL CONTROLS SYSTEM	ESC AUTOMATION				Included with Ventilation Upgrade(s)	\$30,000	\$30,000	\$150,000	No identified deficiencies. Costs are for hardware and software updates Anticipated complete system renewal in 20 years

	EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
				Immediate	1-5 Years	6-10 Years	11-15 Years	Future	
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$10,000	\$10,000	\$10,000	\$100,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (100-mm SERVICE)	2015	30						100-mm service size upgraded in 2015
DOMESTIC WATER PIPE	COPPER PIPE	1953	0		\$10,000		\$100,000		Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$10,000	\$10,000	\$10,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (150-mm SERVICE)	2015	30						150-mm service size upgraded in 2015
SPRINKLER PIPE AND DEVICES	STEEL PIPE				\$10,000	\$10,000	\$10,000	\$200,000	No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 year5

CHARTWELL ELEMENTARY SCHOOL

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
OVERALL ESTIMATED COSTS		\$2,190,000	\$0	\$1,200,000	\$60,000	\$160,000	\$770,000		
HEATING SYSTEM									
BOILER PLANT	6 @ MULTI-TEMP HYDROTHERM Cast Iron Construction Atmospherically Vented	1975	0		\$300,000				Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe) Expansion tank appears undersized
HEATING PIPE OUTSIDE BOILER ROOM	STEEL PIPE (OUTSIDE BOILER ROOM)	1960's	0 - 10		\$150,000				Lower Floor space hreating elements installed as part of 2015 Addition
	SPACE HEATING ELEMENTS - Upper	1960's	0 - 10		\$50,000				
	SPACE HEATING ELEMENTS - Lower	2015	25				\$25,000		
VENTILATION SYSTEMS									
GYMNASIUM	Hydronic Heating Coil Indoor Unit	1956	0		\$150,000				AHU and Ductwork are original construction. AHU located indoors and will need to be delivered in sections. Supply and return air ductwork located below gym floor
ADMINISTRATION/UPPER CLASSROOMS	Hydronic Heating Coil Indoor Unit serving Upper Floor	1956	0		\$450,000				AHU located in fan room on lower floor
LOWER FLOOR CLASSROOMS	Hydronic Heating Coils Indoor Units (6) serving Lower Floor	2015	25					\$270,000	Unit Ventilators installed as part of 2015 Addition
EXHAUST FANS	Fans (Roof Mounted)	1960's			\$60,000				Unit replacement only. Ductwork can be retained in service.
CONTROLS SYSTEM									
DIGITAL CONTROLS SYSTEM	ESC AUTOMATION				Included with Ventilation Upgrade(s)	\$30,000	\$30,000	\$150,000	No identified deficiencies. Costs are for hardware and software updates Anticipated complete system renewal in 20 years

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$10,000	\$10,000	\$10,000	\$100,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (100-mm SERVICE)		30		\$10,000				100-mm service size upgraded in 2015
DOMESTIC WATER PIPE	COPPER PIPE						\$100,000		Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$10,000	\$10,000	\$10,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (150-mm SERVICE)				\$10,000	\$10,000	\$10,000	\$200,000	150-mm service size upgraded in 2015
SPRINKLER PIPE AND DEVICES	STEEL PIPE								No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 year5

GLENEAGLES ELEMENTARY SCHOOL

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE		ESTIMATED REPLACEMENT COST (2018 Baseline)				COMMENTS
				Immediate	1-5 Years	6-10 Years	11-15 Years	Future	
OVERALL ESTIMATED COSTS		\$1,840,000		\$0	\$425,000	\$185,000	\$555,000	\$675,000	
HEATING SYSTEM									
BOILER PLANT	3 @ BURNHAM Cast Iron Construction Atmospherically Vented	2001	8		\$300,000				Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe)
HYDRONIC HEATING SYSTEM	STEEL PIPE (OUTSIDE BOILER ROOM)	2001	25					\$150,000	Heating pipe completely replaced in 2001 HVAC upgrade
	SPACE HEATING ELEMENTS	2001	25					\$50,000	Heating pipe completely replaced in 2001 HVAC upgrade
VENTILATION SYSTEMS									
GYMNASIUM	TRI-METAL INDUSTRIES Hydronic Heating Coil Indoor Unit	2001	10-15				\$75,000		Unit replacement only. Ductwork can be retained in service. Unit is located indoors and will need to be delivered in sections
ADMINISTRATION	ENGINEERED AIR Natural Gas Fired Roof Mounted	2001	1-5		\$30,000				Unit replacement only. Ductwork can be retained in service.
CLASSROOMS	TEMSPEC 17 Unit Ventilators installed 2001	2001	15				\$360,000		Unit replacement only. Ductwork can be retained in service
EXHAUST FANS	10 Fans (Roof Mounted)	2001	15				\$60,000		Unit replacement only. Ductwork can be retained in service.
CONTROLS SYSTEM									
DIGITAL CONTROLS	ESC AUTOMATION				\$30,000	\$30,000	\$30,000	\$150,000	No identified deficiencies. Costs are for hardware and software updates Anticipated complete system renewal in 20 years

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$10,000	\$10,000	\$10,000	\$100,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (38-mm SERVICE)	1950	0		\$25,000	\$25,000			38-mm copper service size not compliant to current BC Plumbing code requirements
DOMESTIC WATER PIPE	COPPER PIPE	1950	0		\$10,000	\$100,000			Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$10,000	\$10,000	\$10,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (100-mm SERVICE)								
SPRINKLER PIPE AND DEVICES	STEEL PIPE				\$10,000	\$10,000	\$10,000	\$200,000	No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 year5

HOLLYBURN ELEMENTARY SCHOOL

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE	Immediate	ESTIMATED REPLACEMENT COST (2018 Baseline)				COMMENTS
					1-5 Years	6-10 Years	11-15 Years	Future	
OVERALL ESTIMATED COSTS		\$1,720,000		\$25,000	\$95,000	\$520,000	\$60,000	\$1,020,000	
HEATING SYSTEM									
BOILER PLANT	2 @ VIESSMANN VITOCROSSAL Stainless Steel Heat Exchanger Forced Draft	2009	25					\$300,000	Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe)
HYDRONIC HEATING SYSTEM	STEEL PIPE (OUTSIDE BOILER ROOM)		0 - 10			\$150,000			
	SPACE HEATING ELEMENTS		0 - 10			\$50,000			
VENTILATION SYSTEMS									
GYMNASIUM	TRI-METAL INDUSTRIES Hydronic Heating Coil Indoor Unit	2009	25			\$75,000		\$75,000	Ductwork is original construction. Replacement in 6-10 years. AHU replacement in 20-25 years. AHU is located indoors and will ned to be delivered in sections
ADMINISTRATION / CLASSROOMS	TEMSPEC 17 Unit Ventilators installed 2001	2009	20					\$320,000	Temspec unit ventilators installed 2009 with replacement ductwork. Long term renewal cost is for new UV's. Ductwork can be retained in service until 2040
EXHAUST FANS	10 Fans (Roof Mounted)	1980's	0 - 10			\$60,000			Unit replacement only. Ductwork can be retained in service.
CONTROLS SYSTEM									
DIGITAL CONTROLS	ESC AUTOMATION				\$30,000	\$30,000	\$30,000		No identified deficiencies. Costs are for hardware and software updates

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$10,000	\$10,000	\$10,000	\$100,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (25-mm SERVICE)	1912	0		\$25,000	\$25,000			25-mm copper service size not compliant to current BC Plumbing code requirements. Water service upgrade should be disucssed with DWV
DOMESTIC WATER PIPE	COPPER PIPE	1950's	0		\$10,000	\$100,000			Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$10,000	\$10,000	\$10,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (150-mm SERVICE)			\$25,000					No backflow device installed. Should be provided immediately for health reasons
SPRINKLER PIPE AND DEVICES	STEEL PIPE				\$10,000	\$10,000	\$10,000	\$200,000	No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 year5

IRWIN PARK ELEMENTARY SCHOOL

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE	Immediate	ESTIMATED REPLACEMENT COST (2018 Baseline)				COMMENTS
					1-5 Years	6-10 Years	11-15 Years	Future	
OVERALL ESTIMATED COSTS		\$2,405,000		\$25,000	\$75,000	\$165,000	\$40,000	\$2,100,000	
HEATING SYSTEM									
BOILER PLANT	4 @ IBC INDUSTRIES Stainless Steel Heat Exchanger Forced Draft	2018	25					\$300,000	Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe) All upgraded as part of 2018 HVAC upgrade
HYDRONIC HEATING SYSTEM	STEEL PIPE (OUTSIDE BOILER ROOM)	2018	40					\$150,000	All upgraded as part of 2018 HVAC upgrade
	SPACE HEATING ELEMENTS	2018	40					\$50,000	All upgraded as part of 2018 HVAC upgrade
VENTILATION SYSTEMS									
GYMNASIUM	TRI-METAL INDUSTRIES Hydronic Heating Coil Roof Mounted Unit	2018	25 - 30					\$75,000	Tri-Metal AHU with new ductwork All upgraded as part of 2018 HVAC upgrade
ADMINISTRATION / CLASSROOMS	APOLLO 22 Unit Ventilators all with hydronic coils	2018	25					\$990,000	22 Apollo Unit Ventilators with new ductwork All upgraded as part of 2018 HVAC upgrade
EXHAUST FANS	Fans (Roof Mounted)	2018	20					\$60,000	All upgraded as part of 2018 HVAC upgrade
CONTROLS SYSTEM									
DIGITAL CONTROLS	ESC AUTOMATION				\$10,000	\$10,000	\$10,000	\$150,000	All upgraded as part of 2018 HVAC upgrade Anticipated complete system renewal in 20 years

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$10,000	\$10,000	\$10,000	\$100,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (38-mm SERVICE)	1955	0		\$25,000	\$25,000			38-mm copper service size not compliant to current BC Plumbing code requirements
DOMESTIC WATER PIPE	COPPER PIPE	1955	0		\$10,000	\$100,000			Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$10,000	\$10,000	\$10,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (150-mm SERVICE)			\$25,000					No backflow device installed. Should be provided immediately for health reasons
SPRINKLER PIPE AND DEVICES	STEEL PIPE				\$10,000	\$10,000	\$10,000	\$200,000	No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 year5

PAULINE JOHNSON ELEMENTARY SCHOOL

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
OVERALL ESTIMATED COSTS		\$2,455,000	\$0	\$1,110,000	\$235,000	\$60,000	\$1,050,000		
HEATING SYSTEM									
BOILER PLANT	2 @ THERMAL SOLUTIONS Copper Fin Construction Power Vented Vented	2006	8		\$300,000				Cost is for replacemnet of complelte boiler room equipment (boilers, pumps, pipe)
HYDRONIC HEATING SYSTEM	STEEL PIPE (OUTSIDE BOILER ROOM)	Very Old	0 - 10		\$150,000				
	SPACE HEATING ELEMENTS	Very Old	0 - 10		\$60,000				
VENTILATION SYSTEMS									
GYMNASIUM	TRI-METAL INDUSTRIES Hydronic Heating Coil Indoor Unit	2014	25-30			\$75,000		\$75,000	Ductwork is original construction. Replacement in 6-10 years. AHU replacement in 20-25 years. AHU is located indoors and will ned to be delivered in sections
ADMINISTRATION		NONE			\$75,000				No ventilaiton currently provided Not in compliance with BC Building Code / Worksafe BC requirements
LIBRARY	TRI-METAL INDUSTRIES Hydronic Heating Coil Indoor Unit	2009	20-25					\$50,000	New AHU and ductwork installed 2009
CLASSROOMS	HORIZONTAL UNIT VENTILATORS (8)	1960-1970	0		\$360,000				Herman Nelson units past end of service life
	TEMSPEC UNIT VENTILATORS (10)	2009	20-25					\$450,000	Temspec vertical units
EXHAUST FANS	Fans (Roof Mounted)	Very Old			\$100,000				Fan and ductwork replacement required
CONTROLS SYSTEM									
DIGITAL CONTROLS SYSTEM	ESC AUTOMATION				Included with Ventilation Upgrade(s)	\$30,000	\$30,000	\$150,000	No identified deficiencies. Costs are for hardware and software updates Anticipated complete system renewal in 20 years

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE		ESTIMATED REPLACEMENT COST (2018 Baseline)				COMMENTS
				Immediate	1-5 Years	6-10 Years	11-15 Years	Future	
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$10,000	\$10,000	\$10,000	\$100,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (50-mm SERVICE)	Very Old	0		\$25,000				50-mm service size not adequate for current BC Plumbing code requirements. Service upgrade should be discussed with DWV
DOMESTIC WATER PIPE	COPPER PIPE	Very Old	0		\$10,000	\$100,000			Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$10,000	\$10,000	\$10,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (100-mm SERVICE)								
SPRINKLER PIPE AND DEVICES	STEEL PIPE				\$10,000	\$10,000	\$10,000	\$200,000	No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 years

RIDGEVIEW ELEMENTARY SCHOOL

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
				Immediate	1-5 Years	6-10 Years	11-15 Years	Future	
OVERALL ESTIMATED COSTS		\$2,330,000		\$0	\$1,635,000	\$60,000	\$160,000	\$475,000	
HEATING SYSTEM									
BOILER PLANT	5 @ MULTI-TEMP HYDROTHERM Cast Iron Construction Atmospherically Vented	1988	0		\$300,000				Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe) Expansion tank appears undersized
HEATING PIPE OUTSIDE BOILER ROOM	STEEL PIPE (OUTSIDE BOILER ROOM)	1954-1970	0 - 10		\$150,000				
	SPACE HEATING ELEMENTS	1954-1970	0 - 10		\$50,000				
VENTILATION SYSTEMS									
GYMNASIUM	Hydronic Heating Coil Indoor Unit located in /Gym Ceiling	1954	0		\$150,000				AHU and Ductwork are original construction. No space in ceiling for new unit which would be larger than exisitng. Replacement unit suggested to be on roof
ADMINISTRATION		NONE	0		\$75,000				No ventilation currently provided Not in compliance with BC Building Code / Worksafe BC requirements
CLASSROOMS	2 OLD AHU's 5 Horizontal Unit Ventilators all with Hydronic Heating Coils	1950's 1954 & 1965	0 0		\$585,000 \$225,000				
EXHAUST FANS	Fans (Roof Mounted)	1953			\$60,000				Unit replacement only. Ductwork can be retained in service.
CONTROLS SYSTEM									
DIGITAL CONTROLS SYSTEM	ESC AUTOMATION				Included with Ventilation Upgrade(s)	\$30,000	\$30,000	\$150,000	No identified deficiencies. Costs are for hardware and software updates Anticipated complete system renewal in 20 years

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
				Immediate	1-5 Years	6-10 Years	11-15 Years	Future	
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$10,000	\$10,000	\$10,000	\$100,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (50-mm SERVICE)	1950's-1960's	0						50-mm copper service size not compliant to current BC Plumbing code requirements. Water service upgrade should be disucssed with DWV
DOMESTIC WATER PIPE	COPPER PIPE	1950's-1960's	0		\$10,000		\$100,000		Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$10,000	\$10,000	\$10,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (100-mm SERVICE)								No backflow device installed on fire line
SPRINKLER PIPE AND DEVICES	STEEL PIPE				\$10,000	\$10,000	\$10,000	\$200,000	No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 year5

WEST BAY ELEMENTARY SCHOOL

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE	Immediate	ESTIMATED REPLACEMENT COST (2018 Baseline)				COMMENTS
					1-5 Years	6-10 Years	11-15 Years	Future	
OVERALL ESTIMATED COSTS		\$1,845,000		\$0	\$95,000	\$185,000	\$590,000	\$975,000	
HEATING SYSTEM									
BOILER PLANT	3 @ VIESSMANN VITODENS (Condensing) and 1 @ VIESSMANN VITOGAS (mid-efficiency) all Cast Iron Construction Power vented	2013	25					\$300,000	Boiler plant upgraded in 2013 Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe)
HYDRONIC HEATING SYSTEM	STEEL PIPE (OUTSIDE BOILER ROOM)	2001	25					\$150,000	Heating pipe completely replaced in 2001 HVAC upgrade
	SPACE HEATING ELEMENTS	2001	25					\$50,000	Heating pipe completely replaced in 2001 HVAC upgrade
VENTILATION SYSTEMS									
GYMNASIUM	TRI-METAL INDUSTRIES Hydronic Heating Coil Indoor Unit	2001	10-15				\$75,000		Unit replacement only. Ductwork can be retained in service. Unit is located indoors and will need to be delivered in sections
ADMINISTRATION	TRI-METAL INDUSTRIES Hydronic Heating Coil Indoor Unit	2001	10-15				\$35,000		Unit replacement only. Ductwork can be retained in service.
CLASSROOMS	TEMSPEC 17 Unit Ventilators installed 2001 all with hydronic coils	2001	15				\$360,000		Unit replacement only. Ductwork can be retained in service until 2035-2040
EXHAUST FANS	10 Fans (Roof Mounted)	2001	15				\$60,000		Unit replacement only. Ductwork can be retained in service.
CONTROLS SYSTEM									
DIGITAL CONTROLS	ESC AUTOMATION				\$30,000	\$30,000	\$30,000	\$150,000	No identified deficiencies. Costs are for hardware and software updates Anticipated complete system renewal in 20 years

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$10,000	\$10,000	\$10,000	\$100,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (38-mm SERVICE)	1950	0		\$25,000	\$25,000			38-mm copper service size not compliant to current BC Plumbing code requirements
DOMESTIC WATER PIPE	COPPER PIPE	1950	0		\$10,000	\$100,000			Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$10,000	\$10,000	\$10,000	\$25,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	STEEL PIPE (100-mm SERVICE)								
SPRINKLER PIPE AND DEVICES	STEEL PIPE				\$10,000	\$10,000	\$10,000	\$200,000	No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 year5

WESTCOTT ELEMENTARY SCHOOL

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
				Immediate	1-5 Years	6-10 Years	11-15 Years	Future	
OVERALL ESTIMATED COSTS		\$2,285,000		\$0	\$1,590,000	\$60,000	\$160,000	\$475,000	
HEATING SYSTEM									
BOILER PLANT	3 @ BURNHAM Cast Iron Construction Atmospherically Vented	2000	7		\$300,000				Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe) Expansion tank appears undersized
HEATING PIPE OUTSIDE BOILER ROOM	STEEL PIPE (OUTSIDE BOILER ROOM)	1956-1960	0 - 10		\$150,000				
	SPACE HEATING ELEMENTS	1956-1960	0 - 10		\$50,000				
VENTILATION SYSTEMS									
GYMNASIUM	Hydronic Heating Coil Indoor Unit located in /Gym Ceiling	1956	0		\$150,000				AHU and Ductwork are original construction. Unit locatred in lower floor fan room. Replacement unit will need to be shipped in sections
ADMINISTRATION		NONE	0		\$75,000				No ventilation currently provided Not in compliance with BC Building Code / Worksafe BC requirements
CLASSROOMS	2 Classrooms with perimeter heat 14 Horizontal Unit Ventilators all with Hydronic Heating Coils	1960 1956	0 0		\$90,000 \$675,000				
EXHAUST FANS	Fans (Roof Mounted)	1956			\$60,000				Unit replacement only. Ductwork can be retained in service.
CONTROLS SYSTEM									
DIGITAL CONTROLS SYSTEM	ESC AUTOMATION				Included with Ventilation Upgrade(s)	\$30,000	\$30,000	\$150,000	No identified deficiencies. Costs are for hardware and software updates Anticipated complete system renewal in 20 years

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE		ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
				Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
PLUMBING & DRAINAGE SYSTEMS										
PLUMBING FIXTURES					\$10,000	\$10,000	\$10,000	\$100,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years	
DOMESTIC WATER SERVICE	COPPER PIPE (50-mm SERVICE)	1950's-1960's	0						50-mm copper service size not compliant to current BC Plumbing code requirements. Water service upgrade should be disucssed with DWV	
DOMESTIC WATER PIPE	COPPER PIPE	1950's-1960's	0		\$10,000		\$100,000		Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years	
SANITARY & STORM PIPE	CAST IRON PIPE				\$10,000	\$10,000	\$10,000	\$25,000	Costs are for repair or replacement due to leakage	
FIRE PROTECTION SYSTEM										
FIRE LINE SERVICE	STEEL PIPE (150-mm SERVICE)								No backflow device installed on fire line	
SPRINKLER PIPE AND DEVICES	STEEL PIPE				\$10,000	\$10,000	\$10,000	\$200,000	No identified deficiencies. Costs are for repair or replacement necessitated by leakage or damaged sprinkler heads Anticipated complete system renewal in 20-25 year5	

CYPRESS PARK PRIMARY SCHOOL

EQUIPMENT		INSTALLED	ESTIMATED REMAINING SERVICE LIFE	Immediate	ESTIMATED REPLACEMENT COST (2018 Baseline)				COMMENTS
					1-5 Years	6-10 Years	11-15 Years	Future	
OVERALL ESTIMATED COSTS		\$900,000		\$0	\$140,000	\$65,000	\$20,000	\$675,000	
HEATING SYSTEM									
BOILER PLANT	2 @ IBC INDUSTRIES Stainless Steel Heat Exchanger Forced Draft	2015	25					\$150,000	Cost is for replacement of complete boiler room equipment (boilers, pumps, pipe) All upgraded as part of 2018 HVAC upgrade
HYDRONIC HEATING SYSTEM	STEEL PIPE (OUTSIDE BOILER ROOM)	1966	0		\$50,000				
	SPACE HEATING ELEMENTS	1966	0		\$25,000				
VENTILATION SYSTEMS									
ADMINISTRATION / CLASSROOMS	APOLLO Unit Ventilators all with hydronic coils	2018	25					\$360,000	Apollo Unit Ventilators with new ductwork All upgraded as part of 2015 HVAC upgrade
EXHAUST FANS	Fans (Roof Mounted)	1966	0		\$25,000				All upgraded as part of 2018 HVAC upgrade
CONTROLS SYSTEM									
DIGITAL CONTROLS	ESC AUTOMATION				\$5,000	\$5,000	\$5,000	\$50,000	All upgraded as part of 2018 HVAC upgrade Anticipated complete system renewal in 20 years

EQUIPMENT	INSTALLED	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
			Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
PLUMBING & DRAINAGE SYSTEMS									
PLUMBING FIXTURES					\$10,000	\$10,000	\$10,000	\$100,000	School District has renewal program for fixtures No identified deficiencies Costs are for fixture replacement necessitated by wear & tear and vandalism Anticipated complete system renewal in 15-20 years
DOMESTIC WATER SERVICE	COPPER PIPE (38-mm SERVICE)	1966	0		\$10,000	\$10,000			38-mm copper service size not compliant to current BC Plumbing code requirements
DOMESTIC WATER PIPE	COPPER PIPE	1966	0		\$10,000	\$35,000			Costs are for repair or replacement due to leakage and lead level Anticipated complete system renewal in 15-20 years
SANITARY & STORM PIPE	CAST IRON PIPE				\$5,000	\$5,000	\$5,000	\$15,000	Costs are for repair or replacement due to leakage
FIRE PROTECTION SYSTEM									
FIRE LINE SERVICE	NONE								
SPRINKLER PIPE AND DEVICES	NONE								

SCHOOL DISTRICT #45 (WEST VANCOUVER)

2018 Facility Reviews Building Envelope Assessments

November 8, 2018

1.0 INTRODUCTION

As requested by West Vancouver School District (SD45), Herold Engineering Limited (HEL) assessed the visible components of the building envelope components of the school buildings within their administration. The assessment is a part of the joint assessment that encompasses structural, electrical, mechanical and building envelope systems of the facilities and this report, in particular, addresses the building envelope aspect.

Built mainly in the 1940's to the 1960's, the multitude of school buildings have had renovations, repairs, renewals, and additions since the original construction dates.

The purpose of this assessment is to audit the current facilities of interest to give a broad view of the conditions and assist with the budget planning and the development of a comprehensive maintenance plan.

In total, we have visited and reviewed 16 schools out of the 17 schools in SD45, which are listed below and attached in the same order following this report. Irwin Park Elementary School is under a mechanical and building envelope rehabilitation, therefore, has been excluded from the report.

APPENDIX A - SECONDARY SCHOOLS

- A1. West Vancouver Secondary School
- A2. Sentinel Secondary School
- A3. Rockridge Secondary School

APPENDIX B - ELEMENTARY SCHOOLS

- B1. Irwin Park Elementary School (*Not included in this Report*)
- B2. Ridgeview Elementary School
- B3. West Bay Elementary School
- B4. Westcot Elementary School
- B5. Ecole Pauline Johnson Elementary School
- B6. Bowen Island Community School
- B7. Caulfield Elementary School
- B8. Ecole Cedardale Elementary School
- B9. Chartwell Elementary School
- B10. Hollyburn Elementary School
- B11. Gleneagles Elementary School

APPENDIX C - PRIMARY SCHOOLS

- C1. Eagle Harbour Primary School
- C2. Cypress Park Primary School
- C3. Lions Bay Primary School

2.0 TERMS OF REFERENCE AND LIMITATIONS

This report has been prepared by HEL exclusively for the Client. HEL accepts no responsibility for the improper or unauthorized use of this report by any third party. HEL, its employees, sub-consultants, and agents accept no responsibility to any other party, including contractors, suppliers, consultants and stakeholders, or their employees or agents, for loss or liability incurred as a result of their use of this report.

Information, data, recommendations, and conclusions contained in this report may not be complete or accurate as a result of information provided to HEL which has not been independently verified or that has not been updated. The information, data, recommendations and conclusions contained in this report are based on conditions revealed through limited visual inspections only and subject to budgetary, time and other constraints and limitations contained in the agreement between HEL and the client.

Every effort has been made to ensure that the information provided are accurate and complete, however, HEL accepts no responsibility for any deficiency, misstatement, inaccuracy or omissions contained in this report as a result of deficiencies, misstatements, inaccuracies or omissions of persons providing information to HEL for use in this report.

This report is based on visual observations and data acquired from the Client, and is limited to major items and major maintenance activities. Private property was not inspected. Unless otherwise agreed in writing by HEL, this report shall not be used to express or imply warranty to the property for any particular purpose.

The work reflects the Consultant's best judgment in light of the information reviewed by them at the time of preparation. HEL is not providing advice about mold, mildew, pollutants, contaminants or other hazardous materials. We recommend an Environmental Consultant be retained for these services.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Herold Engineering Limited and our consultants accept no responsibility for damage, if any, suffered by any third party because of decisions made or actions undertaken based on this report.

3.0 ESTIMATED USEFUL SERVICE LIFE

Expected service life time frames referenced for the building components are based on available manufacturer's literature, warranties, theoretical industry standards, BOMA Preventative Maintenance Guidebook, and the CMHC Life Expectancy Guidelines.

All asset systems and components are subject to a wide variety of factors that affect their life expectancy including; quality of installation, quality of materials, weather conditions and quality of maintenance programs; as a result of this variation, some components may outlive their expected service life, while others may not.

This report reflects our best judgment in the light of the information available at the time of the study.

4.0 RECOMMENDATIONS AND OPINION OF PROBABLE COSTS

HEL included recommended remediation measures to problematic, suspected areas noted. We have also noted and provided recommendations to components in relation to current BC Building Code or contemporary best engineering and construction practices. Upgrade of such components would prolong the building system's general service life and improve the performance of the building especially the robustness and energy efficiency. However, it is not the author's intention to provide opinion in regards to Code and By-law compliance of the original design, work, services, or actions provided by other individuals or organizations.

Dependent on the seriousness, the urgency and associated consequences of deferred action of the issue, the recommendations are classified as **immediate**. Short-term, medium-term and long-term. **Immediate** items require action as soon as practical with in less than a year, because of legislative requirements, safety issues, or the risk of loss of function or acceleration in the rate of degradation. Short-term suggestions pertain to work not yet necessary but should be considered in the near future, i.e. within 2 years, to prevent additional damage. Work considered medium-term is not yet necessary or can be deferred to a more convenient time (3-5 years) without major consequences. Long-term plans are for work mostly related to renewal items that have little impact to the service life or occupant health and safety (5-10 years). Long-term work also includes scheduled review and maintenance recommended that is also key to the adequate serviceability of the systems.

The estimated probable costs is based on our experience with similar conditions and proposed scopes of work and our current knowledge of the condition of the visible components expressed in 2017 dollars. It is an order of magnitude forecast and is for initial budgeting purposes only. With any rehabilitation, there may remain potentially significant unknown costs such as unforeseeable deteriorated structural repair that cannot be determined precisely until overlain components are removed.

5.0 CLOSING COMMENTS

We trust the information contained within this report satisfies your current requirements.

Should you have any comments, questions or concerns, please do not hesitate to contact the undersigned.

Yours truly,

HEROLD ENGINEERING LIMITED

Prepared By:

Reviewed By:

Xuezhou (Victor) Wu, Dipl. Tech

Jarrod Koster, P.Eng.
Principal

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All asset systems and components are subject to a wide variety of factors that affect their life expectancy including; quality of installation, quality of materials, weather conditions and quality of maintenance programs; as a result of this variation, some components may outlive their expected service life, while others may not.

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4.0 RECOMMENDATIONS AND OPINION OF PROBABLE COSTS

HEL included recommended remediation measures to problematic, suspected areas noted. We have also noted and provided recommendations to components in relation to current BC Building Code or contemporary best engineering and construction practices. Upgrade of such components would prolong the building system's general service life and improve the performance of the building especially the robustness and energy efficiency. However, it is not the author's intention to provide opinion in regards to Code and By-law compliance of the original design, work, services, or actions provided by other individuals or organizations.

Dependent on the seriousness, the urgency and associated consequences of deferred action of the issue, the recommendations are classified as **immediate**, **short-term**, **medium-term** and **long-term**. **Immediate** items require action as soon as practical with in less than a year, because of legislative requirements, safety issues, or the risk of loss of function or acceleration in the rate of degradation. **Short-term** suggestions pertain to work not yet necessary but should be considered in the near future, i.e. within 2 years, to prevent additional damage. Work considered **medium-term** is not yet necessary or can be deferred to a more convenient time (3-5 years) without major consequences. **Long-term** plans are for work mostly related to renewal items that have little impact to the service life or occupant health and safety (5-10 years). **Long-term** work also includes scheduled review and maintenance recommended that is also key to the adequate serviceability of the systems.

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Yours truly,


HEROLD ENGINEERING LIMITED

Prepared By:

 2018.11.09

Xuezhou (Victor) Wu, Dipl. Tech

Reviewed By:

 2018.11.13

Jarrod Koster, P.Eng.
Principal



Appendix A

A1. WEST VANCOUVER SECONDARY SCHOOL

1. FACILITY DESCRIPTION

West Vancouver Secondary School consists of a north campus and a south campus (a.k.a Inglewood Learning Centre) separated by a track field. The buildings on the school complex use a multitude of building systems including cast-in-place concrete, concrete masonry block walls, heavy timber post and beam, and dimensional lumber wood framing. The glazing systems consist of a combination of single pane wood frame windows, single pane metal frame windows, double pane aluminum frame windows, and single pane structural silicone glazing with spider fittings. The whole school complex is roofed with modified bituminous membrane except for the west annex building, which is asphalt shingles.

1.1. Assemblies

1.1.1. At-grade Assemblies
<p><u>Observations / Comments</u></p> <p>South Campus:</p> <ul style="list-style-type: none">• The at-grade assemblies are slab-on-grade or framed floor over a crawlspace next to paved impervious walkways or soft landscape.• The cladding termination at the base of the wall is in close proximity to grade at portions of the wall. Wood siding has deteriorated and stucco has cracked and fallen off at a few locations.• Outside and to the east of the staff room at the Student Service Building, asphalt paving is at the same level of the base as the metal cladding, which has led to rust and corrosion of the cladding. <p>North Campus:</p> <ul style="list-style-type: none">• The north side mainly borders landscaped areas while the other sides are adjacent to impervious paved surfaces.• The adjacent finished grade has been largely kept away from the bottom termination of the cladding with a good clearance.• There is a strip of gravel that promotes drainage and discourages vegetation growth near at-grade windows and translucent panel skylights.• HEL occasionally observed vegetation growth directly below the cladding along the south elevation.• Along the north elevation, there is extruded polystyrene insulation attached to the foundation wall below grade. Top of the rigid insulation was observed to be exposed and is experiencing accelerated degradation.

1.1.1. At-grade Assemblies

Recommendations:

South Campus:

- Trim landscaping and vegetation away from the base of the buildings. (Immediate)
- Repair the damaged stucco and wood claddings and regrade the finished grade covering cladding, sloping it away from the building. (Immediate)
- Replace the corroded metal cladding and terminate the new base of wall closure flashing with a clearance from the finished grade. (Immediate)

North Campus:

- Trim landscaping and vegetation away from the base of the buildings. (Immediate)
- Provide protection to the rigid insulation to prevent further damage from UV and mechanical impact. (Short-term)

1.1.2. Exterior Walls

Observations / Comments

South Campus:

- The walls are wood framed walls consisting of the following:
 - Wall finish
 - Dimensional lumber stud wall framing
 - 2" of batt insulation with or without craft paper backing
 - Shiplap sheathing
 - Building paper
 - Painted wood clapboard siding, painted vertical wood siding, metal cladding or stucco cladding
- The various cladding systems are in varying conditions with stucco in poor condition and the other cladding systems in fair to adequate serviceable condition.
- Vertical wood cladding was being repainted at the time of the site review.
- Columns supporting the gymnasium's roof structure are clad with stucco and the stucco cladding is damaged in a few locations leaving the underlain column exposed.
- The walls are concealed barrier walls with no drainage passage, capillary break or adequate potential of drying.
- The walls lack a designated air barrier. As a result, excessive heat loss and interstitial condensation could be reasonably expected. Accumulation of condensation likely would lead to accelerated deterioration of materials affected by moisture.
- 2" of batt insulation is far less than the thermal insulation required for like buildings resulting in above-average heat transfer through the wall assemblies.

North Campus:

- There are five major types of walls on the buildings at the north campus:
 - on the west side and the southwest side of the main building the walls are mainly sandblasted and sealed concrete walls or painted concrete walls with batt insulated steel stud framing and drywall.

1.1.2.	Exterior Walls
	<ul style="list-style-type: none"> ○ Adjacent to the two entrances on the north and at the office wing, middle of the building to the south, enamelled metal panel cladding over rigid insulation, liquid membrane, concrete wall and steel stud furring and drywall. ○ Wood framed walls with batt insulation and stucco or metal cladding outside of the classroom west of the gymnasium. ○ Painted masonry block walls for the theatre wing and the Tech building. ○ Stucco cladding and brick veneer at the gymnasium wing likely over concrete structure. <ul style="list-style-type: none"> • The Tech Building has painted concrete masonry walls without a furring wall behind. The walls are moderately protected by the roof and the paint coating appears in good condition. • Cracks were observed in the concrete eyebrow canopy at the classroom wing between the atriums. The horizontal surface does not appear to have been coated with paint or waterproofing material. • The walls with sandblasted and sealed concrete exterior finish adopt a mass wall strategy as its rain penetration control. The serviceability of such walls relies on temporary absorption of the precipitation and in time release of the stored moisture towards the exterior. The success of the assemblies depend on timely repairs of the cracks and maintenance of the coating to reduce moisture absorption. • Enamel finish on the metal cladding was damaged in a few locations and was displayed as peeled paint and rusted panels. The overall condition of the cladding is serviceable. • Stains and efflorescence were observed on the concrete masonry block walls indicating moisture migration through the walls. • There are hairline cracks and opened up joints observed in the stucco wall west of the gymnasium. The detail around windows is susceptible to water ingress. The stucco assembly at this location is assumed to be a concealed barrier assembly with cladding applied directly over sheathing paper with no provisions to drainage or drying.
	<p><u>Recommendations:</u></p> <p>South Campus:</p> <ul style="list-style-type: none"> • Repair stucco in areas where the underlain wood framing structure is exposed (Immediate) • Consider replacing the concealed barrier walls to cladding systems that incorporate rain screen principles with a capillary break, a drainage passage and more potential for drying. (Medium-term) • Replace the existing sheathing paper and provide a continuous air barrier outboard of sheathing and consider adding insulation outboard of exterior sheathing. (Medium-term) • Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls. (Long-term) <p>North Campus:</p> <ul style="list-style-type: none"> • Repair cracks in the concrete and provide liquid applied waterproofing to the horizontal surface of the concrete canopy (Short-term) • Replace the stucco cladding west of the gymnasium with a cladding system that incorporates rain screen principles. (Short-term) • Replace the metal panels that have a damaged enamel finish. (Short-term) • Closely monitor the performance of the mass wall assemblies. (Long-term)

1.1.3. Windows, Doors and skylights
<p><u>Observations / Comments</u></p> <p>South Campus:</p> <ul style="list-style-type: none"> • The majority of the windows used at the south campus are wood frame or non-thermally broken metal frame windows with single pane float glass except for the West Annex Building, which are glazed with IGUs. • The windows have moderate overhang protection and are in fair to poor condition. • The serviceability of the wood frame windows largely relies on timely maintenance of the paint coating, glazing stops and the seals. • The windows with non-thermally broken frames, glazed with single pane float glass, perform poorly with respect to energy efficiency and contribute significantly to water and air infiltration. • Wood double doors in the gymnasium at the Student Service Building are in poor condition. The rest of the entrance and exit doors appear to be in serviceable condition. • The West Annex Building was under renovation/construction and some of the windows were being replaced. <p>North Campus:</p> <ul style="list-style-type: none"> • Glazing at the north campus is a combination of the following systems: <ul style="list-style-type: none"> ◦ Structural silicone glazing supported by spider fittings at Kay Meek Arts Centre ◦ Thermally-broken aluminum frame punched windows with IGUs in the majority of the classrooms ◦ Kalwall full height specialty metal frame glazing systems in a few classrooms west of the two atriums. ◦ Glass blocks and non-thermally broken metal frame windows with single pane float glass in the middle classroom wing between the two atriums. ◦ Wood frame windows with single pane float glass in the classroom and offices west of the gymnasium • The wood frame windows are in fair to poor condition. • The non-thermally broken metal frame windows and windows with single pane float glass perform poorly with respect to energy efficiency. • The entrance doors and exit doors are metal doors in metal frames and are in good serviceable condition. • There are Kalwall specialty translucent skylights above the atriums and the middle classroom wing.
<p><u>Recommendations:</u></p> <p>South Campus:</p> <ul style="list-style-type: none"> • Replace the double doors in the gymnasium. (Short-Term) • Consider replacing all non-complying windows to assemblies that are compliant with the current North American Fenestration Standard (NAFS-08) with respect to air infiltration/exfiltration and water penetration requirements and have the thermal performance that meets current energy code standards. (Short-Term)

1.1.3. Windows, Doors and skylights

North Campus:

- Replace the wood frame windows in the classroom and offices west of the gymnasium. (Short-term)
- Replace all non-complying windows to assemblies that are compliant with the current North American Fenestration Standard (NAFS-08) with respect to air infiltration/exfiltration and water penetration requirements and have the thermal performance that meets current energy code standards. (Medium-Term)

1.1.4. Roofs

Observations / Comments:

South Campus:

- The main roof of the West Annex Building is a sloped shingle roof with a ventilated attic that drains to gutters at the roof perimeter and the lower flat roof above the hallway in the east.
- The rest of the roofs are modified bituminous membranes over rigid insulation and roof structure. The rigid insulation used in the roof assemblies is likely deficient under current energy efficiency regulations.
- Paint maintenance was underway at the East Annex Building and HEL was able to closely review the roof surface. There are numerous blisters on the roof and the roof is beyond the scope of economical repair and should be replaced.
- There is a roof maintenance and renewal program in place.

North Campus:

- The roofs are modified bituminous membranes over rigid insulation on roof structure.
- The condition of the roof membranes was not reviewed in detail.
- It is our understanding that there is a roof maintenance and renewal program in place.

Recommendations:

South Campus:

- Replace the roof membrane on the East Annex Building and add rigid insulation to reduce heat transfer through the roof. (Short-term)
- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)

North Campus:

- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)

1.1.5. Costing Summary

Please refer to the following page.

A1. West Vancouver Secondary School - Costing Summary						
DESCRIPTION			ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUES	ESTIMATED COSTS	COMMENTS
At-Grade Assembly						
Assets		Recommendations				
South Campus	A combination of soft landscaping and paved impervious walkways	Trim landscaping and vegetation away from the buildings	3-20 yrs.	Immediate	\$1,500	Assemblies susceptible to moisture related deteriorations in close proximity to finished grade are prone to having pre-mature failures. A good clearance and slope away from the building is key for maintaining an adequate service life of the adjacent to grade components.
		Repair the damaged claddings and regrade the finished grade covering claddings		Immediate	\$25,000	
		Replace the corroded metal cladding close to grade and finish it with a clearance to the finished grade		Immediate	\$2,000	
North Campus	Mainly paved surfaces except for landscaping on the north side	Trim landscaping and vegetation away from the buildings		Immediate	\$1,000	
		Provide protection to the exposed rigid insulation		Short-term	\$1,500	
Exterior Walls						
Assets		Recommendations				
South Campus	Wood framed batt insulated wall with cladding	Repair damaged stucco where the underlain wood framing is exposed	5-40 yrs.	Immediate	\$7,000	The various wall types utilize an array of claddings and either mass wall or concealed barrier rain penetration protection strategies and are in varying conditions generally indicative of the age of the construction. It has been well documented that stucco clad wood framed walls when applied without a rain screen cavity are susceptible to moisture associated deteriorations. Estimated costs don't include demolishing or removal and reinstall of sheathing or drywall.
		Replace the concealed barrier walls to cladding systems incorporating rain screen principle(exclude the West Annex which was being renovated) and replace the sheathing paper and incorporate an air barrier outboard of the sheathing		Medium-term	\$80/sqft	
		Consider adding exterior insulation outboard of sheathing(2" of mineral wool assumed)		Medium-term	\$8/sqft	
		Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls		Long-term	\$3/sqft	
North Campus	Concrete with furring wall, concrete wall with enamelled metal cladding, Patinted CMUs, wood framed stucco cladding	Repair cracks in the concrete and provide liquid applied waterproofing to horizontal surfaces of the concrete canopy	0-80 yrs.	Short-term	\$50/sqft	
		Replace the stucco cladding west of the gymnasium to a cladding system that incorporates rain screen principles		Short-term	\$80/sqft	
		Replace the metal panels that have damaged enamel finish		Short-term	\$6,000	
		Close monitor the performance of the mass wall assemblies		Long-term	N/A	
Windows, Doors and Skylights						
Assets		Recommendations				
South Campus	Wood frame or non-thermally broken metal frame with single pane glass	Replace the double doors in the gymnasium	0-2 yrs.	Short-term	\$6,000	With the exception of single pane wood or metal frame windows, existing fenestrations perform adequately.
		Replace all non-complying windows to NAFS compliant assemblies that also meet current energy code.		Short-term	\$2,500/ea.	
North Campus	A combination of structural silicone glazing, thermally-broken aluminum frame punched windows, Kalwall, glass blocks and wood frame single pane windows	Replace the wood frame windows in the classroom and offices west of the gymnasium	2-15 yrs.	Short-term	\$2,500/ea.	
		Replace all non-complying windows to NAFS compliant assemblies that also meet current energy code.		Medium-term	\$2,500/ea.	
Roofs						
Assets		Recommendations				
South Campus	Ashphalt shingles on the West Annex Building and 2-ply SBS for the rest of the buildings	Replace the roof membrane on the East Annex Building and add rigid insulation to reduce heat transfer through the roof. (Assume 3" XPS)	0-10 yrs.	Short-term	\$10/sqft (membrane renewal)	A roof maintenance program including scheduled review of the roof condition, cleaning of the buildups, and targeted repair of suspect areas is key to the adequate service of the roof. The cost estimate doesn't include demolishing.
		Routinely inspect and maintain the modified bituminous roof membranes.		Long-term	\$6/sqft (rigid insulation)	
North Campus	2-ply SBS roof membrane	Routinely inspect and maintain the modified bituminous roof membranes.	5-15 yrs.	Long-term	N/A	

A2. Sentinel Secondary School

1. FACILITY DESCRIPTION

Originally built in 1961, Sentinel Secondary has seen a number of additions and renovations spanning from 1967 to 1974. The main structure of the building is reinforced concrete with metal frame windows and steel framed infill. The roofs are built-up roofs or modified bituminous roofs over low-sloped roof substrates. The ancillary buildings include a portable workshop to the east, Field House Building to the south and Music Centre to the west. The portable buildings were not reviewed and are outside of the scope of the report.

1.1. Assemblies

1.1.1. At-grade Assemblies

Observations / Comments

- There are raised concrete planters, grassed landscaped areas and walkways consisting of asphalt or pavers next to the concrete foundations of the main building.
- Planters and soft landscaping both have the tendency to retain water, creating a hydrostatic pressure next to the reinforced concrete wall.
- There are a few locations where the bottom of the cladding is in close proximity to the finished grade, such as:
 - North of the cafeteria where metal cladding is lower than the finished walkway
 - West side of the Field House Building
- Loose and/or missing screws in the metal cladding were noted on the west side of the Field House Building near grade.
- A hole covered by loose plywood beside the north wall was observed.

Recommendations:

- Tighten and replace screws in the metal cladding on Field House Building (**Immediate**)
- Provide a proper lid to the hole that poses a potential fall hazard (**Immediate**)
- Closely monitor the condition of the walls next to at-grade assemblies at risk. Remove the materials that could retain water or provide proper waterproofing details to protect the space behind from bulk water ingress. (Long-term)

1.1.2. Exterior Walls

Observations / Comments

- The walls of the main building consist of painted concrete structural walls or metal cladding, rigid insulation, steel stud framing and interior wall finish.
- The rigid insulation in the concrete walls and infill walls varies from 1" to 2".
- The concrete walls adopt the rain penetration control strategy of mass walls, which rely on the absorption and temporary storage of the moisture received from precipitation that should be released in time before initiation of moisture associated deterioration. The performance of such walls also depends on the first line of protection provided by a continuous layer of paint coating that stops water from infiltrating concrete.
- HEL observed water stains, peeled paint, signs of rust, and efflorescence on the concrete wall indicative of water ingress and moisture migration within the concrete.
- The metal cladding, depending on the year of construction and the service and maintenance condition, is experiencing varying degrees of deterioration manifested as paint failure and rust.
- 2" of rigid insulation complies with current energy regulations for mass walls, however 1" of rigid insulation would be considered insufficient.

Recommendations:

- Repair cracks and seal joints that have led to water ingress and deterioration of the reinforcing steel. (Short-term)
- Replace the metal cladding that has shown signs of deterioration (Short-term)
- Repaint the exterior of the concrete walls (Medium-term)
- Supplement insulation to the steel framing cavities if walls are being renovated. (Long-term)

1.1.3. Windows, Doors and skylights

Observations / Comments

- The windows at the school are a combination of curtainwall style glazing at the entrance hall and the library and single pane metal frame windows in the classrooms.
- The curtainwall windows appear to be in adequate serviceable condition.
- Cracked and damaged putty, paint failure and failed seal were commonly observed on the single pane metal frame windows. These windows perform poorly with respect to energy efficiency and contribute largely to water and air infiltration.
- There are wood exit doors in fair to poor condition with failed paint and deteriorated hardware. Overhang protection is often absent over these doors.
- The rectangular acrylic skylights above the stairwells and the curtainwall style pyramid skylight in the roof of the library appear to be serviceable.

Recommendations:

- Replace the single pane metal frame windows with windows that conform to the current North American Fenestration Standard (NAFS-08) with respect to air infiltration/exfiltration and water penetration requirements and have the thermal performance that meets current energy code. (Short-term)
- Replace the exit doors and consider providing canopies to protect the doors from the elements. (Short-term)

1.1.4. Roofs

Observations / Comments:

- The original roofs of the main building consist of a concrete roof structure and built-up roofing, which has been partially replaced with modified bituminous membrane.
- The main building was originally designed with 1" of rigid insulation that is insufficient under the current energy conservation regulations.
- The Field House Building appears to be a low-sloped roof that comprises modified bituminous roof membranes over rigid insulation and roof structure.
- The detailed condition of the roofs were not reviewed due to lack of accessibility to the roof surfaces.
- It is our understanding that there is a roof maintenance and renewal program in place.

Recommendations:

- Add rigid insulation over the roof deck to reduce heat loss if the roof is being replaced. (Long-term)
- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)

1.1.5. Costing Summary

Please refer to the following page.

A2. Sentinel Secondary School					
DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUES	ESTIMATED COSTS	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
Planters, grassed landscaped areas and walkways either asphalt or pavers next to concrete foundation wall	Tighten and replace screws in the metal cladding on the Field House Building	5-20 yrs.	Immediate	\$200	Materials placed next to concrete walls without waterproofing membrane poses a risk of moisture ingress when standing water coexists with cracks in the concrete.
	Provide a proper lid to the hole that poses a potential fall hazard		Immediate	\$2,000	
	Monitor the condition of the walls next to at-grade assemblies at risk		Long-term	N/A	
Exterior Walls					
Assets	Recommendations				
Concrete wall or metal cladding with insulation and steel stud framing behind	Repair cracks and seal joints in the concrete	0-18 yrs.	Short-term	\$15,000	To successfully manage rain water penetration at the front face of the concrete, seal all cracks and joints in the concrete and maintain a continuous paint coating. Estimated costs don't include demolishing or removal and reinstall of the overlaying components.
	Replace the metal cladding which has shown signs of deterioration		Short-term	\$80/sqft	
	Repaint the exterior concrete walls		Medium-term	\$2/sqft	
	Add rigid insulation to areas where thermal resistance of the mass assemblies are insufficient (1" rigid assumed)		Long-term	\$2/sqft	
Windows, Doors and Skylights					
Assets	Recommendations				
Curtainwall glazing and single pane metal frame windows. Aluminum frame entrance doors and wood exit doors. Acrylic skylights.	Replace the single pane metal frame windows to windows that conform to the current North American Fenestration Standard (NAFS-08) with respect to air, and water penetration requirements and have the thermal performance that meets current energy code.	0-17 yrs.	Short-term	\$2,500/sqft	The existing single pane metal frame windows perform poorly and should be replaced.
	Replace the exit doors and consider providing canopies		Short-term	\$6,000/ea.	
Roofs					
Assets	Recommendations				
Modified bituminous membrane over 1" of rigid insulation and roof structure.	Add rigid insulation over the roof deck to reduce heat loss if roof is being replaced(3" of rigid assumed)	5-15 yrs.	Long-term	\$6/sqft	A roof maintenance program including scheduled review of the roof condition, cleaning of the buildups, and targeted repair of suspect areas is key to the adequate service of the roof
	Routinely inspect and maintain the modified bituminous roof membranes.		Long-term	N/A	

A3. Rockridge Secondary School

1. FACILITY DESCRIPTION

The Rockridge Secondary School is a two-storey school building built in 1994 comprising reinforced concrete walls and columns over a concrete foundation. The superstructure is T&G or steel decking over glulam timber roof framing and the windows are aluminum frame windows glazed with insulated glass units (IGUs). The exterior wall finishes are either plain concrete or stucco. The roof system consists of cedar shakes over sloped roofs and modified bituminous membraned low-sloped roof.

1.1. Assemblies

1.1.1. At-grade Assemblies
<u>Observations / Comments</u> <ul style="list-style-type: none">• Ground floor of the building is slab-on-grade.• The perimeter of the building is surrounded by paved impervious walkways with sporadic vegetated soft landscaping.• The bottom termination of the cladding is kept an appropriate distance from the finished grade.
<u>Recommendations:</u> <ul style="list-style-type: none">• The at-grade assemblies are in good condition.

1.1.2. Exterior Walls
<u>Observations / Comments</u> <ul style="list-style-type: none">• The majority of the exterior walls consist of<ul style="list-style-type: none">◦ Gypsum wall board◦ Vapour barrier◦ Steel stud furring with batt insulation◦ Concrete wall◦ Stucco cladding or plain exposed concrete• The walls enclosing the gym appear to be unpainted concrete masonry blocks.• The vertical surfaces have moderate overhang protection from wind driven precipitation.• The rain penetration control of the walls adopt a face-sealed perfect barrier system or a storage mass wall. The success of these types of walls depends on either stopping water infiltration at the outmost surface or absorbing and later releasing the moisture to the exterior. Such assemblies have little tolerance built into the system for excess moisture and require constant monitoring and maintenance.• Stains were occasionally observed on the concrete and stucco surface suggesting concentrated water flow over the surface.• There are hairline cracks in the stucco and a failing crack repair in the concrete near the south corner of the building.

1.1.2. Exterior Walls

Recommendations:

- Crack repair of the stucco and concrete. (Short-term)
- Closely monitor the serviceability of the wall assemblies, repair the cracks and maintain the joint sealant. (Long-term)

1.1.3. Windows, Doors and skylights

Observations / Comments

- A few types of aluminum frame windows have been used on the glazing of the building including curtainwall, storefront and punched windows. All windows are glazed with insulated glass units (IGUs) that appear to be in adequate serviceable condition for their age.
- The entrance and exit doors also incorporate glazing with IGUs performing adequately as intended.
- There are sloped aluminum frame curtainwall type skylights above the atriums. The skylights were not closely reviewed in detail.

Recommendations:

- Aluminum windows generally have a service life of 25 to 40 years with IGUs lasting about 15 years before the seal fails.

1.1.4. Roofs

Observations / Comments:

- The main roof is a flat roof comprised of modified bituminous membrane over rigid insulation and sheathing on steel or T&G decking.
- The sloped roofs are cedar shakes over underlayment, roof sheathing and vented attic space insulated with loosely laid insulation.
- Cedar shakes were being repaired/replaced at the time of the visit.

Recommendations:

- Modified bituminous membranes, when conventionally applied, typically have a service life of 20 years. A preventative roof replacement could be considered. (Medium-term)
- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)

1.1.5. Costing Summary

Please refer to the following page.

A3. Rockridge Secondary School					
DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUES	ESTIMATED COSTS	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
Slab on grade borders primarily paved walkways with sporadic vegetated soft landscaping.	Regular maintenance	10-20 yrs.	Long-term	N/A	The at-grade assemblies are in good condition
Exterior Walls					
Assets	Recommendations				
Stucco clad or plain concrete wall with steel stud furring with batt insulation	Crack repair of the stucco and concrete	26-76 yrs.	Short-term	\$16,000	The overhang is reducing the rain exposure of the mass wall surfaces however the serviceability of the wall should be closely monitored.
	Closely monitor the serviceability of the walls and repair cracks and joint sealant as required		Long-term	N/A	
Windows, Doors and Skylights					
Assets	Recommendations				
Various aluminum frame fenestrations with IGUs have been used	Regular maintenance and bi-annual inspection of sealant	1-16 yrs.	Long-term	N/A	The fenestrations appear to be in good serviceable condition
Roofs					
Assets	Recommendations				
Cedar shakes for the sloped roof and modified bituminous membrane on the flat roof	Consider for a preventative roof replacement	0-10 yrs.	Medium-term	\$8/sqft (Cedar replacement).	Modified bituminous membranes when conventionally applied have a service life of 20 years. A preventative roof replacement could be considered
	Routinely inspect and maintain the modified bituminous roof membranes and repair as required.		Long-term	\$10/sqft (membrane full replacement)	

Appendix B

B1. Irwin Park Elementary School

NOT INCLUDED IN THIS REPORT

B2. Ridgeview Elementary School

1. Facility Description

Ridgeview Elementary is a two-storey wood framed school building originally built in 1948 with additions in 1954, 1960, and 1965. The foundations are conventional concrete strip footings supporting reinforced concrete or concrete masonry unit (CMU) walls with either slab-on-grade or vented crawl space. The walls are dimensional lumber framing clad with vertical cedar channel siding or vertical diamond rib metal cladding. The windows are wood frame single pane windows and the roofs are flat roofs with a row of "hip-roof", T-bar skylight over the central corridor.

1.1. Assemblies

1.2. At-grade Assemblies

Observations / Comments

- There is soft landscaping consisting of plants and grass to the north of the building and paved walkway or play area around the remainder of the perimeter.
- A good clearance is kept between the finished grade and the cladding systems at the majority of the perimeter except for the west side of the north entrance beside the gym and the exterior walls of the ground floor classrooms. Plants and pavement are in close proximity to the base of the wall. In some areas, the bottom of the cladding is showing signs of accelerated deterioration.

Recommendations:

- Trim the landscaping back and keep a good clearance from cladding termination to finished grade. (**Immediate**)
- Replace the deteriorated cladding and terminate further from grade while incorporating a proper base of wall waterproofing detail. (**Immediate**)

1.3. Exterior Walls

Observations / Comments

- Based on the design drawings and our observation, the exterior wall assemblies consist of:
 - ½" Gypsum board
 - 2x6 Wood stud wall framing
 - 2" of batt insulation with or without paper backing (vapour barrier)
 - 1" Shiplap board sheathing
 - Building paper
 - Vertical ribbed corrugated metal cladding or painted cedar siding
- The current wall assembly lacks a proper designated air control layer. As a result, excessive heat loss and interstitial condensation could be reasonably expected. Accumulation of condensation likely would lead to accelerated deterioration of materials affected by moisture.
- The original building paper has exceeded its service life.
- The painted cedar siding has exceeded its service life.
- The diamond rib metal cladding dated from the original construction appears to be in fair condition while the corrugated metal cladding that appears to have been installed at a later date to the northeast is in good condition.
- 2" of batt insulation is far less than the current code requirement for thermal insulation of like buildings resulting in above-average heat loss.

Recommendations:

- Replace the painted cedar cladding and the original diamond rib metal cladding with a new cladding system that incorporates rain screen principles with a capillary break, a drainage passage and more potential for drying. (Short-term)
- Replace the sheathing paper, provide an air barrier on the outside of the sheathing, and consider adding insulation outboard of the exterior sheathing if the cladding is being replaced. (Short-term)
- Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls. (Long-term)

1.4. Windows, Doors and skylights

Observations / Comments

- Entrance and exit doors are solid core wood or metal frame doors with moderate overhang protection.
- Doors to the south elevation exiting to the covered play area are in fair to very poor condition.
- Classrooms and the gym have wood frame single pane windows with awning or jalousie operable sashes. The windows perform poorly in terms of energy conservation and contribute significantly to air infiltration. The long-term performance of such windows depend largely on paint coatings which are failing.
- Glass in one of the clerestory windows above the main roof facing north is broken.
- There is a skylight above the central corridor composed of what appeared to be a T-bar system

Recommendations:

- Replace the broken glass in the clerestory window. (**Immediate**)
- Replace the doors existing to the covered play area. (Short-term)
- Replace all windows to assemblies that are compliant with the current North American Fenestrations Standard (NAFS-08) with respect to, air, and water penetration requirements and thermal performance that meets today's energy code. (Medium-term)

1.5. Roofs

Observations / Comments:

- The original roofs are bonded, multi-ply, low-slope, built-up roofs later replaced to two-ply torch-applied SBS modified bituminous membranes with board insulation over roof decks.
- It is our understanding that there is a roof maintenance and renewal program in place.
- The cap flashing over the perimeter of the roofs appears to have been recently replaced.
- The majority of the roof membranes appear recently renewed and are in good condition with the exception of the roof of the 1965 addition. Blisters were observed in the roofing.

Recommendations:

- Repair the blisters in the membranes on the 1965 addition roof. (**Immediate**)
- Routinely inspect the condition of the roof membranes and repair as required. (ongoing)

1.6. Costing Summary

Please refer to the following page.

B2. Ridgeview Elementary School

DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF ISSUES	ESTIMATED COSTS	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
Slab on grade next to paved play area, walkway or soft landscaping	Trim landscaping back and keep a good clearance from cladding to finished grade	10-20 yrs.	Immediate	\$5,000	Assemblies susceptible to moisture related deteriorations in close proximity to finished grade are prone to having pre-mature failures. A good clearance and slope away from the building is key for maintaining an adequate service life of the adjacent to grade components.
	Replace the deteriorated cladding and terminate the new cladding further from grade while incorporating a proper base of wall waterproofing detail		Immediate	\$15,000	
Exterior Walls					
Assets	Recommendations				
Wood frame wall with 2" of batt insulation, building paper, vertical ribbed corrugated metal cladding or painted cedar siding.	Replace the existing cladding to a cladding system that incorporates rain screen principles	0-3 yrs.	Short-term	\$80/sqft	Adding insulation whether to the empty space in the stud wall or outboard of sheathing would improve the space conditioning energy consumption of the building. However, unintentional air leakage through the envelope and existence of multiple layers of vapour impermeable materials should be addressed prior to addition of insulation to avoid subsequent accumulation of moisture within the wall assemblies. The cost estimate doesn't include demolishing of the overlaying materials. HEL recommends an integrated approach to the functional layers of the building envelope in question.
	Replace the existing sheathing paper and provide a continuous air barrier outboard of sheathing		Short-term	\$3.5/sqft	
	Add insulation to the exterior of the walls if cladding is being replaced(Assume 2" of mineral wool)		Short-term	\$8/sqft	
	Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls		Long-term	\$3/sqft	
Windows, Doors and Skylights					
Assets	Recommendations				
Solid core wood or metal frame doors. Wood frame windows with single panel glass.	Replace the broken glass in the clerestory window	3-10 yrs.	Immediate	\$500	Existing fenestrations perform adequately but replacing them to contemporary types would provide better comfort and energy efficiency.
	Replace all non-complying windows to NAFS compliant assemblies that also meet current energy code.		Medium-term	\$2,500/ea.	
Roofs					
Assets	Recommendations				
2-ply SBS roof membrane over rigid insulation and roof structure	Repair the blisters in the roof membranes on the 1965 addition.	2-10 yrs.	Immediate	\$1,500	A roof maintenance program including scheduled review of the roof condition, cleaning of the buildups, and targeted repair of suspect areas is key to the adequate service of the roof.
	Routinely inspect and maintain the modified bituminous roof membranes and repair as required.		Long-term	N/A	

B3. WEST BAY ELEMENTARY SCHOOL

1. FACILITY DESCRIPTION

West Bay Primary School is a two-storey building originally built in 1952. Major additions and renovations took place in 1962 and 1965 with scattered cladding and glazing renewals in the recent years. The substructure is a cast in place concrete foundation, which supports concrete or steel columns, wood frame walls and concrete masonry block walls. There are wood framed walls and glulam beams carrying joists and wood decking. The roofs are low-sloped with modified bituminous roof membranes and the fenestrations are a mix of wood and aluminum.

1.1. Assemblies

1.1.1. At-grade Assemblies
<u>Observations / Comments</u> <ul style="list-style-type: none">• The ground floor of the building is slab on grade or joists over a vented crawl space.• The perimeter of the building borders paved impervious walkways that appear to be sloping away from the building.• Bottom termination of the claddings generally has good clearance from the adjacent finished surface. Only metal cladding at a planter next to the building on the west elevation is in intimate contact with asphalt paving and showing signs of rust.
<u>Recommendations:</u> <ul style="list-style-type: none">• At-grade assemblies appear to be in adequate serviceable condition.

1.1.2. Exterior Walls

Observations / Comments

- The wood framed walls consist of:
 - Wall finishes
 - Dimensional lumber framing
 - 2" of batt insulation with or without craft paper backing
 - Shiplap or plywood sheathing
 - Building paper
 - Painted board & batten cedar cladding, painted plywood cladding or diamond rib metal cladding
- The wood cladding appears to be original to the initial construction and is showing varying degrees of wear and tear, in particular the south facing wall between the west wing and the south wing. The wood cladding is past its useful service life and is due for replacement.
- We observed a crack in the painted concrete masonry wall on the east elevation next to the metal cladding. The crack extends down the foundation wall.
- The metal cladding is in fair condition and could reasonably service the building for another 5 years.
- Closure flashing is not sufficiently covering the wood components under viewed from the second floor hallway towards classroom 306.
- All the wall assemblies lack a designated air control layer. As a result, excessive heat loss and interstitial condensation could be reasonably expected. Accumulation of condensation likely would lead to accelerated deterioration of materials affected by moisture.
- 2" of batt insulation is far less than the current code requirement for insulation value of like buildings resulting in above-average heat loss.

Recommendations:

- Replace the worn wood cladding with a cladding system that incorporates rain screen principles. (**Immediate**)
- Closely monitor the crack in the masonry wall and seek consultation from a structural professional if movement persists. (**Immediate** to Short-term)
- Repair the closure flashing outside of classroom 306 (short-term)
- Incorporate a continuous air barrier to the walls and consider increasing the thermal resistance of the walls to reduce energy cost for space heating of the building. (Long-term)

1.1.3. Windows, Doors and skylights

Observations / Comments

- The majority of the windows are wood frame windows and appear original to the construction of the building. They are glazed with single pane float glass and are in fair condition. The wood windows in the music room are poorly detailed and signs of deterioration were observed.
- The wood glazing stop is missing on the side lite next to the main entrance.
- The Library has storefront type windows with IGUs installed in 2014 and are sheltered by a frosted glass canopy.
- There are a few vinyl frame or aluminum frame windows retrofitted into the walls.
- The windows have moderate to extensive overhang protection from canopies and overhang structures.
- The single pane windows perform poorly in relation to energy efficiency and contribute significantly to water and air infiltration. The long-term performance of such windows depends largely on paint coatings and seals which require routine inspection and timely maintenance.
- The entrance doors and exit doors are wood frame doors in fair serviceable condition with extensive overhang protection.
- There is an acrylic dome skylight above the foyer that hasn't been reviewed in detail.

Recommendations:

- Replace the windows in the music room. (Immediate)
- Replace the glazing stop on the window next to the main entrance. (Immediate)
- Consider replacing all non-complying windows to assemblies that are compliant with the current North American Fenestration Standard (NAFS-08) with respect to air, and water penetration requirements and also have the thermal performance that meets current energy code. (Short-term)

1.1.4. Roofs

Observations / Comments:

- The roofs are low-slope roofs protected by modified bituminous membrane over rigid insulation, board sheathing and steel decking. The roof insulation currently in service is assumed deficient compared to current code requirements.
- The detailed condition of the roofs was not reviewed due to lack of accessibility to the roof surfaces.
- It is our understanding that there is a roof maintenance and renewal program in place.

Recommendations:

- Add rigid insulation over the roof deck to reduce heat loss if the roof is being replaced. (Long-term)
- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)

1.1.5. Costing Summary

Please refer to the following page.

B3. West Bay Primary School					
DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUES	ESTIMATED COSTS	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
Paved impervious walkway next to slab on grade or vented crawl space	Routine cleaning and bi-annual review of the condition	5-25 yrs.	Long-term	N/A	The at grade assemblies appear to be in adequate condition. The standard design life for concrete walkways is 25 years.
Exterior Walls					
Assets	Recommendations				
Wood framed walls with 2" batt insulation, building paper and painted board & batten cedar, painted plywood or diamond rib metal cladding. Concrete masonry unit wall.	Replace the expired wood cladding with a system that incorporates rain screen principles	0-5 yrs.	Immediate	\$80/sqft	The worn wood claddings should be replaced immediately. Adding insulation whether to the empty space in the stud walls or outboard of sheathing would improve the space conditioning energy consumption of the building. However, unintentional air leakage through the envelope and existence of multiple layers of vapour impermeable materials should be addressed prior to addition of insulation to avoid subsequent accumulation of moisture within the wall assemblies. The cost estimate doesn't include demolishing of the overlaying materials. HEL recommends an integrated approach to the functional layers of the building envelope in question.
	Monitor the condition of the crack in the masonry wall		Immediate	N/A	
	Repair the closure flashing outside of classroom 306		Short-term	\$300	
	Replace the sheathing paper and provide a continuous air barrier to the outboard of sheathing		Long-term	\$3.5/sqft	
	Add insulation to the exterior of the walls if cladding is being replaced(Assume 2" of mineral wool)		Long-term	\$8/sqft	
Windows, Doors and Skylights					
Assets	Recommendations				
Wood frame windows with single pane glass and aluminum storefront windows in the library. Wood frame entrance/exit doors. Acrylic dome skylight.	Replace the windows in the music room	0-21yrs.	Immediate	\$4,000	Besides windows in the music room due for replacement, The remaining wood frame windows are recommended to be replaced to contemporary windows that comply with NAFS and current energy code.
	Replace the glazing stop on the window next to the main entrance		Immediate	\$500	
	Replace all non-complying windows to NAFS compliant assemblies that also meet current energy code.		Short-term	\$2,500/ea.	
Roofs					
Assets	Recommendations				
2-ply SBS roof membrane	Routinely inspect and maintain the modified bituminous roof membranes.	5-10 yrs.	Long-term	N/A	A roof maintenance program including scheduled review of the roof condition, cleaning of the buildups, and targeted repair of suspect areas is key to the adequate service of the roof.
	Add rigid insulation over the roof deck if the roof is being replaced. (assume 3" of rigid insulation)		Long-term	\$6/sqft	

B4. Westcot Elementary School

1. FACILITY DESCRIPTION

Westcot Elementary is a two-storey school building constructed of steel post and beam structure and concrete masonry blocks (CMU) and wood framing infill. The original roofs are low-slope built-up roofing that has been replaced with a modified bituminous membrane system. The south facade near the east appears to have been overclad with metal cladding. The majority of the windows are single pane wood frame windows.

1.1. Assemblies

1.1.1. At-grade Assemblies
<u>Observations / Comments</u> <ul style="list-style-type: none">• There is a mix of vegetated or bare soil soft landscaping and impervious walking surfaces covered by pavers or asphalt around the perimeter of the building.• The surrounding grade appears to be sloping away from the building.• The bottom of the cladding is very close to the adjacent finished grade on the east elevation. Vegetation growth was occasionally observed under the cladding along this side.• Metal cladding and vertical cedar siding are terminated at the grade level around the gymnasium and cedar siding is deteriorated at the southwest corner outside of the gymnasium exit.
<u>Recommendations:</u> <ul style="list-style-type: none">• Regrade the adjacent finished grade where there is insufficient clearance at the base of the wall and replace the deteriorated cladding. (Immediate)• Trim the vegetation away from the perimeter of the building and maintain a good clearance between the plants and the exterior wall surface. (Immediate)

1.1.2. Exterior Walls

Observations / Comments

- The original wall construction appears to consist of
 - ½" Gypsum board
 - 2x6 Wood stud wall framing
 - 2" of batt insulation with or without paper backing (vapour barrier)
 - ½" Plywood
 - Building paper
 - Painted vertical cedar cladding, painted wood panel cladding or ribbed metal cladding.
- The original building paper and painted vertical cedar cladding have exceeded their service lives. The cedar cladding is severely damaged outside of the library.
- HEL noticed unpainted plywood panel cladding on the west elevation and the south elevation.
- Painted plywood panels on the gymnasium wall protrude out of the plane of the vertical cedar siding above and have a potential of funneling rain water into the space behind.
- The ribbed metal cladding at the base of the wall at the gymnasium appears to be in fair condition. The ribbed metal panels overcladding the cedar cladding to the south elevation are in good condition.
- The wall assemblies lack a designated air control layer. As a result, excessive heat loss and interstitial condensation could be reasonably expected. Accumulation of condensation would likely lead to accelerated deterioration of materials affected by moisture.
- 2" of batt insulation is far less than the current code requirement for thermal insulation of similar buildings resulting in above-average heat loss.

Recommendations:

- Replace the damaged cedar cladding outside of the library. (Immediate)
- Provide paint coating finish to the unpainted plywood panels. (Immediate)
- Replace the vertical cedar cladding with a new cladding system that incorporates rain screen principles with a capillary break, a drainage passage and increased potential for drying. (Short-term)
- Replace the sheathing membrane/air barrier, and consider adding insulation outboard of exterior sheathing. (Short-term)
- Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls or add insulation outboard of sheathing if cladding is being replaced. (Long-term)

1.1.3. Windows, Doors and skylights

Observations / Comments

- The majority of the existing windows are from the original construction and are wood frame windows with aluminum frame hopper type operable inserts glazed with single pane float glass. Glass in the windows near the front entrance appears to have insulating glass units (IGUs) from a retrofit of a later date.
- A few windows in the library are vinyl frame windows with IGUs.
- The single pane wood frame windows perform poorly with respect to energy conservation and contribute significantly to water and air infiltration. The long-term performance of such windows depend largely on paint coatings which require routine inspection and timely maintenance.
- The entrance doors and exit doors are wood or metal frame doors in fair to poor condition.

Recommendations:

- Replace all windows to assemblies that are compliant with the current North American Fenestration Standard (NAFS-08) with respect to air, and water penetration requirements that also meet today's energy code. (Short-Term)
- Replace the exposed solid-core single wood exit doors on the south elevation and provide overhang protection to doors with high exposure. (Short-Term)

1.1.4. Roofs

Observations / Comments:

- The original roofs consist of:
 - Multi-ply built-up roof
 - Shiplap sheathing
 - Joists
 - 3" batt insulation
 - 1"x4" strapping
 - ½" fibreboard
- The original roof has been replaced with a two-ply torch-applied SBS modified bituminous roofing membrane. The condition of the membranes were not reviewed due to lack of accessibility
- 3" of batt insulation for an attic roof is far less than the current energy requirement for a like roof type resulting in above-average heat transfer through the roof assembly.
- There is soffit finished with ¼" perforated asbestos board.
- It is our understanding that there is a roof maintenance and renewal program in place.

Recommendations:

- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)
- Depending on the accessibility of the roof space and future roof system, consider providing additional insulation to the roof assemblies. (Long-term)

1.1.5. Costing Summary

Please refer to the following page.

B4. Westcot Elementary School					
DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUES	ESTIMATED COSTS	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
Soft landscaping either vegetated or consisted of bare soil and pavers or paved asphalt	Regrade the finished grade where there is insufficient clearance at the base of the wall and replace the deteriorated cladding	10-20 yrs.	Immediate	\$10,000	Assemblies susceptible to moisture related deteriorations in close proximity to finished grade are prone to having pre-mature failures. A good clearance and slope away from the building is key for maintaining an adequate service life of the adjacent to grade components.
	Trim vegetation away from the perimeter of the building and maintain a good clearance between the plants and the wall surface		Immediate	\$2,500	
Exterior Walls					
Assets	Recommendations				
Wood framed wall with 2" of batt insulation, building paper and painted cedar siding, painted wood panel cladding or ribbed metal cladding.	Replace the damaged cedar cladding outside of the library	0-5 yrs	Immediate	\$2,000	Adding insulation whether to the empty space in the stud wall or outboard of sheathing would improve the space conditioning energy consumption of the building. However, unintentional air leakage through the envelope and existence of multiple layers of vapour impermeable materials should be addressed prior to addition of insulation to avoid subsequent accumulation of moisture within the wall assemblies. The cost estimate doesn't include demolishing of the overlying materials. HEL recommends an integrated approach to the functional layers of the building envelope in question.
	Provide paint coating to the unpainted plywood panels		Immediate	\$500	
	Replace the vertical cedar siding to a cladding system that incorporates rain screen principles		Short-term	\$80/sqft	
	Replace the existing sheathing paper and provide a continuous air barrier outboard of sheathing		Short-term	\$3.5/sqft	
	Add insulation to the exterior of the walls if cladding is being replaced(Assume 2" of mineral wool)		Short-term	\$8/sqft	
	Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls		Long-term	\$3/sqft	
Windows, Doors and Skylights					
Assets	Recommendations				
Wood frame windows with aluminum frame operable inserts and single pane glass. Wood or Metl frame doors.	Replace all windows to NAFS compliant assemblies that also meet today's energy code.	2-5 yrs.	Short-term	\$2,500/ea.	Portions of the existing windows are in very poor condition and are recommended to be replaced.
	Replace the wood exit doors on the south elevation		Short-term	\$6,000	
Roofs					
Assets	Recommendations				
2-ply SBS membranes over shiplap sheathing and joists with 3" of batt insulation.	Routinely inspect the condition of the roof membranes and repair as required.	0-15 yrs.	Long-term	N/A	A roof maintenance program including scheduled review of the roof condition, cleaning of the buildups and targeted repair of suspect areas is key to the adequate service of the roof. Estimated costs don't include demolishing.
	Adding insulation to the roof assemblies (Assume 8" of batt insulation)		Long-term	\$15/sqft	

B5. Ecole Pauline Johnson Elementary School

1. FACILITY DESCRIPTION

Ecole Pauline Johnson Elementary was originally built circa 1922 and had renovations and additions in 1943, 1949, and 1992. The structure of the building consists of a mix of light wood framing, heavy timber glulam beams and steel decking supported by steel or concrete columns. The roofs are low-slope modified bituminous membrane roofing and sloped metal roofs. The exterior walls are finished with stucco or brick and the windows are aluminum frame.

1.1. Assemblies

1.1.1. At-grade Assemblies
<p><u>Observations / Comments</u></p> <ul style="list-style-type: none">• The building has a slab-on-grade or framed floor over vented crawlspace which borders soft landscaped areas on the west side and paved hard walking surfaces for the remainders of the building.• A good clearance is kept from the bottom termination of the cladding to the finished grade with only weed growing along the perimeter occasionally observed.• The adjacent grade appears to be sloping away from the building.• There is concrete faced rigid insulation outside of the exterior of the foundation wall in the 1992 addition and there appears to be self-adhered membrane behind the insulation.
<p><u>Recommendations:</u></p> <ul style="list-style-type: none">• Routine maintenance of the perimeter of the building keeping the perimeter of the building clear of foreign materials. (Long-term)

1.1.2. Exterior Walls

Observations / Comments

- The wood framed walls from the original construction are assumed to consist of deficient insulation and no air control or vapour control functional layers. Efflorescence was observed on this facade.
- The original brick masonry is a concealed barrier wall with cladding installed directly over sheathing paper without a capillary break or drainage passage. The building paper and the brick masonry have passed their estimated service lives.
- The stucco clad wall from the 1992 addition has been applied with a rain screen cavity behind and it is in good serviceable condition.
- Lichen growth was observed at a corner of a canopy to wall interface on the east elevation. It is likely that roof runoff overflowed the edge of the canopy gutter and discharged onto the wall.
- All the wall assemblies lack a designated air control layer. As a result, excessive heat loss and interstitial condensation could be reasonably expected. Accumulation of condensation likely would lead to accelerated deterioration of materials affected by moisture.
- Deficient insulation would result in above-average heating required comparing to contemporary like buildings.

Recommendations:

- Consider replacing the original brick masonry wall to a cladding system that incorporates rain screen principles with a capillary break, a drainage passage and an increased potential for drying. (Medium-term)
- Replace the existing sheathing paper and provide a continuous air barrier outboard of sheathing. Consider adding insulation outboard of exterior sheathing if the cladding is being replaced. (Medium-term)
- Closely monitor the function of the gutters, drains and the effectiveness of the kick-out flashing during rain events. (Long-term)

1.1.3. Windows, Doors and skylights

Observations / Comments

- The original wood frame windows from the original construction had been retrofitted with non-thermally broken aluminum windows with awning or jalousie type operable sashes glazed with single pane float glass.
- The windows from the 1992 addition are thermally-broken aluminum windows glazed with insulated glazing units (IGUs) that are in good condition. One window in the library was noted as being broken during the site review.
- The aluminum windows installed in the wood frames have jalousie type operable sashes in the top corner.
- The single pane windows perform poorly in relation to energy efficiency and contribute significantly to water and air infiltration. The long-term performance of such windows depends largely on paint coatings which require routine inspection and timely maintenance.
- The retrofitted aluminum windows are in fair to poor condition.
- The entrance doors and exit doors are wood or metal frame doors and are in fair condition.
- The doors all have extensive overhang protection and are in fair to good condition.

Recommendations:

- Replace the windows that have jalousie sashes. (Immediate)
- Replace the broken window in the library. (Immediate)
- Replace all non-complying windows to assemblies that are compliant with the current North American Fenestration Standard (NAFS-08) with respect to air, and water penetration requirements and have thermal performance that meets current energy code. (Short-Term)
- Routinely inspect the condition of the sealant joints and maintain the seal between the window frame and adjacent cladding systems. (Long-term)

1.1.4. Roofs

Observations / Comments:

- The roofs are a combination of sloped metal roofs and 2-ply SBS modified bituminous membrane low-sloped roofs.
- The detailed condition of the roofs was not reviewed due to lack of accessibility to the roof surfaces.
- HEL assumes that there is deficient insulation placed within the original roof assembly.
- It is our understanding that there is a roof maintenance and renewal program in place.

Recommendations:

- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)
- Add insulation to the original roof if it is verified to be deficient to reduce heat transfer through the roof. (Long-term)

1.1.5. Costing Summary
<i>Please refer to the following page.</i>

B5. Ecole Pauline Johnson Elementary School

DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUES	ESTIMATED COSTS	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
Slab on grade or vented crawlspace which borders soft landscaped areas or hard walking surfaces.	Routine maintenance of the perimeter of the building keeping the perimeter of the building clear of foreign materials	15-20 yrs.	Long-term	N/A	No evidence of water infiltration near at-grade assembly noted.
Exterior Walls					
Assets	Recommendations				
Brick masonry and stucco clad rain screen walls.	Replace the original masonry walls to a cladding system that incorporates rain screen principles	0-25 yrs.	Medium-term	\$80/sqft	Adding insulation whether to the empty space in the stud wall or outboard of sheathing would improve the space conditioning energy consumption of the building. However, unintentional air leakage through the envelope and existence of multiple layers of vapour impermeable materials should be addressed prior to addition of insulation to avoid subsequent accumulation of moisture within the wall assemblies. The cost estimate doesn't include demolishing of the overlaying materials. HEL recommends an integrated approach to the functional layers of the building envelope in question.
	Replace the existing sheathing paper and provide a continuous air barrier outboard of sheathing		Medium-term	\$3.5/sqft	
	Add insulation to the exterior of the walls if cladding is being replaced(Assume 2" of mineral wool)		Medium-term	\$8/sqft	
	Monitor the function of the gutters, drains and the effectiveness of the kick-out flashing during rain events		Long-term	N/A	
Windows, Doors and Skylights					
Assets	Recommendations				
Non-thermally broken aluminum windows with single pane float glass or thermally-broken aluminum windows with IGUs.	Replace the windows that have jalousie sashes	0-15 yrs.	Immediate	\$2,500/ea.	The non-thermally broken windows perform poorly and should be replaced to improve the wall assembly's resistance to elements and occupant comfort.
	Replace the broken window in the library		Immediate	\$2,500	
	Replace all non-complying windows to NAFS compliant assemblies that also meet today's energy code.		Short-term	\$2500/ea.	
	Routinely inspect and maintain the sealant joints around windows		Long-term	N/A	
Roofs					
Assets	Recommendations				
Sloped metal roofs and 2-ply SBS modified bituminous membrane low-sloped roofs.	Routinely inspect and maintain the modified bituminous roof membrane.	5-15 yrs.	Long-term	N/A	A roof maintenance program including scheduled review of the roof condition, cleaning of the buildups, and targeted repair of suspect areas is key to the adequate service of the roof
	Add rigid insulation over the roof deck if the roof is being replaced. (assume 3" of rigid insulation)		Long-term	\$6/sqft	

B6. Bowen Island Community School

1. FACILITY DESCRIPTION

Bowen Island Community School was originally constructed in 1979 with additions and renovations in 1990, 1998, and 2012. The roofs are low-sloped roofs and sloped roofs covered by modified bituminous membranes over steel decking or T&G wood decking on trusses. The walls are a combination of conventional wood frame walls and concrete block walls over cast-in-place concrete foundation and slab-on-grade. The original windows have been replaced to aluminum frame windows glazed with insulating glass units (IGUs).

1.1 Assemblies

1.1.1 At-grade Assemblies
<u>Observations / Comments</u> <ul style="list-style-type: none">• The majority of the building perimeter borders are paved hard surfaces that appear to be sloping away from the building.• There are areas where vegetation in the adjacent landscaped space have grown to be in close proximity to the base of the wall.• Bottom termination of the metal cladding is very close to the adjacent grade at a few locations.
<u>Recommendations:</u> <ul style="list-style-type: none">• Trim vegetation away from the base of the building and prevent it from growing into the space behind the cladding. (Immediate)

1.1.2 Exterior Walls
<u>Observations / Comments</u> <ul style="list-style-type: none">• The framed wall construction consists of the following:<ul style="list-style-type: none">○ Gypsum wall board○ 6-mil polyethylene vapour retarder○ Batt insulation in 2x6 framing○ Plywood sheathing○ Building paper○ Air space○ Brick veneer or stucco cladding.• The original brick veneer wall has been clad over with corrugated metal cladding.• There are painted concrete block walls surrounding the covered play area and at the gymnasium.• The metal clad and stucco clad walls have both adopted a rain screen principle with an air gap between the water shedding surface and the water resistive barrier providing a drainage passage, a capillary break and pressure equalization.• All cladding systems reviewed from the outside appear to be in good serviceable condition except for an outside corner trim in the metal cladding out of northwest exit. The trim has deformed from what appeared to be mechanical impact.
<u>Recommendations:</u> <ul style="list-style-type: none">• Replace the deformed corner trim in the metal cladding. (Immediate)

1.1.3 Windows, Doors and skylights

Observations / Comments

- The existing windows and main exit doors are thermally broken aluminum frame windows glazed with IGUs. The fenestrations appear to be performing adequately indicative of the age of the install.
- The metal frame exit doors have moderate overhang protection. They are in good serviceable condition.
- There is a strip of curtain wall type skylight over the west hallway.

Recommendations

- Review the seals and waterproofing details of the skylight bi-annually and maintain accordingly. (Long-term)

1.1.4 Roofs

Observations / Comments:

- Roof assemblies consist of 2-ply modified bituminous membranes over rigid insulation and roof decking.
- The condition of the roofs were not reviewed in detail due to lack of accessibility to the roof surfaces.
- Due to the location of the building and surrounding natural environment, debris buildup from neighbouring trees could be observed from a distance.

Recommendations:

- Regular clean-up of the roof surfaces and routine inspections of the condition of the roof membranes is required with repairs completed as needed. (Long-term)

1.1.5 Costing Summary

Please refer to the following page.

B6. Bowen Island Community School					
DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUE	ESTIMATED COST	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
Slab on grade borders paved hard surfaces and a few sections of soft landscaping.	Trim vegetation away from the base of the building	10-20 yrs.	Immediate	\$700	Assemblies susceptible to moisture related deteriorations in close proximity to finished grade are prone to having pre-mature failures. Good clearance and slope away from the building is key for maintaining an adequate service life of the adjacent-to-grade components
Exterior Walls					
Assets	Recommendations				
Brick veneer or stucco cladding over building paper and batt insulated wood framed walls	Replace the deformed corner trim in the metal cladding	20-30 yrs.	Immediate	\$1,000	Despite minor deficiencies pertinent to aesthetics, the current assemblies appear to be servicing adequately
Windows, Doors and Skylights					
Assets	Recommendations				
Thermally broken aluminum frame windows glazed with IGUs Metal frame exit doors Curtain wall type skylight	Review the seals and waterproofing details of the skylight bi-annually	2-19 yrs.	Long-term	N/A	No performance issue was noted during the site review
Roofs					
Assets	Recommendations				
Regularly clean up the roof surface and routinely inspect the condition of the roof membranes and repair as required	Regularly clean up the roof surface and routinely inspect the condition of the roof membranes and repair as required	5-15 yrs.	Long-term	N/A	A roof maintenance program including scheduled review of the membrane condition, cleaning of the buildups, and targeted repair of suspect areas is key to the adequate service life of the roof

1. FACILITY DESCRIPTION

Caulfeild Elementary is a two-storey school building constructed of concrete or steel columns supporting beams and floors with wood framing and glazing infill. The roofs are a combination of sloped metal roofs and low-slope roofs with 2-ply SBS modified bituminous membranes. The majority of the windows are single-pane wood frame windows and the remainder are double-pane vinyl frame windows. The exterior walls are clad with painted cedar clapboards or vertical metal cladding.

1.1. Assemblies

1.1.1. At-grade Assemblies
<p><u>Observations / Comments</u></p> <ul style="list-style-type: none">• The building is mainly bordered with a paved impervious surface which appears to be sloping away from the building.• The ground floor of the building is a slab-on-grade and good clearance has been kept between the finished grade and the bottom termination of the cladding except for the north side of the gymnasium. The base of the wall closure flashing is in close proximity with the adjacent cladding at this location.
<p><u>Recommendations:</u></p> <ul style="list-style-type: none">• To reduce the exposure to water from backsplash and subsequent accelerated deterioration of the metal cladding, provide a good clearance to the cladding on the north wall of the gymnasium. (Short-term)

1.1.2. Exterior Walls

Observations / Comments

- The original wall construction appears to consist of
 - Wall finish
 - 2x6 Wood stud wall framing
 - 2" of batt insulation with or without paper backing (vapour barrier)
 - ½" plywood sheathing
 - Building paper
 - Painted cedar clapboard cladding or metal cladding
- The original building paper and cedar cladding has exceeded its service life and the siding is in poor condition especially on the wall section between the west wing and the gym.
- The corrugated metal cladding appears to have been recently installed and is in good condition.
- The framed walls consist of a concealed barrier wall system with no drainage path or capillary break. This wall system has limited potential for drying.
- The wall assemblies lack a designated air control layer. As a result, excessive heat loss and interstitial condensation could be reasonably expected. Accumulation of condensation would likely lead to accelerated deterioration of materials affected by moisture.
- 2" of batt insulation is far less than the current code requirement for thermal insulation of similar buildings resulting in above-average heat loss.

Recommendations:

- Replace the cedar siding with a new cladding system that incorporates rain screen principle with a capillary break, a drainage passage and more potential for drying. (Short-term)
- Replace the sheathing membrane/air barrier to make provision for a continuous air barrier on the exterior of the sheathing. (Short-term)
- Consider adding insulation outboard of exterior sheathing if cladding is being replaced. (Short-term)
- Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls. (Long-term)

1.1.3. Windows, Doors and skylights

Observations / Comments

- The windows from the original construction primarily installed and kept on the east elevation are wood frame windows with wood awning or hopper style operable vents glazed with single pane float glass secured by wood glazing stops or putty.
- The windows in the west wing of the school appear to have been retrofitted with vinyl frame windows glazed with insulated glass units (IGUs).
- The wood windows are in poor condition. Peeled paint, weathered mullions and muntins, and missing glazing stops were commonly observed on the existing wood windows.
- The single pane wood frame windows also perform poorly in relation to energy conservation and contribute significantly to air infiltration. The long-term performance of such windows depend largely on paint coatings which requires routine inspection and timely maintenance.
- The entrance doors and exit doors are solid core wood or metal frame doors protected by overhangs and are in fair serviceable condition.
- There are no skylights in this building.

Recommendations:

- Replace all wood windows to assemblies that are compliant with the current North American Fenestration Standard (NAFS-08) with respect to air, and water penetration requirements that also meet current energy code. (Short term)

1.1.4. Roofs

Observations / Comments:

- The west wing and the library on the east are sheltered with a sloped metal roof.
- Metal roofs have an estimated service life of 25 to 40 years.
- The remaining roofs are low-slope roofs with 2-ply SBS modified bituminous membrane
- Indicated by the 1966 addition drawings, the original roofs have only 1" of rigid insulation which is far less than the current energy conservation requirement.
- It is our understanding that there is a roof maintenance and renewal program in place.

Recommendations:

- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)
- Add insulation to the roofs to reduce heat transfer through the roof and improve the energy efficiency of the building if roof membrane is being replaced. (Long-term)

1.1.5. Costing Summary

Please refer to the following page.

B7. Caulfeild Elementary School					
DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUE	ESTIMATED COST	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
Perimeter of the building is bordered by paved impervious surface.	Provide a clearance from bottom of cladding to the finished grade north of the gymnasium.	10-20 yrs.	Short-term	\$5,000	Assemblies susceptible to moisture related deteriorations in close proximity to finished grade are prone to having pre-mature failures. A good clearance and slope away from the building is key for maintaining an adequate service life of the adjacent to grade components.
Exterior Walls					
Assets	Recommendations				
Wood framed walls with 2" of batt insulation, building paper, painted cedar clapboard cladding or metal cladding.	Replace the cedar cladding with a new cladding system that incorporates rain screen principle	0-25 yrs.	Short-term	\$80/sqft	Adding insulation whether to the cavities in the stud wall or outboard of sheathing would improve the space conditioning energy consumption of the building. However, unintentional air leakage through the envelope and existence of multiple layers of vapour impermeable materials should be addressed prior to addition of insulation to avoid subsequent accumulation of moisture within the wall assemblies. The cost estimate doesn't include demolishing of the overlaying materials. HEL recommends an integrated approach to the functional layers of the building envelope in question. Estimated costs don't include demolishing or removal and reinstall of sheathing or drywall.
	Replace the sheathing membrane to provide a continuous air barrier on the exterior of the sheathing.		Short-term	\$3.5/sqft	
	Add insulation outboard of exterior sheathing if cladding is being replaced. (Assume 2" of mineral wool)		Short-term	\$8/sqft	
	Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls.		Long-term	\$3/sqft	
Windows, Doors and Skylights					
Assets	Recommendations				
Wood frame windows with single pane float glass and retrofitted vinyl frame windows with IGUs. Solid core wood or metal frame doors.	Replace all non-complying windows to NAFS compliant assemblies that also meet today's energy code.	0-10 yrs.	Short-term	\$2,500/ea.	Existing wood frame windows are not performing as intended and should be replaced.
Roofs					
Assets	Recommendations				
Sloped metal roof and low-slope roofs with 2-ply SBS modified bituminous membrane	Routinely inspect and maintain the modified bituminous roof membranes.	10-15 yrs.	Long-term	N/A	A roof maintenance program including scheduled review of the roof condition, cleaning of the buildups, and targeted repair of suspect areas is key to the adequate service of the roof.
	Add rigid insulation over the roof deck if the roof is being replaced. (assume 3" of rigid insulation)		Long-term	\$6/sqft	

B8. Ecole Cedardale Elementary School

1. FACILITY DESCRIPTION

Ecole Cedardale Elementary is a two-storey wood post and beam structure with wood framing and glazing infill resting on concrete strip-footing or concrete masonry unit foundations and slab-on-grade. The roofs are low-slope roofs protected by 2-ply SBS modified bituminous membranes.

1.1. Assemblies

1.1.1. At-grade Assemblies
<u>Observations / Comments</u> <ul style="list-style-type: none">• East and north sides have paved concrete sidewalks next to the base of the cladding and the west borders have grass soft landscaping.• The surrounding grade appears to be sloping away from the building and a good clearance is kept between the finished grade and the claddings with the exception of the north elevation next to a ramp way. Corrugated metal cladding is buried by soil at this location.
<u>Recommendations:</u> <ul style="list-style-type: none">• Regrade the landscaping at the section on the north elevation where the wall cladding is buried. Provide clearance from the closure flashing of the metal cladding to finished grade to avoid accelerated corrosion of the metal cladding. (Immediate)

1.1.2. Exterior Walls

Observations / Comments

- The original wall construction appears to consist of
 - ½" Gypsum board
 - 2x6 Wood stud wall framing
 - 2" of batt insulation with or without paper backing (vapour barrier)
 - 1" Shiplap board sheathing
 - Building paper
 - Painted vertical cedar cladding or painted wood panel cladding.
- The east side addition on the ground floor appears to be batt insulated dimensional lumber wood framing with poly vapour and air barrier and corrugated metal cladding.
- The original building paper has exceeded its service life.
- The original painted vertical cedar siding has exceeded its service life.
- The corrugated metal cladding appears in good condition.
- The wall assemblies, apart from the addition, lack a designated air control layer. As a result, excessive heat loss and interstitial condensation could be reasonably expected. Accumulation of condensation would likely lead to accelerated deterioration of materials affected by moisture.
- 2" of batt insulation is far less than the current code requirement for thermal insulation of similar buildings resulting in above-average heat loss.

Recommendations:

- Replace the vertical cedar siding with a new cladding system that incorporates rain screen principles with a capillary break, a drainage passage and increased potential for drying. (Short-term)
- Replace the sheathing membrane/air barrier, and consider adding insulation outboard of exterior sheathing. (Short-term)
- Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls. (Long-term)

1.1.3. Windows, Doors and skylights

Observations / Comments

- The existing windows from the original construction are wood frame windows with aluminum frame awning or jalousie type operable inserts glazed with single pane float glass by wood glazing stops or putty.
- The windows installed in the east elevation ground floor addition appear to be thermally broken curtain wall windows glazed with insulating glass units (IGUs).
- The wood frame windows perform poorly in relation to energy conservation and contribute significantly to air infiltration. The long-term performance of such windows depend largely on paint coatings which requires routine inspections and timely maintenance.
- The entrance doors and exit doors are wood or metal frame doors in fair condition.
- There are no skylights in this building.

Recommendations:

- The jalousie windows are designed to maximize ventilation, are inherently leaky and should be replaced. (Short-Term)
- Replace all windows to assemblies that are compliant with the current North American Fenestration Standard (NAFS-08) with respect to air infiltration/exfiltration, and water penetration requirements and also meet current energy code. (Medium Term)

1.1.4. Roofs

Observations / Comments:

- The roofs are low-sloped roofs protected with two-ply torch-applied SBS modified bituminous membranes with board insulation over roof decks. The roofs appear to have sufficient slope towards the roof drains and scupper drains.
- The building is located in a wooded area. Leaves and lichen growth were observed on the roof that require to be cleaned regularly to avoid retention of water and plugging of the drains
- It is our understanding that there is a roof maintenance and renewal program in place.

Recommendations:

- Regularly clean up the organic debris from defoliation. (Long-term)
- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)

1.1.5. Costing Summary

Please refer to the following page.

B8. Ecole Cedardale Elementary School					
DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUE	ESTIMATED COST	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
Paved concrete sidewalks and a section of soft landscaping	Regrade the landscaping north of the building where cladding is buried	10-20 yrs.	Immediate	\$800	Assemblies susceptible to moisture related deteriorations in close proximity to finished grade are prone to having pre-mature failures. A good clearance and slope away from the building is key for maintaining an adequate service life of the adjacent-to-grade components.
Exterior Walls					
Assets	Recommendations				
Original construction consists of wood framed walls with 2" of batt insulation, building paper, painted vertical cedar cladding or painted wood panel cladding. Recent addition consists of wood framed walls fully insulated with batt insulation and corrugated metal cladding.	Replace the vertical cedar siding with new cladding assemblies that incorporates rain screen principles.	0-25 yrs.	Short-term	\$80/sqft	Adding insulation whether to the empty space in the stud wall or outboard of sheathing would improve the space conditioning energy consumption of the building. However, unintentional air leakage through the envelope and existence of multiple layers of vapour impermeable materials should be addressed prior to addition of insulation to avoid subsequent accumulation of moisture within the wall assemblies. The cost estimate doesn't include demolishing of the overlaying materials. HEL recommends an integrated approach to the functional layers of the building envelope in question. Estimated costs don't include demolishing or removal and reinstall of sheathing or drywall.
	Replace the sheathing membrane to provide an air barrier outboard of sheathing.		Short-term	\$3.5/sqft	
	Add insulation to the exterior of the walls if cladding is being replaced(Assume 2" of mineral wool)		Short-term	\$8/sqft	
	Add insulation to fill up the entire stud cavity to increase overall thermal resistance of the walls		Short-term	\$3/sqft	
Windows, Doors and Skylights					
Assets	Recommendations				
Wood frame windows with aluminum frame operable inserts and single pane float glass. The most recent addition has curtain wall windows with IGUs. Wood or metal frame entrance/exit doors.	Replace the jalousie windows to windows complying to the most up-to-date fenestration regulations	2-15 yrs.	Short-term	\$2,500/ea.	Existing fenestrations other than aluminum windows from perform adequately but replacing them to contemporary types would provide better comfort and energy efficiency.
	Replace all non-complying windows to NAFS compliant assemblies that also meet today's energy code.		Medium-term	\$2,500/ea.	
Roofs					
Assets	Recommendations				
2-ply SBS modified bituminous membranes over rigid insulation over roof decks	Regularly clean up the organic debris from the defoliation.	5-10 yrs.	Long-term	N/A	A roof maintenance program including scheduled review of the roof condition, cleaning of the buildups, and targeted repair of suspect areas is key to the adequate service of the roof
	Routinely inspect and maintain the modified bituminous roof membranes.		Long-term		

1. FACILITY DESCRIPTION

Chartwell elementary is a two-storey school building built circa 1966. The structure is a mix of heavy timber framing and concrete suspended slab with concrete blocks or dimensional wood framed infill resting on conventional concrete foundation walls and strip footings. The windows are wood frame or non-thermally broken aluminum framed, primarily glazed with single pane float glass. The roofs are low-slope roofs with built-up roofing or modified bituminous membranes over plank decking.

1.1. Assemblies

1.1.1. At-grade Assemblies
<u>Observations / Comments</u> <ul style="list-style-type: none">• The perimeter of the building is surrounded by paved hard surfaces that appear to be sloping away from the building.• The ground floor is a slab-on-grade. A good clearance from bottom of the cladding to the adjacent finished surface is generally kept throughout.• A small section of the metal cladding has been terminated at the grade level.
<u>Recommendations:</u> <ul style="list-style-type: none">• Condition of the metal cladding and its underlain structure that are close to adjacent grade should be examined and continuously monitored. Remediate if required.(Short-term)

1.1.2. Exterior Walls

Observations / Comments

- According to the architectural drawings dated June 1966, the wood framed wall construction consist of
 - 1/4" plywood or pegboard
 - strapping
 - 2x4 wood stud wall framing
 - 2" of batt insulation
 - 3/4" shiplap
 - building paper
 - 3/8" painted plywood with battens or 3/4" vertical cedar rustic channel cladding
- The vertical cedar cladding and plywood cladding have exceeded their service lives but are in fair condition and could perform adequately with continued maintenance.
- The framed walls are concealed barrier walls with no drainage path, capillary break and have limited potential for drying.
- A large portion of the walls are now clad with diamond rib metal cladding which appears to be in good condition.
- Fascia boards at the edge of the roofs at various levels are severely weathered.
- The exposed concrete surfaces are coated with waterproofing paint. HEL observed cracking in concrete and paint failure at the edge of the exposed suspended slab.
- The wall assemblies lack a designated air control layer. As a result, excessive heat loss and interstitial condensation could be reasonably expected. Accumulation of condensation would likely lead to accelerated deterioration of materials affected by moisture.
- There appears to be no insulation in the CMU walls and 2" of batt insulation in the wood framed walls. This is far less than the current code requirement for thermal insulation of similar buildings resulting in above-average heat loss.

Recommendations:

- Repaint or replace the weathered fascia boards. (**Immediate**)
- Repair the cracked concrete and maintain the waterproof coating of all exposed concrete surfaces. (**Immediate**)
- Consider replacing the wood clad walls to cladding systems that incorporate a rain screen principle with a capillary break, a drainage passage and more potential for drying. (Short-term)
- Replace the sheathing membrane and construct a continuous air barrier outboard of sheathing, and consider adding insulation outboard of exterior sheathing. (Medium-term)
- Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls or add insulation outboard of sheathing if cladding is being replaced. (Long-term)

1.1.3. Windows, Doors and Skylights

Observations / Comments

- The existing windows are a mix of wood frame windows and non-thermally broken aluminum window wall systems glazed with single pane float glass with the exception of a few windows at the centre wing facing the covered play area to the south that are aluminum windows glazed with insulated glass units (IGUs). The windows have jalousie or awning operable sashes.
- The windows have moderate overhang protection from canopies and overhang structures and are in fair condition.
- The window walls have interspersed opaque sandwich panels with 1/2" of XPS rigid insulation.
- The performance of the existing windows largely relies on timely maintenance of the paint coating, glazing stops and the seals.
- The glazing stop on one of the aluminum windows facing the basketball court is damaged.
- The single pane wood frame windows perform poorly with respect to energy efficiency and contribute significantly to water and air infiltration. The long-term performance of such windows depend largely on paint coatings which require routine inspections and timely maintenance.
- The entrance doors and exit doors consist of wood or metal frame doors that are in fair condition.
- The doors all have moderate overhang protection. Paint failure is commonly observed on the doors and repainting is required on a few of the wood exit doors.
- There are three acrylic curb mount skylights over the back entrance canopy and one white tint skylight over the centre of the east wing. All skylights appear to be in fair serviceable condition.

Recommendations:

- Repair or replace the glazing stop in the window facing the basketball court. (**Immediate**)
- The jalousie windows are designed to maximize ventilation that are inherently leaky and should be replaced. (**Immediate**)
- Consider replacing all windows to assemblies that are compliant with the current North American Fenestration Standard (NAFS-08) with respect to air infiltration/exfiltration and water penetration requirements and also meet current energy code. (Short-Term)

1.1.4. Roofs

Observations / Comments:

- According to the design drawings and our observation on site, the roof assemblies are
 - Ceiling finish
 - 3" plank decking
 - 1" rigid insulation
 - Built-up roofing or 2-ply modified bituminous roof membranes
- HEL observed debris build-up and lichen growth on the built-up roofs that have the propensity to retain water.
- 1" of rigid insulation is far less than current energy conservation requirements which leads to above average heat loss through the roofs.
- It is our understanding that there is a roof maintenance and renewal program in place.

Recommendations:

- Clean up the debris and vegetation on the built-up roofing to encourage drainage and drying of the roof. (Short-term)
- Add rigid insulation over the roof deck to reduce heat loss when the roof is being replaced. (Long-term)
- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)

1.1.5. Costing Summary

Please refer to the following page.

B9. Chartwell Elementary School					
DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUE	ESTIMATED COST	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
Paved hard surfaces.	Examine and monitor the condition of the metal cladding and underlain structure close to adjacent grade. Remediate if required.	10-20 yrs.	Short-term	\$2,000	No deterioration visible at the section but examination and close monitoring recommended.
Exterior Walls					
Assets	Recommendations				
Wood framed walls with 2" of batt insulation, building paper, painted plywood cladding, vertical cedar cladding or diamond rib metal cladding.	Repaint or replace the weathered fascia boards	5-15 yrs.	Immediate	\$3,700	Adding insulation whether to the empty space in the stud wall or outboard of sheathing would improve the space conditioning energy consumption of the building. However, unintentional air leakage through the envelope and existence of multiple layers of vapour impermeable materials should be addressed prior to addition of insulation to avoid subsequent accumulation of moisture within the wall assemblies. The cost estimate doesn't include demolishing of the overlaying materials. HEL recommends an integrated approach to the functional layers of the building envelope in question.
	Repair the cracked concrete and maintain the waterproof coating of all exposed concrete surfaces.		Immediate	\$45/sqft	
	Replace the wood clad walls to a cladding systes that incorporates rain screen principles		Short-term	\$80/sqft	
	Replace the existing sheathing paper and provide a continuous air barrier outboard of sheathing		Medium-term	\$3.5/sqft	
	Add insulation to the exterior of the walls if cladding is being replaced(Assume 2" of mineral wool)		Medium-term	\$8/sqft	
	Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls		Long-term	\$3/sqft	
Windows, Doors and Skylights					
Assets	Recommendations				
Wood frame windows and non-thermally broken aluminum window walls both with single pane float glass and a few retrofitted aluminum windows with IGUs. Wood or metal frame entrance/exit doors. Acrylic skylights	Repair or replace the glazing stop in the window facing the basketball court	3-10 yrs.	Immediate	\$2,500	Existing fenestrations perform adequately but replacing them to contemporary types would provide better comfort and energy efficiency.
	Replace the jalousie windows to windows complying to the most up-to-date fenestration regulations		Immediate	\$2,500/ea.	
	Replace all non complying windows to assemblies compliant with NAFS-08 that also meet current energy code		Short-term	\$2,500/ea.	
Roofs					
Assets	Recommendations				
Built-up roofing or 2-ply modified bituminous roof membranes over low-slope roofs.	Clean up the debris and vegetation on the built up roof	5-15 yrs.	Short-term	N/A	A roof maintenance program including scheduled review of the roof condition, cleaning of the buildups, and targeted repair of suspect areas is key to the adequate service of the roof
	Routinely inspect and maintain the modified bituminous roof membranes.		Long-term	N/A	
	Add rigid insulation over the roof deck if the roof is being replaced. (assume 3" of rigid insulation)		Long-term	\$6/sqft	

1. FACILITY DESCRIPTION

Hollyburn Elementary is a two-storey school building built circa 1966 and constructed primarily of wood framing supported by concrete foundation walls and strip footings. The roof over the original compound is a vented sloped roof with asphalt shingles and the remainder of the roof surfaces are low-sloped roofs protected by SBS modified bituminous membranes. The walls are clad with painted cedar clapboard siding, vertical cedar channel rustic siding or diamond ribbed metal cladding. The windows are primarily wood frame windows.

1.1. Assemblies

1.1.1. At-grade Assemblies
<u>Observations / Comments</u> <ul style="list-style-type: none">• The perimeter of the building is surrounded by paved walkways which appear to be sloping away from the building. The ground floor is either slab-on-grade or framed floor over a vented crawl space.• Bottom termination of the cladding is very close to the finished grade near the entrance between the gymnasium and the classrooms along the west elevation. HEL observed signs of accelerated deterioration in the cladding and the trims.
<u>Recommendations:</u> <ul style="list-style-type: none">• Remove the deteriorated cladding close to grade, examine the condition of the underlain assemblies and replace the cladding. Terminate the cladding with a good clearance to grade. (Immediate)

1.1.2. Exterior Walls

Observations / Comments

- The wood framed wall construction appears to consist of the following:
 - ½" Gypsum board
 - 2x6 Wood stud wall framing
 - 2" of batt insulation with or without paper backing (vapour barrier)
 - ½" Plywood
 - Building paper
 - Painted vertical cedar siding, painted wood panel cladding or ribbed metal cladding.
- The original building paper and painted vertical cedar siding have exceeded their service lives. However, the majority of the claddings observed are in fair condition and could perform adequately in most areas with timely maintenance except for the cedar planks outside of the gymnasium, which have defects that are beyond the scope of economical repair.
- Paint failure is prevalent on the band board adjacent to grade, windowsill frame, and fascia board.
- A windowsill is cut off on two ends on the west elevation and the wood is exposed.
- The wall assemblies lack a designated air control layer. As a result, excessive heat loss and interstitial condensation could be reasonably expected. Accumulation of condensation likely would lead to accelerated deterioration of materials affected by moisture.
- 2" of batt insulation is far less than the current code requirement for thermal insulation of the like buildings resulting in above-average heat loss.

Recommendations:

- Replace the damaged cedar cladding outside of the gymnasium. (Immediate)
- Repair the window to the west elevation with the cut off sill. (Immediate)
- Repaint the exterior cladding and trims that display signs of paint failure. (Short-term)
- Consider replacing the cedar cladding with a system that incorporates rain screen principle with a capillary break, a drainage passage and more potential for drying. (Short-term)
- Replace the sheathing membrane/air barrier, and consider adding insulation outboard of exterior sheathing. (Short-term)
- Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls or add insulation outboard of sheathing if cladding is being replaced. (Long-term)

1.1.3. Windows, Doors and skylights

Observations / Comments

- The existing windows appear to be from the original construction. They are wood frame windows with wood frame single hung or aluminum frame awning type operable sash inserts glazed with single pane float glass. A small portion of the windows are equipped with insulating glass units (IGUs) which appear to be from a later retrofit.
- The windows are in fair to poor condition. Paint failure was prevalent on the window frames in particular on the window sill.
- The single pane wood frame windows perform poorly with respect to energy efficiency and contribute significantly to water and air infiltration. The long-term performance of such windows depend largely on paint coating which requires routine inspection and timely maintenance.
- The entrance doors and exit doors are wood or metal frame doors in fair to poor condition.
- The doors all have adequate overhang protection with the exception of a double door facing east near the south end of the building. Paint failure was severe and the hardware is rusted on the door.
- There is a pyramid curtain wall style skylight over the upper quadrant of the building. There was no sign of water infiltration around the skylight. HEL noted a crack in the drywall below the skylight that should be continuously monitored.

Recommendations:

- Replace the double door that is severely weathered and consider adding an overhang to protect it from the elements. (**Immediate**)
- Consider replacing all windows to assemblies that are compliant with the current North American Fenestration Standard (NAFS-08) with respect to air infiltration/exfiltration and water penetration requirements and meet the current energy code. (Short-Term)

1.1.4. Roofs

Observations / Comments:

- The roofs adopted two different roofing systems
 - Sloped asphalt shingle roof with vented attic space
 - Modified bituminous roof membranes on low slope roofs with vented or unvented roof space below
- The roof runoff drains to gutters and rain water leaders then to either a tight pipe system or directly discharges to adjacent paved surface.
- There is no designated air barrier in the vented roofs and the air barrier is poorly transitioned from the walls to the roofs. Varying degrees of air leakage can be expected resulting in heat loss and possible interstitial condensation.
- The existing drawings indicate that the roofs are insulated with 3" of batt insulation or 1" or rigid insulation which is far less than the current requirement of BC Building Code.
- It is our understanding that there is a roof maintenance and renewal program in place.

Recommendations:

- Connect the rainwater leaders to the tight pipe system to avoid ponding and freezing. (Short-term)
- Construct a roof assembly to provide a continuous air barrier and additional insulation to reduce heat loss through the roofs during the next roof renewal. (Medium-term)
- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)

1.1.5. Costing Summary

Please refer to the following page.

B10. Hollyburn Elementary School					
DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUE	ESTIMATED COST	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
Slab on grade or vented crawl space next to paved walkways	Remove and replace the deteriorated cladding close to grade and examine the condition of the underlain assemblies	10-20 yrs.	Immediate	\$2,000	Assemblies susceptible to moisture related deteriorations in close proximity to finished grade are prone to having pre-mature failures. A good clearance and slope away from the building is key for maintaining an adequate service life of the adjacent to grade components.
Exterior Walls					
Assets	Recommendations				
Wood frame wall with 2" of batt insulation, building paper, painted vertical cedar siding, painted wood panel cladding or ribbed metal cladding.	Replace the damaged cedar cladding outside of the gymnasium	0-12 yrs.	Immediate	\$6,000	Paint failure is prevalent throughout the building and exposed wood components should be painted to provide protection against elements. Adding insulation whether to the empty space in the stud walls or outboard of sheathing would improve the space conditioning energy consumption of the building. However, unintentional air leakage through the envelope and existence of multiple layers of vapour impermeable materials should be addressed prior to addition of insulation to avoid subsequent accumulation of moisture within the wall assemblies. The cost estimate doesn't include demolishing of the overlaying materials. HEL recommends an integrated approach to the functional layers of the building envelope in question.
	Repair the cut-off sill of the window to the west elevation		Immediate	\$1,500	
	Repaint the exterior claddings and trims whose finish display signs of paint failure		Short-term	\$10,000	
	Replace the cedar cladding to a cladding system that incorporates rain screen principles		Short-term	\$80/sqft	
	Replace the sheathing membrane to provide a continuous air barrier outboard of exterior sheathing		Short-term	\$3.5/sqft	
	Add insulation to the exterior of the walls if cladding is being replaced(Assume 2" of mineral wool)		Short-term	\$8/sqft	
	Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls		Long-term	\$3/sqft	
	Windows, Doors and Skylights				
Assets	Recommendations				
Wood frame windows with aluminum operable inserts and single pane glass.	Replace the double door severely weathered and consider adding an overhang	0-3 yrs.	Immediate	\$6,500	Existing fenestrations perform poorly and are recommended to be replaced to improve occupant comfort and energy efficiency.
Wood or metal frame entrance/exit doors. Pyramid curtain wall skylight.	Replace all windows to assemblies that are compliant with NAFS-08 that also meet today's energy code.		Short-term	\$2,500/ea.	
Roofs					
Assets	Recommendations				
Sloped asphalt shingle roof. Modified bituminous roof over flat roofs.	Connect the rainwater leaders to the tight pipe system	5-15 yrs.	Short-term	\$1,400	A roof maintenance program including scheduled review of the roof condition, cleaning of the buildups, and targeted repair of suspect areas is key to the adequate service of the roof. Estimated costs don't include demolishing.
	Construct a roof assembly to provide a continuous air barrier and add insulation to the roof (Assume 3" of rigid insulation)		Medium-term	\$8/sqft	
	Routinely inspect the roof and repair as required		Long-term	N/A	

1. FACILITY DESCRIPTION

Gleneagles Elementary is a two-storey school building originally built in 1950 with additions in 1955, 1963, 1966 and 1967. The superstructure of the building consists of wood trusses, glulam beams and dimensional lumber wood frame infill walls. The substructure is cast-in-place concrete foundation walls and strip footings. The roofs are built-up roofing or modified bituminous roofing membranes over plank decking or shiplap decking. The original windows are single pane wood framed windows and portions of them have been retrofitted to aluminum or vinyl frame windows with IGUs.

1.1. Assemblies

1.1.1. At-grade Assemblies

Observations / Comments

- The majority of the building perimeter borders paved hard surface that appears to be sloping away from the building.
- The building's ground floor is slab-on-grade or wood framed floor over a crawlspace. A good clearance from bottom of the cladding to the adjacent finished surface is generally kept throughout.
- There are landscaped areas surrounding the north of the building where cladding is in close proximity to the finished grade. In some of the areas, the metal cladding is terminated at the same level of the finished grade or even buried by soil resulted in premature deterioration of the metal displayed as rust.
- Around the gymnasium and the storage room next to the gymnasium, a pressure treated band board has been placed at the base of the wall near the grade, which was covered by a metal flashing. The board has become loose and it is detaching from the wall.

Recommendations:

- Remove the pressure treated board around the building and examine the condition of the underlain assemblies. (**Immediate**)
- Replace the rusted metal cladding. Terminate the new base of wall closure flashing with a clearance from the finished grade. (**Immediate**)
- Regrade the finished grade to provide a good clearance between finished grade and the cladding. Provide a waterproofing detail if the framing is inevitably close to grade. (**Immediate**)

1.1.2. Exterior Walls

Observations / Comments

- According to the architectural drawings, the framed wall construction consists of
 - 3/8" Plywood
 - Dimensional lumber wood stud wall framing
 - 2" of batt insulation
 - 3/4" shiplap
 - building paper
 - Vertical cedar board and batten or wood panel siding
- The majority of the wood cladding has been replaced or clad over with diamond ribbed metal cladding with the exception of the areas between the windows. The existing wood trim has been maintained that appears to be in serviceable condition.
- There is a stack bond concrete masonry wall between ELL and classroom 211 that is protected with serviceable paint coating.
- The metal cladding installed at a later day appears in fair to good condition. Dented metal cladding was occasionally observed inflicted from impact.
- The wood clad walls are concealed barrier walls with no drainage path, capillary break or adequate potential of drying.
- Extruded polystyrene (XPS) foam rigid insulation was observed installed around a hose bib behind the horizontal metal cladding. If the rigid insulation has been installed to the entire wall area behind the metal cladding, a reduction of the overall drying capability towards the outside of the wall could be expected.
- All the wall assemblies lack a designated air control layer. As a result, excessive heat loss and interstitial condensation could be reasonably expected. Accumulation of condensation would likely lead to accelerated deterioration of materials affected by moisture.
- 2" of batt insulation is far less than the current code requirement for thermal insulation of similar buildings resulting in above-average heat loss.

Recommendations:

- Examine if XPS insulation had been installed to the entire wall area and whether an air barrier has been incorporated to the remodeled walls. Closely monitor the condition of the walls. (Short-term)
- Consider replacing the wood clad walls to cladding systems that incorporate a rain screen principle with a capillary break, a drainage passage and more potential for drying. (Short-term)
- Replace the existing sheathing paper and provide a continuous air barrier outboard of sheathing and consider adding insulation outboard of exterior sheathing. (Short-term)
- Routinely inspect and maintain the paint and sealant of the existing wood trim and other wood components that are exposed to elements. (Long-term)
- Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls. (Long-term)

1.1.3. Windows, Doors and skylights

Observations / Comments

- The existing windows are a combination of single-pane wood frame windows, single-pane non-thermally broken aluminum windows, non-thermally broken aluminum windows glazed with insulated glass units (IGUs) and retrofitted vinyl frame punched windows glazed with IGUs.
- The windows have moderate overhang protection from canopies and overhang structures and are in fair to poor condition.
- Portions of the aluminum windows installed in the wood frame have jalousie type operable sashes.
- The single pane wood frame windows perform poorly in relation to energy efficiency and contribute significantly to water and air infiltration. The long-term performance of such windows depend largely on paint coating which requires routine inspection and timely maintenance.
- The retrofitted vinyl frame windows appeared to be installed in 2002 are in adequate serviceable condition.
- The entrance doors and exit doors are wood or metal frame doors in fair condition.
- The doors all have adequate overhang protection. The metal door panel below the covered play area beside the exterior stairs is dented.

Recommendations:

- The jalousie windows designed to maximize ventilation are inherently leaky and should be replaced. (Immediate)
- Consider replacing all non-complying windows to assemblies that are compliant with the current North American Fenestration Standard (NAFS-08) with respect to air infiltration/exfiltration and water penetration requirements and have the thermal performance that meets current energy code. (Short-Term)
- Replace the dented door panel below the covered play area. (Short-Term)

1.1.4. Roofs

Observations / Comments:

- According to the design drawings and our observation on site, the roof assemblies are
 - Ceiling finish
 - 2" or 3" plank decking
 - 2 layers of ½" rigid insulation (1" in total)
 - Built-up roof or 2-ply modified bituminous roof membranes
- The detailed condition of the roofs were not reviewed due to lack of accessibility to the roof surfaces.
- 1" of rigid insulation is far less than current energy conservation requirement which leads to above average heat loss through the roofs.
- Viewed from upper floor, there is extensive lichen growth on the built-up roof over the canopy on the south elevation facing the basketball courts.
- It is our understanding that there is a roof maintenance and renewal program in place.

Recommendations:

- Clean up the debris and vegetation on the built up roof to encourage drainage and drying of the roof runoff. (Long-term)
- Add rigid insulation over the roof deck to reduce heat loss if the roof is being replaced. (Long-term)
- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)

1.1.5. Costing Summary

Please refer to the following page.

B11. Gleneagle Elementary School

DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUES	ESTIMATED COSTS	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
Slab on grade and crawl space border primarily paved hard surface with small sections of the perimeter that are next to soft landscape.	Remove the pressure treated board around the building and examine the condition of underlain assemblies	10-20 yrs.	Immediate	\$5,000	Assemblies susceptible to moisture related deteriorations in close proximity to finished grade are prone to having pre-mature failures. A good clearance and slope away from the building is key for maintaining an adequate service life of the adjacent to grade components.
	Replace the rusted metal cladding and terminate the new closure flashing with a good clearance from the grade		Immediate	\$2,000	
	Regrade the finished grade to provide a clearance between finished grade and cladding		Immediate	\$1,000	
Exterior Walls					
Assets	Recommendations				
Wood frame walls with 2" of batt insulation, building paper, painted cedar board and batten, painted wood panel, or diamond rib metal cladding.	Examine the makeup of the walls to see if XPS insulation is used behind the entire wall areas behind the	2-25 yrs.	Short-term	\$1,500	Adding insulation whether to the empty space in the stud wall or outboard of sheathing would improve the space conditioning energy consumption of the building. However, unintentional air leakage through the envelope and existence of multiple layers of vapour impermeable materials should be addressed prior to addition of insulation to avoid subsequent accumulation of moisture within the wall assemblies. The cost estimate doesn't include demolishing of the overlaying materials. HEL recommends an integrated approach to the functional layers of the building envelope in question.
	Replace the wood clad walls to cladding systems that incorporate a rain screen principle		Short-term	\$80/sqft	
	Replace the existing sheathing paper and provide a continuous air barrier outboard of sheathing		Short-term	\$3.5/sqft	
	Add insulation to the exterior of the walls if cladding is being replaced(Assume 2" of mineral wool)		Short-term	\$8/sqft	
	Inspect and maintain the paint and sealant of the existing wood components exposed to elements		Long-term	N/A	
	Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls		Long-term	\$3/sqft	
Windows, Doors and Skylights					
Assets	Recommendations				
Wood frame windows with single pane float glass, non-thermally broken aluminum windows with IGU or single pane float glass and retrofitted vinyl frame windows with IGUS. Wood or metal frame doors.	Replace the jalousie windows to windows complying to the most up-to-date fenestration regulations	0-10 yrs.	Immediate	\$2,500/ea.	Existing fenestrations perform adequately but replacing them to contemporary types would provide better comfort and energy efficiency.
	Replace all non-complying windows to NAFS compliant assemblies that also meet current energy code.		Short-term	\$2,500/ea.	
	Replace the dented door panel below the covered play area		Short-term	\$5,000	
Roofs					
Assets	Recommendations				
Built up roofs or 2-ply modified bituminous membranes over 1" of rigid insulation and plank decking.	Clean up the debris and vegetation on the built-up roofing	5-15 yrs.	Long-term	N/A	A roof maintenance program including scheduled review of the roof condition, cleaning of the buildups, and targeted repair of suspect areas is key to the adequate service of the roof
	Routinely inspect and maintain the modified bituminous roof membranes.		Long-term	N/A	
	Add rigid insulation over the roof deck if the roof is being replaced. (assume 3" of rigid insulation)		Long-term	\$6/sqft	

Appendix C

C1. Eagle Harbour Montessori School

1. FACILITY DESCRIPTION

Eagle Harbour Montessori is a one-storey school building originally built in 1967 with additions and renovations in year 1976 and 1979. The roofs of the building consist of decking and joists supported by beams and dimensional lumber wood framed walls over concrete foundation walls and strip footings. The glazing systems include aluminum storefront windows and wood frame windows with aluminum operable sash inserts. The walls are either finished with bricks, cedar clapboard cladding or metal cladding.

1.1. Assemblies

1.1.1. At-grade Assemblies
<u>Observations / Comments</u> <ul style="list-style-type: none">• The majority of the building perimeter border is paved hard surface that appears to be sloping away from the building.• Asphalt has been terminated at the same level as the bottom of the cladding at a few locations outside of the classrooms.• The landscaped area outside of the gymnasium has been cleared but there are stains visible on the metal cladding.
<u>Recommendations:</u> <ul style="list-style-type: none">• Regrade the finished grade to provide a good clearance between finished grade and the cladding. Provide a waterproofing detail if the framing is inevitably close to grade. (Immediate)• Maintain a good clearance between the vegetation surrounding the building and the cladding of the building enclosure. (Long-term)

1.1.2. Exterior Walls

Observations / Comments

- The framed wall construction consists of the following:
 - Wall finish
 - Dimensional lumber wood stud wall framing
 - 2" of batt insulation with or without craft paper back
 - Plywood
 - Building paper
 - Painted cedar clapboard cladding or metal cladding.
- The original building paper and painted cedar cladding have exceeded their service lives and are in fair to poor condition and consideration should be given for replacement.
- Metal cladding installed at a later day appears in good serviceable condition.
- The wood clad walls are concealed barrier walls with no drainage path, capillary break or adequate potential of drying.
- There are brick walls enclosing the storage outside of the gymnasium that are in good to fair condition. The brick walls appear to be uninsulated.
- All the wall assemblies lack a designated air control layer. As a result, excessive heat loss and interstitial condensation could be reasonably expected. Accumulation of condensation likely would lead to accelerated deterioration of materials affected by moisture.
- 2" of batt insulation is far less than the current code requirement for thermal insulation of similar buildings resulting in above-average heat loss.

Recommendations:

- Replace the wood clad walls to a cladding system that incorporates rain screen principles with a capillary break, a drainage passage and increased potential for drying. (Short-term)
- Replace the existing sheathing paper and provide a continuous air barrier outboard of sheathing and consider adding insulation outboard of exterior sheathing. (Short-term)
- Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls. (Long-term)
- Routinely inspect and maintain the paint and sealant of the existing wood trim and other wood components that are exposed to the elements. (Long-term)

1.1.3. Windows, Doors and skylights

Observations / Comments

- The existing windows are a combination of single-pane wood frame windows, single-pane non-thermally broken aluminum windows, and aluminum storefront windows glazed with insulated glass units (IGUs).
- The storefront window appears to be in adequate serviceable condition.
- The windows have moderate protection from canopies and overhang structures and are in fair to poor condition. Some window sills associated with wood windows are damaged and should be replaced.
- The performance of wood windows largely rely on timely maintenance of the paint coating, glazing stops and the seals.
- The single pane windows perform poorly in relation to energy efficiency and contribute significantly to water and air infiltration. The long-term performance of such windows depend largely on paint coating which requires routine inspection and timely maintenance.
- The doors all have adequate overhang protection. However, the wood exit doors have expired and should be replaced.

Recommendations:

- Replace the damaged wood frame windows. (Immediate)
- Replace the expired wood doors. (Short-term)
- Consider replacing all non-complying windows to assemblies that are compliant with the current North American Fenestration Standard (NAFS-08) with respect to air infiltration/exfiltration and water penetration requirements and have the thermal performance that meets current energy code. (Short-Term)

1.1.4. Roofs

Observations / Comments:

- Roof assemblies consist of 2-ply modified bituminous over 1" of rigid insulation.
- The detailed condition of the roofs were not reviewed due to lack of accessibility to the roof surfaces.
- 1" of rigid insulation is far less than current energy conservation requirement which leads to above average heat loss through the roofs.
- It is our understanding that there is a roof maintenance and renewal program in place.

Recommendations:

- Add rigid insulation over the roof deck to reduce heat loss if the roof is being replaced. (Long-term)
- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)

1.1.5. Costing Summary

Please refer to the following page.

C1. Eagle Harbour Montessori School					
DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUES	ESTIMATED COSTS	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
Paved hard surfaces and a small portion of landscaped areas	Regrade the finished grade to provide clearance between finished grade and cladding	10-20 yrs.	Immediate	\$5,000	Assemblies susceptible to moisture related deteriorations in close proximity to finished grade are prone to having pre-mature failures. A good clearance and slope away from the building is key for maintaining an adequate service life of the adjacent to grade components.
	Maintain a good clearance between the vegetation and the cladding		Long-term	N/A	
Exterior Walls					
Assets	Recommendations				
Wood framed walls with 2" of batt insulation, building paper, painted cedar cladding or metal cladding and brick walls	Replace the wood clad walls to s cladding system that incorporates rain screen principles	0-15 yrs.	Short-term	\$80/sqft	Adding insulation whether to the empty space in the stud wall or outboard of sheathing would improve the space conditioning energy consumption of the building. However, unintentional air leakage through the envelope and existence of multiple layers of vapour impermeable materials should be addressed prior to addition of insulation to avoid subsequent accumulation of moisture within the wall assemblies. The cost estimate doesn't include demolishing of the overlaying materials. HEL recommends an integrated approach to the functional layers of the building envelope in question. Estimated costs don't include demolishing or removal and reinstall of sheathing or drywall.
	Replace the existing sheathing paper and provide a continuous air barrier outboard of sheathing		Short-term	\$3.5/sqft	
	Add insulation to the exterior of the walls if cladding is being replaced(Assume 2" of mineral wool)		Short-term	\$8/sqft	
	Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls		Long-term	\$3/sqft	
	Inspect and maintain the paint and sealant of the existing wood components exposed to elements biannually		Long-term	N/A	
Windows, Doors and Skylights					
Assets	Recommendations				
Single pane wood frame windows, single pane non-thermally broken aluminum windows and aluminum storefront windows with IGUs.	Replace the damaged wood frame windows	0-15 yrs.	Immediate	\$2,500/ea.	Except for the storefront windows and windows with damaged frame,existing fenestrations perform adequately but replacing them to contemporary types would provide better comfort and energy efficiency.
	Replace the wood exit doors		Short-term	\$1500/ea.	
	Replace all non-complying windows to NAFS compliant assemblies that also meet current energy code.		Short-term	\$2,500/ea.	
Roofs					
Assets	Recommendations				
2-ply SBS modified bituminous membrane over 1" of rigid insulation over the roof deck.	Routinely inspect the condition of the roof membrane and repair as required	5-15 yrs.	Long-term	N/A	A roof maintenance program including scheduled review of the roof condition, cleaning of the buildups, and targeted repair of suspect areas is key to the adequate service of the roof
	Add rigid insulation over the roof deck if the roof is being replaced. (assume 3" of rigid insulation)		Long-term	\$6/sqft	

C2. Cypress Park Primary School

1. FACILITY DESCRIPTION

Cypress Park Primary is a one-storey school building built in 1966. The roof is modified bituminous membranes over sheathing and joists supported by glulam beams. The walls are dimensional lumber wood framing that is clad with stucco or vertical cedar cladding. The walls are situated on conventional cast-in-place concrete foundation walls and strip footings. The windows are wood frame windows with metal frame operable inserts glazed with single pane float glass.

1.1. Assemblies

1.1.1. At-grade Assemblies
<u>Observations / Comments</u> <ul style="list-style-type: none">• The ground floor is joists over a crawl space surrounded by a paved walkway and soft landscape.• There is wood base trim all around the building at the bottom of the stucco cladding and full-height glazing. The base trim is at finished grade level and it has severely deteriorated.
<u>Recommendations:</u> <ul style="list-style-type: none">• Remediate the deteriorated base trim and examine the condition of the underlying framing. Remediate the deteriorated wood framing if required.(Immediate)• Regrade the finished grade to provide clearance between finished grade and the cladding. Provide a waterproofing detail if the framing is inevitably close to grade.(Immediate)

1.1.2. Exterior Walls

Observations / Comments

- According to the architectural drawings, the framed wall construction consists of
 - Wall finish
 - Dimensional lumber wood stud wall framing
 - 2" of batt insulation
 - 3/4" shiplap
 - building paper
 - Vertical cedar cladding or stucco cladding.
- The original building paper and painted vertical cedar siding have exceeded their service lives. However, the claddings observed are in fair condition and could perform adequately with timely maintenance.
- Wood trims, also an integral part of the wood frame windows are in very poor condition. HEL noted severely deteriorated trims in a number of locations.
- The exposed aggregate stucco cladding had been applied directly against building paper over shiplap sheathing. It appears to be in fair serviceable condition.
- The wood clad walls are a concealed barrier wall system with no drainage path, capillary break or adequate potential for drying.
- All the wall assemblies lack a designated air control layer. As a result, excessive heat loss and interstitial condensation could be reasonably expected. Accumulation of condensation would likely lead to accelerated deterioration of materials affected by moisture.
- 2" of batt insulation is far less than the current code requirement for thermal insulation of similar buildings resulting in above-average heat loss.

Recommendations:

- Replace the deteriorated wood trims. (**Immediate**)
- Consider replacing the concealed barrier walls to cladding assemblies that incorporate rain screen principles with a capillary break, a drainage passage and increased potential for drying. (Short-term)
- Replace the existing sheathing paper and provide a continuous air barrier outboard of sheathing and consider adding insulation outboard of exterior sheathing. (Short-term)
- Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls. (Long-term)

1.1.3. Windows, Doors and skylights

Observations / Comments

- The windows appear to be from the original construction and are single pane wood frame windows with metal frame operable sash inserts.
- The windows have moderate protection from canopies and overhang structures and are in poor condition.
- The wood frames of several windows have severely deteriorated.
- The performance of the wood windows largely rely on timely maintenance of the paint coatings, glazing stops and the seals.
- The single pane wood frame windows perform poorly with respect to energy efficiency and contribute significantly to water and air infiltration. The long-term performance of such windows depend largely on glazing stops, seals and paint coatings which require routine inspection and timely maintenance.
- The entrance doors and exit doors are wood or metal frame doors that are in fair condition.
- There are skylights located on the centre line of the building over the covered play area and the hallway that were not closely reviewed due to lack of accessibility.

Recommendations:

- Replace or repair the deteriorated wood frame windows. (Short-term)
- Consider replacing all non-complying windows to assemblies that are compliant with the current North American Fenestration Standard (NAFS-08) with respect to air, and water penetration requirements and have the thermal performance that meets current energy code. (Short-term)
- Replace the entrance and exit doors. This should be completed with the cladding and window replacement program (Short-term)

1.1.4. Roofs

Observations / Comments:

- The original roofs consisted of built-up roofing over 1" of rigid insulation or 2" of batt insulation between joists. The original roofs appear to have been replaced with SBS modified bituminous membranes.
- Portions of the roof insulated with batt insulation is ventilated through perforated soffit and doghouse vents at roof ridges.
- The detailed condition of the roofs were not reviewed due to lack of accessibility to the roof surfaces.
- 1" of rigid insulation or 2" of batt insulation is far less than current energy conservation requirements which leads to above average heat loss through the roofs.
- It is our understanding that there is a roof maintenance and renewal program in place.

Recommendations:

- Add rigid insulation over the roof deck to reduce heat loss if the roof is being replaced and the roof type is converted into rigid insulation only over the deck. (Long-term)
- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)

1.1.5. Costing Summary

Please refer to the following page.

C2. Cypress Park Primary School					
DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUES	ESTIMATED COSTS	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
The perimeter of the building is surrounded by a paved walkway and soft landscape.	Remediate the deteriorated base trim	10-20 yrs.	Immediate	\$8,000	Assemblies susceptible to moisture related deteriorations in close proximity to finished grade are prone to having pre-mature failures. A good clearance and slope away from the building is key for maintaining an adequate service life of the adjacent to grade components.
	Regrade the finished grade to provide clearance between finished grade and the cladding. Provide a waterproofing detail if framing is close to grade		Immediate	\$15,000	
Exterior Walls					
Assets	Recommendations				
Wood framed walls with 2" of batt insulation, building paper, vertical cedar cladding or stucco cladding.	Replace the deteriorated wood trims.	0-15 yrs.	Immediate	\$10,000	Adding insulation whether to the empty space in the stud wall or outboard of sheathing would reduce the space conditioning energy consumption of the building. However, unintentional air leakage through the envelope and existence of multiple layers of vapour impermeable materials should be addressed prior to addition of insulation to avoid subsequent accumulation of moisture within the wall assemblies. The cost estimate doesn't include demolishing of the overlaying materials. HEL recommends an integrated approach to the functional layers of the building envelope in question.
	Replace the walls to cladding systems that incorporate a rain screen principle		Short-term	\$80/sqft	
	Replace the existing sheathing paper and provide a continuous air barrier outboard of sheathing		Short-term	\$3.5/sqft	
	Add insulation to the exterior of the walls if cladding is being replaced(Assume 2" of mineral wool)		Short-term	\$8/sqft	
	Add insulation to fill up the entire stud cavity to increase the overall thermal resistance of the walls		Long-term	3\$/sqft	
Windows, Doors and Skylights					
Assets	Recommendations				
Wood frame windows with metal frame operable sash inserts and single pane float glass. Wood or metal frame entrance/exit doors. Aluminum frame skylights	Replace the deteriorated wood frame windows	3-10 yrs.	Short-term	\$2,500/ea.	Except for the windows with deteriorated frames, existing fenestrations perform adequately but replacing them to contemporary types would provide better comfort and energy efficiency.
	Replace all non-complying windows to NAFS compliant assemblies that also meet current energy code.		Short-term	\$2,500/ea.	
	Replace the entrance and exit doors		Short-term	\$6,000/ea.	
Roofs					
Assets	Recommendations				
Sloped roof with 2-ply SBS modified bituminous membranes	Add rigid insulation over the roof deck if the roof is being replaced and converted. (assume 3" of rigid insulation)	5-15 yrs.	Long-term	\$6/sqft	A roof maintenance program including scheduled review of the roof condition, cleaning of the buildups, and targeted repair of suspect areas is key to the adequate service of the roof
	Routinely inspect and maintain the modified bituminous roof membranes.		Long-term	N/A	

C3. Lions Bay Primary School

1. FACILITY DESCRIPTION

Lions Bay Primary School was built circa 1977 and is a one and a half storey building consisting of steel and concrete structure over concrete slab-on-grade and cast-in-place concrete foundations. The roofs are modified bituminous membranes over steel decking and the walls are split-face concrete masonry blocks or stucco. The windows are from the original construction and are comprised of wood frame windows with aluminum operable sash inserts.

1.1. Assemblies

1.1.1. At-grade Assemblies
<u>Observations / Comments</u> <ul style="list-style-type: none">The entire building is surrounded by paved impervious walkway surfaces that appear to be sloping away from the building.
<u>Recommendations:</u> <ul style="list-style-type: none">At grade assemblies appear to be in adequate service condition.

1.1.2. Exterior Walls
<u>Observations / Comments</u> <ul style="list-style-type: none">Two major types of walls coexist in the building – unpainted block walls and stucco finished wood framed walls. A small portion of the wall area between the roof parapet and the clerestory windows above the east entrance is clad with diamond ribbed metal cladding.The majority of the wall areas are sheltered by canopies or overhangs above and are in fair condition.The block walls are mass walls with a moisture management strategy that relies on shedding and/or absorbing and later releasing of the moisture from precipitation. The block walls were built with split-face concrete blocks and the blocks are unpainted.All the wall assemblies lack a designated air control layer. As a result, excessive heat loss and interstitial condensation could be reasonably expected. Accumulation of condensation likely would lead to accelerated deterioration of materials affected by moisture.The thermal insulation in the walls is assumed to be far less than the current code requirements for insulation values of like buildings resulting in above-average heat loss.
<u>Recommendations:</u> <ul style="list-style-type: none">Closely monitor the performance of the mass walls and apply a vapour permeable moisture repellant coating to the exterior surface of the walls if the accumulation of the moisture in the walls exceeds the rate of drying. (Long-term)Incorporate a continuous air barrier to the walls and consider increasing the thermal resistance of the walls to reduce energy cost for space heating of the building. (Long-term)

1.1.3. Windows, Doors and skylights

Observations / Comments

- The windows are full-height wood framed windows with aluminum operable sash inserts glazed with single pane float glass. A few of the windows appear to have been retrofitted with insulated glass units (IGUs) dated 1980.
- The windows have extensive overhang protection from canopies and overhang structures and are in fair condition.
- The single pane windows perform poorly in relation to energy efficiency and contribute significantly to water and air infiltration. The long-term performance of such windows depend largely on paint coating and seals which require routine inspection and timely maintenance.
- The entrance doors and exit doors are wood or metal framed doors and are in fair serviceable condition with extensive overhang protection. The gym door is accessed by steel exterior stairs. The frame is deteriorated at one of the corners and the paint has peeled off along the sill.

Recommendations:

- Replace the gym door and frame. (Short-term)
- Consider replacing all non-complying windows to assemblies that are compliant with the current North American Fenestration Standard (NAFS-08) with respect to air leakage, and water penetration requirements and thermal performance that meets today's energy code. (Short-term)

1.1.4. Roofs

Observations / Comments:

- The roofs are flat roofs protected by modified bituminous membrane over rigid insulation, board sheathing and steel decking. The roof insulation currently in service is assumed deficient of the current standards.
- The detailed condition of the roofs were not reviewed due to lack of accessibility to the roof surfaces.
- It is our understanding that there is a roof maintenance and renewal program in place.

Recommendations:

- Add rigid insulation over the roof deck to reduce heat loss if the roof is being replaced. (Long-term)
- Routinely inspect the condition of the roof membranes and repair as required. (Long-term)

1.1.5. Costing Summary

Please refer to the following page.

C3. Lions Bay Primary School					
DESCRIPTION		ESTIMATED REMAINING SERVICE LIFE	URGENCY OF THE ISSUES	ESTIMATED COSTS	COMMENTS
At-Grade Assembly					
Assets	Recommendations				
Impervious walkway surrounds the entire perimeter of the building	Routine cleaning and bi-annual review of the condition	25 yrs.	N/A	N/A	The at-grade assemblies are in good condition. The standard design life for concrete walkways is 25 years.
Exterior Walls					
Assets	Recommendations				
Block wall and stucco finished wood framed infill wall. A small portion of the wall is clad with diamond rib metal	Monitor the performance of the walls and apply coating if necessary	9 -59 yrs.	Long-term	N/A	Despite stains and cracks noticed, the walls are in adequate serviceable condition. Monitor the walls and repair the cracks to ensure the adequate performance of the assemblies on the long-term. The estimated cost doesn't include demolishing.
	Incorporate an air barrier to the walls and increase the thermal resistance of the walls		Long-term	\$3.5/sqft	
Windows, Doors and Skylights					
Assets	Recommendations				
Replace all non-complying windows to assemblies compliant with NAFS that also meet today's energy code	Rpair or replace the gym door frame and repaint the door leaves	0-5 yrs.	Short-term	\$3,500	Existing fenestrations perform adequately however replacing then would improve occupant comfort and energy efficiency.
	Replace all non-complying windows to assemblies compliant with NAFS that also meet current energy code		Short-term	\$2,500/ea.	
Roofs					
Assets	Recommendations				
2-ply SBS membrane over rigid insulation, sheathing and steel decking.	Add rigid insulation over the roof deck if the roof is being replaced (3" rigid XPS assumed)	5-15 yrs.	Long-term	\$6/sqft	A roof maintenance program including scheduled review of the roof condition, cleaning of the buildups, and targeted repair of suspect areas is key to the adequate service life of the roof
	Routinely inspect the membrane condition and repair as required		Long-term	N/A	



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**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**BOWEN ISLAND COMMUNITY SCHOOL
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: October 3, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Main Switchboard	Square D Main breaker and switchboard	1-3 years
Hallway Distribution Panels	Square D	12 years
Mechanical Room Panels	Square D	1-3 years

Condition Summary

- Main Switchgear appears is from the original construction in 1979. Equipment appears to be in good condition but is at the end of the expected lifetime of 40 years for main switchgear.
- Hallway panels include various vintages with some from the 1999 renovation/addition. Panels appear to be in good condition.
- Mechanical Room 14A includes multiple panels and fused switchgear that dates to the original construction. This equipment is nearing its expected lifetime and should be replaced.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	Wall-mount/T-Bar Fluorescent Fixtures Fluorescent Lamps Ballasts	5-10 years 3-5 years 8-10 years

Classroom Lighting	T-Bar Fluorescent Fixtures	5-10 years
	Fluorescent Lamps	3-5 years
	Ballasts	8-10 years
Service Room Lighting	Surface Fluorescent Fixtures	5-10 years
	Fluorescent Lamps	3-5 years
	Ballasts	8-10 years
Gymnasium Lighting	Surface HID Fixtures	6-8 years
	HID Lamps	5-10 years
	Ballasts	8-10 years
Field Lighting	Pole mounted HID Fixtures	10-15 years
	HID Lamps	5-10 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Fluorescent lamps and ballasts require regular replacements.
- Fluorescent fixtures appear to be in good condition with some discoloration of the lensing.
- All lighting fixtures can be replaced with more efficient LED versions to reduce energy usage.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards Quickstart	12-15 years
Annunciator Panel	LED with zone labels	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detectors	Standard, Smoke	3-5 years
	Standard, Heat	5-8 years

Condition Summary

- Fire Alarm panel is in good condition.
- Bells and pull stations appear to be from the original fire alarm installation with some sections added during the 1999 addition.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Remote-head fixtures	17-20 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be from recently replaced with LED units in good condition.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Bowen Community School

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future	

OVERALL ESTIMATED COSTS	\$356,000	\$0	\$93,500	\$194,000	\$50,500	\$18,000	Estimate based on Fixture replacement (no ballast/relamp 5-15 years)
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Electrical Distribution

Main service equipment	Main Switchboard	<3		\$25,000			
Distribution panels	Hallway Panels Mechanical Room Panels	12 to 15 years <3		\$16,000	\$36,000		

Lighting

Hallway lighting	Wall-mount/T-Bar Fluorescent Fixtures	5 to 10			\$18,000			
	Fluorescent lamps	3 to 5		\$8,000		\$8,000		Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	8 to 10			\$13,000			Ballast replacement timeline only if fixtures not replaced
Classroom Lighting	T-Bar Fluorescent Fixtures	5 to 10			\$72,000			
	Fluorescent lamps	3 to 5		\$31,000				Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	8 to 10			\$52,000			Ballast replacement timeline only if fixtures not replaced
Service Room Lighting	Surface-mount Fluorescent Fixtures	5 to 10			\$17,000			
	Fluorescent lamps	3 to 5		\$8,000				Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	8 to 10			\$12,000			Ballast replacement timeline only if fixtures not replaced
Gymnasium lighting	Surface-mount Fluorescent Fixtures	6 to 8			\$20,000			
	HID Lamps	5 to 10			\$9,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	8 to 10			\$13,000			Ballast replacement timeline only if fixtures not replaced
Field Lighting	Pole-mount HID Fixtures	10 to 15				\$12,000		Energy reduction available with LED fixtures. Fixture replacement only.
	HID Lamps	5 to 10			\$4,000			
Exterior lighting	Wall-mount HID Fixtures	10 to 15				\$10,000		Energy reduction available with LED fixtures
	HID Lamps	5 to 10			\$4,000			

Fire Alarm

Fire Alarm panel	Control panel	12 to 15				\$20,000		
	Annunciator panel	12 to 15				\$3,000		
	Batteries	3 to 5		\$1,000	\$1,000	\$1,000		Batteries to be replaced every 5-8 years
Devices	Bells	8 to 10			\$10,000			
	Pull Stations	8 to 10			\$9,000			
	Smoke Detector(s)	3 to 5		\$1,000	\$1,000	\$1,000		Detectors to be replaced every 5-8 years
	Heat Detector(s)	5 to 8			\$1,000			Heat Detectors to be replaced every 10 to 12 years

Life Safety

Emergency lighting	Remote fixtures	17 to 20					\$18,000	
	Batteries	3 to 5		\$2,000		\$2,000		Batteries require replacement every 5-8 years
Exit signs	Red Text based Signs	6 to 10			\$9,000			
	Batteries	3 to 5		\$1,500		\$1,500		Batteries require replacement every 5-8 years

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**CAULFEILD ELEMENTARY SCHOOL
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: July 17, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Main Switchboard	Cutler-Hammer CMP-A1	21 years
Hallway Distribution Panels	<i>Various manufacturers</i>	
	Amalgamated Electric	Exceeds maximum recommended
	Cutler-Hammer	6-10 years
Sub-main Electrical Room Equipment	<i>Various manufacturers</i>	
	Amalgamated Electric	Exceeds maximum recommended
	Siemens	0-5 years
	Federal Pioneer	Exceeds maximum recommended

Condition Summary

- Main Switchgear was installed in 1999 and is in good condition.
- Distribution equipment located in the Sub-main Electrical room consists of panels, disconnects and splitters from the original construction and additions in the 1960s. Nearly all equipment has exceeded the recommended lifespan and should be replaced.
- Hallway panels include multiple manufacturers from various vintages. Panels appear to be in good condition and should be replaced based on age.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Classroom Lighting	Suspended/T-Bar	5-10 years
	Fluorescent Fixtures	
	LED Lamps	5-10 years
	Ballasts	20-25 years
Service Room Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Gymnasium Lighting	Surface Fluorescent Fixtures	6-8 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Fluorescent lamps and ballasts have been changed to LED replacement tubes and new ballasts this year. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- Exterior lighting fixtures can be replaced with more efficient LED versions to reduce energy usage.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards FireShield Plus	12-15 years
Annunciator Panel	LED with zone labels	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detector	Standard, Smoke	3-5 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation with some sections added during the 1999 addition.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Self-contained fixtures	6-10 years
	Remote-head fixtures	12-15 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be from varying vintages with some units being self-contained (including internal battery) and some units being remote heads connected to central batteries.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Caulfield Elementary School

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future	

OVERALL ESTIMATED COSTS	\$468,000	\$52,000	\$10,500	\$230,000	\$42,500	\$133,000	Estimate based on Fixture replacement (no ballast/relamp 5-15 years)
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Electrical Distribution

Main service equipment	Main Switchboard	15+				\$25,000	
Distribution panels	Hallway Panels Sub Main Electrical Room Equipment	Varied 0	\$22,000 \$30,000		\$22,000		Panels are of various vintages and can be replaced as per age Original service connection exceeds recommended lifespan

Lighting

Hallway lighting	T-Bar Fluorescent Fixtures LED Lamps Ballasts	5 to 10 5 to 10 15+			\$33,000 \$15,000		\$24,000	Lamp costs not necessary if fixtures are replaced Ballast replacement timeline only if fixtures not replaced
Classroom Lighting	Suspended/T-Bar Fluorescent Fixtures LED Lamps Ballasts	5 to 10 5 to 10 15+			\$86,000 \$37,000		\$62,000	Lamp costs not necessary if fixtures are replaced Ballast replacement timeline only if fixtures not replaced
Service Room Lighting	Surface-mount Fluorescent Fixtures LED Lamps Ballasts	5 to 10 5 to 10 15+			\$18,000 \$8,000		\$13,000	Lamp costs not necessary if fixtures are replaced Ballast replacement timeline only if fixtures not replaced
Gymnasium lighting	Surface-mount Fluorescent Fixtures LED Lamps Ballasts	6 to 8 5 to 10 15+			\$15,000 \$7,000		\$9,000	Lamp costs not necessary if fixtures are replaced Ballast replacement timeline only if fixtures not replaced
Exterior lighting	Wall-mount HID Fixtures HID Lamps	10 3 to 5		\$4,000	\$10,000			Energy reduction available with LED fixtures

Fire Alarm

Fire Alarm panel	Control panel Annunciator panel Batteries	12 to 15 12 to 15 3 to 5		\$1,000	\$1,000	\$20,000 \$3,000 \$1,000		Batteries to be replaced every 5-8 years
Devices	Bells Pull Stations Smoke Detector(s)	8 to 10 8 to 10 3 to 5		\$1,000	\$1,000	\$13,000 \$11,000 \$1,000		Detectors to be replaced every 5-8 years

Life Safety

Emergency lighting	Self-contained fixtures Remote fixtures Batteries	6 to 10 12 to 15 3 to 5		\$3,000		\$9,000 \$13,000 \$3,000		Batteries require replacement every 5-8 years
Exit signs	Red Text based Signs Batteries	6 to 10 3 to 5		\$1,500		\$11,000 \$1,500		Batteries require replacement every 5-8 years

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**ECOLE CEDARDALE
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: July 10, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Service Entrance	Amalgamated Electric	Exceeds maximum
	Disconnect	recommended
Electrical Room Equipment	<i>Various manufacturers</i>	
	Amalgamated Electric	Exceeds maximum recommended
	Siemens	6-10 years
	Eaton	6-10 years
	Square D	6-10 years
	Westinghouse	Exceeds maximum recommended
Hallway Distribution Panels	<i>Various manufacturers</i>	
	Amalgamated Electric	Exceeds maximum recommended
	Siemens	6-10 years
	Federal Pioneer	Exceeds maximum recommended
	Square D	6-10 years
	Westinghouse	Exceeds maximum recommended

Condition Summary

- Main Switchgear was installed in 1960s and is in beyond the recommended equipment lifespan.
- Distribution equipment located in the Electrical room consists of panels, disconnects and splitters from the original construction and additions in the 1960s. Nearly all equipment has exceeded the recommended lifespan and should be replaced.
- Hallway panels include multiple manufacturers from various vintages. Panels appear to be in good condition and should be replaced based on age.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	T-Bar Fluorescent Fixtures	5-10 years
	Pot lights	12-15 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Classroom Lighting	Surface/T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Service Room Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Gymnasium Lighting	Surface Fluorescent Fixtures	6-8 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Regular replacement of lamps and ballasts will be required until fixtures are replaced with LED fixtures.
- Fixtures in lower floor are in good condition and from 2015 addition.
- Exterior lighting fixtures can be replaced with more efficient LED versions to reduce energy usage.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards Fire Panel	12-15 years
Annunciator Panel	LED with zone labels	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detector	Standard, Smoke	3-5 years
	Standard, Heat	5-8 years

Condition Summary

- Fire Alarm panel is in good condition.
- Bells and pull stations appear to be from the original fire alarm installation with some sections added during the 2015 addition.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Self-contained fixtures	6-10 years
	Remote-head fixtures	12-15 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be from varying vintages with some units being self-contained (including internal battery) and some units being remote heads connected to central batteries.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Ecole Cedardale

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future	

OVERALL ESTIMATED COSTS \$324,000 \$41,000 \$9,500 \$159,000 \$40,500 \$74,000 Estimate based on Fixture replacement (no ballast/relamp 5-15 years)

Electrical Distribution

Main service equipment	Service disconnect	0	\$10,000					Service entrance is from 1960s and exceeds recommended service life
Distribution panels	Electrical Room Equipment	Varied	\$16,000		\$3,000			
	Hallway Panels	Varied	\$15,000		\$15,000			

Lighting

Hallway lighting	T-Bar Fluorescent Fixtures	5 to 10			\$9,000			2015 installation Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
	Pot light Fixtures	12 to 15				\$4,000		
	LED lamps	5 to 10			\$4,000			
	Ballasts	20 to 25					\$9,000	
Classroom Lighting	Surface/T-Bar Fluorescent Fixtures	5 to 10			\$55,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
	LED lamps	5 to 10			\$24,000			
	Ballasts	20 to 25					\$39,000	
Service Room Lighting	Surface-mount Fluorescent Fixtures	5 to 10			\$27,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
	LED lamps	5 to 10			\$12,000			
	Ballasts	20 to 25					\$19,000	
Gymnasium lighting	Surface-mount Fluorescent Fixtures	6 to 8			\$11,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
	LED lamps	5 to 10			\$5,000			
	Ballasts	20 to 25					\$7,000	
Exterior lighting	Wall-mount HID Fixtures	5 to 10			\$10,000			Energy reduction available with LED fixtures
	HID Lamps	3 to 5		\$4,000				

Fire Alarm

Fire Alarm panel	Control panel	12 to 15				\$20,000		Batteries to be replaced every 5-8 years
	Annunciator panel	12 to 15				\$3,000		
	Batteries	3 to 5		\$1,000	\$1,000	\$1,000		
Devices	Bells	8 to 10			\$7,000			Detectors to be replaced every 5-8 years Heat Detectors to be replaced every 10 to 12 years
	Pull Stations	8 to 10			\$8,000			
	Smoke Detector(s)	3 to 5		\$1,000	\$1,000	\$1,000		
	Heat Detector(s)	5 to 8			\$1,000			

Life Safety

Emergency lighting	Self-contained fixtures	6 to 10			\$3,000			Batteries require replacement every 5-8 years
	Remote fixtures	12 to 15				\$12,000		
	Batteries	3 to 5		\$2,000		\$2,000		
Exit signs	Red Text based Signs	6 to 10			\$8,000			Batteries require replacement every 5-8 years
	Batteries	3 to 5		\$1,500		\$1,500		

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**CHARTWELL ELEMENTARY SCHOOL
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: August 15, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Service Disconnect	Taylor Electric	6-10 years
Distribution Panels	<i>Various manufacturers</i>	
	Westinghouse	Exceeds maximum recommended
	Federal Pioneer	Exceeds maximum recommended
	Square D	6-10 years
Electrical Room Equipment	<i>Various manufacturers</i>	
	Amalgamated Electric	Exceeds maximum recommended
	Taylor Electric	6-10 years
	Square D	6-10 years

Condition Summary

- Service disconnect has been replaced from the original installed unit and appears to be in good condition.
- Distribution equipment located in the Electrical room consists of panels, disconnects and splitters from the original construction and renovations over the years. Some of this equipment has exceeded the recommended lifespan and should be replaced. Most appears to be in good condition.
- Distribution panels include multiple manufacturers from various vintages. Panels appear to be in good condition and should be replaced based on age.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Classroom Lighting	Suspended/T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Service Room Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Gymnasium Lighting	Surface Fluorescent Fixtures	6-8 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted LED Fixtures	10-15 years

Condition Summary

- Fluorescent lamps and ballasts have been changed to LED replacement tubes and new ballasts this year. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- Exterior lighting fixtures have been recently replaced to LED and appear to be in good condition.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards FireShield Plus	12-15 years
Annunciator Panel	LED with zone labels	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detector	Standard, Smoke	3-5 years
Detector	Standard, Heat	6-8 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Self-contained fixtures	6-10 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be in good condition.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Chartwell Elementary School

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
OVERALL ESTIMATED COSTS		\$341,000	\$20,000	\$5,500	\$201,000	\$36,500	\$78,000	Estimate based on Fixture replacement (no ballast/relamp 5-15 years)
Electrical Distribution								
Main service equipment	Service disconnect	6 to 10			\$10,000			
Distribution panels	Electrical Room Equipment Distribution Panels	Varied Varied	\$15,000 \$5,000		\$5,000 \$24,000			
Lighting								
Hallway lighting	T-Bar Fluorescent Fixtures LED lamps Ballasts	5 to 10 5 to 10 20 to 25			\$37,000 \$11,000		\$26,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Classroom Lighting	Surface/T-Bar Fluorescent Fixtures LED lamps Ballasts	5 to 10 5 to 10 20 to 25			\$44,000 \$19,000		\$32,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Service Room Lighting	Surface-mount Fluorescent Fixtures LED lamps Ballasts	5 to 10 5 to 10 20 to 25			\$14,000 \$7,000		\$10,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Gymnasium lighting	Surface-mount Fluorescent Fixtures LED lamps Ballasts	6 to 8 5 to 10 20 to 25			\$16,000 \$7,000		\$10,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Exterior lighting	Wall-mount LED Fixtures	10 to 15				\$8,000		
Fire Alarm								
Fire Alarm panel	Control panel Annunciator panel Batteries	12 to 15 12 to 15 3 to 5		\$1,000	\$1,000	\$20,000 \$3,000 \$1,000		Batteries to be replaced every 5-8 years
Devices	Bells Pull Stations Smoke Detector(s) Heat Detector(s)	8 to 10 8 to 10 3 to 5 5 to 8		\$1,000	\$15,000 \$8,000 \$1,000 \$2,000	\$1,000		Detectors to be replaced every 5-8 years Heat Detectors to be replaced every 10 to 12 years
Life Safety								
Emergency lighting	Self-contained fixtures Batteries	6 to 10 3 to 5		\$2,000	\$16,000	\$2,000		Batteries require replacement every 5-8 years
Exit signs	Red Text based Signs Batteries	6 to 10 3 to 5		\$1,500	\$8,000	\$1,500		Batteries require replacement every 5-8 years

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**CYPRESS PARK ELEMENTARY SCHOOL
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: July 17, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Service Disconnect	Amalgamated Electric	Exceeds maximum recommended
Hallway Distribution Panels	Westinghouse	Exceeds maximum recommended
Electrical Room Equipment	<i>Various manufacturers</i>	
	Amalgamated Electric	Exceeds maximum recommended
	Allied Controls	5-10 years

Condition Summary

- The service disconnect is from the original 1966 construction and exceeds the maximum recommended lifespan for the equipment. This hardware should be replaced.
- Distribution equipment located in the Electrical room consists of panels, disconnects, splitters and lighting control panels. Most of this equipment is from the original construction in the 1966, exceeding the recommended lifespan, and should be replaced.
- Distribution panels are from a manufacturer that is no longer in business and they exceed the recommended service life for electrical panels. These panels should be replaced.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	Surface Fluorescent Fixtures	5-10 years
	Fluorescent Lamps	3-5 years
	Ballasts	10-15 years
Classroom Lighting	Surface Fluorescent Fixtures	5-10 years
	Fluorescent Lamps	3-5 years
	Ballasts	10-15 years
Service Room Lighting	Surface Fluorescent Fixtures	5-10 years
	Fluorescent Lamps	3-5 years
	Ballasts	10-15 years
Gymnasium Lighting	Surface Fluorescent Fixtures	5-10 years
	Fluorescent Lamps	3-5 years
	Ballasts	10-15 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Fluorescent lamps and ballasts have a service life of 3-5 years and 15-20 years, respectively. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- Exterior lighting fixtures can be replaced with more efficient LED versions to reduce energy usage.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards FireShield Plus	12-15 years
Annunciator Panel	LED with zone labels	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detector	Standard, Smoke	3-5 years
Detector	Standard, Heat	5-8 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	None noted	
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- No emergency lights were noted during the site inspection. Emergency lights should be added to provide for exit illumination in case of a power outage.
- Battery packs within exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Cypress Park Elementary School

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
OVERALL ESTIMATED COSTS		\$145,500	\$28,000	\$24,500	\$70,500	\$21,500	\$1,000	Estimate based on Fixture replacement (no ballast/relamp 5-15 years)
Electrical Distribution								
Main service equipment	Service disconnect	0	\$6,000					Service entrance is from 1960s and exceeds recommended service life
Distribution panels	Electrical Room Equipment Hallway Panels	Varied Varied	\$8,000 \$8,000		\$7,500			
Lighting								
	Surface-mount Fluorescent Fixtures	5 to 10			\$7,000			
Hallway lighting	Fluorescent lamps	3 to 5		\$2,000				Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	10 to 15				\$5,000		Ballast replacement timeline only if fixtures not replaced
	Surface-mount Fluorescent Fixtures	5 to 10			\$24,000			
Classroom Lighting	Fluorescent lamps	3 to 5		\$11,000				Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	10 to 15				\$17,000		Ballast replacement timeline only if fixtures not replaced
	Surface-mount Fluorescent Fixtures	5 to 10			\$2,000			
Service Room Lighting	Fluorescent lamps	3 to 5		\$1,000				Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	10 to 15				\$1,000		Ballast replacement timeline only if fixtures not replaced
	Surface-mount Fluorescent Fixtures	5 to 10			\$6,000			
Gymnasium lighting	Fluorescent lamps	3 to 5		\$3,000				Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	10 to 15				\$4,000		Ballast replacement timeline only if fixtures not replaced
	Wall-mount HID Fixtures	5 to 10			\$10,000			Energy reduction available with LED fixtures
Exterior lighting	HID Lamps	3 to 5		\$4,000				
Fire Alarm								
	Control panel	12 to 15				\$15,000		
Fire Alarm panel	Annunciator panel	12 to 15				\$3,000		
	Batteries	3 to 5		\$1,000	\$1,000	\$1,000		Batteries to be replaced every 5-8 years
	Bells	8 to 10			\$4,000			
Devices	Pull Stations	8 to 10			\$3,000			
	Smoke Detector(s)	3 to 5		\$1,000	\$1,000	\$1,000		Detectors to be replaced every 5-8 years
	Heat Detector(s)	5 to 8			\$1,000			Heat Detectors to be replaced every 10 to 12 years
Life Safety								
	Self-contained fixtures	0	\$6,000					Currently no emergency lights installed
Emergency lighting	Batteries	5 to 8			\$1,000		\$1,000	Batteries require replacement every 5-8 years. Batteries required only if fixtures installed.
	Red Text based Signs	6 to 10			\$3,000			
Exit signs	Batteries	3 to 5		\$1,500		\$1,500		Batteries require replacement every 5-8 years

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**EAGLE HARBOUR MONTESSORI
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: July 17, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Service Disconnect	Amalgamated Electric	Exceeds maximum recommended
Distribution Panels	<i>Various manufacturers</i>	
	Federal Pioneer	Exceeds maximum recommended
	Square D	6-10 years
Electrical Room Equipment	<i>Various manufacturers</i>	
	Amalgamated Electric	Exceeds maximum recommended
	Federal Pioneer	Exceeds maximum recommended
	Square D	6-10 years

Condition Summary

- Service disconnect has been replaced from the original installed unit and appears to be in good condition.
- Distribution equipment located in the Electrical room consists of panels, disconnects and splitters from the original construction and renovations over the years. Some of this equipment has exceeded the recommended lifespan and should be replaced. Most appears to be in good condition.
- Distribution panels include multiple manufacturers from various vintages. Panels appear to be in good condition and should be replaced based on age.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	T-Bar Fluorescent Fixtures	5-10 years
	Entrance Pot lights	10-15 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Classroom Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Service Room Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Gymnasium Lighting	Suspended Fluorescent	6-8 years
	Fixtures	
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Fluorescent lamps and ballasts have been changed to LED replacement tubes and new ballasts this year. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- Exterior lighting fixtures should be replaced with LED fixtures to reduce energy consumption.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards FireShield Plus	12-15 years
Annunciator Panel	None	
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detector	Standard, Smoke	3-5 years
Detector	Standard, Heat	6-8 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Remote fixtures	6-10 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be in good condition.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs for emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Eagle Harbour Montesorri

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)				COMMENTS
		Immediate	1-5 Years	6-10 Years	11-15 Years	

OVERALL ESTIMATED COSTS	\$222,000	\$31,000	\$8,500	\$102,000	\$33,500	\$47,000	Estimate based on Fixture replacement (no ballast/relamp 5-15 years)
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Electrical Distribution

Main service equipment	Service disconnect	0	\$10,000					Service entrance is from 1960s and exceeds recommended service life
Distribution panels	Electrical Room Equipment Hallway Panels	Varied Varied	\$9,000 \$12,000		\$3,000 \$3,000			

Lighting

	T-Bar Fluorescent Fixtures	5 to 10			\$9,000			
	Entrance pot lights	10 to 15				\$2,000		
Hallway lighting	LED lamps	5 to 10			\$3,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$7,000	Ballast replacement timeline only if fixtures not replaced
	Surface-mount Fluorescent Fixtures	5 to 10			\$32,000			
	LED lamps	5 to 10			\$14,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
Classroom Lighting	Ballasts	20 to 25					\$23,000	Ballast replacement timeline only if fixtures not replaced
	Surface-mount Fluorescent Fixtures	5 to 10			\$8,000			
	LED lamps	5 to 10			\$4,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
Service Room Lighting	Ballasts	20 to 25					\$6,000	Ballast replacement timeline only if fixtures not replaced
	Suspended Fluorescent Fixtures	6 to 8			\$17,000			
	LED lamps	5 to 10			\$8,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
Gymnasium lighting	Ballasts	20 to 25					\$11,000	Ballast replacement timeline only if fixtures not replaced
	Wall-mount HID Fixtures	5 to 10			\$10,000			Energy reduction available with LED fixtures
	HID Lamps	3 to 5		\$4,000				

Fire Alarm

	Control panel	12 to 15				\$20,000		
Fire Alarm panel	Annunciator panel							No annunciator
	Batteries	3 to 5		\$1,000	\$1,000	\$1,000		Batteries to be replaced every 5-8 years
	Bells	8 to 10			\$7,000			
	Pull Stations	8 to 10			\$5,000			
Devices	Smoke Detector(s)	3 to 5		\$1,000	\$1,000	\$1,000		Detectors to be replaced every 5-8 years
	Heat Detector(s)	5 to 8			\$1,000			Heat Detectors to be replaced every 10 to 12 years

Life Safety

Emergency lighting	Remote fixtures	12 to 15				\$9,000		
	Batteries	3 to 5		\$1,000		\$1,000		Batteries require replacement every 5-8 years
	Red Text based Signs	6 to 10			\$5,000			
Exit signs	Batteries	3 to 5		\$1,500		\$1,500		Batteries require replacement every 5-8 years

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**GLENEAGLES ELEMENTARY SCHOOL
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: July 17, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Service Disconnect	EP	Exceeds maximum recommended
Distribution Panels	<i>Various manufacturers</i>	
	EP	Exceeds maximum recommended
	Cutler Hammer	10-15 years
	Square D	6-10 years
Electrical Room Equipment	<i>Various manufacturers</i>	
	EP	Exceeds maximum recommended
	Triangle	Exceeds maximum recommended
	FPE	Exceeds maximum recommended
	Square D	6-10 years
Sub-main Electrical Room Equipment	<i>Various manufacturers</i>	
	EP	Exceeds maximum recommended
	Cutler Hammer	10-15 years
	Amalgamated	Exceeds maximum recommended

Condition Summary

- Main service disconnect is from the original construction in the 1950s and should be replaced.
- Distribution equipment located in the main Electrical room consists of panels, disconnects and splitters from the original construction and renovations over the years. Most of this equipment has exceeded the recommended lifespan and should be replaced.
- Distribution equipment located in the sub-main Electrical room consists of panels, disconnects and splitters from the later 1966 addition. Most of this equipment has exceeded the recommended lifespan and should be replaced.
- Distribution panels include multiple manufacturers from various vintages. Panels appear to be in good condition and should be replaced based on age.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Classroom Lighting	T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Service Room Lighting	Surface/T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Gymnasium Lighting	Surface Fluorescent Fixtures	6-8 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Fluorescent lamps and ballasts have been changed to LED replacement tubes and new ballasts this year. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- Exterior lighting fixtures should be replaced with LED fixtures to reduce energy consumption.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Simplex	12-15 years
Annunciator Panel	LED with zone labels	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detector	Standard, Smoke	3-5 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Remote fixtures	10-15 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be in good condition.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Gleneagles Elementary School

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future	

OVERALL ESTIMATED COSTS \$349,000 \$41,000 \$9,500 \$172,000 \$47,500 \$79,000 Estimate based on Fixture replacement (no ballast/relamp 5-15 years)

Electrical Distribution

Main service equipment	Service disconnect	0	\$10,000					
Distribution panels	Electrical Room Equipment	Varied	\$15,000		\$3,000			
	Sub-main Electrical Room Equipment	Varied	\$12,000			\$3,000		
	Distribution Panels	Varied	\$4,000		\$16,000			

Lighting

	T-Bar Fluorescent Fixtures	5 to 10			\$26,000			
Hallway lighting	LED lamps	5 to 10			\$8,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$18,000	Ballast replacement timeline only if fixtures not replaced
	T-Bar Fluorescent Fixtures	5 to 10			\$60,000			
Classroom Lighting	LED lamps	5 to 10			\$26,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$43,000	Ballast replacement timeline only if fixtures not replaced
	Surface-mount Fluorescent Fixtures	5 to 10			\$13,000			
Service Room Lighting	LED lamps	5 to 10			\$6,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$9,000	Ballast replacement timeline only if fixtures not replaced
	Surface-mount Fluorescent Fixtures	6 to 8			\$15,000			
Gymnasium lighting	LED lamps	5 to 10			\$7,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$9,000	Ballast replacement timeline only if fixtures not replaced
	Wall-mount HID Fixtures	5 to 10			\$10,000			Energy reduction available with LED fixtures
Exterior lighting	HID Lamps	3 to 5		\$4,000				

Fire Alarm

	Control panel	12 to 15				\$20,000		
Fire Alarm panel	Annunciator panel	12 to 15				\$3,000		
	Batteries	3 to 5		\$1,000	\$1,000	\$1,000		Batteries to be replaced every 5-8 years
	Bells	8 to 10			\$11,000			
Devices	Pull Stations	8 to 10			\$8,000			
	Smoke Detector(s)	3 to 5		\$1,000	\$1,000	\$1,000		Detectors to be replaced every 5-8 years

Life Safety

	Remote fixtures	10 to 15				\$16,000		
Emergency lighting	Batteries	3 to 5		\$2,000		\$2,000		Batteries require replacement every 5-8 years
	Red Text based Signs	6 to 10			\$8,000			
Exit signs	Batteries	3 to 5		\$1,500		\$1,500		Batteries require replacement every 5-8 years

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**HOLLYBURN ELEMENTARY SCHOOL
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: August 15, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Service Disconnect	Electrical Industries	Exceeds maximum recommended
Distribution Panels	<i>Various manufacturers</i>	
	Westinghouse	Exceeds maximum recommended
	Commander	Exceeds maximum recommended
	EP	Exceeds maximum recommended
	Cutler Hammer	10-15 years
	Square D	6-10 years
Electrical Room Equipment	<i>Various manufacturers</i>	
	Amalgamated Electric	Exceeds maximum recommended
	Federal NOARK	Exceeds maximum recommended
	Cutler Hammer	10-15 years
	Electrical Industries	Exceeds maximum recommended

Condition Summary

- Service disconnect appears to be from the original construction and exceeds maximum recommended service life. Disconnect should be replaced.
- Distribution equipment located in the Electrical room consists of panels, disconnects and splitters from the original construction and additions from the 1950s and 1960s. Most of this equipment has exceeded the recommended lifespan and should be replaced.
- Distribution panels include multiple manufacturers from various vintages. Panels appear to be in good condition and should be replaced based on age.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Classroom Lighting	T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Service Room Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Gymnasium Lighting	Surface Fluorescent Fixtures	6-8 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Fluorescent lamps and ballasts have been changed to LED replacement tubes and new ballasts this year. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- Exterior lighting fixtures should be replaced with LED fixtures to reduce energy consumption.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards FireShield Plus	12-15 years
Annunciator Panel	LED with zone labels	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detector	Standard, Smoke	3-5 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Self-contained fixtures	6-10 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be in good condition.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Hollyburn Elementary School

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
OVERALL ESTIMATED COSTS		\$395,000	\$37,000	\$9,500	\$222,000	\$28,500	\$98,000	Estimate based on Fixture replacement (no ballast/relamp 5-15 years)
Electrical Distribution								
Main service equipment	Service disconnect	0	\$10,000					
Distribution panels	Electrical Room Equipment Distribution Panels	Varied Varied	\$15,000 \$12,000		\$5,000 \$12,000			
Lighting								
Hallway lighting	T-Bar Fluorescent Fixtures LED lamps Ballasts	5 to 10 5 to 10 20 to 25			\$35,000 \$10,000		\$25,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Classroom Lighting	Surface/T-Bar Fluorescent Fixtures LED lamps Ballasts	5 to 10 5 to 10 20 to 25			\$73,000 \$32,000		\$52,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Service Room Lighting	Surface-mount Fluorescent Fixtures LED lamps Ballasts	5 to 10 5 to 10 20 to 25			\$19,000 \$8,000		\$14,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Gymnasium lighting	Surface-mount Fluorescent Fixtures LED lamps Ballasts	6 to 8 5 to 10 20 to 25			\$11,000 \$5,000		\$7,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Exterior lighting	Wall-mount HID Fixtures HID Lamps	5 to 10 3 to 5		\$4,000	\$12,000			Energy reduction available with LED fixtures
Fire Alarm								
Fire Alarm panel	Control panel Annunciator panel Batteries	12 to 15 12 to 15 3 to 5		\$1,000	\$1,000	\$20,000 \$3,000 \$1,000		Batteries to be replaced every 5-8 years
Devices	Bells Pull Stations Smoke Detector(s)	8 to 10 8 to 10 3 to 5		\$1,000	\$13,000 \$10,000 \$1,000	\$1,000		Detectors to be replaced every 5-8 years
Life Safety								
Emergency lighting	Self-contained fixtures Batteries	6 to 10 3 to 5		\$2,000	\$20,000	\$2,000		Batteries require replacement every 5-8 years
Exit signs	Red Text based Signs Batteries	6 to 10 3 to 5		\$1,500	\$10,000	\$1,500		Batteries require replacement every 5-8 years

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**IRWIN PARK ELEMENTARY SCHOOL
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: August 15, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Main Switchgear	Square D	6-8 years
Distribution Panels	<i>Various manufacturers</i>	
	EP	Exceeds maximum recommended
	Cutler Hammer	6-10 years
	Federal Pioneer	Exceeds maximum recommended
	Square D	3-10 years

Condition Summary

- Main switchgear appears have been replaced from the original installed unit and appears to be in good condition.
- Distribution panels include multiple manufacturers from various vintages. Panels appear to be in good condition and should be replaced based on age.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Classroom Lighting	Suspended/T-Bar	5-10 years
	Fluorescent Fixtures	
	LED Lamps	5-10 years
	Ballasts	20-25 years
Service Room Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Gymnasium Lighting	Surface Fluorescent Fixtures	6-8 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Fluorescent lamps and ballasts have been changed to LED replacement tubes and new ballasts this year. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- Exterior lighting fixtures should be replaced with LED fixtures to reduce energy consumption.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards FireShield	12-15 years
Annunciator Panel	LED with zone labels	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detector	Standard, Heat	6-8 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Self-contained fixtures	6-10 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be in good condition.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Irwin Park Elementary School

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
OVERALL ESTIMATED COSTS		\$403,000	\$8,000	\$9,500	\$260,000	\$28,500	\$97,000	Estimate based on Fixture replacement (no ballast/relamp 5-15 years)
Electrical Distribution								
Main service equipment	Main Switchgear	6 to 8			\$45,000			
Distribution panels	Distribution Panels	Varied	\$8,000		\$10,000			
Lighting								
Hallway lighting	T-Bar Fluorescent Fixtures	5 to 10			\$39,000			
	LED lamps	5 to 10			\$11,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$28,000	Ballast replacement timeline only if fixtures not replaced
Classroom Lighting	Surface/T-Bar Fluorescent Fixtures	5 to 10			\$68,000			
	LED lamps	5 to 10			\$29,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$48,000	Ballast replacement timeline only if fixtures not replaced
Service Room Lighting	Surface-mount Fluorescent Fixtures	5 to 10			\$16,000			
	LED lamps	5 to 10			\$7,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$11,000	Ballast replacement timeline only if fixtures not replaced
Gymnasium lighting	Surface-mount Fluorescent Fixtures	6 to 8			\$15,000			
	LED lamps	5 to 10			\$7,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$10,000	Ballast replacement timeline only if fixtures not replaced
Exterior lighting	Wall-mount HID Fixtures	5 to 10			\$8,000			Energy reduction available with LED fixtures
	HID Lamps	3 to 5		\$4,000				
Fire Alarm								
Fire Alarm panel	Control panel	12 to 15				\$20,000		
	Annunciator panel	12 to 15				\$3,000		
	Batteries	3 to 5		\$1,000	\$1,000	\$1,000		Batteries to be replaced every 5-8 years
Devices	Bells	8 to 10			\$15,000			
	Pull Stations	8 to 10			\$10,000			
	Smoke Detector(s)	3 to 5		\$1,000	\$1,000	\$1,000		Detectors to be replaced every 5-8 years
	Heat Detector(s)	5 to 8			\$2,000			Heat Detectors to be replaced every 10 to 12 years
Life Safety								
Emergency lighting	Self-contained fixtures	6 to 10			\$20,000			
	Batteries	3 to 5		\$2,000		\$2,000		Batteries require replacement every 5-8 years
Exit signs	Red Text based Signs	6 to 10			\$10,000			
	Batteries	3 to 5		\$1,500		\$1,500		Batteries require replacement every 5-8 years

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**LIONS BAY COMMUNITY SCHOOL
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: July 17, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Service Disconnect	Westinghouse	Exceeds maximum recommended
Electrical Room Equipment	Westinghouse	Exceeds maximum recommended

Condition Summary

- Service disconnect appears to be from the original construction and exceeds the maximum recommended service life.
- Distribution equipment located in the Electrical room consists of panels, disconnects and splitters from the original construction. All this equipment has exceeded the recommended lifespan and should be replaced.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Classroom Lighting	Suspended Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years

Service Room Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Gymnasium Lighting	Surface Fluorescent Fixtures	6-8 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Fluorescent lamps and ballasts have been changed to LED replacement tubes and new ballasts this year. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- Exterior lighting fixtures should be replaced with LED fixtures to reduce energy consumption.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards FireShield Plus	12-15 years
Annunciator Panel	LED with zone labels	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detector	Standard, Heat	6-8 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Remote fixtures	10-15 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights are present in the gymnasium only.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Lions Bay Community School

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future	

OVERALL ESTIMATED COSTS	\$149,500	\$30,000	\$6,000	\$59,000	\$26,500	\$28,000	Estimate based on Fixture replacement (no ballast/relamp 5-15 years)
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Electrical Distribution

Main service equipment	Service disconnect	0	\$10,000					
Distribution panels	Electrical Room Equipment	0	\$20,000					

Lighting

Hallway lighting	Surface-mounted Fluorescent Fixtures	5 to 10			\$2,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
	LED lamps	5 to 10			\$1,000			
	Ballasts	20 to 25					\$2,000	
Classroom Lighting	Suspended Fluorescent Fixtures	5 to 10			\$24,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
	LED lamps	5 to 10			\$11,000			
	Ballasts	20 to 25					\$17,000	
Service Room Lighting	Surface-mount Fluorescent Fixtures	5 to 10			\$2,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
	LED lamps	5 to 10			\$1,000			
	Ballasts	20 to 25					\$2,000	
Gymnasium lighting	Surface-mount Fluorescent Fixtures	6 to 8			\$11,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
	LED lamps	5 to 10			\$5,000			
	Ballasts	20 to 25					\$7,000	
Exterior lighting	Wall-mount HID Fixtures	5 to 10			\$6,000			Energy reduction available with LED fixtures
	HID Lamps	3 to 5		\$2,500				

Fire Alarm

Fire Alarm panel	Control panel	12 to 15				\$20,000		Batteries to be replaced every 5-8 years
	Annunciator panel	12 to 15				\$3,000		
	Batteries	3 to 5		\$1,000	\$1,000	\$1,000		
Devices	Bells	8 to 10			\$4,000			Heat detectors to be replaced every 10-12 years
	Pull Stations	8 to 10			\$3,000			
	Heat Detector(s)	5 to 8			\$1,000			

Life Safety

Emergency lighting	Remote fixtures	6 to 10			\$2,000			Gymnasium only Batteries require replacement every 5-8 years
	Batteries	3 to 5		\$1,000		\$1,000		
Exit signs	Red Text based Signs	6 to 10			\$3,000			Batteries require replacement every 5-8 years
	Batteries	3 to 5		\$1,500		\$1,500		

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**ECOLE PAULINE JOHNSON
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: August 15, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Service Disconnect	Amalgamated Electric	Exceeds maximum recommended
Distribution Panels	<i>Various manufacturers</i>	
	Westinghouse	Exceeds maximum recommended
	Federal Pioneer	Exceeds maximum recommended
	Square D	6-10 years
Electrical Room Equipment	<i>Various manufacturers</i>	
	Amalgamated Electric	Exceeds maximum recommended
	Federal Pioneer	Exceeds maximum recommended
	Square D	3-5 years

Condition Summary

- Service disconnect has been replaced from the original installed unit but exceeds the maximum recommended service life and should be replaced.
- Distribution equipment located in the Electrical room consists of panels, disconnects and splitters from the original construction and additions/renovations over the years. Most of this equipment has exceeded the recommended lifespan and should be replaced.
- Distribution panels include multiple manufacturers from various vintages. Panels appear to be in good condition and should be replaced based on age.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Classroom Lighting	T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Service Room Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Gymnasium Lighting	Surface Fluorescent Fixtures	6-8 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Fluorescent lamps and ballasts have been changed to LED replacement tubes and new ballasts this year. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- Exterior lighting fixtures should be replaced with LED fixtures to reduce energy consumption.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards FireShield Plus	12-15 years
Annunciator Panel	LED with zone labels	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detector	Standard, Smoke	3-5 years
Detector	Standard, Heat	6-8 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Self-contained fixtures	Near or exceeds maximum recommended
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be 25-30 years old and should be replaced in the near future.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Ecole Pauline Johnson

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future	
OVERALL ESTIMATED COSTS	\$363,000	\$54,000	\$7,500	\$184,000	\$26,500	\$91,000	Estimate based on Fixture replacement (no ballast/relamp 5-15 years)

Electrical Distribution

Main service equipment	Service disconnect	0	\$10,000				
Distribution panels	Electrical Room Equipment Distribution Panels	Varied Varied	\$12,000 \$14,000		\$3,000 \$5,000		

Lighting

Hallway lighting	T-Bar Fluorescent Fixtures LED lamps Ballasts	5 to 10 5 to 10 20 to 25			\$39,000 \$12,000		\$28,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Classroom Lighting	Surface/T-Bar Fluorescent Fixtures LED lamps Ballasts	5 to 10 5 to 10 20 to 25			\$72,000 \$31,000		\$51,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Service Room Lighting	Surface-mount Fluorescent Fixtures LED lamps Ballasts	5 to 10 5 to 10 20 to 25			\$7,000 \$3,000		\$5,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Gymnasium lighting	Surface-mount Fluorescent Fixtures LED lamps Ballasts	6 to 8 5 to 10 20 to 25			\$10,000 \$5,000		\$7,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Exterior lighting	Wall-mount HID Fixtures HID Lamps	5 to 10 3 to 5		\$4,000	\$10,000			Energy reduction available with LED fixtures

Fire Alarm

Fire Alarm panel	Control panel Annunciator panel Batteries	12 to 15 12 to 15 3 to 5		\$1,000	\$1,000	\$20,000 \$3,000 \$1,000		Batteries to be replaced every 5-8 years
Devices	Bells Pull Stations Smoke Detector(s) Heat Detector(s)	8 to 10 8 to 10 3 to 5 5 to 8		\$1,000	\$14,000 \$9,000 \$1,000 \$2,000	\$1,000		Detectors to be replaced every 5-8 years Heat Detectors to be replaced every 10 to 12 years

Life Safety

Emergency lighting	Self-contained fixtures Batteries	<1 3 to 5	\$18,000		\$2,000			Batteries require replacement every 5-8 years following new fixture installation
Exit signs	Red Text based Signs Batteries	6 to 10 3 to 5		\$1,500	\$9,000	\$1,500		Batteries require replacement every 5-8 years

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**RIDGEVIEW ELEMENTARY SCHOOL
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: July 10, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Service Disconnect	ITE	Exceeds maximum recommended
Distribution Panels	Square D	6-10 years
Electrical Room Equipment	<i>Various manufacturers</i>	
	Commander	Exceeds maximum recommended
	Square D	6-10 years

Condition Summary

- Service disconnect has been replaced from the original installed unit and appears to be in good condition.
- Distribution equipment located in the Electrical room consists of panels, disconnects and splitters from the original construction and renovations in the 1960s. Most of this equipment has exceeded the recommended lifespan and should be replaced. Some still appears to be in good condition.
- Distribution panels appear to be in good condition.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years

Classroom Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Service Room Lighting	Suspended Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Gymnasium Lighting	Surface Fluorescent Fixtures	6-8 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Fluorescent lamps and ballasts have been changed to LED replacement tubes and new ballasts this year. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- Exterior lighting fixtures should be replaced with LED fixtures to reduce energy consumption.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards FireShield	12-15 years
Annunciator Panel	LED with zone labels	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detector	Standard, Heat	6-8 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Self-contained fixtures	6-10 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be in good condition.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Ridgeview Elementary School

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future	

OVERALL ESTIMATED COSTS	\$361,000	\$20,000	\$8,500	\$213,000	\$27,500	\$92,000	Estimate based on Fixture replacement (no ballast/relamp 5-15 years)
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Electrical Distribution

Main service equipment	Service disconnect	0	\$10,000					
Distribution panels	Electrical Room Equipment	Varied	\$10,000		\$8,000			
	Distribution Panels	6 to 10			\$15,000			

Lighting

Hallway lighting	T-Bar Fluorescent Fixtures	5 to 10			\$37,000			
	LED lamps	5 to 10			\$11,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$27,000	Ballast replacement timeline only if fixtures not replaced
Classroom Lighting	Surface Fluorescent Fixtures	5 to 10			\$66,000			
	LED lamps	5 to 10			\$29,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$48,000	Ballast replacement timeline only if fixtures not replaced
Service Room Lighting	Suspended Fluorescent Fixtures	5 to 10			\$13,000			
	LED lamps	5 to 10			\$6,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$10,000	Ballast replacement timeline only if fixtures not replaced
Gymnasium lighting	Surface-mount Fluorescent Fixtures	6 to 8			\$11,000			
	LED lamps	5 to 10			\$5,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$7,000	Ballast replacement timeline only if fixtures not replaced
Exterior lighting	Wall-mount HID Fixtures	5 to 10			\$10,000			Energy reduction available with LED fixtures
	HID Lamps	3 to 5		\$4,000				

Fire Alarm

Fire Alarm panel	Control panel	12 to 15				\$20,000		
	Annunciator panel	12 to 15				\$3,000		
	Batteries	3 to 5		\$1,000	\$1,000	\$1,000		Batteries to be replaced every 5-8 years
Devices	Bells	8 to 10			\$14,000			
	Pull Stations	8 to 10			\$9,000			
	Heat Detector(s)	5 to 8			\$2,000			Heat Detectors to be replaced every 10 to 12 years

Life Safety

Emergency lighting	Self-contained fixtures	6 to 10			\$18,000			
	Batteries	3 to 5		\$2,000		\$2,000		Batteries require replacement every 5-8 years
Exit signs	Red Text based Signs	6 to 10			\$9,000			
	Batteries	3 to 5		\$1,500		\$1,500		Batteries require replacement every 5-8 years

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**ROCKRIDGE SECONDARY SCHOOL
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: July 17, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Main Switchgear	Cutler Hammer	16-20 years
Distribution Panels	Cutler Hammer	6-10 years
Electrical Room Equipment	Cutler Hammer	6-10 years

Condition Summary

- All electrical service and distribution gear appear to be from the original construction in 1994. The equipment appears to be in good condition and well-maintained.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	Suspended Fluorescent	5-10 years
	Fixtures	
	Fluorescent Lamps	3-5 years
	Suspended CFL High Bay	5-10 years
	Fixtures	
	Flush-mounted CFL Pot	5-10 years
	Lights	
	CFL Bulbs	3-5 years
	Ballasts	10-15 years

Classroom Lighting	Suspended Fluorescent Fixtures	5-10 years
	Fluorescent Lamps	3-5 years
	Ballasts	10-15 years
Service Room Lighting	Surface Fluorescent Fixtures	5-10 years
	Fluorescent Lamps	3-5 years
	Ballasts	10-15 years
Gymnasium Lighting	Surface Fluorescent Fixtures	6-8 years
	Fluorescent Lamps	3-5 years
	Ballasts	10-15 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Regular replacement of the lamps will be required until fixtures are replaced with LED fixtures.
- All light fixtures can be replaced with LED fixtures to reduce energy consumption.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards EST 2	3-5 years
Annunciator Panel	LED with zone labels	6-10 years
Batteries	Standard	3-5 years
Pull Stations	Standard	10-12 years
Bells/strobes	Standard	10-12 years
Detector	Standard, Smoke	3-5 years
Detector	Standard, Heat	6-8 years

Condition Summary

- Fire Alarm panel appears to be from the original fire alarm installation and in good condition. Panel should be replaced as it is nearing the end of the recommended maximum service life.
- Bells and pull stations appear to be from the original fire alarm installation and in good condition.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Self-contained fixtures	6-10 years
	Remote fixtures	10-15 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be in good condition.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Rockridge Secondary School

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
OVERALL ESTIMATED COSTS		\$936,000	\$0	\$198,500	\$576,000	\$101,500	\$60,000	Estimate based on Fixture replacement (no ballast/relamp 5-15 years)
Electrical Distribution								
Main service equipment	Main Switchgear	15+					\$60,000	
Distribution panels	Electrical Room Equipment	6 to 10			\$25,000			
	Distribution Panels	6 to 10			\$120,000			
Lighting								
	Suspended Fluorescent Fixtures	5 to 10			\$45,000			Energy reduction available with LED fixtures
	Fluorescent Lamps	3 to 5		\$15,000		\$15,000		Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
Hallway lighting	Suspended CFL High Bay Fixtures	5 to 10			\$60,000			Energy reduction available with LED fixtures
	Flush-mounted CFL Pot Lights	5 to 10			\$12,000			Energy reduction available with LED fixtures
	CFL Bulbs	3 to 5		\$23,000		\$23,000		Bulb costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	10 to 15				\$74,000		Ballast replacement timeline only if fixtures not replaced
	Suspended Fluorescent Fixtures	5 to 10			\$171,000			Energy reduction available with LED fixtures
	Fluorescent Lamps	3 to 5		\$74,000		\$74,000		Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
Classroom Lighting	Ballasts	10 to 15				\$122,000		Ballast replacement timeline only if fixtures not replaced
	Surface-mount Fluorescent Fixtures	5 to 10			\$28,000			Energy reduction available with LED fixtures
	Fluorescent Lamps	3 to 5		\$12,000		\$12,000		Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
Service Room Lighting	Ballasts	10 to 15				\$20,000		Ballast replacement timeline only if fixtures not replaced
	Surface-mount Fluorescent Fixtures	6 to 8			\$40,000			Energy reduction available with LED fixtures
	Fluorescent Lamps	3 to 5		\$18,000		\$18,000		Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
Gymnasium lighting	Ballasts	10 to 15				\$25,000		Ballast replacement timeline only if fixtures not replaced
	Wall-mount HID Fixtures	5 to 10			\$20,000			Energy reduction available with LED fixtures
Exterior lighting	HID Lamps	3 to 5		\$8,000		\$8,000		Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
Fire Alarm								
	Control panel	3 to 5		\$40,000				
	Annunciator panel	6 to 10			\$7,000			
Fire Alarm panel	Batteries	3 to 5		\$1,000	\$1,000	\$1,000		Batteries to be replaced every 5-8 years
	Bells/strobes	10 to 12				\$40,000		
	Pull Stations	10 to 12				\$24,000		
Devices	Smoke Detector(s)	3 to 5		\$1,000	\$1,000	\$1,000		Detectors to be replaced every 5-8 years
	Heat Detector(s)	6 to 8			\$2,000			Heat Detectors to be replaced every 10 to 12 years
Life Safety								
	Self-contained fixtures	6 to 10			\$20,000			
	Remote fixtures	10 to 15				\$29,000		
Emergency lighting	Batteries	3 to 5		\$5,000		\$5,000		Batteries require replacement every 5-8 years
	Red Text based Signs	6 to 10			\$24,000			
Exit signs	Batteries	3 to 5		\$1,500		\$1,500		Batteries require replacement every 5-8 years

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**ECOLE SENTINEL SECONDARY SCHOOL
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: August 15, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Main Service Disconnect	EP	Exceeds maximum recommended
Main Switchgear	<i>Various manufacturers</i>	
	Bulldog Electric	Exceeds maximum recommended
	Siemens	6-10 years
	Square D	Exceeds maximum recommended
Distribution Panels	<i>Various manufacturers</i>	
	Bulldog Electric	Exceeds maximum recommended
	ITE	Exceeds maximum recommended
	Federal Pioneer	Exceeds maximum recommended
	Cutler Hammer	6-10 years
	Square D	6-10 years

Condition Summary

- Main Service disconnect is from the original construction of the building in 1961. The service transformers are installed in a vault within the building which is no longer standard practice from BC Hydro. It is unclear when the most recent servicing was completed by BC Hydro. Maintenance should be requested from BC Hydro.
- The main switchgear consists of three separate fused panels from various vintages including the initial construction, 1960s additions and renovations sometime in the 1980s/1990s.
- Distribution panels throughout the school include multiple manufacturers from various vintages. Panels appear to be in good condition and should be replaced based on age.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	LED Pot Light Fixtures	15-20 years
	T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Classroom Lighting	Suspended/T-Bar	5-10 years
	Fluorescent Fixtures	
	LED Lamps	5-10 years
	Ballasts	20-25 years
Service Room Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Gymnasium Lighting	Surface Fluorescent Fixtures	6-8 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted/Suspended	5-10 years
	HID Fixtures	
	HID Lamps	3-5 years

Condition Summary

- Fluorescent lamps and ballasts have been changed to LED replacement tubes and new ballasts this year. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- New LED pot light fixtures were installed this year.

- Exterior lighting fixtures should be replaced with LED fixtures to reduce energy consumption.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards EST 2	12-15 years
Annunciator Panel	LED with map	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detector	Standard, Smoke	3-5 years
Detector	Standard, Heat	6-8 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Self-contained fixtures	6-10 years
	Remote fixtures	10-15 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be in good condition.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Ecole Sentinel Secondary School

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future	

OVERALL ESTIMATED COSTS \$1,195,000 \$120,000 \$24,000 \$666,000 \$116,000 \$269,000 Estimate based on Fixture replacement (no ballast/relamp 5-15 years)

Electrical Distribution

Main service equipment	Service disconnect	0	\$30,000					Does not include potential costs for BC Hydro servicing change to remove transformers from the underground vault
	Main Switchgear	Varied	\$45,000		\$15,000			
Distribution panels	Distribution Panels	Varied	\$45,000		\$63,000			

Lighting

Hallway lighting	LED Potlights	15+			\$77,000			2018 upgrade
	T-Bar Fluorescent Fixtures	5 to 10			\$31,000			
	LED lamps	5 to 10			\$13,000			
	Ballasts	20 to 25				\$31,000		
Classroom Lighting	Surface/T-Bar Fluorescent Fixtures	5 to 10			\$235,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
	LED lamps	5 to 10			\$101,000			
	Ballasts	20 to 25				\$168,000		
Service Room Lighting	Surface-mount Fluorescent Fixtures	5 to 10			\$59,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
	LED lamps	5 to 10			\$26,000			
	Ballasts	20 to 25				\$43,000		
Gymnasium lighting	Surface-mount Fluorescent Fixtures	6 to 8			\$42,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
	LED lamps	5 to 10			\$19,000			
	Ballasts	20 to 25				\$27,000		
Exterior lighting	Wall-mount HID Fixtures	5 to 10			\$15,000			Energy reduction available with LED fixtures Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	HID Lamps	3 to 5		\$8,000				

Fire Alarm

Fire Alarm panel	Control panel	12 to 15				\$45,000		Batteries to be replaced every 5-8 years
	Annunciator panel	12 to 15				\$5,000		
	Batteries	3 to 5		\$2,000	\$2,000	\$2,000		
Devices	Bells	8 to 10			\$41,000			Detectors to be replaced every 5-8 years Heat Detectors to be replaced every 10 to 12 years
	Pull Stations	8 to 10			\$32,000			
	Smoke Detector(s)	3 to 5		\$3,000	\$3,000	\$3,000		
	Heat Detector(s)	5 to 8			\$6,000			

Life Safety

Emergency lighting	Self-contained fixtures	6 to 10			\$13,000			Batteries require replacement every 5-8 years
	Remote fixtures	10 to 15				\$50,000		
	Batteries	3 to 5		\$7,000		\$7,000		
Exit signs	Red Text based Signs	6 to 10			\$32,000			Batteries require replacement every 5-8 years
	Batteries	3 to 5		\$4,000		\$4,000		

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**WEST BAY ELEMENTARY SCHOOL
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: July 17, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Service Disconnect	Commander	Exceeds maximum recommended
Distribution Panels	<i>Various manufacturers</i>	
	Electrical Industries	Exceeds maximum recommended
	Amalgamated	Exceeds maximum recommended
	Cutler Hammer	6-10 years
	Square D	3-5 years
Electrical Room Equipment	<i>Various manufacturers</i>	
	Electrical Industries	Exceeds maximum recommended
	Amalgamated	Exceeds maximum recommended
	Federal Pioneer	Exceeds maximum recommended
	Taylor Electric	Exceeds maximum recommended
	Square D	3-5 years

Condition Summary

- Service disconnect has been replaced from the original installed unit but still exceeds the maximum recommended service life.
- Distribution equipment located in the Electrical room consists of panels, disconnects and splitters from the original construction and renovations over the years. Most of this equipment has exceeded the recommended lifespan and should be replaced.
- Distribution panels include multiple manufacturers from various vintages. Panels appear to be in good condition and should be replaced based on age.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Classroom Lighting	Suspended/T-Bar	5-10 years
	Fluorescent Fixtures	
	LED Lamps	5-10 years
	Ballasts	20-25 years
Service Room Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Gymnasium Lighting	Surface Fluorescent Fixtures	6-8 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Fluorescent lamps and ballasts have been changed to LED replacement tubes and new ballasts this year. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- Exterior lighting fixtures should be replaced with LED fixtures to reduce energy consumption.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Kidde	12-15 years
Annunciator Panel	LED with zone labels	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detector	Standard, Smoke	3-5 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Remote fixtures	10-15 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be in good condition.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

West Bay Elementary School

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
OVERALL ESTIMATED COSTS		\$361,000	\$39,000	\$9,500	\$199,000	\$28,500	\$85,000	Estimate based on Fixture replacement (no ballast/relamp 5-15 years)
Electrical Distribution								
Main service equipment	Service disconnect	0	\$10,000					
Distribution panels	Electrical Room Equipment Distribution Panels	Varied Varied	\$20,000 \$9,000		\$3,000 \$21,000			
Lighting								
Hallway lighting	T-Bar Fluorescent Fixtures LED lamps Ballasts	5 to 10 5 to 10 20 to 25			\$21,000 \$6,000		\$15,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Classroom Lighting	Surface/T-Bar Fluorescent Fixtures LED lamps Ballasts	5 to 10 5 to 10 20 to 25			\$66,000 \$29,000		\$47,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Service Room Lighting	Surface-mount Fluorescent Fixtures LED lamps Ballasts	5 to 10 5 to 10 20 to 25			\$19,000 \$9,000		\$14,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Gymnasium lighting	Surface-mount Fluorescent Fixtures LED lamps Ballasts	6 to 8 5 to 10 20 to 25			\$13,000 \$6,000		\$9,000	Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years Ballast replacement timeline only if fixtures not replaced
Exterior lighting	Wall-mount HID Fixtures HID Lamps	5 to 10 3 to 5		\$4,000	\$10,000			Energy reduction available with LED fixtures Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
Fire Alarm								
Fire Alarm panel	Control panel Annunciator panel Batteries	12 to 15 12 to 15 3 to 5		\$1,000	\$1,000	\$20,000 \$3,000 \$1,000		Batteries to be replaced every 5-8 years
Devices	Bells Pull Stations Smoke Detector(s)	8 to 10 8 to 10 3 to 5		\$1,000	\$9,000 \$9,000 \$1,000		\$1,000	Detectors to be replaced every 5-8 years
Life Safety								
Emergency lighting	Remote fixtures Batteries	6 to 10 3 to 5		\$2,000	\$17,000		\$2,000	Batteries require replacement every 5-8 years
Exit signs	Red Text based Signs Batteries	6 to 10 3 to 5		\$1,500	\$9,000		\$1,500	Batteries require replacement every 5-8 years

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**WEST VANCOUVER SECONDARY SCHOOL ANNEX
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: August 15, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
High Voltage Disconnect	English Electric	Exceeds maximum recommended
Main switchgear	EP	Exceeds maximum recommended
Distribution Panels	<i>Various manufacturers</i>	
	ITE	Exceeds maximum recommended
	Siemens	25-30 years
	Commander	Exceeds maximum recommended
	Square D	6-10 years

Condition Summary

- Main switchgear appears to be the original installed unit and in poor condition. This gear has far exceeded its recommended life and should be replaced immediately.
- High voltage disconnect and service transformers are installed in a vault within the building which is no longer standard practice from BC Hydro. It is unclear when the most recent servicing was completed by BC Hydro. Maintenance should be requested from BC Hydro.
- Distribution panels include multiple manufacturers from various vintages. Panels appear to be in good condition and should be replaced based on age.
- Panel B (Siemens) has been replaced in the past two years and will not require replacement for a 25-30 years.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Classroom Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Service Room Lighting	Suspended Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Fluorescent lamps and ballasts have been changed to LED replacement tubes and new ballasts this year. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- Exterior lighting fixtures should be replaced with LED fixtures to reduce energy consumption.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards FireShield	12-15 years
Annunciator Panel	LED with zone labels	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation.
- Fire Alarm batteries to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Remote fixtures	10-15 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be in good condition.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

West Vancouver Secondary School Annex

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS	
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future		
OVERALL ESTIMATED COSTS		\$288,000	\$36,000	\$6,500	\$136,000	\$38,500	\$71,000	Estimate based on Fixture replacement (no ballast/relamp 5-15 years)
Electrical Distribution								
Main service equipment	Main switchgear	0	\$30,000					Does not include any costs for changes to transformers in vault or HV switch
Distribution panels	Distribution Panels	Varied	\$6,000		\$3,000		\$3,000	
Lighting								
	Surface Fluorescent Fixtures	5 to 10			\$37,000			
Hallway lighting	LED lamps	5 to 10			\$11,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$26,000	Ballast replacement timeline only if fixtures not replaced
	Surface-mount Fluorescent Fixtures	5 to 10			\$44,000			
Classroom Lighting	LED lamps	5 to 10			\$19,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$32,000	Ballast replacement timeline only if fixtures not replaced
	Suspended Fluorescent Fixtures	5 to 10			\$14,000			
Service Room Lighting	LED lamps	5 to 10			\$7,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$10,000	Ballast replacement timeline only if fixtures not replaced
	Wall-mount HID Fixtures	5 to 10			\$6,000			Energy reduction available with LED fixtures
Exterior lighting	HID Lamps	3 to 5		\$2,000				
Fire Alarm								
	Control panel	12 to 15				\$15,000		
Fire Alarm panel	Annunciator panel	12 to 15				\$3,000		
	Batteries	3 to 5		\$1,000	\$1,000	\$1,000		Batteries to be replaced every 5-8 years
	Bells	8 to 10			\$15,000			
Devices	Pull Stations	8 to 10			\$8,000			
Life Safety								
Emergency lighting	Remote fixtures	10 to 15				\$16,000		
	Batteries	3 to 5		\$2,000		\$2,000		Batteries require replacement every 5-8 years
	Red Text based Signs	6 to 10			\$8,000			
Exit signs	Batteries	3 to 5		\$1,500		\$1,500		Batteries require replacement every 5-8 years

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**WEST VANCOUVER SECONDARY SCHOOL
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: August 15, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Main Switchgear	Federal Pioneer	3-5 years
Mechanical MCCs	<i>Various manufacturers</i>	
	Cutler Hammer	6-10 years
	Square D	6-10 years
Distribution Panels	<i>Various manufacturers</i>	
	Siemens	6-10 years
	Federal Pioneer	3-5 years
	Cutler Hammer	6-10 years
	General Electric	6-10 years
	Commander	Exceeds maximum recommended
	Square D	6-10 years

Condition Summary

- Main switchgear appears to have been replaced from the original installed unit and in good condition. This gear is nearing the end of its recommended life and should be replaced in the coming years.
- The motor control centers within the school appear to be in good condition.
- Distribution panels include multiple manufacturers from various vintages. Panels appear to be in good condition and should be replaced based on age.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	Decorative fixtures	5-8 years
	CFL Pot lights	5-10 years
	T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Classroom Lighting	Suspended/T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Service Room Lighting	Suspended Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Gymnasium Lighting	Surface Fluorescent Fixtures	6-8 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted HID Fixtures	5-10 years
	HID Lamps	3-5 years

Condition Summary

- Fluorescent lamps and ballasts have been changed to LED replacement tubes and new ballasts this year. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- Exterior lighting fixtures should be replaced with LED fixtures to reduce energy consumption.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards EST 3	12-15 years
Annunciator Panel	LED with map	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years
Detector	Standard, Smoke	3-5 years
Detector	Standard, Heat	6-8 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Self-contained fixtures	6-10 years
	Remote fixtures	10-15 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be in good condition.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

West Vancouver Secondary School

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future	

OVERALL ESTIMATED COSTS \$1,691,000 \$3,000 \$246,500 \$906,000 \$128,500 \$407,000 Estimate based on Fixture replacement (no ballast/relamp 5-15 years)

Electrical Distribution

Main service equipment	Main Switchgear	3 to 5		\$40,000				
Distribution panels	Mechanical MCCs	6 to 10			\$50,000			
	Distribution Panels	Varied	\$3,000	\$186,000	\$30,000			

Lighting

Hallway lighting	Decorative fixtures	5 to 8			\$28,000			
	Pot Lights	5 to 10			\$28,000			
	T-Bar Fluorescent Fixtures	5 to 10			\$70,000			
	LED lamps	5 to 10			\$23,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25				\$42,000		Ballast replacement timeline only if fixtures not replaced
Classroom Lighting	Suspended/T-Bar Fluorescent Fixtures	5 to 10			\$327,000			
	LED lamps	5 to 10			\$140,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25				\$233,000		Ballast replacement timeline only if fixtures not replaced
Service Room Lighting	Suspended Fluorescent Fixtures	5 to 10			\$125,000			
	LED lamps	5 to 10			\$55,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25				\$89,000		Ballast replacement timeline only if fixtures not replaced
Gymnasium lighting	Surface-mount Fluorescent Fixtures	6 to 8			\$68,000			
	LED lamps	5 to 10			\$30,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25				\$43,000		Ballast replacement timeline only if fixtures not replaced
Exterior lighting	Wall-mount HID Fixtures	5 to 10			\$15,000			Energy reduction available with LED fixtures
	HID Lamps	3 to 5		\$6,000				Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years

Fire Alarm

Fire Alarm panel	Control panel	12 to 15				\$50,000		
	Annunciator panel	12 to 15				\$3,000		
	Batteries	3 to 5		\$3,000	\$3,000	\$3,000		Batteries to be replaced every 5-8 years
Devices	Bells	8 to 10			\$45,000			
	Pull Stations	8 to 10			\$44,000			
	Smoke Detector(s)	3 to 5		\$1,000	\$1,000	\$1,000		Detectors to be replaced every 5-8 years
	Heat Detector(s)	5 to 8			\$2,000			Heat Detectors to be replaced every 10 to 12 years

Life Safety

Emergency lighting	Self-contained fixtures	6 to 10			\$26,000			
	Self-contained fixtures	10 to 15				\$61,000		
	Batteries	3 to 5		\$9,000		\$9,000		Batteries require replacement every 5-8 years
Exit signs	Red Text based Signs	6 to 10			\$44,000			
	Batteries	3 to 5		\$1,500		\$1,500		Batteries require replacement every 5-8 years

**SCHOOL DISTRICT 45 (WEST VANCOUVER)
2018 FACILITY REVIEWS**

**WESTCOT ELEMENTARY SCHOOL
ELECTRICAL SYSTEMS ASSESSMENT**

Date of Site Review: July 10, 2018
Reviewed by: Craig Reitmeier, P.Eng.

DISTRIBUTION SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Service Disconnect	Federal Pioneer	Exceeds maximum recommended
Distribution Panels	<i>Various manufacturers</i>	
	Amalgamated	Exceeds maximum recommended
	Federal Pioneer	Exceeds maximum recommended
	Cutler Hammer	6-10 years
Electrical Room Equipment	<i>Various manufacturers</i>	
	Amalgamated Electric	Exceeds maximum recommended
	Federal Pioneer	Exceeds maximum recommended
	Square D	6-10 years

Condition Summary

- Service disconnect has been replaced from the original installed unit but exceeds the maximum recommended service life and should be replaced.
- Distribution equipment located in the Electrical room consists of panels, disconnects and splitters from the original construction and renovations over the years. Most of this equipment has exceeded the recommended lifespan and should be replaced.
- Distribution panels include multiple manufacturers from various vintages. Panels appear to be in good condition and should be replaced based on age.

LIGHTING SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Hallway Lighting	T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Classroom Lighting	Suspended/T-Bar Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Service Room Lighting	Surface Fluorescent Fixtures	5-10 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Gymnasium Lighting	Surface Fluorescent Fixtures	6-8 years
	LED Lamps	5-10 years
	Ballasts	20-25 years
Exterior Lighting	Wall-mounted LED Fixtures	10-15 years

Condition Summary

- Fluorescent lamps and ballasts have been changed to LED replacement tubes and new ballasts this year. Regular replacement of the lamps will be required until the fixtures are replaced with LED fixtures.
- Exterior lighting fixtures have been recently replaced to LED and appear to be in good condition.

FIRE ALARM SYSTEM

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Control Panel	Edwards FireShield Plus	12-15 years
Annunciator Panel	LED with zone labels	12-15 years
Batteries	Standard	3-5 years
Pull Stations	Standard	8-10 years
Bells	Standard	8-10 years

Condition Summary

- Fire Alarm panel is recently installed and in good condition.
- Bells and pull stations appear to be from the original fire alarm installation.
- Fire Alarm batteries and detectors to be replaced every 5 to 8 years.

LIFE SAFETY SYSTEMS

<u>Equipment</u>	<u>Type</u>	<u>Remaining Service Life</u>
Emergency Lighting	Self-contained fixtures	6-10 years
	Remote fixtures	10-15 years
	Batteries	3-5 years
Exit Signs	Red Text based signs	6-10 years
	Batteries	3-5 years

Condition Summary

- Emergency lights appear to be in good condition but do not appear to be sufficient to provide the necessary coverage.
- Emergency light lamps can be replaced with LED lamps for extended runtime and reduced energy usage.
- Battery packs within emergency lights and exit signs should be replaced every 5 to 8 years.
- Exit signs are operational but style does not match current building code.

Westcot Elementary School

EQUIPMENT	ESTIMATED REMAINING SERVICE LIFE	ESTIMATED REPLACEMENT COST (2018 Baseline)					COMMENTS
		Immediate	1-5 Years	6-10 Years	11-15 Years	Future	

OVERALL ESTIMATED COSTS \$349,000 \$43,000 \$4,500 \$164,000 \$51,500 \$86,000 Estimate based on Fixture replacement (no ballast/relamp 5-15 years)

Electrical Distribution

Main service equipment	Service disconnect	0	\$10,000					
Distribution panels	Electrical Room Equipment	Varied	\$18,000		\$4,000			
	Distribution Panels	Varied	\$15,000		\$3,000			

Lighting

Hallway lighting	T-Bar Fluorescent Fixtures	5 to 10			\$28,000			
	LED lamps	5 to 10			\$8,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$20,000	Ballast replacement timeline only if fixtures not replaced
Classroom Lighting	Surface/T-Bar Fluorescent Fixtures	5 to 10			\$65,000			
	LED lamps	5 to 10			\$28,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$47,000	Ballast replacement timeline only if fixtures not replaced
Service Room Lighting	Surface-mount Fluorescent Fixtures	5 to 10			\$14,000			
	LED lamps	5 to 10			\$6,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$10,000	Ballast replacement timeline only if fixtures not replaced
Gymnasium lighting	Surface-mount Fluorescent Fixtures	6 to 8			\$15,000			
	LED lamps	5 to 10			\$7,000			Lamp costs not necessary if fixtures are replaced. Relamp every 5-8 years
	Ballasts	20 to 25					\$9,000	Ballast replacement timeline only if fixtures not replaced
Exterior lighting	Wall-mount LED Fixtures	10 to 15				\$10,000		

Fire Alarm

Fire Alarm panel	Control panel	12 to 15				\$20,000		
	Annunciator panel	12 to 15				\$3,000		
	Batteries	3 to 5		\$1,000	\$1,000	\$1,000		Batteries to be replaced every 5-8 years
Devices	Bells	8 to 10			\$12,000			
	Pull Stations	8 to 10			\$9,000			

Life Safety

Emergency lighting	Self-contained fixtures	6 to 10			\$4,000			
	Remote fixtures	10 to 15				\$14,000		
	Batteries	3 to 5		\$2,000		\$2,000		Batteries require replacement every 5-8 years
Exit signs	Red Text based Signs	6 to 10			\$9,000			
	Batteries	3 to 5		\$1,500		\$1,500		Batteries require replacement every 5-8 years

Appendix B

Future Updates