Final Reports

London and Middlesex Housing Corporation (LMHC)

London, Ontario

2015 Facilities Condition Analysis

Submitted by:

VFA, Inc. an Accruent Company

James M. Streeter, Sr.Project Director

Andrew J. Daw, Project Manager

April 2016

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NOTE: Complete data is submitted separately in electronic format within the on-line licensed proprietary software database located the custom VFA.Facility URL on the internet. This printed (pdf) report includes only certain representative samples of selected reports. The data reports which form the basis of the information in this report were run 2015. Thus, since the date these reports were run, the data in the active database has changed somewhat.

ACKNOWLEDGEMENTS

VFA Canada extends our appreciation to London and Middlesex Housing Corporation (LMHC), and particularly to the Facilities Management Department Administrators and Staff, for the cooperation and assistance provided during this Assessment project. The successful completion of this project would not have been possible without their valuable guidance, cooperation and assistance. It was truly a team effort.

While we worked most closely on this project with Paul Roszell, Director, Assets & Property Services; Terry Calder, Construction Manager**;** Valerie McCourt, Manager, Property Services, Marlene Briggs; Assets & Property Services Coordinator, Josh Browne; Manager, Social Housing Administrations, there are many other key administrators and members of the project team who contributed many hours of time and helped to make the project a success. In particular, we certainly wish to thank the facilities staff members who served as escorts for our assessor teams, responded to our numerous questions about buildings and systems and operational procedures, and reviewed the draft data.

VFA hopes that the information provided as a result of this Assessment will prove to be a useful tool for furthering the overall aims, goals and objectives of London and Middlesex Housing Corporation (LMHC) in the years to come.

VFA CONTACTS

Mr. Lee Kaufman
VP, Assessment Services
lkaufman@accruent.com
617-772-8160

Mr. James Streeter, P.E.
Senior Director
jstreeter@accruent.com
617-772-8196

Mr. Andrew Daw
Project Manager
adaw@accruent.com
313-319-7309

Executive Summary Report

London and Middlesex Housing Corporation (LMHC)
London, Ontario

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Assessment Summary	
Buildings Assessed:	154 Assets
Total Asset Area (SF):	2,885,673
Replacement Value (CRV):	$621.3m
Average Asset Age:	46 Years
Average Asset 2 Year FCI:	.09 (9%)
Condition Range:	"Good"
2 Year FCI Renewal Cost	$56.8m
Average RI:	0.36 (36%)

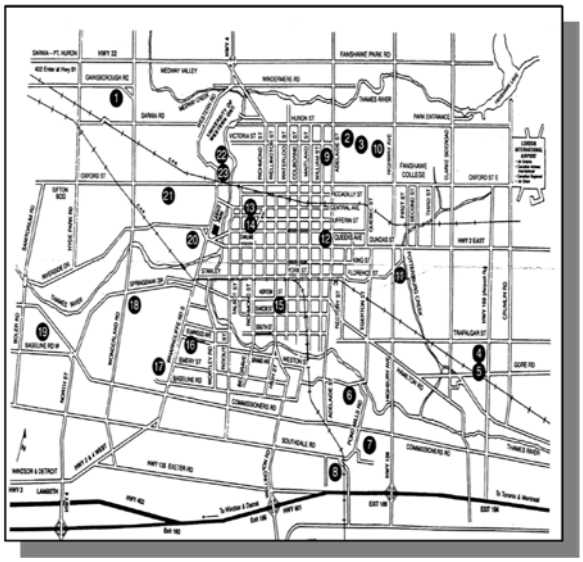


Figure 1: Location Map of LMHC Assets within London

Assessment Scope

In 2015, VFA, Canada Corporation, an Accruent Company conducted a Facility Condition Assessment (FCA) for London and Middlesex Housing Corporation (LMHC) in London, Ontario. The scope of work included the collection of all possible previously documented information relevant for conducting a condition assessment, field observation walk-through, input of the information into the ***VFA.facility*** capital planning and asset management software and subsequent reporting as follows with consideration of the unique functionality of public residential properties.

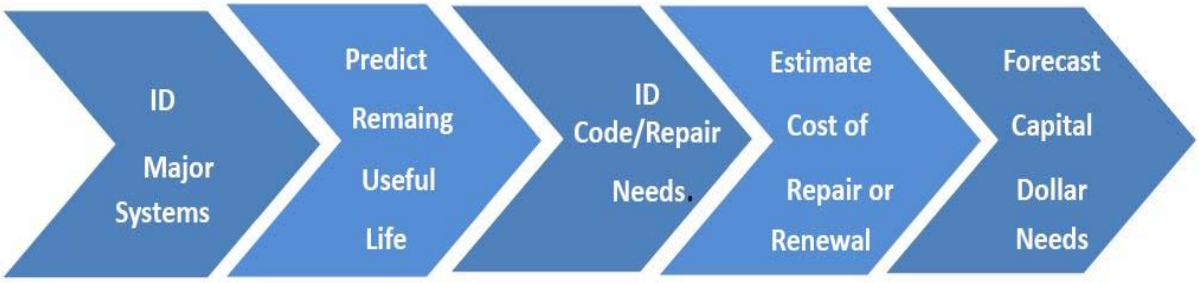
Methodology

The 2015 assessment followed a "Systems Model" approach that included an evaluation of each Asset's (Building and Site Component) Systems to establish their age, condition, and remaining useful lifetime. Theoretical useful "Lifetime" expectancies were established for each building system type based on the Building Owners & Managers Association (BOMA) average expected useful life values. With known installation year and average lifetime expected a predicted renewal of the system can be forecasted. As part of the condition assessment, VFA observed the condition of each system and through observation and discussion of maintenance practices, a secondary observed years remaining was recorded that may align to theoretical age expectancy or may be recorded as doing better or worse in terms of aging. System renewals are generated based on the observed years remaining of the systems.

The **Current Replacement Value** (CRV) was established for each system by taking unit counts of system quantity and multiplying by R.S. Means unit cost data. The total asset CRV (building or site) is based on the sum total of all its individual System CRV's. All costs are linked to current, nationally recognized, R. S. Means cost data values embedded in *VFA.facility* using specific line items, and are adjusted annually for inflation and market fluctuations.

Requirements, Actions, Priorities

In addition to System age and condition, the assessment's visual survey sought to identify major repairs, upgrades, and renewals anticipated within the next five years. For Systems with five years or less of their BOMA standard 'useful lifetime' remaining, or five years or less based on their observed condition, a "**Requirement**" was generated by the software for their renewal. In addition, Requirements were created for observed deficient conditions, and each assigned a priority based on when it was judged the corrective action should be performed. The priorities and their timing are based on years relative to the date of the assessment report. For each Requirement, a corrective '**Action**', with a brief scope description and estimated costs, was then created, using the Means cost data embedded in *VFA.facility*.



Assessment Findings – Asset FCIs

Using the data gathered in the field assessments, a **Facility Condition Index**, or FCI, was calculated for each building Asset, to establish a standard measure for comparing Asset condition. A FCI measures the condition of an asset (building, site element, portfolio, etc.) relative to its replacement value. FCI allows comparisons of the relative condition of buildings of different sizes, uses and cost. One absolute measure of condition could be the dollar value of its needs, which if used to help decide priorities, might tend to weigh large buildings more heavily all the time. The FCI is calculated as a ratio of the sum of the near term needs for an asset(s) divided by its replacement value. The definition of needs includes all past, current and projected needs of two years from date of assessment. The FCI excludes program needs, program change, needed upgrades and expansion.

$$FCI = \frac{\sum [\text{ Near Term 2 Year Needs, in \$\$}]}{\text{Current Replacement Value, in \$\$}}$$

IFMA Standard Condition Ratings, based on FCI - The higer the FCI the worse conditon of a building.

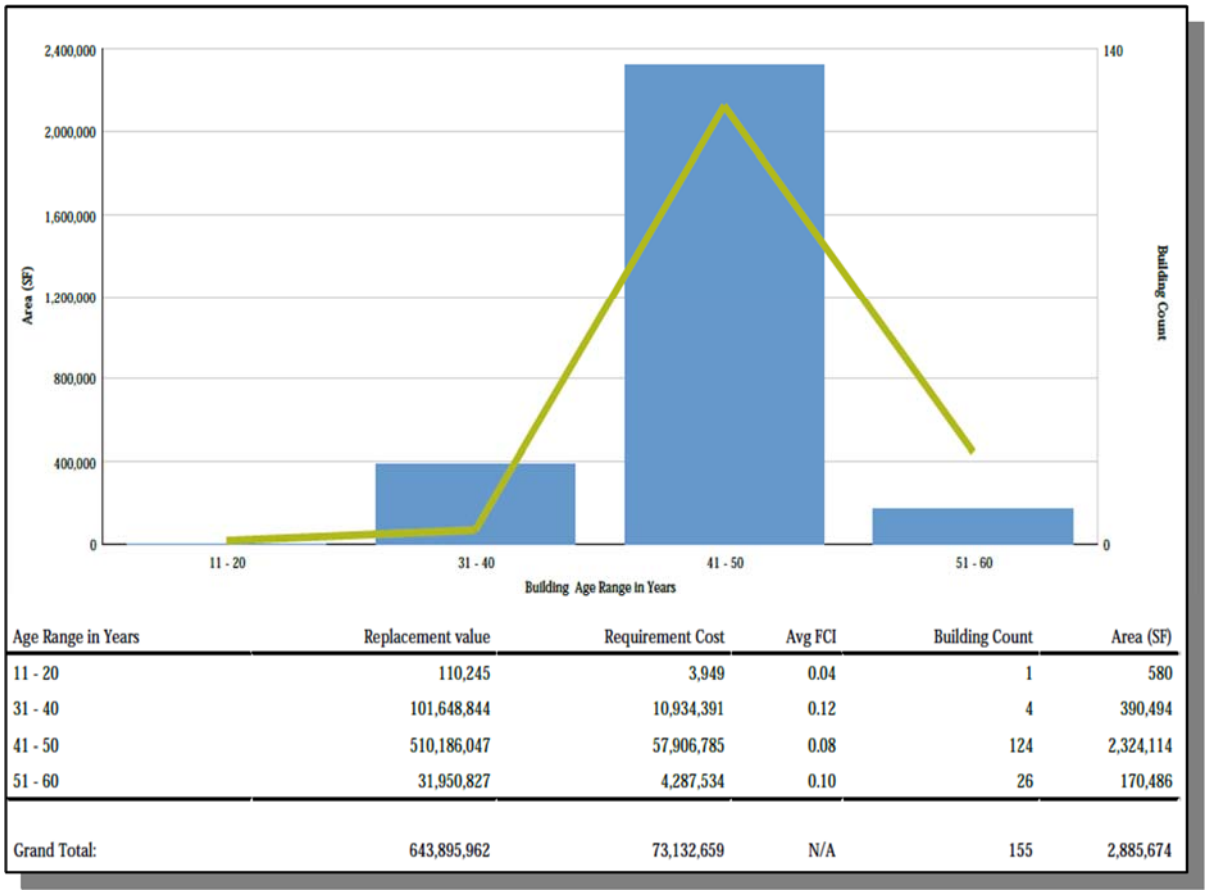
A **Facility Condition Index** (**FCI**) measures the condition of an asset (building, site element, portfolio, etc) relative to its replacement value. FCI allows comparisons of the *relative* condition of buildings of different sizes, uses and cost. (One *absolute* measure of condition could be the dollar value of its needs, which if used to help decide priorities, might tend to weigh large buildings more heavily all the time.) The FCI is calculated as a ratio of the sum of the near term needs for an asset(s) divided by its replacement value.

Assessment Findings – FCI Renewal Requirements

The 2 Year FCI of the building Assets assessed in 2015, as shown in **Figure 2**, is 9% of the Assets' calculated CRV. This FCI value represents an overall condition generally considered "*Good*" for the LMHC's assets under recognized standards used by the IFMA, APPA, large universities, and numerous other public and private organizations.

Figure 2: LMHC Campus Average FCI Asset Condition Scale (2-Year)

Overall, LMHC has been doing an appropriate job in maintaining their capital assets at a level that the industry would consider in good standing within the age distribution of the assets (**Figure 3**).



Age Range in Years	Replacement value	Requirement Cost	Avg FCI	Building Count	Area (SF)
11 - 20	110,245	3,949	0.04	1	580
31 - 40	101,648,844	10,934,391	0.12	4	390,494
41 - 50	510,186,047	57,906,785	0.08	124	2,324,114
51 - 60	31,950,827	4,287,534	0.10	26	170,486
Grand Total:	643,895,962	73,132,659	N/A	155	2,885,674

Figure 3: LMHC Asset Distribution by Age

Note that the FCI is just a snapshot however, and tells only part of the story. If we look out over the next twenty years, and the potential impact on the Asset FCIs if no capital investments are made during that time the condition of the building will decline significantly. Without significant investment, LMHC will not keep pace with their aging infrastructure and the FCI can be expected to increase

The FCI settings can be modified to include one or more years of requirements and renewals. Increasing the years included in the FCI will inherently increase the FCI as more $$ are being included in the numerator divided by the current replacement value. Referring to (**Figure 4**) below, FCI's were calculated based on 1, 2 and 5 year comparisons of Requirements and Renewals identified. The 1 year FCI of .04 or **4%** ("*Very Good*") represents the highest priority items and the most critical needs, of the Asset CRV. However the FCI increases to .40 or roughly **40%** within the 5 year scenario with the assets bordering on *"Poor"* condition. The increase to 40% assumes no capital spend occurs to address the requirements identified over the 5 year period. The increase also signifies a significant medium term capital re-investment is being projected of 31% of CRV. The underlying reason for this significant increase is that LMHC owns a large percentage of buildings that were constructed around the same time and therefore are all aging at similar rates. This has created a tidal wave of expected renewals coming due at the same time as a result of systems aging out at the same time across many buildings.

The Asset FCIs in the database provide LMHC with a means to readily benchmark and compare the condition of building Assets of different values, sizes, and uses across their portfolio, to identify areas of concern, and investigate funding needs.

Number of Assets (Apartment Housing)	Average Age	Total Size (SF)	Asset Replacement Value (CRV)	1 Year FCI	2 Year FCI	5 Year FCI
146	46	2,879,669	$4,400,748	4%	9%	40%

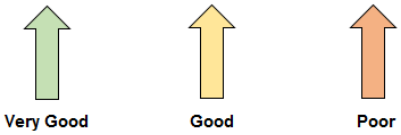


Figure 4: LMHC Campus Average FCI Asset Comparison (1-Year, 2-Year and 5- Year FCI)

ASSESSMENT FINDINGS - SCI

Similar to the FCI is the 'SCI' or **System Condition Index**. The SCI provides a measure of the relative condition of an Asset's, or group of Assets', major building Systems, and is the ratio of the total cost of Requirements needed to upgrade the system, divided by the total calculated replacement value of that system, and thus, the lower the SCI value, the better the observed condition of the system. System groups may be evaluated and reported by individual building Asset, groups of Assets, or by a base-wide 'roll-up'.

Figure 5, on the next page displays SCIs of the ten major Asset System groups across the LMHC Assets assessed in 2015. The building system groups with the highest SCI's, i.e., the poorest condition, are the Electrical Systems group with an average SCI at .66, or 66% of the total replacement value, followed by the *Exterior Enclosure, Fire Protection, Interior Construction, Plumbing & HVAC* needs, which is not unusual per the building types of public housing.

System Group and Priority	1- Due within 1 Year of Inspection	2- Due within 2 Years of Inspection	3- Due within 5 Years of Inspection	4- Not Time Based	Total
Electrical System	$0.4m	$11.4m	$35.1m	$0.4m	$47.4m
Equipment and Furnishings	$0	$0	$6.7m	$0	$6.7m
Exterior Enclosure	$0	$0.3m	$17.1m	$0.5m	$17.8m
Fire Protection	$0	$0	$4.1m	$0	$4.1m
Furnishings	$0	$0	$8.9m	$0	$8.9m
HVAC System	$0	$0.9m	$27.8m	$0.5m	$29.3m
Interior Construction and Conveyance	$0.1m	$1.9m	$77.6m	$0	$79.6m
Plumbing System	$0	$0.9m	$27.0m	$0	$27.9m
Site	$0.1m	$0.7m	$11.6m	$0	$12.4m
Structure	$0.0m	$0.3m	$0.2m	$0	$0.5m
Total	$0.7m	$16.4m	$216.1m	$1.4m	$234.6m

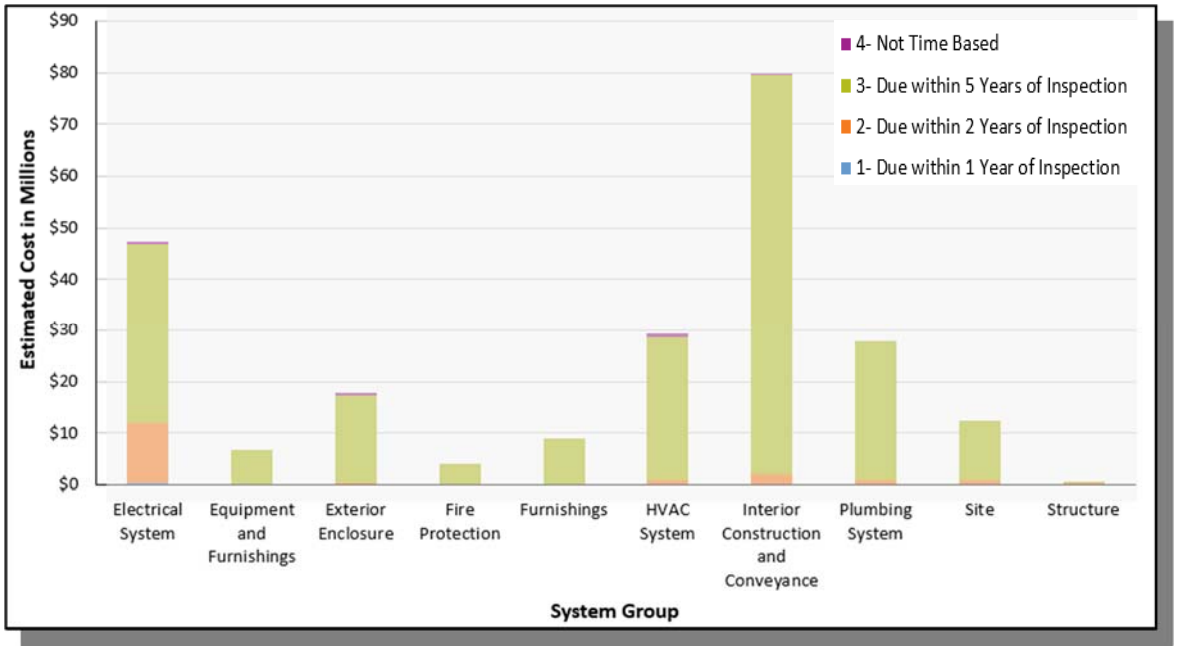


Figure 5: Needs (Requirements) Sorted by System Groups and by Priority in table and graph form

It is important to note that within the systems groups, designated funding within those groups may be addressed by ongoing operations and infrastructure maintenance through LMHC. For example repainting of interior walls or replacement of flooring might be funded by an annual maintenance program although a large capital investment is illustrated in **Figure 5** above.

The results of the $234.6m in total needs, $216.1m has been identified for full replacement within 5 years of the Inspection or 92% as compared to the Priority 1 (1%), Priority 2 (6%) and Priority 4 (1%).

These amounts are associated with **System Renewals** that have reached or exceeded their useful service life and as a result *should* be replaced in their entirety. Building systems that have reached or have exceeded their useful service life require higher levels of maintenance and repair dollars annually. With that, a Renewal Percentage is assigned in response to the question: "At the end of its useful life, what % of this System will need to be 'renewed'?" For foundations, for example, where end of useful life may mean minor loss of damproofing or minor cracking or spalling, the Renewal percentage is less than 10% (partial repairs). For systems, where the existing system needs to be removed entirely in order to achieve full renewal, incurring demolition and disposal costs and perhaps interfering with adjacent systems, the Renewal Percentage may be 125%.

As systems reach or exceed their intended useful life, the risk of sudden failure increases that could render the use of a facility unacceptable. Increases in efficiencies may also be a deciding factor to renew or partial replacement of a specific system. The financial requirements may seem significant over the next 5 years that should raise a sense of urgency, but not panic at this point. A look at the long-term plan to address these funding needs, investigating the specific system groups that are unique to public housing type is required for more strategic capital planning to address the current and future renewal needs.

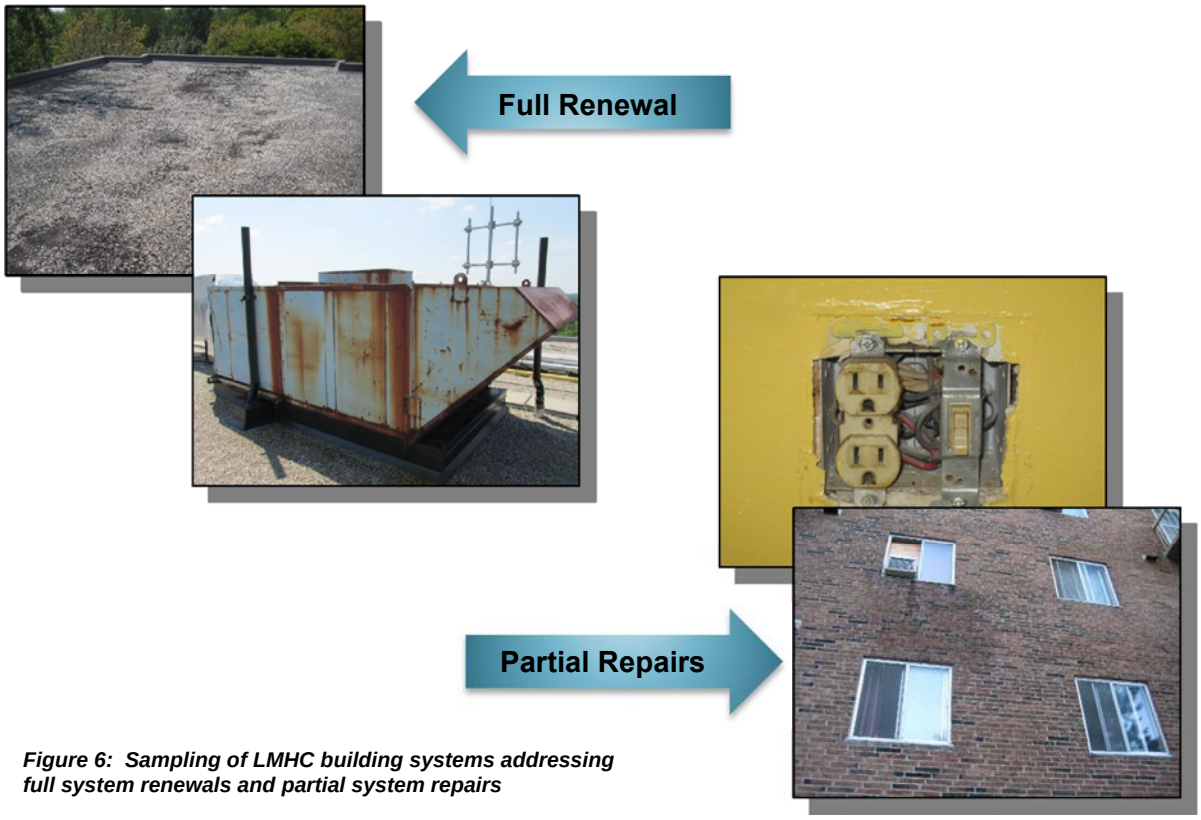
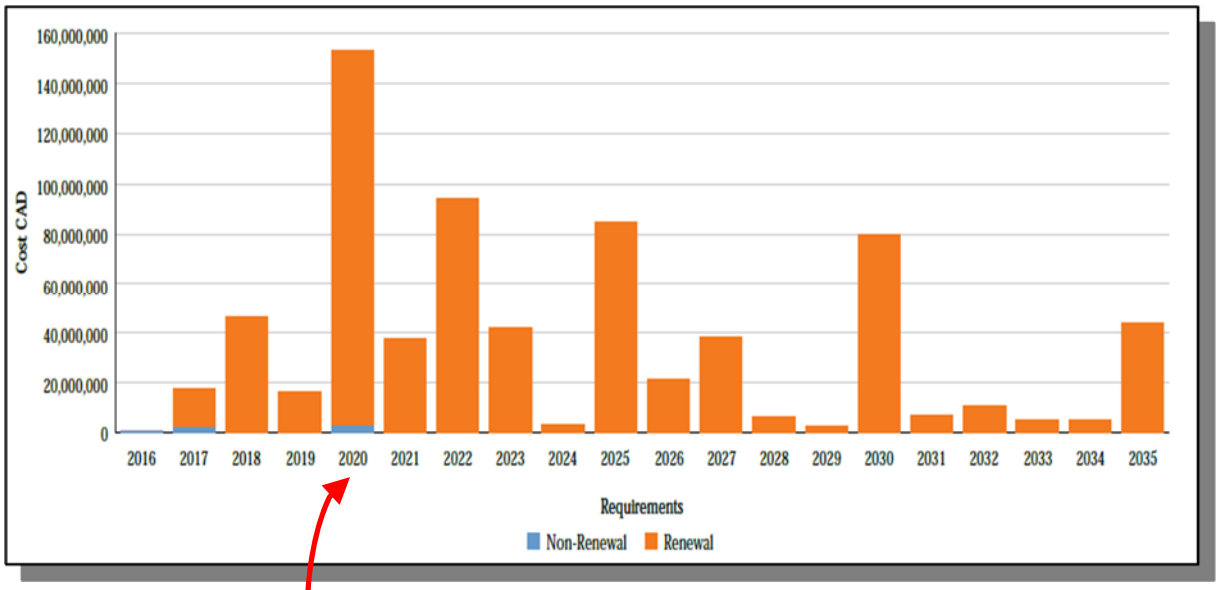


Figure 6: Sampling of LMHC building systems addressing full system renewals and partial system repairs

FUNDING NEEDS

With the capture of condition data into the *VFA.facility* software, we can analyze the funding needs required by year as well as evaluate levels of funding and its impact on facility conditions over time. The funding levels shown in **Figure 7,** below**,** would eliminate all deferred maintenance known or anticipated over the next twenty years and beyond.



Year	Renewal Requirements	Non-Renewal Requirements	Total
2016	11,009	169,954	180,963
2017	15,301,829	2,017,577	17,319,406
2018	46,570,855	0	46,570,855
2019	16,070,087	0	16,070,087
2020	150,579,264	2,756,256	153,335,520
2021	37,310,186	0	37,310,186
2022	94,187,486	0	94,187,486
2023	42,109,084	0	42,109,084
2024	2,874,117	0	2,874,117
2025	84,647,125	0	84,647,125
2026	21,180,885	0	21,180,885
2027	37,863,418	0	37,863,418
2028	6,339,643	0	6,339,643
2029	2,294,200	0	2,294,200
2030	79,409,966	0	79,409,966
2031	6,434,209	0	6,434,209
2032	10,539,880	0	10,539,880
2033	4,884,030	0	4,884,030
2034	5,039,717	0	5,039,717
2035	43,785,815	0	43,785,815
Total	707,432,805	4,943,787	712,376,592

Figure 7: Summary of 20 year Funding Needs by Requirement Type and Year

Funding needs are separated by complete renewals of building systems and requirements addressing system repairs ***and*** partial system replacements. For example, identified major HVAC systems may not require a full replacement, but repairs of specific components would extend the lifetime as with a Fire Panel replacement may not need to change wiring, only the specific front and end devices.

FUNDING SCENARIOS

Although the assets are aging in uniform manner due to the proximity of lifetime, building type and current capital planning, the strategy to address these future challenges (both in the short and long term) will be analyzed in the following pages.

With the Asset condition data contained in the database, and using the Funding Module within *VFA.facility*, we can examine various funding strategies, analyze their fiscal implications over various time periods, and project the impact of deferred maintenance, for individual Assets, specific sites, or across the entire portfolio. Values, either assumed or measured, and different time ranges, can be entered into the funding module for analysis purposes, to see their cost implications and to project their impact on facility conditions over time.

To show the analysis potential of the database in *VFA.facility*, ***Figure 6***, depicts the results of three potential funding scenarios, applied to the all the assessed LMHC Assets, projected out over 20 years. In these examples, the costs for annual system renewals are included in the analysis, an industry standard 2% deferment penalty is applied year to year for carrying a maintenance backlog forward, and to simplify the comparison, an annual inflation rate of 0% is assumed over the time period examined.

Scenario	Total Applied Funding	Average per Year	Annual Cost per SF	% of CRV	Ending FCI
Maintain FCI	$467.5m	$23.4m	$8.10	3.8%	0.09
Target (Specific FCI)	$270.6m	$13.5m	$4.69	2.2%	0.40
Extrapolate (Speicfic) Funding	$44.2m	$2.2m	$0.77	0.4%	0.75

Figure 6: Three LMHC Funding Chart Scenarios with impact on FCI compared over 20 years

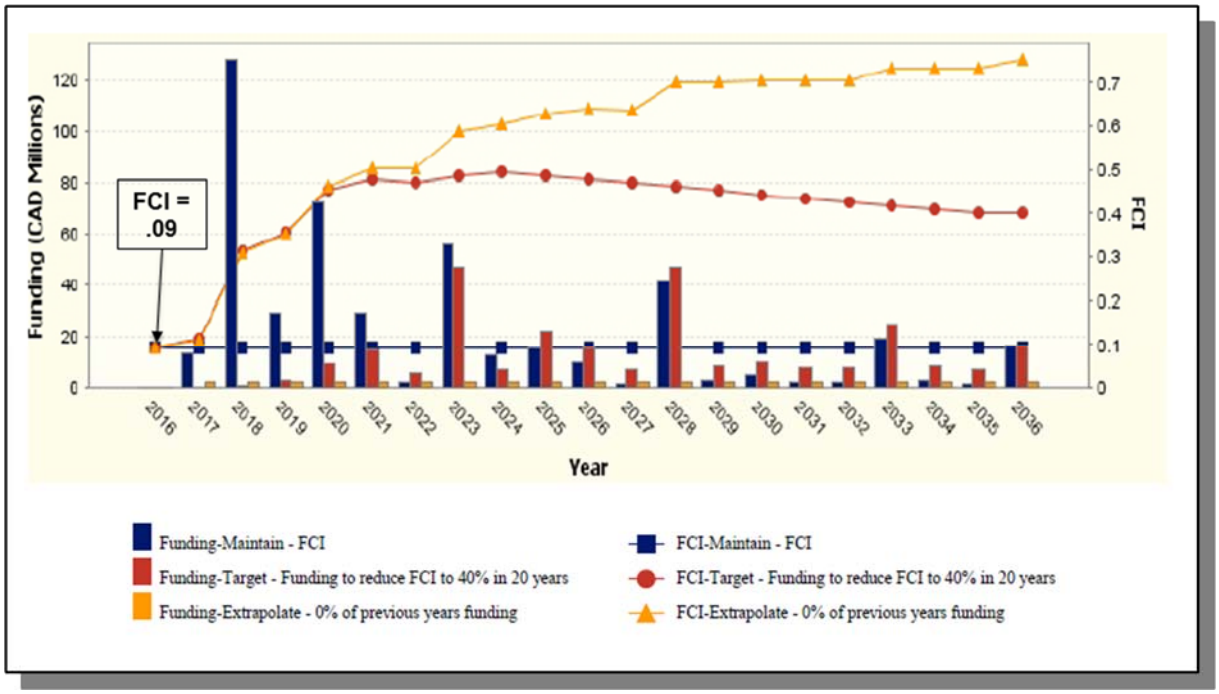


Figure 7: Three LMHC Funding Graph Scenarios with impact on FCI compared over 20 years
Note: All figures are in today's dollars (0% inflation) based on the 2- Year FCI Setting

Three 20 Year Funding Scenarios were modeled, as shown above in **Figure 7**:

- ***Maintain Current FCI*** **-** explores the effects of setting funding levels to maintain the existing overall FCI of .**09**. In this scenario, the condition is good with the overall FCI of the building and will remain the same for the period of choice. The total aggregated net present value of applied funding for the set period given the assumed zero plant growth.

- ***Target (Specific FCI)*** **-** explores the effects of moving the overall FCI to **0.40**, which is considered "Poor" by industry standards. In this scenario, the building improvements are distributed over a multi-year period increasing the FCI to an efficient 0.40 in 20 years, and maintained at this level thereafter. This scenario implies continued use of the facilities during renewal improvements.

- ***Extrapolate (Specific) Funding*** **-** explores the effects of investing the current LMHC budget of $2.2 million annually.

Utilizing the Funding Module within *VFA.facility*, LMHC can develop scenarios for specific systems and exam multi-year funding scenarios. For example an Elevator replacement strategy throughout the portfolio can be reviewed within the database. Thus creating a separate plan for lifecycle replacement or repairs staged over multiple years and adjusted accordingly per the LMHC's budget and needs.

COMPARISON OF BUILDING TYPES

Evaluating the LMHC assets by building types (Country Sites, Highrise Towers and Townhomes/ Semi-detached housing), all were constructed within a 28 year window between 1960 and 1978 thus require similar higher cost lifecycle replacements at approximately the same timeframe. **Figure 8**, below, analyzes the data by separation of these building types. Note the FCI is fairly consistent within the building types.

Asset Name	Building Type	Age	Size (SF)	Cost/SF	CRV	2- Year FCI	FCI Renewal Cost	RI	RI Cost
157 Simpson Street	County Site	39	14,703	$185	$2.7m	0.19	$0.5m	0.45	$1.2m
125 Head Street	County Site	42	15,973	$275	$4.4m	0.07	$0.3m	0.25	$1.1m
49 Bella Street	County Site	37	33,234	$258	$8.6m	0.07	$0.6m	0.27	$2.3m
Walnut Street	Highrise	38	151,307	$272	$41.1m	0.12	$5.1m	0.30	$12.4m
Berkshire	Highrise	43	60,906	$326	$19.9m	0.11	$2.2m	0.27	$5.4m
349 Wharncliffe Road North	Highrise	42	97,250	$252	$24.5m	0.11	$2.6m	0.25	$6.1m
345 Wharncliffe Road North	Highrise	44	97,250	$248	$24.2m	0.11	$2.6m	0.48	$11.6m
Oxford	Highrise	45	72,530	$303	$22.0m	0.10	$2.2m	0.34	$7.6m
Dundas	Highrise	47	79,000	$325	$25.7m	0.10	$2.5m	0.45	$11.6m
Albert	Highrise	46	48,504	$334	$16.2m	0.10	$1.6m	0.34	$5.4m
Hale	Highrise	44	91,338	$290	$26.5m	0.10	$2.5m	0.41	$10.9m
Base Line	Highrise	43	157,500	$282	$44.4m	0.09	$4.1m	0.33	$14.6m
Simcoe	Highrise	40	146,364	$263	$38.5m	0.09	$3.3m	0.29	$11.1m
McNay	Highrise	39	191,250	$243	$46.5m	0.08	$3.8m	0.28	$12.9m
Commissioners	Highrise	45	80,035	$310	$24.8m	0.08	$2.0m	0.36	$8.9m
William	Highrise	49	46,518	$348	$16.2m	0.08	$1.3m	0.40	$6.5m
Kent	Highrise	43	145,460	$268	$39.0m	0.07	$2.9m	0.20	$7.8m
Allan Rush Gardens	Townhome/ Semi-detached	55	4,320	$175	$0.8m	0.14	$0.1m	0.58	$0.4m
Boulee	Townhome/ Semi-detached	47	6,240	$140	$0.9m	0.13	$0.1m	0.40	$0.3m
Marconi	Townhome/ Semi-detached	49	11,650	$152	$1.8m	0.11	$0.2m	0.43	$0.8m
Boulee	Townhome/ Semi-detached	47	6,720	$139	$0.9m	0.11	$0.1m	0.37	$0.3m
Tecumseh	Townhome/ Semi-detached	54	7,426	$359	$2.7m	0.10	$0.3m	0.38	$1.0m
Southdale / Millbank	Townhome/ Semi-detached	44	16,320	$128	$2.1m	0.09	$0.2m	0.54	$1.1m
Pond Mills	Townhome/ Semi-detached	44	16,200	$143	$2.3m	0.08	$0.2m	0.50	$1.2m
Huron	Townhome/ Semi-detached	45	17,763	$122	$2.2m	0.06	$0.1m	0.28	$0.6m
Total/ Average		46	2,885,673	$164	$621.3m	0.09	$56.8m	0.36	$223.8m

Figure 8: LMHC Assets separated by building types

Further information can be produced through reports available within *VFA.facility* as well as additional analysis – whether specific needs within a particular asset or the entire condition of the housing portfolio. This written report is only a snapshot summary of the data delivered electronically in the full database. *VFA.facility* is intended to be used as a live tool, constantly updated and frequently accessed to inform decision-making with current information.

GLOSSARY OF TERMS

% Renew
Is the percentage of the System that is repaired or replaced when it reaches the end of its useful life.

Actions
Is a strategy for correcting a Requirement that includes the scope of work to be done and an itemized estimate of the construction cost.

Adjustment Factor
A number assigned to a system to account for additional costs due to design, inspection and educational premiums. The adjustment factor is multiplied against the line items for the total system replacement cost.

Asset
A free-standing structure, a portion of a structure, or any part of facility infrastructure that is distinguishable from its surroundings by date of construction, construction type, and/or the systems that serve it.

Asset Type
The role that the asset has in the facility. For example, an asset can be a building, a utility, or an outdoor structure. The Asset Type field allows the asset record to be customized to capture information about a variety of buildings and infrastructure that can exist in a facility.

Backlog
Maintenance or renewal of asset systems that has been identified.

City Cost Index (CCI)
A factor used to adjust RSMeans Construction Data to a specific city. The appropriate CCI can be selected from a list compiled by RSMeans that includes most major U.S. and Canadian cities.

Commission Date
The date that an asset becomes current.

Construction Type
The type of construction relative to structural elements and their fire protection.

Current Replacement Value (CRV)
The cost required to replace a building or system in kind, determined by summing the replacement values of each system.

Facility Condition Index (FCI)
An index that measures the relative condition of assets. The sum of the systems requiring replacement, and the needed requirements, within the next five years divided by the current replacement value (CRV) for the asset produces the FCI. Generally, the higher the FCI, the poorer the condition of the facility.

Lifetime
The number of years an asset system is expected to be useful (its *useful life)*.

Line Item
A discrete cost in the detail cost of a system. It includes the class, the code, the description, the number of units, the unit of measurement, a cost per unit and a total, which includes Overhead and Profit for the given trade.

Present Value (PV)
An approach used in capital budgeting that compares the current value of a dollar versus the value of that same dollar in the future after discounting. NPV is calculated by removing the accumulated inflation over the funding period.

Region
The first level of division for facility management. Regions are divided into campuses.

R.S. Means
Industry-standard construction cost data source. Commonly used in the USA for construction cost estimating.

Record
A collection of data about your facility. It contains all the information for an item, such as a campus or asset.

Renewal Cost
The cost of replacing an asset system as it reaches or exceeds the end of its useful life.

Replacement Cost
The current cost of replacing an asset, a set of assets or an entire campus in total dollars adjusted annually for inflation.

Resource
As used in VFA.Facility, generally refers to labor for construction work. The labor rates for each RSMeans line item within an action are affected by the Resource type selected.

Size
The gross area of an asset in the appropriate unit of measurement. The accuracy of the size calculation affects the asset's replacement value.

System
A collection of items within a particular building (or other asset) that serves a purpose. An assembly, set of finishes, fixtures, one or more pieces of equipment, or other components that makes up an asset. Examples: Ceilings of different types are systems; lighting is a system; air-conditioning ductwork is a system.

System Condition Index (SCI)
The System Condition Index (SCI) is a benchmarking matrix that measures the relative condition of a System. SCI is viewable by generating an SCI report (Classic Reports). See SCI Report.
SCI is a ratio of the System's linked deferred maintenance FCI Requirements divided by the System's Replacement Cost: SCI = $ FCI Requirement Costs (divided by) $ System Replacement Cost
For example:
A System with a Replacement Cost of $50,000 and Requirements of $10,000 has an SCI of 0.20 ($10,000/$50,000).

System Model
The relevant cost information for each system in an asset. In a cost model, each asset system is identified along with its projected lifetime in years, the cost, the cost as a % of CRV, and the % renewed at the end of its lifetime. System models calculate an asset's cost per unit of measurement, which determines the CRV.

System Renewal
The replacement of an asset system as it reaches or exceeds the end of its useful life.

Uniformat Categories
Uniformat is a system of organizing the products and materials that go into buildings and other construction projects. Uniformat is promulgated by the Construction Specifications Institute (CSI) and is widely used in North America. Uniformat II is the current version, and has four levels of classifications of asset systems.

Years Remaining
The number of year of the system’s service life that are projected to be remaining at the time of inspection. Years Remaining is used to calculate the year the next renewal is expected to be required. For example, a 20-year roof that has 5 years remaining is projected for replacement in 5 years.