KELLER
ENGINEERING

RESERVE FUND STUDY

FOR

CARLETON CONDOMINIUM CORPORATION 22

REPORT PREPARED FOR

CARLETON CONDOMINIUM CORPORATION 22
c/o Bridgeport Realty Management
100 Argyle Avenue, Ottawa, Ontario

January 5, 2016

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EXECUTIVE SUMMARY

Based on our visual examination of the property, it is our opinion that Carleton Condominium Corporation 22 is in satisfactory condition. A number of common elements will, however, require repairs or replacement over the 30-year horizon of this reserve fund study.

Based on our fiscal analysis and best current estimate, it is recommended that annual reserve fund contributions be increased to $172,731 in fiscal year 2016/17. Increases in the annual contributions in fiscal years 2017/18 and all years thereafter are budgeted at 2.0% per year, which is our assumed yearly construction cost increase. This funding plan, in our opinion, will provide adequate funds to carry out necessary repair work and will provide a surplus which will be required in later years to pay for major capital expenditures anticipated beyond the time period examined in this Reserve Fund Study.

Major Repair / Replacement Work

The following major repair/replacement work will be required over the next few years:

- Asphalt Pavement Reconstruction
- Asphalt Walkway Resurfacing
- Mansard Shingle Replacements
- Wood Fencing Replacement
- Precast Entry Steps Installation
- Stucco Replacement with Vinyl Siding
- Hardboard Replacement with Vinyl Siding

Maintenance and Minor Repairs

The maintenance and minor repair items, which should be carried out on a periodic basis or as required using funds from the operating budget, are listed below:

- Valve Survey
- Landscaping
- Brick Veneer Repairs
- Exterior Painting

Future Work

The following items are not expected to require repair or replacement within the 30-year scope of this study; however, it is likely that work will be required in the future. Budgeting for these items will commence as they approach the 30-year scope of the Reserve Fund Study:

- Sewer system repairs
- Site services repairs

1.0 INTRODUCTION

The Board of Directors of Carleton Condominium Corporation 22 (CCC 22) commissioned Keller Engineering to inspect the common elements of its condominium complex and to prepare the following Reserve Fund Study. The work included the review of civil, structural, architectural, and exterior electrical common elements.

- commissioning of work

Carleton Condominium Corporation 22 is a 43-year old, 88-unit condominium complex containing of 13 blocks with 4 to 11 units per block. The building consists of cast-in-place concrete foundation walls with conventional wood-framed construction above grade. Exterior wall cladding consists of aluminum siding, hardwood siding, stucco, and masonry veneer. The roofing is comprised of asphalt shingles on mansard style roofs. The property, also known as Beaverhill Place is located at 2049-2069 Jasmine Crescent, in Ottawa, Ontario (See Fig. 1). A Key Plan is shown in Fig. 2.

- description of property

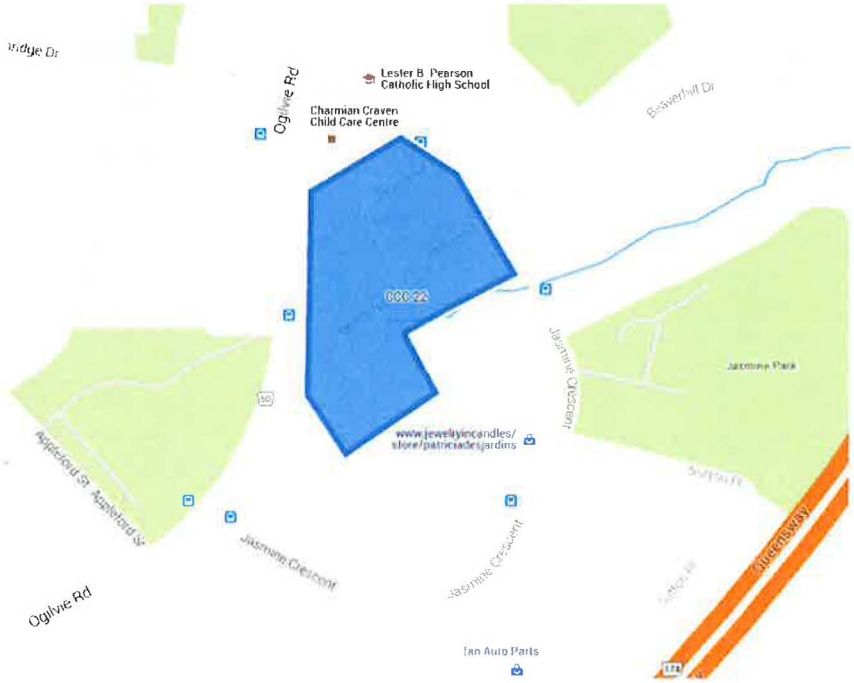


Fig. 1: Location Map

- Location of CCC 22

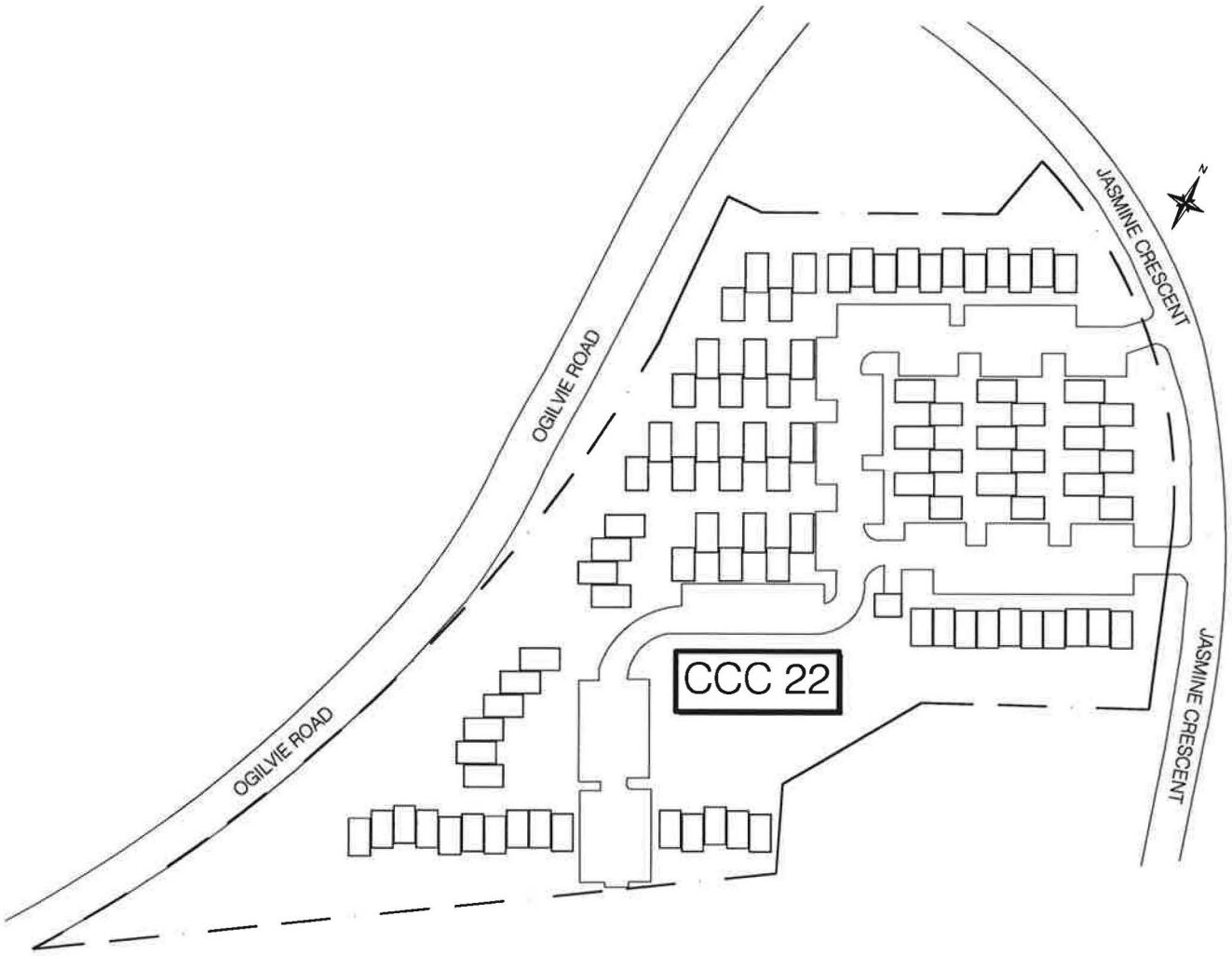


Fig. 2: Key Plan

2.0 STUDY OBJECTIVES

- major repairs and replacement planning

In accordance with 'The Condominium Act, 1998' and the associated Regulations, the purpose of this study is to determine whether the amount of money in the reserve fund and the amount of contributions collected by the Corporation are adequate to provide for the expected costs of major repairs and replacement of the common elements and assets of the Corporation. The Reserve Fund Study contains findings about the current conditions of the common elements and it tabulates major capital expenditure predictions over the next thirty years.

- establishment of reserve fund levels

Although we recommend reserve fund contributions or funding levels as part of this Reserve Fund Study, within 120 days of receiving the study, it is the responsibility of the Board of Directors in consort with the Corporation's property management and financial advisors, to review the Reserve Fund Study and propose a plan for future funding of the reserve fund which the Board determines will ensure that the fund will be adequate for the purpose for which it was established.

Note that the most accepted interpretation of "adequate" funding is that the annual contributions can remain constant (increasing only by inflation) and that no special assessments are necessary.

- 15-year grace period

Grace Period: Condominiums declared before May 5, 2001 have a 15-year "grace period" from the date of their first reserve fund study received under the current Act. For CCC 22, the fund will need to be "adequate" by 2018.

- class of reserve fund study

This Reserve Fund Study satisfies the requirements of a Comprehensive Study as outlined in Part IV of the Ontario Regulation 48/01, s. 28.

3.0 BACKGROUND INFORMATION

Background information was provided by Ms. Edi McCord, of Bridgeport Realty Management, Property Manager for CCC 22.

A site inspection was carried out on November 10, 2015, by Mr. Andrew Van Bakel, B.A.Sc. Civ. Eng. and Mr. Steve Christison, P.Eng., of Keller Engineering.

A previous Reserve Fund Study carried out by Keller Engineering was reviewed as part of the preparation of this Study.

4.0 ASSUMPTIONS AND LIMITATIONS

- study limitations

The accuracy of the discussions, conclusions and cost information contained in this study is limited to the extent of information available at this time. The assessment of the condition of the common property elements is based upon visual examination only. No destructive testing or performance monitoring was conducted.

Projections of building component life expectancy assume that the corporation and owners will provide good and timely periodic maintenance. The study does not make allowances for the effects of rare events such as flood, fire, lightning, explosions, etc.

Future cost projections for the repair or replacement of common element items is based on a set inflation rate taken as an average of past years construction price index, which is provided by Statistics Canada. Since it is difficult to determine the percentage increase on an item by item basis as market value increases may vary annually, the most accurate projection is provided by the previous year's average of the entire construction industry, extrapolated over the life span of the study.

- assumptions

It has been assumed that the expected standards of performance and appearance correspond to the current norm and that housing industry averages and manufacturers' published data on component life expectancy apply to this condominium.

5.0 GENERAL INFORMATION

5.1 Determination of Repair/Replacement Costs

The procedures for determining repair/replacement costs of the common property elements involve site inspections, quantity take-offs from drawings, cost calculations and a spreadsheet layout. These procedures are described in detail in this report.

- information sources and analysis

First, a Technical Audit is performed to assess the general condition of the common elements. This site work also allows the determination of the type of repair or replacement work that will be required for each common element as well as the time period when such work will likely be required.

- the Technical Audit

Once the type and quantity of repair/replacement work are known, the costs associated with such work are estimated. Keller Engineering has developed an extensive listing of unit costs for a wide variety of repair and replacement work involving all civil, structural, architectural, and exterior electrical elements that are typically included in Reserve Fund Studies. This listing was compiled using prices obtained from repair and replacement contracts in which Keller Engineering has been involved as well as from cost estimates provided by manufacturers, suppliers and contractors. For unique repair or replacement items, advice is generally obtained from a contractor with experience in the work of concern. In such cases, the contractor examines the work and prepares an estimate for our use in the Reserve Fund Study.

- cost estimation

Further, to ensure that major repair/replacement work at the condominium complex is properly specified and carried out, it is strongly recommended, for most major projects, that an engineer with experience in the work of concern be hired to provide professional assistance. Engaging the services of a professional engineer should ensure that the work is properly specified, tendered, and executed. Engineering fees will often be a significant portion of the costs of a repair/replacement project.

- engineering fees paid from reserve fund

Engineering fees related to the common element repairs will be paid out of the reserve fund. Accordingly, a suitable allowance for engineering fees has been included in the spreadsheet where it is likely that the Board will require professional assistance in implementing the work. Engineering fees can range between 5% and 15% of the value of the construction work, depending on the extent and complexity of the work.

5.2 Forecasting

- adjustment of reserve fund levels

Capital expenditures for repair and replacement of building components have been forecasted in current dollars and the most probable fiscal years when these expenditures will be required have been set out in this report. Adjustments for construction cost increases as well as earned interest are automatically made to the spreadsheet and, since the annual fees are to be revised in the current year, the recommended contributions are also determined in current dollars. Beyond the current year, it is the Board's responsibility to ensure that the reserve fund contributions are in line with those outlined in the spreadsheet.

When an expense will be incurred depends on a number of factors, such as:

- priorities in reserve fund allocation

i) The urgency of repair or replacement: Some building components, such as water supply, sanitary sewers or electricity distribution mains, must operate flawlessly at all times. Interruptions in their good functioning cannot be tolerated and repair costs for these items cannot be deferred.

ii) The perceived importance of a repair or replacement: For example, caulking, paving or paint need not be repaired when the first blemish appears. The Board of Directors has considerable freedom to delay or advance the time when funds will be spent on these non-essential types of repairs to suit the demand from owners and the financial constraints of the Corporation's budget.

- timing of expenditures

In most cases, expenses for each type of repair have been budgeted for the specific fiscal year in which the repair or replacement will likely be required. Repair/replacement of the building components will usually be carried out throughout the complex during one year rather than spreading the repairs out over a few years. For cases where repair/replacement of a building component is not required throughout the complex at the same time, it may be more cost effective to phase the work over two or more years. Phasing the work may also be necessary due to a lack of reserve funds. A prudent manager would be expected to determine whether phasing the work is cost effective and to have the work carried out accordingly. Some of the expenses outlined in this Reserve Fund Study will occur early in the predicted time period, other expenses will be incurred late, but the accumulated reserve fund should be ample to pay for all of these expenses as they become due.

- responsibility and "The Final Authority"

It is within the Board's power to advance or defer non-essential repair contracts based on sound technical advice at the time of the scheduled repair. The forecasted fund should be sufficient to pay for foreseeable

repairs.

5.3 Spreadsheet

The main purpose of the spreadsheet is to determine the annual reserve fund contributions required to ensure that there will be sufficient funds to pay for all foreseeable expenditures over the next thirty years.

- purpose of spreadsheet

To achieve this goal, all projected expenditures are entered into the spreadsheet and the cost predictions are summed up and then adjusted for yearly construction cost increases to determine the total expenditures to be incurred in each fiscal year.

- spreadsheet variables

Trial values for the annual reserve fund contributions are then entered into the spreadsheet and through an iterative process the most appropriate (recommended) annual contributions and the plan for future funding are determined. The iterations account for annual expenditures, annual contributions from owners' monthly fees, and contributions from investment interest earned on the unused balance of the reserve fund. The above figures are adjusted to account for yearly construction cost increases prior to determining the recommended funding plan, and the annual contributions are shown in the actual dollar values of the respective years.

- determining the "bottom line"

The most appropriate contribution ensures that enough funds are accumulated in the reserve fund to cover all anticipated expenditures as they become due while leaving a surplus at the end of the study period. The size of the surplus depends greatly on the individual condominium and on the expenses that are to be incurred beyond the study period. Condominiums which are expected to incur large expenditures shortly beyond the study period should have a large surplus. This large surplus is required to avoid drastic increases in contributions or special assessments in later years.

- additional factors

At the end of the spreadsheet, the remaining reserve fund on January 31, 2045 is also shown in current dollars to provide a better perspective of how much money remains at the end of the study period.

- keeping the reserve fund in perspective

Over the past few years, the rate of increase of construction costs has varied significantly between -0.7% and 4.4%. In this report, an annual inflation rate of 2.0% has been used. While the increase in construction costs will fluctuate from year to year, an annual rate of 2.0% will likely provide a reasonable representation of how prices will increase over the next few years.

- assumed yearly increases in construction costs

For this Reserve Fund Study a rate of 2.0% was assumed in calculating the annual contributions from interest earned on the remaining reserve fund. While actual inflation and interest rates may differ from those assumed for this report, the above rates, in combination, should be representative over the next few years.

- assumed rate of return on investments

In accordance with the Condominium Act and the associated Regulations, Reserve Fund Study Updates must be conducted every 3 years. These updates will allow for adjustments to interest rates,

- Reserve Fund Study Update mandatory every 3 years

construction cost increases, and/or the funding plan, due to any unforeseen costs incurred over the three-year period.

5.4 Management Planning Table

The Management Planning Table included in Appendix C provides managers and Board members with a list of expected major expenses and their likely occurrence. The information contained in this table is presented elsewhere in the text of this study and is summarized here for convenience.

- Management Planning Table summarizes annual expenses

5.5 Notice of Future Funding of the Reserve Fund

The Notice of Future Funding of the Reserve Fund documentation included, in Appendix D, is provided for the funding plan created as part of this Study. This document contains a summary of the Reserve Fund Study and a summary of the proposed plan for future funding. Copies of this notice are to be sent to each of the owners to give notice and make them aware of the proposed plan.

- Notice of Future Funding documentation required by the Act

6.0 TECHNICAL AUDIT AND COSTING

The following sections include a brief technical discussion of the major building components common to the condominium approximate quantities involved, life expectancy, repair/replacement costs and the fiscal years in which work is anticipated.

6.1 Site Services

The main sewer systems should last the life of the condominium complex without requiring major repairs or replacement. While the sewers should not be a problem, they should not be ignored under the assumption that they will operate flawlessly at all times. Periodic inspection by a qualified inspection company should be carried out to ensure all systems are functioning properly. An allowance of $5,000 has been allocated for sewer cleaning in fiscal year 2015/16 and every 5 years thereafter. In addition, a sum of $5,000 has been budgeted for video inspection of the sewer lines every 10 years commencing in fiscal year 2015/16. Occasional repairs which may arise should be paid out of the reserve fund, but no funds are budgeted for these repairs because it is impossible to predict what costs will be incurred, if any. For safety purposes, an allowance of $50,000 has been budgeted in fiscal year 2032/33 and every 5 years thereafter for major sewer system repairs if required.

- inspect and clean sewers periodically

Sewer Cleaning & Inspection	
. Frequency	5 years
. Cost (Clean)	$5,000
. Year(s)	2015/16, 2020/21 2025/26, 2030/31, 2035/36 2040/41
. Frequency	5 years
. Cost (Inspect)	$5,000
. Year(s)	2015/16, 2025/26 2035/36
. Frequency	5 years
. Cost (Major)	$50,000
. Year (s)	2032/33, 2037/38 20423/43

Water supply lines and most underground electrical site services also should last the life of the condominium complex without major repair or replacement.

At the request of the Board, a valve survey of the water lines is to be completed in the spring of 2016. As such an allowance of $15,000 has been budgeted in fiscal year 2016/17.

Valve Survey	
. Cost	$15,000
. Year(s)	2016/17

The concrete parking bollards with electrical receptacles are in fair condition; however, the board reported isolated electrical receptacles are not functioning. As such, an allowance of $5,000 has been budgeted in fiscal year 2016/17 and every 5 years thereafter for replacement of the concrete parking bollards as required.

- parking bollards fair

Parking Bollards	
. Service Life	30-40 years
. Frequency	5 years
. Cost	$5,000
. Year(s)	2016/17, 2021/22 2026/27, 2031/32 2036/37, 2041/42

6.2 Asphalt Pavement

The asphalt pavement on the roadways and parking areas is in poor to fair condition as moderate surface erosion, heaving, and isolated transverse cracks were observed at isolated locations with the worst being in the rear parking lot beside units 1-21. Given the current condition of the asphalt pavement, it is our recommendation that the roadways and parking areas be reconstructed in the near future. Complete reconstruction involves the removal of existing asphalt pavement as well as the existing sub-base. New sub-base materials are then implemented and compacted, prior to the reinstatement of a new asphalt overlay. This is often required instead of resurfacing due to pavement sub-base deterioration, or because another overlay will adversely affect levels and drainage. Complete reconstruction of the rear parking lot is expected to cost $68,000 and we have budgeted this work in fiscal year 2016/17. The remaining asphalt reconstruction is expected to cost $282,000 and has been budgeted for fiscal year 2020/21.

- asphalt pavement poor to fair

Asphalt Roadway & Parking Areas	
. Qty	5200 m^2
. Service Life	15-20 years
. Cost (Recon.)	$68,000
. Year(s)	2016/17
. Cost (Recon.)	$282,000
. Year(s)	2020/21
. Cost (Overlay)	$195,000
. Year(s)	2040/41

Approximately 20 years after the asphalt reconstruction, an overlay will be necessary. As such, we have budgeted $195,000 for an asphalt overlay on all roadways and parking areas in fiscal year 2040/41.

The asphalt walkways are in poor to fair condition and should be replaced in the near future. Pavement cracking, settlement and heaving are present. Complete reconstruction of the walkways is estimated to cost $170,000 and this work is budgeted for fiscal year 2020/21 and every 20 years thereafter.

- asphalt walkways poor to fair

Asphalt Walkways	
. Qty	3250 m^2
. Service Life	15-20 years
. Cost	$170,000
. Year(s)	2020/21, 2040/41

To maintain the condition of the asphalt pavement between resurfacing cycles, crack and rut repairs and asphalt patching should be carried out on a regular basis using funds from the operating budget.

6.3 Entrance Stairs

The interlocking unit pavers and dry stack units at the front entrances of each unit vary in condition throughout the complex. Separation of the dry stack units and settlement of the whole front entrance system was typically observed. We recommend all front entrance steps be replaced with precast concrete steps to avoid further deterioration and settlement of the existing system. We expect installation of the precast entry steps at each unit to cost $260,000 and should be carried out on an as-required basis. As such, we have budgeted this work over a 10-year period beginning in fiscal year 2016/17.

- interlocking pavers vary

Precast Concrete Entry Steps	
. Qty	88
. Service Life	30-40 years
. Cost	$260,000
. Year(s)	2016/17-2025/26

The precast concrete steps at the rear entrances of each unit are in satisfactory condition. Isolated surface cracking and corrosion was observed. Due to the fact that the condition of the steps varies, wholesale replacement will likely not be required. As such, an allowance of $5,000 is allocated in fiscal year 2020/21 and every 10 years thereafter for the replacement of deteriorated precast concrete steps.

- precast concrete steps satisfactory

Rear Precast Concrete Step Replacement Allowance	
. Frequency	10-12 years
. Cost	$5,000
. Year(s)	2020/21, 2030/31 2040/41

6.4 Exterior Concrete

The cast-in-place concrete curbs and precast parking stall curbs are in fair condition; however, there is minor damage at isolated locations, likely due to snow removal operations. Concrete curbs will experience gradual deterioration and repairs will likely be required approximately every 15 to 20 years. Curb repairs should consist of the cutting-out and reconstruction of defective sections, as merely patching the curbs will not provide lasting repairs. An allowance of $5,000 and $22,000 has been budgeted for curb repairs in fiscal years 2016/17 and 2020/21 respectively in conjunction with the asphalt pavement work.

Complete replacement of the concrete curbs is scheduled for fiscal year 2040/41 in conjunction with the asphalt pavement work at an estimated cost of $100,000.

- concrete curbs satisfactory

Concrete Curbs	
. Qty	850 m
. Service Life	30-40 years
. Cost (Repair)	$5,000
. Year(s)	2016/17
. Cost (Repair)	$22,000
. Year(s)	2020/21
. Cost (Replace)	$100,000
. Year(s)	2040/41

6.5 Landscaping

The landscaped grounds, shrubs and trees are in satisfactory condition. The occasional landscaping work, such as tree removal, pruning, topsoil replacement and minor regrading should be carried out as required using funds from the operating budget. To ensure funds are available when major work is required, a general landscaping allowance of $5,000 has been budgeted for fiscal year 2020/21 and every 10 years thereafter.

- landscaping satisfactory

Landscaping Allowance	
. Frequency	10-12 years
. Cost	$5,000
. Year(s)	2020/21, 2030/31 2040/41

There are a number of large/medium sized trees present throughout the complex, many of which are in close proximity to the buildings. Experience has shown that trees growing too close to buildings can cause damage (cracking) to foundations and foundation walls. Therefore, large mature trees which grow in close proximity to the buildings should be periodically removed and replaced with smaller species planted further from the buildings. To ensure that funds are available when this work is required, an allowance of $5,000 is allocated in fiscal year 2016/17 and every 10 years thereafter.

In addition, regular tree pruning should be carried out to maintain the health of the existing trees and to control the growth of large trees, whose branches which overhang the roofs may cause damage to the

- monitor tree growth

Tree Removal Allowance	
. Frequency	10-12 years
. Cost	$5,000
. Year(s)	2016/17, 2026/27 2036/37

asphalt shingle roofing or the wall cladding. We recommend that the trees be pruned as required to avoid unnecessary repairs. This maintenance work should be covered by the operating budget.

6.6 Fencing

The wood privacy fencing is in poor condition and should be replaced in the near future. Unstable posts and rotted wood was observed at multiple locations. Replacement of the wood fencing is estimated to cost $200,000 and this work has been budgeted over a 2-year period beginning in fiscal year for fiscal year 2016/17 and every 25 years thereafter.

Local repairs and staining should be carried out as required after installation of the new fencing using funds form the operating budget.

- wood fencing poor

Wood Fencing	
. Qty	1060 m
. Service Life	20-30 years
. Cost	$200,000
. Year(s)	2016/17-2017/18 2041/42-2042/43

6.7 Foundation Walls

The foundation walls and parging are in satisfactory condition as no significant cracks were observed and no leaks have been reported. Occasional crack, parging and minor concrete repairs to the foundation walls should be carried out as required. To ensure funds are available when foundation repairs are required, an allowance of $5,000 has been included in fiscal year 2020/21 and every 10 years thereafter.

- foundation walls satisfactory

Foundation Wall Repair Allowance	
. Frequency	10 years
. Cost	$5,000
. Year(s)	2020/21, 2030/31 2040/41

6.8 Window Wells

The galvanized sheet metal window wells are in fair to satisfactory condition and should provide many more years of service. Replacement of the metal window wells should be carried out on an as-required basis. As such, an allowance of $10,000 has been budgeted in fiscal year 2025/26 and every 10 years thereafter.

- window wells fair to satisfactory

Window Wells	
. Service Life	20-25 years
. Cost	$10,000
. Year(s)	2025/26, 2035/36

6.9 Masonry Veneer

The brick veneer is in satisfactory condition and should provide many more years of service, however, minor cracking of mortar joints was observed at isolated locations. In general, repairs should be carried out as required, and an allowance of $15,000 has been made in fiscal year 2020/21 and every 12 years thereafter, to ensure that funds are available when brick veneer repairs become necessary.

- brick veneer satisfactory

Brick Repair Allowance	
. Frequency	10-12 years
. Cost	$15,000
. Year(s)	2020/21, 2032/33 2044/45

6.10 Stucco

The stucco is in fair condition for its age and it should provide many more years of service. Isolated sections of the stucco veneer have had an additional stucco coating applied and it was common to see cracking in these coatings. According to the information provided by the Board, all the stucco veneer is to be replaced with vinyl siding in the near future. We estimate the replacement of the stucco with vinyl siding to cost $330,000 and have budgeted this work over a 3-year period beginning in fiscal year 2016/17.

- stucco fair

Stucco Replacement With Vinyl Siding	
. Qty	2300 m^2
. Service Life	30-40 years
. Cost	$330,000
. Year(s)	2016/17-2018/19

6.11 Siding, Trim & Flashing

The hardboard siding is in fair condition for its age and should provide many more years of service before requiring replacement. Peeling paint and minor deterioration was observed at isolated locations. According to the information provided by the Board, the hardboard siding is to be replaced with vinyl siding in the near future. We estimate the replacement of the hardboard siding with vinyl siding to cost $30,000 and we have budgeted this work over a 3-year period beginning in fiscal year 2016/17.

- hardboard siding fair

Hardboard Siding Replacement With Vinyl Siding	
. Qty	200 m^2
. Service Life	30-40 years
. Cost	$30,000
. Year(s)	2016/17-2018/19

The aluminum siding is in fair condition and should provide many more years of service. Isolated areas of deterioration were observed. Based on an estimated service life of 50 years, the aluminium siding will require replacement in fiscal year 2022/23. As such, we have budgeted $565,000 for its replacement over a 3-year period beginning in 2022/23.

- aluminum siding fair

Aluminum Siding	
. Qty	3600 m^2
. Service Life	50 years
. Cost	$565,000
. Year(s)	2022/23-2024/25

6.12 Soffits & Fascia

The vented aluminum soffits and fascias are in satisfactory condition and should provide many more years of service before requiring replacement. Replacement of the soffits and fascia is expected to cost $105,000, and has been budgeted in fiscal year 2034/35, in conjunction with the roof replacement work

- soffits and fascia satisfactory

Soffits & Fascia	
. Soffit Area	900 m^2
. Fascia Length	1900 m
. Service Life	30-40 years
. Cost	$105,000
. Year(s)	2034/35

6.13 Exterior Painting

The painting is in fair condition with only isolated locations of deterioration observed. Given the current condition of the paint finishes and a standard service life, painting of all exterior elements will be required in the next few years; A sum of $10,000 is allocated in fiscal year 2016/17 and every 6 years thereafter for the painting of all exterior elements.

Exterior painting serves an important function in preserving exposed materials and enhancing the appearance of the property. Therefore, painting should be inspected regularly and minor touch-ups carried out as required using funds from the annual operating budget.

- exterior painting fair

Exterior Painting	
. Frequency	5-6 years
. Cost	$10,000
. Year(s)	2016/17, 2022/23 2028/29, 2034/35, 2040/41

6.14 Caulking

The condition of the caulking varies throughout the complex as caulking replacements have occurred at various times. In general, the caulking is in poor to fair condition and should be replaced in the near future. As the windows and doors are classified as a "unit owner responsibility" the caulking around them is also not the condominiums responsibility. Caulking replacement is scheduled for fiscal year 2018/19 and every 12 years thereafter, in conjunction with exterior painting work, at an estimated cost of $15,000.

When caulking is replaced, only high quality materials should be used and all old caulking should be removed before applying the new caulking. Caulking should be inspected regularly and the necessary repair work carried out by a qualified contractor. Minor repairs should be paid for out of the operating budget. Complete re-caulking will likely be required every 12-15 years.

- caulking poor to fair

Caulking	
. Service Life	12-15 years
. Cost	$15,000
. Year(s)	2018/19, 2030/31 2042/43

6.15 Windows, Patio Doors & Skylights

The windows and patio doors are classified as a "unit owner responsibility" and therefore no funds have been associated with their repairs or replacement throughout the 30-year planning horizon of this study.

- windows and patio doors unit owner responsibility

6.16 Doors

The exterior doors are classified as a "unit owner responsibility" and therefore no funds have been associated with their repairs or replacement throughout the 30-year planning horizon of this study.

- exterior doors unit owner responsibility

6.17 Shingles/Mansards

The asphalt shingles on each unit excluding the mansard shingles were replaced in 2014 and are therefore in satisfactory condition. With proper maintenance and local repairs, these roofs should provide another 20 years of service. We estimate that complete replacement of the asphalt shingles, including new ice and water protection membrane at the eaves and new metal flashing, will cost $495,000 and this work is budgeted for 2034/35. Minor roofing repairs should be carried out as required using funds from the operating budget.

- asphalt shingle roofing satisfactory

Asphalt Shingle Roofing	
. Qty	7350 m^2
. Service Life	15-20 years
. Cost	$495,000
. Year(s)	2034/35

The asphalt shingle mansards throughout the complex are in fair condition. Isolated shingle uplifting and deterioration was observed. We expect these mansard roofs will require replacement within the next 5 years. As such, we have budgeted $135,000 in 2019/20 and every 20 years thereafter for this work.

Asphalt Shingle Mansards	
. Service Life	15-20 years
. Cost	$135,000
. Year(s)	2019/20, 2039/40

6.18 Eavestroughing & Downspouts

The majority of the eavestroughing and downspouts are classified as a "unit owner responsibility" and therefore no funds have been associated with their repairs or replacement throughout the 30-year planning period of this study.

- eavestroughing and downspouts unit owner responsibility

At the request of the Board, an allowance of $5,000 has been allocated in fiscal year 2016/17 for isolated repairs to the sections of eavestroughing that are condominium responsibility.

Eavestroughing	
. Cost	$5,000
. Year(s)	2016/17

6.19 Attics

The attics were inspected at Units 73 and 23. The attics appeared to be in satisfactory condition with adequate insulation and ventilation. In each of the attics inspected, ten to twelve inches of cellulose insulation was found, providing an approximate insulating value of R40. The wood trusses and aspenite sheathing were observed to be in good condition. However, minor discolouration of the roof trusses, possibly due to condensation, was observed at various locations. We recommend that the attics be monitored over the winter months for condensation and ice build-up. If the problems are deemed severe, repair recommendations can be made at that time.

- attics satisfactory
- monitoring of attics over the winter is recommended

6.20 Chimney Stacks

The chimneys were constructed as part of the oil furnace system within each unit at CCC 22. These chimneys are original to the complex, which are now 43 years old. As such, the chimneys are reaching the end of their service life and will likely require replacement in the near future; however, according to the information provided by the Board, most oil furnaces have been decommissioned and the houses are being heated with different systems. We recommend all chimneys in use be inspected by a qualified company to ensure they are replaced as soon as it becomes necessary. The cost of this work should be covered by an operating budget.

- chimneys reaching end of service life
- inspect and clean chimneys regularly

6.21 Condominium Office Building

The condominium office building, which consists of an office space, is in fair condition. The office finishes will occasionally require refurbishment and an allowance of $2,500 has been included in fiscal year 2017/18 and every 10 years thereafter to ensure funds are available when required.

- condominium office building fair
-

Condominium Office Building Refinishing Allowance	
. Frequency	10 years
. Cost	$2,500
. Year(s)	2017/18, 2027/28 2037/38

The asphalt shingle roof is in poor condition and should be replaced in the near future as deterioration and uplift was observed. As such, we have budgeted $3,000 for this work in fiscal year 2016/17 and every 20 years thereafter.

- condominium office roof poor
-

Condominium Office Asphalt Shingle Roof	
. Frequency	10 years
. Cost	$3,000
. Year(s)	2016/17, 2036/37

6.22 Exterior Lighting

The light standards, wall-mounted light fixtures and lights in the front vestibules are in fair condition and should provide many more years of service. At the request of the Board, LED lights are to be installed in all light standards and as such, an allowance of $10,000 has been budgeted in fiscal year 2016/17 for replacement of all light standards with new supports and LED bulbs.

Replacement of the wall mounted light fixtures will be required over the 30-year planning horizon of this study. As such, an allowance of $10,000 has been budgeted in fiscal year 2022/23 for their replacement.

- exterior lighting fair

Light Standards	
. Frequency	10 years
. Cost	$10,000
. Year(s)	2016/17

Wall Mounted Light Fixtures	
. Cost	$10,000
. Year(s)	2022/23

6.23 Miscellaneous Items

The exterior wood framed electric meter cabintes are in fair condiiton and should provide many more years of service if properly maintained. To ensure funds are available when replacement if required, an allowance of $5,000 has been budgted in fiscal year 2025/26 for their replacement.

- gas meter cabinets fair

Electric Meter Cabinets	
. Cost	$5,000
. Year(s)	2022/23

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on our visual examination of the property, Carleton Condominium Corporation 22 is in satisfactory condition; however, significant repairs and renewal work will be required over the next few years. Our financial analysis shows that Carleton Condominium Corporation 22 will accumulate deficit over the next 30 years at the current Reserve Fund contribution level.

Based on our best current estimate and discussion with the Board, it is recommended that annual reserve fund contributions be increased in fiscal year 2016/17 to $172,731. Increases in annual contributions in fiscal year 2017/18 and all years thereafter are budgeted at 2.0% per year, which is our assumed yearly increase in construction costs. The above contributions are required to carry out all anticipated repairs and they also provide a surplus which will be required in later years to pay for major capital expenditures anticipated beyond the time period examined in this Reserve Fund Study.

- increase reserve fund contributions to $172,731

Finally, Reserve Fund Study updates are scheduled every three years in accordance with the new Condominium Act. The Reserve Fund Study updates alternate between updated studies based on site inspection and updated studies not based on site inspection.

- update the Reserve Fund Study every three years

Andrew Van Bakel, B.A.Sc. Civ. Eng.

Steve Christison, P. Eng.

APPENDIX A:
SPREADSHEET FOR
MAJOR REPAIR AND
REPLACEMENT COSTS

CCC 22: Spreadsheet For Major Repair & Replacement Costs, Fiscal Years 2016 to 2045

	AGE OF COMPLEX	43 Years	44 Years	45 Years	46 Years	47 Years	48 Years	49 Years	50 Years	51 Years	52 Years	53 Years	54 Years	55 Years	56 Years	57 Years	58 Years
	REPAIR/REPLACEMENT ITEMS	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
6.1	Site Services	$10,000	$20,000				$5,000	$5,000				$10,000	$5,000				$5,000
6.2	Asphalt Pavement		$68,000				$452,000										
6.3	Entrance Stairs		$26,000	$26,000	$26,000	$26,000	$31,000	$26,000	$26,000	$26,000	$26,000	$26,000					$5,000
6.4	Exterior Concrete		$5,000				$22,000										
6.5	Landscaping		$5,000				$5,000						$5,000				$5,000
6.6	Fencing		$135,000	$65,000													
6.7	Foundation Walls						$5,000										$5,000
6.8	Window Wells											$10,000					
6.9	Masonry Veneer						$15,000										
6.10	Stucco		$110,000	$110,000	$110,000												
6.11	Siding, Trim & Flashing		$10,000	$10,000	$10,000				$188,000	$188,000	$189,000						
6.12	Soffits & Fascias																
6.13	Exterior Painting		$10,000						$10,000						$10,000		
6.14	Caulking				$15,000												$15,000
6.15	Windows, Patio Doors, Skylights																
6.16	Doors																
6.17	Shingles/Mansards					$135,000											
6.18	Eavestroughing & Downspouts		$5,000														
6.19	Attics																
6.20	Chimneys																
6.21	Condominium Office Building		$3,000	$2,500										$2,500			
6.22	Exterior Lighting		$10,000						$10,000								
6.23	Miscellaneous Items								$5,000								
7.0	Reserve Fund Study Update	$5,000			$3,000			$5,000			$3,000			$5,000			$3,000
	YEARLY EXPENDITURE TOTALS	$15,000	$407,000	$213,500	$164,000	$161,000	$535,000	$36,000	$239,000	$214,000	$218,000	$46,000	$10,000	$7,500	$10,000	$0	$38,000
	EXPENDITURES INCL. INFLATION	$15,000	$415,140	$222,125	$174,038	$174,272	$590,683	$40,542	$274,536	$250,735	$260,530	$56,074	$12,434	$9,512	$12,936	$0	$51,143
	CONTRIBUTIONS FROM FEES	$169,344	$172,731	$176,185	$179,709	$183,303	$186,969	$190,709	$194,523	$198,413	$202,382	$206,429	$210,558	$214,769	$219,065	$223,446	$227,915
	ADDITIONAL CONTRIBUTIONS																
	INTEREST CONTRIBUTIONS	$14,381	$13,782	$11,148	$10,966	$11,337	$7,579	$5,171	$5,984	$4,768	$3,749	$4,756	$8,372	$12,616	$17,026	$21,709	$26,190
	REMAINING RESERVE FUND	$803,424	$574,797	$540,005	$556,643	$577,011	$180,877	$336,214	$262,186	$214,632	$160,232	$315,344	$521,840	$739,713	$962,867	$1,208,022	$1,410,983

ESTIMATED RESERVE FUND = $634,699 Jan 31, 2015
CURRENT ANNUAL CONTRIBUTIONS = $169,344 Feb 1, 2015
FUTURE ANNUAL CONTRIBUTIONS = $172,731 Feb 1, 2016

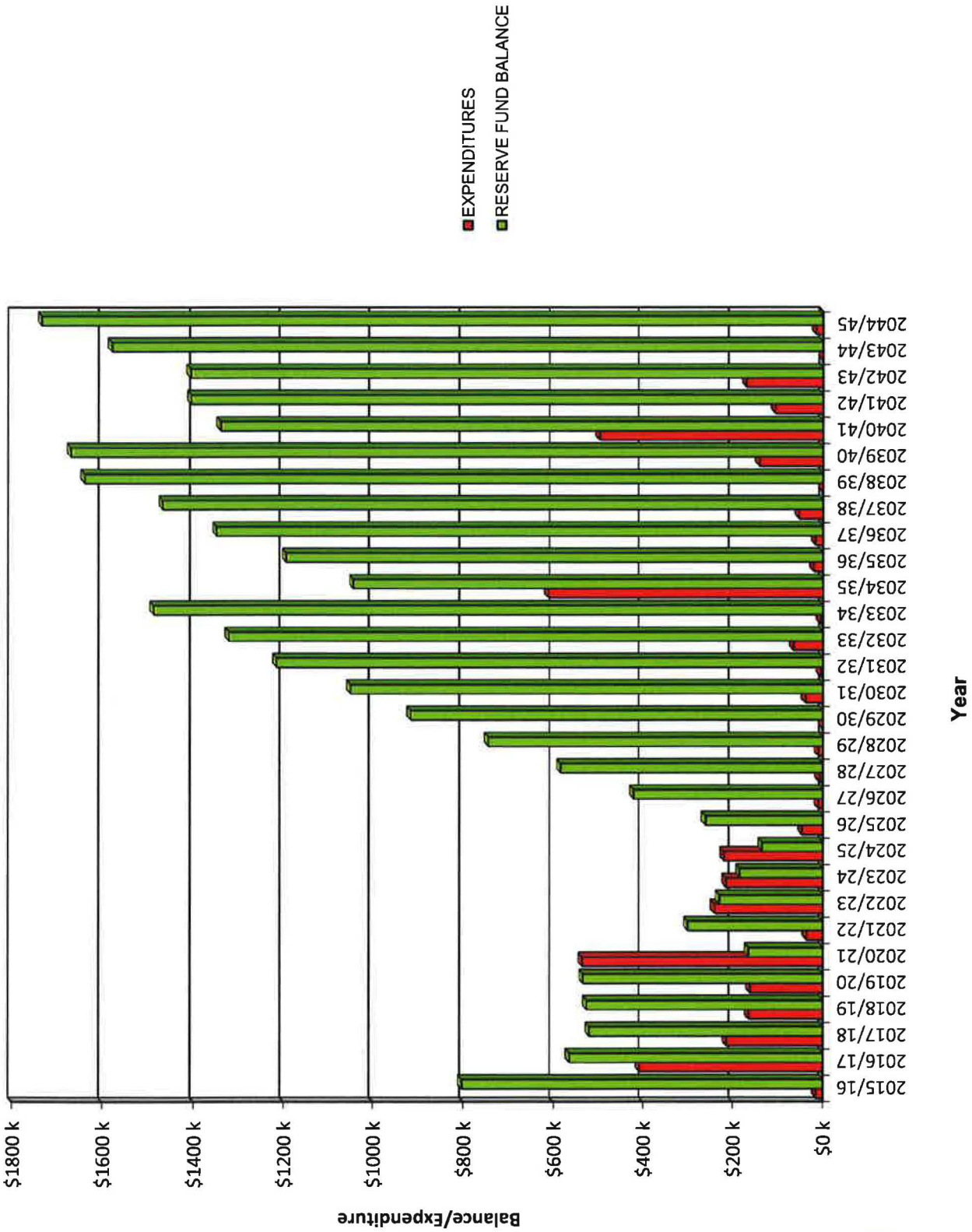
NOTES: *1) Interest contributions for each year are based on the average remaining reserve fund for that year at an interest rate of 2.0%.*

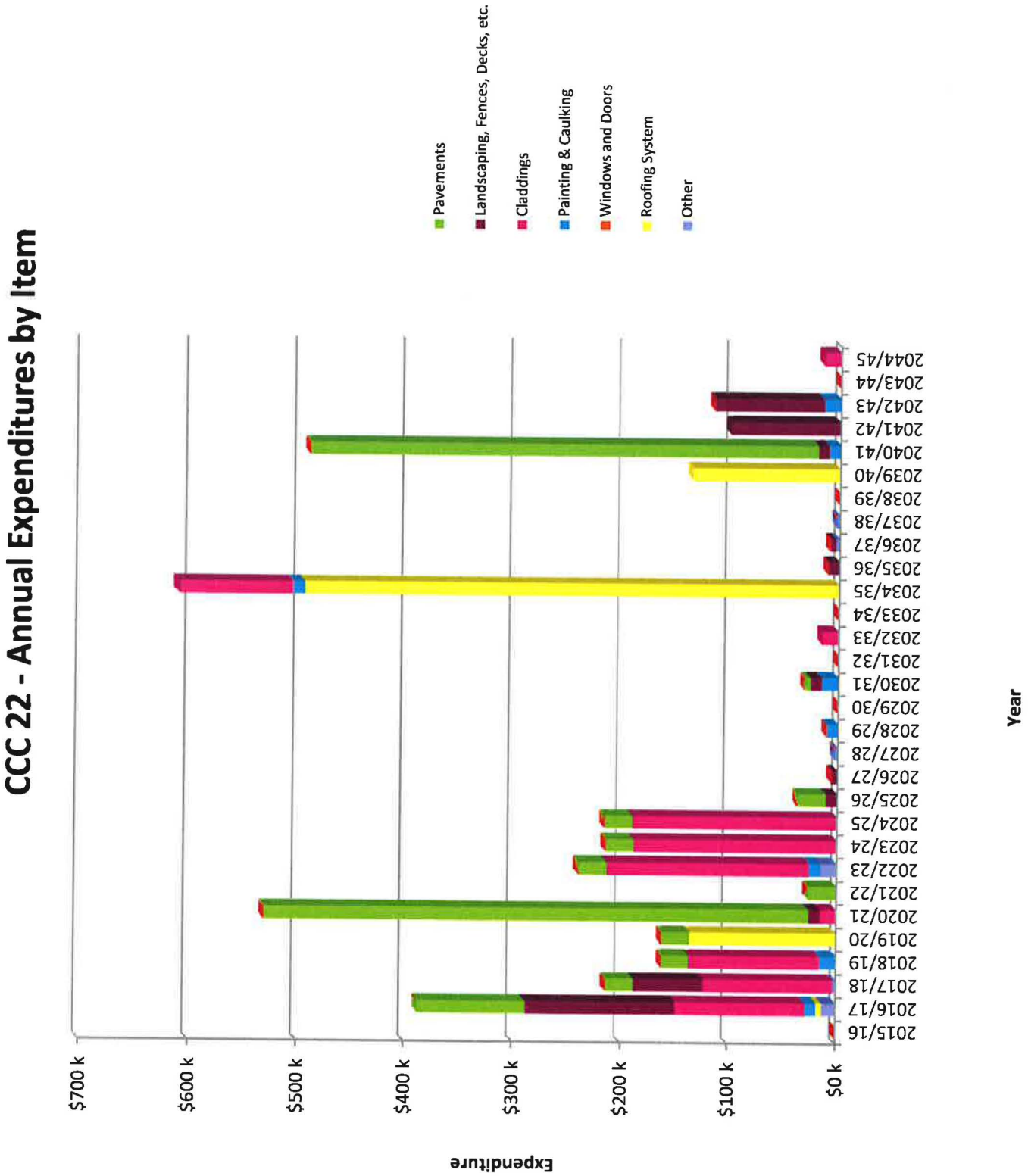
2) Estimates for expenditures include HST and, where appropriate, engineering fees.

59 Years	60 Years	61 Years	62 Years	63 Years	64 Years	65 Years	66 Years	67 Years	68 Years	69 Years	70 Years	71 Years	72 Years		AGE OF COMPLEX	
2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45	TOTALS	REPAIR/REPLACEMENT ITEMS	
$5,000	$50,000			$10,000	$5,000	$50,000			$5,000	$5,000	$50,000			$240,000	6.1	Site Services
									$365,000					$885,000	6.2	Asphalt Pavement
									$5,000					$275,000	6.3	Entrance Stairs
									$100,000					$127,000	6.4	Exterior Concrete
					$5,000				$5,000					$30,000	6.5	Landscaping
										$100,000	$100,000			$400,000	6.6	Fencing
									$5,000					$15,000	6.7	Foundation Walls
				$10,000										$20,000	6.8	Window Wells
	$15,000												$15,000	$45,000	6.9	Masonry Veneer
														$330,000	6.10	Stucco
														$595,000	6.11	Siding, Trim & Flashing
			$105,000											$105,000	6.12	Soffits & Fascias
			$10,000						$10,000					$50,000	6.13	Exterior Painting
											$15,000			$45,000	6.14	Caulking
														$0	6.15	Windows, Patio Doors, Skylights
														$0	6.16	Doors
			$495,000					$135,000						$765,000	6.17	Shingles/Mansards
														$5,000	6.18	Eavestroughing & Downspouts
														$0	6.19	Attics
														$0	6.20	Chimneys
					$3,000	$2,500								$13,500	6.21	Condominium Office Building
														$20,000	6.22	Exterior Lighting
		$5,000			$3,000			$5,000			$3,000			$5,000	6.23	Miscellaneous Items
$5,000	$65,000	$5,000	$610,000	$20,000	$16,000	$52,500	$0	$140,000	$495,000	$105,000	$168,000	$0	$15,000	$40,000	7.0	Reserve Fund Study Update
$6,864	$91,016	$7,141	$888,655	$29,719	$24,251	$81,164	$0	$225,181	$812,100	$175,709	$286,757	$0	$26,638	$4,010,500	YEARLY EXPENDITURE TOTALS	
$232,473	$237,122	$241,865	$246,702	$251,636	$256,669	$261,802	$267,038	$272,379	$277,827	$283,383	$289,051	$294,832	$300,729	$5,214,894	EXPENDITURES INCL. INFLATION	
														$6,869,961	CONTRIBUTIONS FROM FEES	
$30,784	$35,160	$39,717	$36,406	$32,899	$38,153	$43,096	$48,488	$52,642	$48,786	$45,462	$47,491	$51,452	$58,238	$0	ADDITIONAL CONTRIBUTIONS	
$1,667,376	$1,848,643	$2,123,084	$1,517,538	$1,772,354	$2,042,925	$2,266,659	$2,582,186	$2,682,026	$2,196,539	$2,349,675	$2,399,461	$2,745,745	$3,078,074	$788,308	INTEREST CONTRIBUTIONS	
														$3,078,074	REMAINING RESERVE FUND	
										REMAINING RESERVE FUND IN 2016 DOLLARS				$1,733,301		

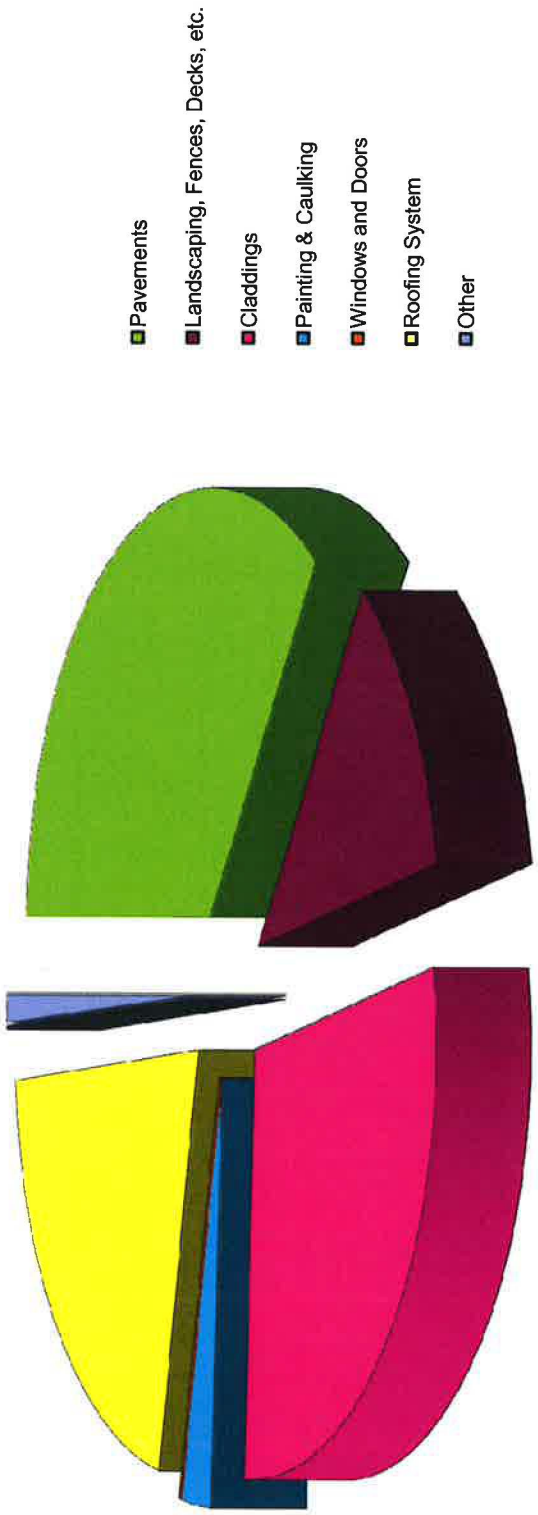
3) Inflation assumed to be at an average rate of 2.0% over the time frame examined above.

CCC 22 - Reserve Fund Annual Expenditures/Closing Balance




CCC 22 - Annual Expenditures by Item
Pavements
Landscaping, Fences, Decks, etc.
Claddings
Painting & Caulking
Windows and Doors
Roofing System
Other
$700 k
$600 k
$500 k
$400 k
$300 k
$200 k
$100 k
$0 k
Expenditure
2015/16
2016/17
2017/18
2018/19
2019/20
2020/21
2021/22
2022/23
2023/24
2024/25
2025/26
2026/27
2027/28
2028/29
2029/30
2030/31
2031/32
2032/33
2033/34
2034/35
2035/36
2036/37
2037/38
2038/39
2039/40
2040/41
2041/42
2042/43
2043/44
2044/45
Year

CCC 22 - Total Expenditures by Category



APPENDIX B:
PHOTO REVIEW

1 General view of CCC 22

2 Showing the condition of the asphalt pavement in the rear parking lot. Note cracking and heaving

3 Showing poor condition of the asphalt walkways. Note severe cracking.

4 Showing settled interlocking unit pavers at front entrance to a unit

5 Showing a section of deteriorated wood fencing

6 Showing a galvanized sheet metal window well

7 Showing existing cracked stucco to be replaced with vinyl siding

8 Showing existing hardboard siding to be replaced with vinyl siding

9 Showing typical condition of the caulking throughout the complex

10 Showing typical condition of the asphalt shingle mansard roofs. Note minor uplift.

APPENDIX C:
MANAGEMENT PLANNING
TABLE

CCC 22 : Annual Major Repair & Replacement Work, Fiscal Years 2015/16 to 2044/45

Year		Description of Work	Cost	Yearly Total	Inflated Yearly Total
43	2015/16	6.1 Sewer Cleaning	$5,000		
		6.1 Sewer Inspection	$5,000		
		7.0 Reserve Fund Study (With Site Visit)	$5,000		
				$15,000	$15,000
44	2016/17	6.1 Valve Survey	$15,000		
		6.1 Parking Bollard Repalcement Allowance	$5,000		
		6.2 Rear Parking Lot Reconstruction	$68,000		
		6.3 Precast Concrete Entry Steps Replacement Allowance	$26,000		
		6.4 Concrete Curb Repairs	$5,000		
		6.5 Tree Removal Allowance	$5,000		
		6.6 Wood Fencing Replacement	$135,000		
		6.10 Stucco Reaplcement	$110,000		
		6.11 Hardboard Siding Replacement	$10,000		
		6.13 Exterior Painting	$10,000		
		6.18 Eavestroughing Allowance	$5,000		
		6.21 Condominium Office Roof Replacement	$3,000		
		6.22 Light Standard Replacement	$10,000		
				$407,000	$415,140
45	2017/18	6.3 Precast Concrete Entry Steps Replacement Allowance	$26,000		
		6.6 Wood Fencing Replacement	$65,000		
		6.10 Stucco Replacement	$110,000		
		6.11 Hardboard Siding Replacement	$10,000		
		6.21 Condominium Office Refinishing Allowance	$2,500		
				$213,500	$222,125
46	2018/19	6.3 Precast Concrete Entry Steps Replacement Allowance	$26,000		
		6.10 Stucco Replacement	$110,000		
		6.11 Hardboard Siding Replacement	$10,000		
		6.14 Caulking Repalcement	$15,000		
		7.0 Reserve Fund Study Update (Without Site Visit)	$3,000		
				$164,000	$174,038

Notes:
1) Estimates for expenditures include HST and, where applicable, engineering fees.
2) Inflation assumed to be at an average of 2.0 % over the time frame examined above.

CCC 22 : Annual Major Repair & Replacement Work, Fiscal Years 2015/16 to 2044/45

Year		Description of Work	Cost	Yearly Total	Inflated Yearly Total
47	2019/20	6.3 Precast Concrete Entry Steps Replacement Allowance	$26,000		
		6.17 Aspahlt Shingle Mansard Replacements	$135,000		
				$161,000	$174,272
48	2020/21	6.1 Sewer Cleaning	$5,000		
		6.2 Asphalt Pavement Reconstruction	$282,000		
		6.2 Asphalt Walkway Resurfacing	$170,000		
		6.3 Precast Concrete Entry Steps Replacement Allowance	$26,000		
		6.3 Rear Precast Concrete Step Replacement Allowance	$5,000		
		6.4 Concrete Curb Repairs	$22,000		
		6.5 Landscaping Allowance	$5,000		
		6.7 Foundation Wall Repair Allowance	$5,000		
		6.9 Brick Repair Allowance	$15,000		
				$535,000	$590,683
49	2021/22	6.1 Parking Bollard Replacement Allowance	$5,000		
		6.3 Precast Concrete Entry Steps Replacement Allowance	$26,000		
		7.0 Reserve Fund Study Update (With Site Visit)	$5,000		
				$36,000	$40,542
50	2022/23	6.3 Precast Concrete Entry Steps Replacement Allowance	$26,000		
		6.11 Aluminum Siding Replacement	$188,000		
		6.13 Exterior Painting	$10,000		
		6.22 Wall Mounted Light Fixtures	$10,000		
		6.23 Electric Meter Cabintes Replacement	$5,000		
				$239,000	$274,536
51	2023/24	6.3 Precast Concrete Entry Steps Replacement Allowance	$26,000		
		6.11 Aluminum Siding Replacement	$188,000		
				$214,000	$250,735

Notes:

1) Estimates for expenditures include HST and, where applicable, engineering fees.
2) Inflation assumed to be at an average of 2.0 % over the time frame examined above.

CCC 22 : Annual Major Repair & Replacement Work, Fiscal Years 2015/16 to 2044/45

Year		Description of Work	Cost	Yearly Total	Inflated Yearly Total
52	2024/25	6.3 Precast Concrete Entry Steps Replacement Allowance	$26,000		
		6.11 Aluminum Siding Replacement	$189,000		
		7.0 Reserve Fund Study Update (Without Site Visit)	$3,000		
				$218,000	$260,530
53	2025/26	6.1 Sewer Cleaning	$5,000		
		6.1 Sewer Inspection	$5,000		
		6.3 Precast Concrete Entry Steps Replacement Allowance	$26,000		
		6.8 Window Well Replacement Allowance	$10,000		
				$46,000	$56,074
54	2026/27	6.1 Parking Bollard Replacement Alloewance	$5,000		
		6.5 Tree Removal Allowance	$5,000		
				$10,000	$12,434
55	2027/28	6.21 Condominium Office Refinishing Allowance	$2,500		
		7.0 Reserve Fund Study Update (With Site Visit)	$5,000		
				$7,500	$9,512
56	2028/29	6.13 Exterior Painting	$10,000		
				$10,000	$12,936
57	2029/30	No Work Scheduled			
				$0	$0
58	2030/31	6.1 Sewer Cleaning	$5,000		
		6.3 Rear Precast Concrete Step Replacement Allowance	$5,000		
		6.5 Landscaping Allowance	$5,000		
		6.7 Foundation Wall Repair Allowance	$5,000		
		6.14 Caulking Replacement	$15,000		
		7.0 Reserve Fund Study Update (Without Site Visit)	$3,000		
				$38,000	$51,143

Notes:

1) Estimates for expenditures include HST and, where applicable, engineering fees.
2) Inflation assumed to be at an average of 2.0 % over the time frame examined above.

CCC 22 : Annual Major Repair & Replacement Work, Fiscal Years 2015/16 to 2044/45

	Year		Description of Work	Cost	Yearly Total	Inflated Yearly Total
59	2031/32	6.1	Parking Bollard Replacement Allowance	$5,000		
					$5,000	$6,864
60	2032/33	6.1	Major Sewer System Repair Allowance	$50,000		
		6.9	Brick Repair Allowance	$15,000		
					$65,000	$91,016
61	2033/34	7.0	Reserve Fund Study Update (With Site Visit)	$5,000		
					$5,000	$7,141
62	2034/35	6.12	Soffits & Fascia Replacement	$105,000		
		6.13	Exterior Painting	$10,000		
		6.17	Asphalt Shingle Roofing Replacements	$495,000		
					$610,000	$888,655
63	2035/36	6.1	Sewer Cleaning	$5,000		
		6.1	Sewer Inspection	$5,000		
		6.8	Window Well Replacement Allowance	$10,000		
					$20,000	$29,719
64	2036/37	6.1	Parking Bollard Replacement Allowance	$5,000		
		6.5	Tree Removal Allowance	$5,000		
		6.21	Condominium Offcie Shingle Roof Replacement	$3,000		
		7.0	Reserve Fund Study Update (Without Site Visit)	$3,000		
					$16,000	$24,251

Notes:

1) Estimates for expenditures include HST and, where applicable, engineering fees.
2) Inflation assumed to be at an average of 2.0 % over the time frame examined above.

CCC 22 : Annual Major Repair & Replacement Work, Fiscal Years 2015/16 to 2044/45

Year		Description of Work		Cost	Yearly Total	Inflated Yearly Total
65	2037/38	6.1	Major Sewer System Repairs	$50,000		
		6.21	Condominium Office Refinishing Allowance	$2,500		
					$52,500	$81,164
66	2038/39		No Work Scheduled			
					$0	$0
67	2039/40	6.17	Asphalt Shingle Mansards Replacements	$135,000		
		7.0	Reserve Fund Study Update (With Site Visit)	$5,000		
					$140,000	$225,181
68	2040/41	6.1	Sewer Cleaning	$5,000		
		6.2	Asphalt Pavement Overlay	$195,000		
		6.2	Asphalt Walkway Resurfacing	$170,000		
		6.3	Rear Precast Concrete Step Replacement Allowance	$5,000		
		6.4	Concrete Curb Replacements	$100,000		
		6.5	Landscaping Allowance	$5,000		
		6.7	Foundation Wall Repair Allowance	$5,000		
		6.13	Exterior Painting	$10,000		
					$495,000	$812,100
69	2041/42	6.1	Parking Bollard Replacement Allowance	$5,000		
		6.6	Wood Fencing Replacement	$100,000		
					$105,000	$175,709

Notes:
1) Estimates for expenditures include HST and, where applicable, engineering fees.
2) Inflation assumed to be at an average of 2.0 % over the time frame examined above.

CCC 22 : Annual Major Repair & Replacement Work, Fiscal Years 2015/16 to 2044/45

Year		Description of Work		Cost	Yearly Total	Inflated Yearly Total
70	2042/43	6.1	Major Sewer System Repairs	$50,000		
		6.6	Wood Fencing Replacement	$100,000		
		6.14	Caulking Replacement	$15,000		
		7.0	Reserve Fund Study Update (Without Site Visit)	$3,000		
					$168,000	$286,757
71	2043/44		No Work Scheduled			
					$0	$0
72	2044/45	6.9	Brick Repair Allowance	$15,000		
					$15,000	$26,638

Notes:
1) Estimates for expenditures include HST and, where applicable, engineering fees.
2) Inflation assumed to be at an average of 2.0 % over the time frame examined above.