City of Richmond

Report to Committee

To:	Public works and Transportation Committee	**Date:**	September 9, 2002
From:	Steve Ono, P.Eng. Director, Engineering	**File:**	2050-01
Re:	**Ageing Facility Infrastructure Life Cycle Maintenance**		

Staff Recommendation

That Council receive the report on Ageing Facility Infrastructure Life Cycle Maintenance dated September 9, 2002 from the Director, Engineering for information.

Steve Ono, P.Eng.
Director, Engineering

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Staff Report

Origin

The Facility Life Cycle Planning Work Program presented to Public Works & Transportation Committee on July 5, 2000 outlined a 3-year assessment period for City buildings and facilities, with periodic updates to be presented to Committee as the work progresses. This report provides an update with respect to the life cycle maintenance costs required to maximize the lifespan of City buildings.

Findings of Fact

Existing Building Inventory

The City of Richmond's buildings represent notable financial worth with a current replacement value of $200 million. The current inventory of 130 buildings comprises a total area of 1,445,857 sq. ft. Approximately 50% of this building area has been constructed during the past 10 years. The buildings are grouped into three categories.

- Community Safety Buildings – facility audits have been completed, and replacement strategies are in progress.
- Community Use Buildings - were assessed during 2001.
- Corporate Facilities - are currently being assessed.

Facility Maintenance Considerations

Buildings are composed of many complex and technical systems, with each system requiring varying degrees of operation, maintenance, repair and eventual replacement. The various aspects of Building Operations and Maintenance can be categorized as follows:

- Annual Maintenance - Includes operation, preventative maintenance and repairs. Funds are adequately budgeted in the annual operating budget.
- Life Cycle Maintenance – Is the cyclical maintenance, overhaul and replacement of assets or systems at the end of its service life. Funds are allocated as part of the annual capital budget process and funded through the mechanical equipment replacement reserve fund.
- Building Replacements - Is the replacement of an entire building at the end of service life or because of technical, economic, obsolescence, modernization, or compatibility issues. Building replacement is funded through the annual capital budget utilizing the capital building and infrastructure reserve fund or other funding mechanisms.

This report addresses the Life Cycle Maintenance requirements.

Current Funding

Over the past 10 years, the City's building inventory has increased by approximately 300,000 sq. ft. while capital funding for life cycle maintenance over the same period has decreased significantly.

The recommended annual funding levels for life cycle maintenance by the American Public Works Association (APWA), International Facility Managers Association (IFMA) and Building Operators and Managers Association (BOMA) are between 2% and 4% of the building replacement value. For the City of Richmond, the recommended funding would amount to between $4,000,000 and $8,000,000 per annum. This compares to the City's actual 2002 allocation of $589,000.

The Mechanical Equipment Replacement Reserve Fund has a current balance of approximately $783,900. This reserve fund does not have a consistent or sustained annual funding source.

Current Conditions

The industry standard indicator of building condition is to measure the value of all current building deficiencies in relation to the replacement value of the building. This ratio is the Facility Condition Index or FCI, the higher the FCI, the poorer the condition of the facilities.

For the City of Richmond, facility condition audits have been completed for approximately 50% (720,000 sq. ft.) of the total 1.45 million sq. ft. The audits have revealed a backlog of building deficiencies that require correction as well as future predictions for asset replacement through the facility renewal forecast.

Based on buildings assessed to date, the City's overall facility condition is fair to poor with an FCI of 0.13. An FCI for buildings in good condition is 0.05 indicating that building deficiencies are 5% of the building replacement value.

The building deficiencies can be grouped into categories such as Building Integrity, Air Quality, Energy and Building Code Compliance. Extrapolating the audit results to date, it is estimated that the building deficiency backlog for all City buildings is projected to be $27,000,000. Of this amount, an estimated $8,000,000 would be considered either critical priority 1 or potentially critical priority 2 and should be corrected within the next year or two.

Analysis

At this time the City's building inventory can be considered overall as in fair condition due to the fact that a large percentage (50%) is less than 10 years old. As these and other buildings age and with no regular contributions to the mechanical equipment replacement reserve fund, accelerated depreciation in both the facility condition index and asset value can be expected.

In defining the most suitable course of action staff have developed the following three options that would address the likely outcomes of:

1. Maintaining the current funding.
2. Maintaining the current FCI.
3. Reducing the FCI to 0.05 over a 10-year period.

Assumptions made include:

- That the building replacement cost is annually adjusted by the construction cost inflation rate, currently 2.5%.
- All values are adjusted for inflation for the 20-year duration of the analysis.
- The discount rate for net present value calculation is equal to the inflation rate.
- Deficiencies that are not corrected are adjusted for further deterioration by an annual backlog deterioration rate of 2%.
- The current building inventory will not increase.

OPTION 1 - Maintain Current Funding Level

This option maintains funding for life cycle maintenance at current levels (adjusted annually for inflation) as funded through the Physical Plant Sustaining Capital Program with a total amount of $589,000/year in 2002. Building deterioration and FCI will increase rapidly in this scenario so that after 20 years the FCI reaches 0.57 and buildings will likely require premature replacement.

After 20 years:

Total investment over 20 years	$ 11,780,000
Building Replacement Value	$327,580,000
Deficiency Backlog	$187,908,000
Net Building Value	$139,671,000

OPTION 2 - Maintain Current FCI at 0.13

This option indicates, on average, annual funding of $5,776,500 is required for life cycle maintenance in order to maintain the projected FCI at 0.13. In this option the building replacement value increases and the deficiency backlog is controlled but increases from $27,000,000 to $44,293,000 over 20 years. Effectively, the buildings would remain in the same relative condition as at present.

After 20 years:

Total Investment over 20 years	$115,530,000
Building Replacement Value	$327,580,000
Deficiency Backlog	$ 44,293,000
Net Building Value	$283,287,000

OPTION 3 - Reduce and Maintain FCI of 0.05

In this option, improving the condition of existing buildings to achieve a sustainable FCI of 0.05 by reducing the deficiency backlog from $27,000,000 to $16,379,000 over a 10-year timeframe requires annual funding of $6,412,150 on average thereby maximizing the lifespan of the buildings.

After 20 years:

Total Investment over 20 years	$128,243,000
Building Replacement Value	$327,580,000
Deficiency Backlog	$ 16,379,000
Net Building value	$311,201,000

These scenarios indicate that if life cycle maintenance funding is not increased, the condition of City facilities will deteriorate rapidly, and building lifespan will not be optimized. Notably, in comparing option 2 with option 3, additional investment of $12.7M over 20 years results in $28M fewer deficiencies and a corresponding higher net building value.

Financial Impact

None at this time.

Conclusion

Building audits have confirmed that on average, the City of Richmond's building infrastructure is in fair to poor condition. At current life cycle funding levels this infrastructure will deteriorate rapidly. To achieve and maintain the recommended industry standard for buildings in good condition, the current life cycle maintenance program is under-funded by an average $5.8 million per year.

An estimated annual funding requirement in the amount of $6.4 million per year would result in a long-term sustainable building inventory in good condition with an FCI of 0.05, capable of serving the City and the community through an optimum building lifespan.

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