



City of Richmond

Report to Committee

To: General Purposes Committee

Date: February 24, 2004

From: Jim Hancock
Fire Chief

File: 2052-02-F4

Re: Community Safety Building Replacement - Sea Island Fire Hall

Staff Recommendation

1. That the attached report from the Fire Chief be received for information, and that
2. That the replacement of the Sea Island Fire Hall proceed as Option 3 at a revised project cost of \$2,875,000.

Jim Hancock
Fire Chief
(2700)

Robert Gonzalez, P.Eng.
Director, Engineering

Att.

FOR ORIGINATING DIVISION USE ONLY	
ROUTED TO:	CONCURRENCE CONCURRENCE OF GENERAL MANAGER
Budgets	Y <input type="checkbox"/> N <input type="checkbox"/>

Staff Report

Origin

At the General Purpose committee meeting of February 16, 2004 it was moved and seconded

That the report (dated January 22, 2004, from the Fire Chief), regarding the Community Safety Building Replacement – Sea Island Fire Hall, be referred to staff for clarification and additional information on the three options.

Prior to the question on the motion being called, staff were directed to:

- (1) *present a high-quality fire hall facility with appropriate community space, which would meet the long term needs of the Department, as well as providing an environmentally sustainable building, as this facility would be setting the standard for future fire hall construction;*
- (2) *the cost of construction of such a facility as described in (1) above;*
- (3) *provide additional information on Option 1, along with photographs of the design concept;*
- (4) *provide information on why, with respect to Option 1, (i) the lifecycle of the proposed structure was reduced from 75 years for Options 2 and 3; (ii) the proposed structure was not environmentally sustainable; and (iii) Maintenance and Lifecycle costs were not optimized; and*
- (5) *whether the design for the Sea Island Fire Hall was to be used in the construction of the Hamilton and Bridgeport fire halls.*

This report responds to the questions directed above.

Background

Staff research undertaken during the Community Safety Building Replacement Master Plan study identified the need to replace four Richmond Fire Rescue (RFR) fire halls, including the Sea Island Fire Hall, and resulted in Council adopting a design standard of 7,650 sq.ft. for the new community fire halls.

Attached is the report dated January 22, 2004 that went forward to General Purposes Committee.

Analysis

1. High Quality Fire Hall

This facility was illustrated to the communities of Burkeville and Hamilton as a Concept fire hall and reflected a concrete and brick construction that would meet the requirements of RFR, the community and the Green Building Council and a “LEED” (leadership in energy and environmental design) silver or gold standard through a variety of water retention/recycling proposals, green roofing, permeable paving, and other energy saving measures (Powersmart initiatives, heat pumps, natural lighting, etc...).

Minor revisions to the original concept resulted in the schematic design, presented as "Attachment 1" in the original January 22, 2004 report, for the "Design" fire hall of 7,500 sq. ft. and an estimated cost of \$3.13M, retained all of the high quality brick character, sustainable fire hall initiatives, and shared community meeting space considered in the Concept.

2. Construction Cost of High Quality Fire Hall

Appendix 1 illustrates the proposed floor plan and design features for high quality fire hall, with an estimated project total cost of \$3.13M:

3. Examples of Pre - Engineered Fire Hall (Option 1)

The concept of simplifying the present design and constructing a non sustainable building using a steel frame box design as illustrated in Option 1 of the staff report was proposed by staff as one solution that meets the space needs of RFR using the \$2.631M of funds currently allocated.

This type of construction is well established throughout the lower Mainland and can range in application from a simple garage/warehouse to commercial office / business complex buildings. One primary advantage is the speed of construction, since the bulk of the building structure and envelope is manufactured off site. Staff will be available to present a photographic selection of fire halls constructed in this fashion .

4. Lifecycle, Sustainability, and Maintenance Costs

(i) Facility Lifecycle - In the report considered by the General Purposes Committee February 16, Option 1 presented a pre-engineered fire hall meeting the space requirements of Richmond Fire Rescue, but constructed to lower standards and using an exterior metal siding similar to that found on pre-engineered industrial/commercial buildings. The building meets all of the required post disaster standards and building codes, but due to the exterior and interior building components being of lower quality, the lifecycle is estimated to be 50 years.

(ii) Environmentally Sustainable - In considering Option 1, a pre-engineered fire hall, Leadership in Environmental Design (LEED) initiatives to meet a recognized sustainable standard would not apply since the materials are not natural to the local environment and their manufacture contributes to GHG (Green House Gas). The building would generally be unable to contribute to improving our environment except in a limited fashion with the use of energy efficient lighting, some natural lighting, ventilation, and storm water management.

LEED initiatives that have been deleted from Option 1 include: grey water recycling, low emission materials, Green roofing and permeable paving.

(iii) Optimizing Maintenance Costs - The technical and functional life cycle of conventional buildings is between 50 and 75 years. Accepted maintenance principles predict that over the lifecycle of a building, maintenance and replacement costs (M&R) will equal the capital cost of the building (see following table)

Building Type	Building Construction Cost (A)	Estimated Lifecycle (B)	Annual M&R renewal costs (A/B)
Pre -Engineered	\$1.56 M	50 years	\$31,200
Conventional Design	\$1.95 M	75 years	\$26,000

Figures calculated with a zero inflation rate based on building replacement cost only

Reduction in M&R costs of a conventional design over the initial 50 years is \$260,000 or 67% of the increase in the capital investment of \$390,000, with no requirement to replace the infrastructure for a further 25 year period

5. Template or Repeatable Design

To date, concept design drawings have only been developed for the two fire halls slated for replacement during 2004 (Sea Island) and 2005 (Hamilton). In each case the interior floor plans and finishes are intended to be standardized although not identical. Likewise, the exterior designs are intended to share familiar themes but would not become "cookie cutter" models of each other since the specific neighbourhood settings and visual requirements differ at each location. It is anticipated that Bridgeport Fire Hall will closely follow the above models to provide consistency and a degree of uniformity. For each location, this standard provides cost efficiencies in both design fees and construction costs over individual design.

Ultimately, the option and budget preferred and supported by the General Purposes Committee would determine the eventual degree of standardization, sustainability and exterior design of each of the fire halls.

Financial Impact

The following table summarizes the anticipated funding requirements for the various options and Appendix 1 summarizes the scope for each option:

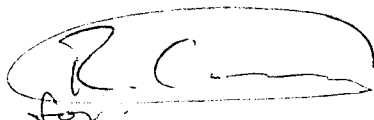
Option	Project Budget	Additional Funding
High Quality Sustainable Fire Hall – 7,500 sq. ft + LEED	\$3,132,582	\$501,582
Option 1 – Pre-Engineered – 7,500 sq. ft – Minimum LEED	\$2,326,000	Nil
Option 2 - High Quality Sustainable Fire Hall – 6,500 sq. ft + LEED	\$2,631,000	Nil
Option 3 – 7,000 sq. ft – NO LEED	\$2,875,000	\$244,000

Funding is available from the Community Safety Building Replacement Budget with no increase in the overall global strategy at this time. Any surplus or savings realized during the project will be returned to the Community Safety Buildings Budget.

Conclusion

This report responds to the requests made by the General Purposes Committee in order to clarify aspects of the original report dealing with a revised project cost for the replacement of the Sea Island Fire Hall.

The recommendation “*That the replacement of the Sea Island Fire Hall proceed as Option 3 at a revised project cost of \$2,875,000*” included in the original staff report dated January 22, 2004 is still valid.



David Naysmith, P. Eng.
 Manager, Facilities Planning & Construction
 (3312)

DN:cmm

Description	High Quality Sustainable Fire Hall 7,500 sq.ft	OPTION 1 Pre Engineered Fire Hall 7,500 sq.ft	OPTION 2 High Quality Sustainable Fire Hall 6,500 sq.ft	OPTION 3 "Recommended" Fire Hall 7,000 sq.ft
Accommodation				
Fire Rescue	✓	✓	✓	✓
RCMP	✓ shared	✓ shared	✓ shared	✓ shared
Community	✓ shared	✓ shared	✓ shared	✓ shared
Tower	✓ 60'	✓ 60'	✓ 30'	✓ 60'
Outdoor Fitness	✓	✓		✓ possible
Lifecycle				
Building Life Span	75 years	50 years	75 years	75 years
Maint & Replacement/Year	\$28,000	\$31,200	\$24,700	\$26,000
Energy Dependency	low	high	low	average
Sustainable Initiatives (LEED)	Silver / Gold	None	Silver / Gold	None
Project Cost				
Construction	\$2.1M	\$1.56M	\$1.85M	\$1.95M
Other	\$820K	\$616K	\$688K	\$735K
Contingency	\$210K	\$150K	\$93K	\$190K
Total	\$3.13M	\$2.33M	\$2.63M	\$2.875M
Green (or LEED) Initiatives				\$110K
				\$2.985K

Appendix 2

**Copy of Community Safety Building Replacement
Sea Island Fire Hall Staff Report
January 22, 2004**



City of Richmond

Report to Committee

To: General Purposes Committee

Date: January 22, 2004

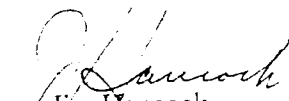
From: Jim Hancock
Fire Chief

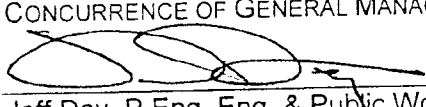
File: 2052-02 F4

Re: **Community Safety Building Replacement - Sea Island Fire Hall**

Staff Recommendations:

1. That the replacement of the Sea Island Fire Hall proceeds as Option 3 at a revised project cost of \$2,875,000.


 Jim Hancock
 Fire Chief
 (2700)

FOR ORIGINATING DIVISION USE ONLY		
ROUTED TO:	CONCURRENCE	CONCURRENCE OF GENERAL MANAGER
Budgets	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	 Jeff Day, P.Eng. Eng. & Public Works

Staff Report

Origin

Richmond Fire Rescue (RFR) and Facility Management staff have been working with architects and quantity surveyors to revise and refine the scope of work for the Sea Island Fire Hall project since the estimated construction cost for the project exceeds Council approved budget.

This report addresses the necessary changes to the project in order to remain closer to, or within the existing budget allocation, and seeks Committee's approval for the revised strategy.

Background

Staff research undertaken during the Community Safety Building Replacement Master Plan study identified the need to replace four fire halls, including the Sea Island Fire Hall, and resulted in Council adopting a design standard of 7,650 sq. ft. for the new community fire halls. A preliminary estimate, solely based on square footage and 2002 costs, was utilized for budgeting purposes.

Provincial guidelines require that all new fire halls be built to post disaster standards as per the Building Code. Furthermore, the selected site for the Sea Island Fire Hall must meet the Federal Department of Fisheries and Oceans' requirements to protect environmental sensitive fish habitat areas.

The final schematic design for an environmentally sustainable Fire Hall for Sea Island represents a facility of approximately 7,500 sq. ft. (Attachment 1) but with an estimated project cost of \$3.13M, an increase of \$0.5M from the approved budget of \$2.63M.

Analysis

The following are adjustments to the scope of the project due to unexpected and non-controllable features, e.g.:

- On and off-site preparation associated with post-disaster, soil conditions and sustainability elements (\$100,000);
- Department of Fisheries and Oceans' requirements for fish habitat compensation and landscaping costs to incorporate paths and a bridge into environmentally sensitive areas (\$56,000);
- Traffic signalling pre-emption controls (\$90,000);
- A recommended increase in design and construction contingency of 10% due to an anticipated "hot market" and higher regional construction costs (\$118,000);
- Variable percentage increases in city costs i.e. Fees, F&E, Permits, DCC's, GST and overheads etc. (\$136,000).

Discussion

In order to construct the Sea Island Fire Hall within the existing budget of \$2.63M it is necessary to reduce the total building construction costs by up to \$0.5M to compensate for the above factors. This can be done in one of two ways:

- Maintain the required RFR program space of 7,500 sq. ft. and reduce the overall quality, appearance and lifecycle of the building, or
- Maintain the quality, appearance and lifecycle of the building and reduce the program space (area).

A third option for consideration would be a compromise in reducing both space and quality without necessarily sacrificing the overall project values.

Option 1

Within budget - 7,500 sq.ft. Program Space – Low Quality – Minimal Sustainable Initiatives

To accommodate this option it would be necessary to abandon the current design principles and consider a simpler, steel framed or possibly a pre-engineered facility (Attachment 2).

Steel framed pre-engineered buildings are frequently used by the construction and warehouse industry for lightweight medium life buildings (up to 50 years) and have been adapted in many situations to fulfil the needs for a post disaster fire hall. Examples of this type of application can be found in Squamish and Oliver in B.C, and throughout the U.S.

This style of building would be “Power Smart” and would include permeable pavement to better manage storm water. It will also provide a post disaster facility within the current budget and meet the operational requirements of RFR.

Appendix I provides a summary table of advantages and disadvantages of this and other options.

Option 2

Within Budget – 6,500 Sq.Ft. Program Space - High Quality – Sustainable Initiatives

In this option it would be necessary to eliminate the RFR training room, multi-purpose room, and community meeting space, and potentially reduce the height of the training tower from 60 ft. to 30 ft. These items could then be planned for future addition as RFR operations dictate. (Attachment 3.)

The resultant fire hall would retain its primary program characteristics with the second floor becoming multi purpose to compensate for the loss of the Training and Education Development Centre (EDC) and a corresponding loss of community access space. Design concepts using brick construction and environmental sustainability would be maintained in keeping with the City’s vision and commitment to environmental sustainability.

Since the Sea Island site is preloaded for a larger facility, Option 2 also provides the ability to revisit and expand into a 7,500 sq.ft. facility at some point in the future.

Staff anticipates that these measures would be sufficient to achieve the required cost reductions, but the resulting facility would not satisfy RFR operational requirements for a successful fire hall.

Option 3

Increase Budget - 7,000 Sq.Ft Program Space - Reduced Quality - Minimal Sustainable Initiatives (Recommended)

A number of reductions can be considered that would retain the larger benefits of meeting RFR operational needs, without sacrificing the existing design intent. These reductions in scope (Attachment 4) would reduce building size by approximately 500 sq. ft., which results in RFR sharing meeting space with the community. Building quality would be acceptably reduced using heavy steel frame construction, split concrete block and cladding rather than structural concrete and bricks. Sustainable "green" initiatives would also be impacted as noted in Option 1.

Implementing these reductions in the scope of work would necessitate an estimated increase of \$244,000 in the budget. The resultant building would meet the basic operational requirements of RFR and reflect the City's vision and values for quality.

As evident from the impact summary as noted in Appendix I, Option 3 provides a compromise solution that maintains the integrity of the current design without sacrificing overall construction quality other than limiting "Green" initiatives. Option 3 facility would be approximately 7,000 sq. ft. and it will satisfy the basic operational requirements of RFR as well as provide continued access to meeting space for the community.


Financial Impact

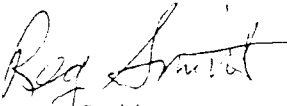
Proceeding with Option 3 requires an increase of \$244,000 to the original budget. This funding is available from the Community Safety Building Replacement budget with no increase in the overall global strategy at this time. Any surplus or savings realized during the project will be returned to the Community Safety buildings budget.

Conclusion

Option 3 provides a building that will meet the basic operational needs of RFR and the community through the sharing of meeting space. It is recommended as a compromise solution because of the fiscal realities currently facing the City.

The Sea Island Fire Hall is the first of four fire halls slated for replacement over the next several years. Dependent upon which option is selected, the decision will provide a "frame of reference" for the future RFR fire hall replacements and provide input into future design and budgets of fire halls in general.


David Naysmith, P. Eng.
Manager, Facility Planning & Construction
(3312)


Reg Smith
Deputy Chief
(2702)

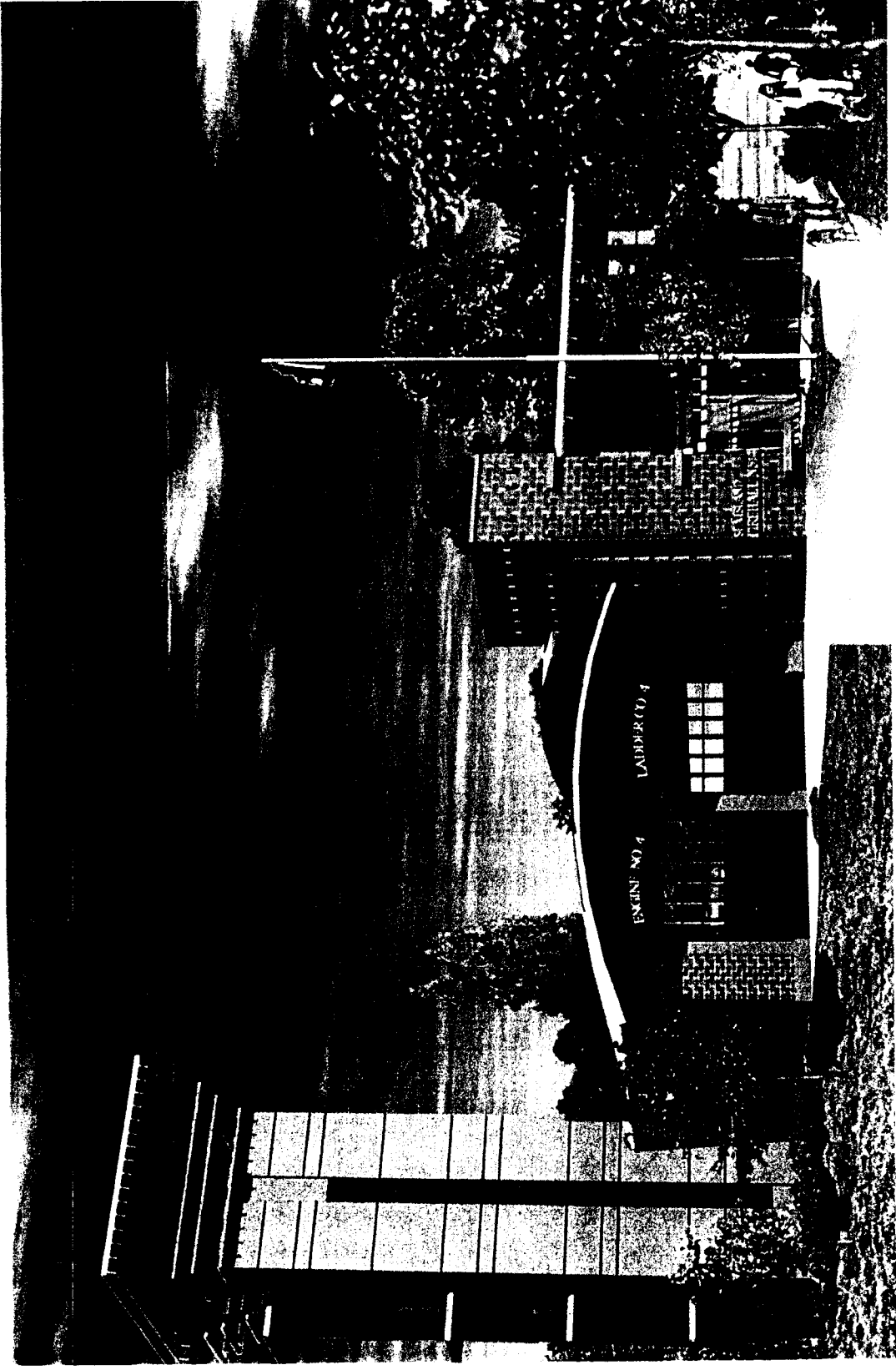
APPENDIX I: SUMMARY OF OPTIONS AND IMPACT SUMMARY

Description	Option 1	Option 2	Option 3
	Pre-engineered	Custom-built	Custom-built
	7,500 sq ft	6,500 sq ft	7,000 sq ft
Total budgeted project costs (<i>based on Nov 2003 Canadian Construction unit costs</i>)	\$2,326,000	\$2,631,000	\$2, 875,000

Impact Summary:

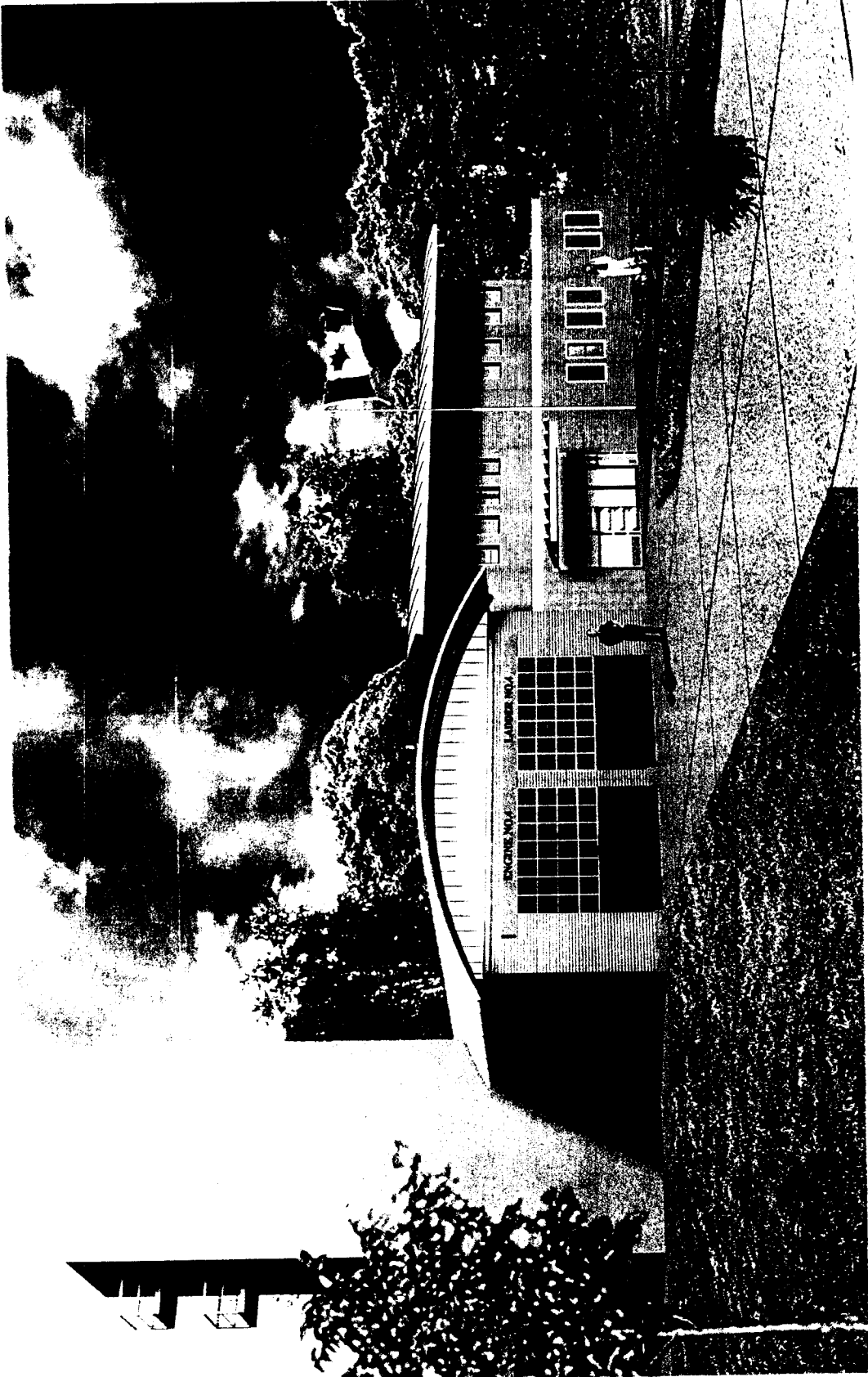
Option 1	Option 2	Option 3
Pre-engineered	Custom-design	Custom-design
7,500 sq ft	6,500 sq ft	7,000 sq ft
Within budget	Within budget	Additional funding of \$244,000 required
Meets long term needs of RFR	Does NOT meet the long term needs of RFR	Meets basic needs of RFR
Meets community access needs and requirements	Does NOT meet community access needs and requirements	Meets community access needs and requirements
Does NOT meet expectations of City vision: less "curb-appeal"	Meets full expectations of City vision	Meets basic expectations of City vision
Does NOT provide an environmentally sustainable building: Includes Power Smart and permeable pavement	Provides an environmentally sustainable building: "green initiatives"	Does NOT provide an environmentally sustainable building: Includes Power Smart and permeable pavement
Does NOT meet neighbourhood expectations for design	Meets neighbourhood expectations for design	Meets neighbourhood expectations for design
Maintenance and Lifecycle costs NOT optimized *	Maintenance and Lifecycle costs optimized	Maintenance and Lifecycle costs optimized
Lifecycle: up to 50 years	Maximizes building lifecycle: up to 75 years	Maximizes building lifecycle: up to 75 years

* **Option 1.** meeting the approved budget, operational requirements of RFR, and dedicated community meeting space is achieved to the detriment of building quality and environmental sustainability. Staff estimates this will have a maintenance and lifecycle impact of \$220,000 from a reduced lifecycle over the 50 years, over Options 2 and 3.



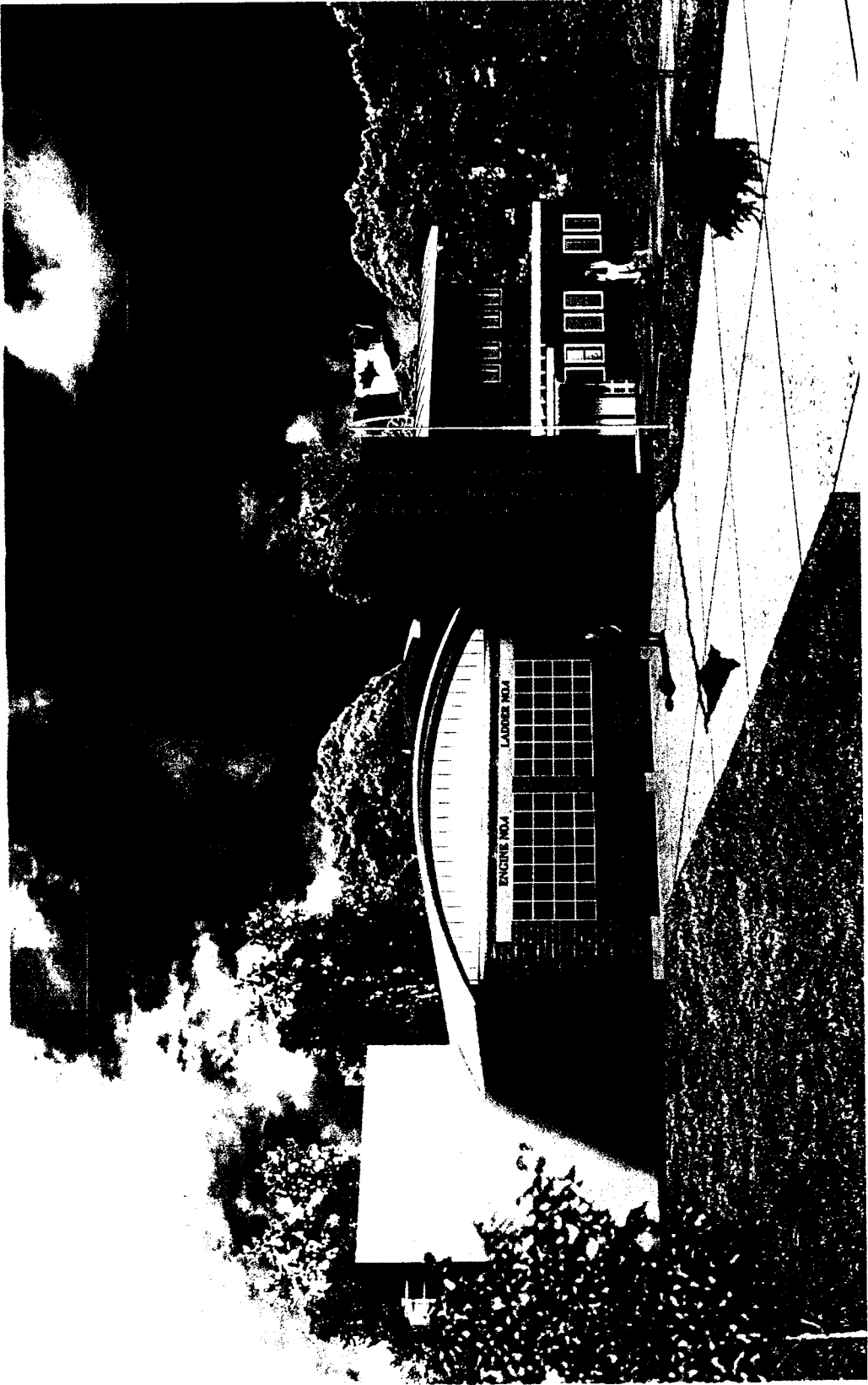
City of Richmond
Firehall No. 4 - Sea Island
November 6th, 2003

ATTACHMENT #1



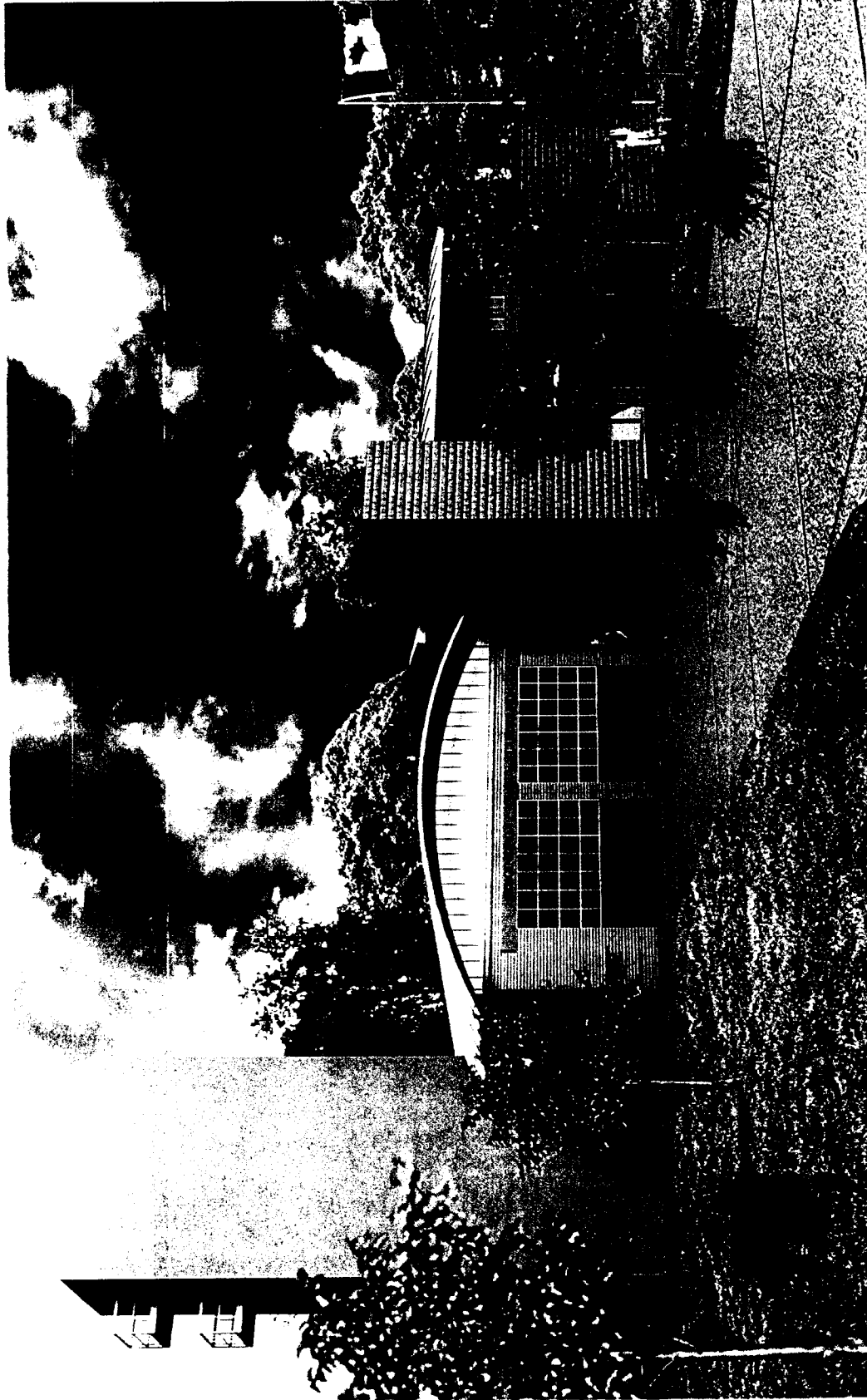
City of Richmond
Firehall No. 4 - Sea Island
November 6th, 2003

ATTACHMENT #2



City of Richmond
Firehall No. 4 - Sea Island
November 6th, 2003

ATTACHMENT #3



City of Richmond
Firehall No. 4 - Sea Island
November 6th, 2003

ATTACHMENT #4