

HERITAGE STANDING INC.

Structural Engineering for Historic Buildings
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The River Arts Resource Council
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203-73 Milltown Blvd.
St. Stephen, NB, E3L 1G5

2016-02-29
Rev. 0
Internal Job Reference: 16069

Dear The River Arts Resource Council:

Subject: Desktop review of 2016 Building Condition Assessment

Heritage Standing Inc. (HSI) was retained by Margaret Williamson 2016-02-20 on behalf of the The River Arts Resource Council community group. HSI was retained to provide a professional review of 2016 Town of St. Stephen Building Condition Assessment: 34 Milltown Boulevard, St. Stephen, NB; authored by Dillon Consulting. River ARC requested that HSI undertake this desktop review taking the following into consideration:

- Their planned future use will maintain the prior occupancy category. Therefore, no change in occupancy for the building.
- Any construction work is to focus on maintenance, remediating deferred maintenance, and ensuring that the building meets National requirements.

I contacted engineer of record, Brian Latimer, on 2016-02-22 to inform him I was engaged to review his report, he was receptive and answered some questions.

Objective

The objective of this letter is to review the 2016 Building Condition Assessment Report by Dillon Consulting (henceforth referred to as the Dillon Report), with consideration for River ARC's interests in the Old Town Hall property, located at 34 Milltown Boulevard, St. Stephen. The findings in this letter are based solely upon the 2016 report and no independent investigation was done as part of the scope.



Figure 1: South facade of Old Town Hall (Photo Credit: John Leroux)



Figure 2: South east corner of Old Town Hall (Photo Credit: John Leroux)

I had made a walk-through of the Old Town Hall building in 2014 with Architect John Leroux. However, in order to allow consistent discussion of potential conservation work, this letter will use the findings and cost estimates from the 2016 Dillon Report as the bases of evaluation.

The methodology to be used for this desktop review consists of my general findings, section-by-section discussion of the Dillon Report, and final conclusions. Detailed discussion is to be found in the Annex of the Letter.

HSI Evaluation Methodology

The HSI evaluation of the Dillon reports focuses on what work would be required for continued use of the building. This evaluation used the following standards and guidelines to base the reconsideration of the presented material:

- National Building Code of Canada, 2010 Edition (NBCC)
- Ontario Building Code, 2012 Edition (OBC)
- The Nova Scotia Building Code Act, effective Jan 31st 2015 (NSBCA)
- Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition (Standards and Guidelines)

As a desktop review of the Dillon Report no new evaluation of costs or current building condition was undertaken. Findings are based entirely on the data presented in the Dillon Report and consideration of the alternative objectives evaluated.

General Review Findings

The Dillon report appears to undertake the Condition Assessment of the Old Town Hall in order to identify what would be deficiencies in an equivalent new structure. The report approach evaluates the additional requirements that would exist if the Old Town Hall were built today. The structure was evaluated with this objective and conclusions were based upon present-day performance standards. The report is consistent and practical in its review towards these goals. As quoted by Major Quartermain in a CBC interview, Dillon Consulting was asked to “determine how much it would cost to completely restore the building to modern standards.”

The objective of this report is to evaluate whether work identified in the Dillon report would not be required if the end objective were the continued safe use of the building. The existing Old Town Hall was completed in 1887 and there is justification for not having the building updated to meet exactly the same NBCC requirements for an equivalent new structure, with occupant and public safety remaining paramount and uncompromisable in both cases.

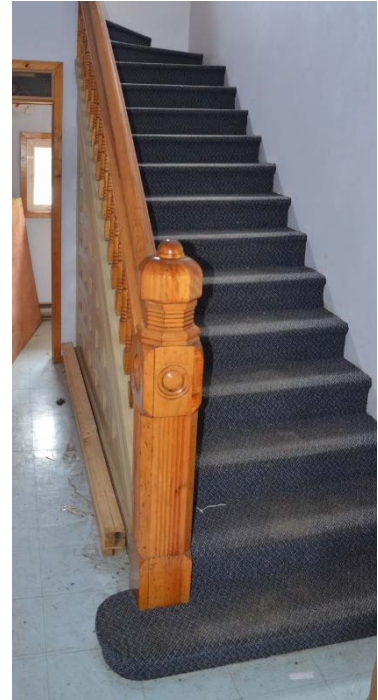


Figure 3: Interior stair (Photo Credit: John Leroux)

Evaluation

Review of the Dillon Report item by item was undertaken alongside a review of three building codes. Three Canadian building codes were used as references, for broader consideration of a unique problem with tools designed to meet the same end performance and objectives. Canada, like most developed countries, has a building codes which allow consideration of alternative codes that are designed for the same or higher performance levels as it is difficult to adequately consider all possibilities. Therefore three references were used.

Our evaluation based upon the Dillon Report findings is that not all prescribed work would be required in order to occupy the building. Indeed, there are items that require immediate action to avoid localized structural failure, such as the building's upper east façade, and these items need to be addressed as soon as possible. Also, there are other items that need to be address before the building can be occupied, such as the mould and asbestos concerns. Based upon the Dillon Report findings, both the cost estimates for items required to keep the building standing and for items that should be done before occupying are considered Immediate Costs that would have to be shouldered by the building owner.

There are other items deemed important, but not required, before the building is occupied. Although these are more long-term deferred maintenance issues, their degradation is accelerated by non-occupancy. These items are considered Future Maintenance issues. While some of these should be addressed in the coming years, their non-remediation does not preclude building occupancy.

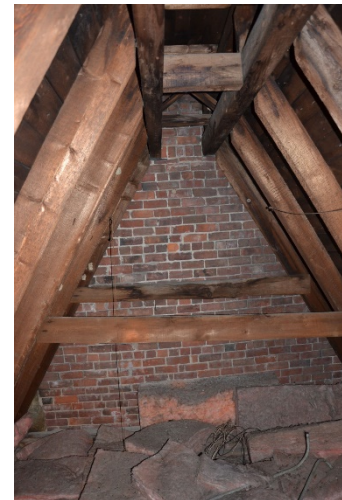


Figure 4: Attic looking at east wall. (Photo Credit: John Leroux)

Some items were evaluated as unnecessary. These upgrades had been identified as required to make the building equivalent to a new structure, but they are neither required nor practical when looking at the minimum work needed to continue use of the building. An example of this is the elevator.

Cost estimates were extrapolated from Table 5-2 of the Dillon Report on “Construction Costs based on Higher Current Cost Data”. This was used instead of Table 5-1 “Summary of Upgrading Costs Based on CPI” for considering the worst case scenario.

Due to the unknowns involved with a desktop review, some items were given budget leeway to account for potential future issues, or to account for the unclear distribution of projected costs. For example, while the upgrading of domestic water piping is not required, a budget was left to provide for any potential pipe bursts that may have happened during the time the building was unoccupied.

Details about the evaluation is provided in this Letter's Annex.

Results

Based upon our desktop evaluation of the Dillon Report work we projected Immediate and Future Maintenance Costs. These costs are shown alongside the Dillon Report numbers upon which they are based in Table 1.

Table 1: Construction Costs based on Higher Current Cost Data - Comparison of full upgrade to required

<i>ITEM</i>	DILLON Report Costs	HSI Immediate Costs	HSI Future Maintenance Costs
<i>2.1 to 2.4 Building Facades</i>	\$ 458,000.00	\$ 300,000.00	\$ 158,000.00
<i>2.5 Exterior Walls – Insulation & Vapour Barrier</i>	\$ 131,000.00	\$ 70,000.00	\$ 30,000.00
<i>2.6 Doors</i>	\$ 14,000.00		\$ 10,000.00
<i>2.7 Roofing</i>	\$ 34,000.00	\$ 34,000.00	
<i>2.8 Stone Foundation</i>	\$ 59,000.00		\$ 59,000.00
<i>2.9 Basement Space</i>	\$ 15,000.00	\$ 8,000.00	\$ 4,000.00
<i>2.10 First, Second and Third Floor Spaces</i>	\$ 10,000.00	\$ 7,000.00	\$ 2,000.00
<i>2.11 Attic Space</i>	\$ 5,000.00	\$ 5,000.00	
<i>2.12 Building Code Requirements</i>	\$ 589,000.00	\$ 120,000.00	
<i>3.1 Heating and Ventilation</i>	\$ 176,000.00	\$ 25,000.00	\$ 25,000.00
<i>3.2 Sanitary Piping</i>	\$ 5,300.00	\$ 2,000.00	
<i>3.3 Domestic Water piping</i>	\$ 44,000.00	\$ 7,000.00	
<i>4.1 Electrical</i>	\$ 160,000.00	\$ 15,000.00	
<i>Sub-Total</i>	\$1,700,300.00	\$ 593,000.00	\$ 288,000.00
<i>Contingency (15%)</i>	\$ 255,045.00	\$ 88,950.00	\$ 43,200.00
<i>Total (Not Including Tax)</i>	\$1,955,345.00	\$ 681,950.00	\$ 331,200.00

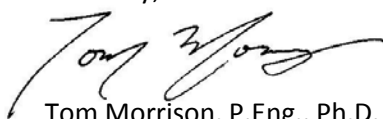
The desktop evaluation was able to reduce immediate costs to 35% of the full upgrade costs or \$681,950.00. Total work, including future maintenance, is \$1,013,150.00, or 52%, of Dillon Report costs. It may be possible to further reduce the required work, but those evaluations are outside the scope of this review.

Conclusions

The St. Stephen Old Town Hall (also known as the Old Post Office), is a unique and valuable building. Conservation of the building could take many forms, including enabling its continued use. Retaining and repurposing these types of buildings is a viable option, providing social, cultural, ecological and economic benefits.

Please contact me if you have any questions

Sincerely;



Tom Morrison, P.Eng., Ph.D.
Principal Engineer



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ANNEX to Desktop review of 2016 Building Condition Assessment Letter

This annex is to provide further detail and clause references for regulations impacting the existing building. The following standards and guidelines will be used for this discussion:

1. The National Building Code of Canada – 2010 Edition
2. The Ontario Building Code – 2012 Edition
3. The Nova Scotia Building Code Act with November 18th, 2014 amendments

These four references have been selected as significant Canadian Codes and Standards that meet the level of safety Canadian society demands of its structures. The National Building Code of Canada [NBCC] is the foundation of all building codes in Canada. Various Canadian jurisdictions either adopt it without amendment (as is the case for New Brunswick), adopt it with minor amendment (as in Nova Scotia), or use the code as a base for development of their own document (as in Ontario). As well as ensuring public safety the NBCC strives to ensure good construction practices and is intended for use in economically practical fashions.

The Ontario Building Code [OBC] has adopted much of the NBCC to create their own document. One significant addition to the OBC with regards to existing buildings is that Ontario has developed a part of their code that is dedicated to existing buildings.

The Nova Scotia Building Code Act [NSBCA] officially adopts the National Building Code of Canada 2010, with some additions and amendments for the code placed in the act. With regards to existing and historic buildings the NSBCA contains a Schedule D on “Alternative Compliance Methods for Existing Buildings”. The British Columbia Building Code Act is similar in this regard to the NSBCA.

All building codes set the minimum acceptable level of performance. In some situations it is appropriate to use engineering judgement and evaluation to find the best solutions. The codes provide initial statements regarding the general objectives and functional statements as preliminary information. These objectives and functional statements are what building owners are required to meet. Following this, in Division B of NBCC and OBC, are acceptable solutions to meet the stated objectives. In unique

cases alternative solutions can be used so long as they meet performance needs and can be justified to the Authority Having Jurisdiction.

Application of the Codes and Guidelines

Sentence 1.1.1.1.(1) in Division A Part 1 of the NBCC states “This Code applies to the design, construction and occupancy of all new buildings, and the alteration, reconstruction, demolition, removal, relocation and occupancy of all existing buildings”. This indicates that the Building Code is not applied in the same fashion as for an existing structure, and that processes relating to the maintenance of a building are not within the scope of the NBCC. Further explanation on this is provided in Appendix A of Division A, Sentence A-1.1.1.1.(1) where the Code provides a page of description on how to apply the NBCC to existing structures. Important points include:

- “The Code is most often applied to existing or relocated buildings when an owner wishes to rehabilitate a building, change its use, or build an addition, or when an enforcement authority decrees that a building or class of buildings be altered for reasons of public safety.”
- “It is not intended that the NBC be used to enforce the retrospective application of new requirements to existing buildings”
- “For example, although the NBC could be interpreted to require the installation of fire alarm, standpipe and hose, and automatic sprinkler systems in an existing building for which there were no requirements at the time of construction, it is the intent of the CCBFC that the NBC not be applied in this manner”
- “change of occupancy may affect some requirements [...] Depending on the construction of the building and the changes in load, structural modifications may be required”
- “Code application to existing or relocated buildings requires careful consideration of the level of safety needed for that building”
- “In developing Code requirements for new buildings, consideration has been given to the cost they impose on a design in relation to the perceived benefits in terms of safety. The former is definable; the latter difficult to establish on a quantitative basis [...] the increased cost of implementing in an existing building [...] may be prohibitive.”
- “successful application of the Code requirements to existing construction becomes a matter of balancing the cost of implementing a requirement with the relative importance of that requirement to the overall Code objectives.”

Also highlighted is the ability to use alternative compliance approaches so long as they meet an equivalent or higher level of performance from the code requirements. The NBCC indicates that it should not be directly applied to an existing structure without consideration and clear purpose. Ensuring safety and balancing practical implications of any plans are important.

The OBC includes Part 10 and Part 11 of Division B, to be applied to existing buildings requiring a permit or for when construction takes place with an existing building more than 5 years old. As stated in Division A Sentence 1.1.2.7.(1) “... if an existing building is extended or is subject to material alteration or repair, this Code applies only to the design and construction of the extensions and those parts of the building that are subject to the material alteration or repair”.

Part 10 of OBC is on change of major occupancy for existing buildings. This highlights how to evaluate the impact of occupancy change in an existing buildings.

Part 11 of the OBC looks at the renovation of existing buildings. This part of the building code is applied when “an existing building is subject to extension, material alteration or repair” (Sentence 11.1.2.1.(1) Division B). With measures taken to ensure that performance levels are maintained. For basic renovations, as defined by Article 11.3.3.1, construction can be carried out to maintain or improve existing performance levels for the building, and no other unsafe conditions exist, future upgrading to current code is not required. The exceptions are when construction is for a hotel, or when existing interior walls, ceilings, floor, or roof assemblies are substantially removed for new walls, ceilings, floors or roofs.

Based upon the information provided for this desktop review, although the St. Stephen Old Town Hall has not been in use for the past 7 years, the proposed future building and past use are both considered “Major Occupancy D: Business and personal services occupancies”. Based upon a review of requirements for existing buildings, measures must be undertaken to ensure that occupants and the general public are safe at the site and that the performance level of the building is maintained or improved. Acceptable solutions are to be found working with the Authority Having Jurisdiction (AHJ), however, it is not required that the building meet the same prescriptive requirements as an equivalent new structure.

Review of the Dillon Report Requirements

As discussed in the letter, the Dillon report provided a review of the structure and an evaluation of what would be required to bring the building up to meet the code requirements for an equivalent new structure. This section of the Annex will provide a closer look at acceptable alternatives for existing structures as based upon the Dillon report findings and descriptions.

The Review of the Dillon report will start with section 2.1 and proceed with a discussion of cost corrections.

Review of: 2.1 East Façade

The major issues identified in the east façade category relate to the failure of an unreinforced brick wall. The Dillon Report highlights that “immediate repair is required”. The review by HSI of the information concurs with the report. Easier repair of the wall may be possible using helical ties and anchors, but no conclusions of alternatives can be drawn without site investigation.

Replacement of windows and trim is recommended in the Dillon report. If the current windows and trim are keeping water out, this can be addressed in the future. This is a maintenance item.

Review of: 2.2 South Façade

The Dillon Report stipulates various masonry repairs as well as window replacement. Masonry repairs should be done to ensure structural performance. As for the East façade, if the current windows and trim are keeping water out, this can be addressed in the future. This is a maintenance item.

Review of: 2.3 West Façade

The Dillon Report identifies a deficient exterior fire escape as well as windows and general masonry deterioration. Existing fire escapes on historic buildings are allowed by the OBC, Table 11.5.1.1.D/E, provided that certain other conditions can be met. Item number DE62 goes so far as to say that “[fire escapes] are permitted or may be reconstructed or recreated (as in the case of a heritage building).”

Under No. 28 of the Schedule “D” Alternate Compliance Methods for Existing Buildings” the NSBC allows existing fire escapes so long as the solution is acceptable to the AHJ and the building is fully sprinklered.

Masonry deterioration will require repair, further site review will identify if it can be treated as a maintenance item or if it must be repaired prior to occupation. Again, if the current windows and trim are still water-tight, then this can be addressed at a later point in time.

Review of: 2.4 North Façade

The Dillon Report identifies issues with the sidewalk canopy and an out-of-plumb gable. Other issues relate to maintenance and monitoring. Structural health monitoring could be used to determine the extent to which some issues require repair rather than temporary stabilization. If the windows and trim are not leaking, then this does not need immediate attention.

Review of: 2.5 Exterior Walls – Insulation & Vapour Barrier

The Dillon Report identifies inadequate or missing insulation and vapour barrier throughout the building. Neither exist in the basement.

All buildings must provide safe conditions for occupants. In Annex A of Division A, Sentence A-1.1.1.1.(1), the NBCC discusses how the code is laid out for new structures where many requirements can be implemented at minimal economic cost. However, for existing structures this approach is no longer valid. Because the building is already standing, some requirements will come with the large cost of retrofitting. For this reason designers are expected to balance their costs against those requirements that do not compromise safety. Lack of insulation and vapour barrier in an existing building do not in themselves create an “unsafe condition”. Furthermore, the thermal properties of thick masonry can be evaluated to determine their performance. With consideration for both its R-value and the benefits of its thermal mass, thick masonry will provide some insulation and vapour control.

The OBC indicates that only for those areas undergoing construction would potential upgrades to insulation and vapour barrier be required. In those areas the existing performance levels should be maintained or improved. The extent of potential construction work required may not affect many of these regions of the building.

Finally, insulation of historic masonry cannot be done in the same manner as the insulation of new masonry. The insulation of foundations can increase freeze-thaw damage to the masonry wall, as well as increase mold growth. For the Old Town Hall a simpler solution may be to leave the basement uninsulated and insulate between the floor joists. Based on our past projects, basement insulation is complex and if possible best avoided.

Review of: 2.6 Doors

The Dillon report suggests replacing the doors if renovating the building to current standards. This is not a requirement, but it would provide benefit to the maintenance plans for the site.

Review of: 2.7 Roofing

The Dillon Report found that the roof is not keeping water out. Keeping moisture out is important to preventing future degradation of the building and should be part of the initial repairs.

Review of: 2.8 Stone Foundation

The Dillon Report found that the basement flooded commonly during storm events. Evaluation could be done to look at options, including accommodating and managing such events. There was no evidence given to indicate that this is creating an unsafe condition structurally. However, excessive moisture can lead to mould and fungal attack. If flooding the space will need to be regularly cleaned and ventilated. This can be treated as a maintenance issue. Many historic buildings exist with porous foundations.

Review of: 2.9 Basement Space

The Dillon Report found localized wall failures, mould and potential asbestos board. If they are load bearing the walls will require repair. Asbestos can be tested for, and if positive, either removed or encapsulated in place.

Review of: 2.10 First, Second and Third Floor Spaces

The Dillon Report identified multiple maintenance issues. As an existing staircase, the discussion can be with the AHJ regarding priority for repair. Deteriorated framing should be repaired.

No. 18 of NSBCA Schedule D allows existing conditions for stairs ramps handrails and guards to remain so long as they do not create a hazardous condition and are acceptable to the AHJ.

Review of: 2.11 Attic Space

Roof work has already been specified in other sections of the report. The rotated heavy timbers could be strengthened in place.

Review of: 2.12 Building Code Requirements

The Dillon Report has identified code requirements that “At a minimum this item will include an elevator with fire rated shaft, handicap accessible washrooms, fire rated floor and stairwells, handicap accessibility ramp and building sprinkler system”. These recommendations are in-line with the Dillon Report’s objective of identifying areas for work which would allow the Old Town Hall to meet the same requirements as a new structure.

As discussed in prior section, the NBCC does allow for consideration of alternative approaches for existing structures and encourages review of reasonable goals to meet needs. The explanatory notes on this Division A requirement indicates that elements such as elevators would not be required. The building is not to have medical or treatment occupancies, the building already exists and it would be an excessive economic cost for minimal value at this stage, and actual construction is minimal. Precedent has been set with this regard throughout New Brunswick where existing buildings have gone from public use to community groups or private use, and repurposed without addition of an elevator.

The OBC provides alternative compliance options in the Part 11 Tables. Reduced fire resistance ratings are allowed for existing structures, greater reductions allowed if the structure is sprinklered. Existing solid cord wood doors are allowed in place of new fire rated doors for proposed uses. Details of the extensive conditions for which an existing state is acceptable are provided in Table 11.5.1.1.D/E. Evaluation with NFPA 914 "Fire Protection for Historic Structures" may find that the existing conditions already meet requirements.

The NSBCA provides multiple exemptions and alternatives for these findings. No. 34 of Schedule D provides exemption for barrier-free washrooms so long as no medical or therapeutic services are offered in the building and the building is less than 120 m² in building area (floor plan of the largest floor). The actual building area was not provided in the Dillon Report so this may or may not be allowable. Multiple items in Schedule D (No. 1, 2, 14, 15) also allow for reduced or removed fire ratings walls, separations, and floors depending on use so long as the building is fully sprinklered. Furthermore, resources such as the National Fire Protection Associations NFPA 914 can provide the fire resistance rating of the historic materials. These are often longer than expected.

No. 18 of NSBCA Schedule D allows existing conditions for stairs ramps handrails and guards to remain so long as they do not create a hazardous condition and are acceptable to the AHJ.

Installation of a building sprinkler system would be a substantial increase in the performance level of the building. A sprinkler system improve fire safety for building and occupants as well as providing further justification for minimising other interventions, as noted in the NSBCA. Some discussion points can be found for avoiding this intervention, as provided by NBCC Appendix A. The owner should decide if they wish to discuss with the AHJ, but a sprinkler system will improve safety for building and occupants and, if properly designed, can provide fire safety economically. Also, new fire alarm systems can provide increased safety to occupants.

Review of: 3.1 Heating and Ventilation

The Dillon Report identified requirements for the equivalent new structure and requires full ventilation. They also recommend new, more efficient, heating.

As in prior discussion, requiring installation of these services does not appear to be the intent of the NBCC.

The OBC does not require this work unless building-wide renovations are undertaken. For localized needs, it is acceptable that required airflow be provided by mechanical and/or natural means (Alternative compliance DE82 to DE85). Therefore, even if undertaking extensive work, natural airflow can be used to meet outdoor air rates. Therefore, so long as all windows are operable, natural airflow can be provided.

The NSBCA states in No. 36 of Schedule D that “Existing mechanical systems in buildings are not required to fully comply with the requirements of Parts 6 or 7 provided: (a) it is not an unsafe condition and (b) it is acceptable to the AHJ.

Review of: 3.2 Sanitary Piping

The Dillon Report evaluated that 10% of piping would require replacement. This can be treated as a maintenance issue.

Review of: 3.3 Domestic Water Piping

The Dillon Report found that for the equivalent new structure thermal insulation would be required on all piping. This is not a requirement for existing buildings outside of when new piping is being installed.

Review of: 4.0 Building Electrical Systems

The Dillon Report evaluated that the electrical system had been upgraded multiple times but does not meet current code, and advises that replacement of both electrical and communication systems would be required to meet current standards. Because of this objective no clear issue spawning the requirement was identified and we assume this upgrade is not required under the River ARC objectives outlined.

If the building has live knob and tube wiring, this would require replacement as this has been shown to be a fire hazard.

Cost Estimates

Following review of the Dillon Report we looked at the costs suggested in meeting their objectives. With consideration for the objectives we were asked to revisit some of these costs. For the purposes of this report only the “Table 5-2: Construction Costs based on Higher Current Cost Data” information was used. The HSI costs were based entirely on Dillon’s projected costs and our evaluation of their information. HSI costs were divided into two categories: Immediate Costs, where work needs to be done before putting the building into full use; and Maintenance Costs, where work can be done after the building is in use.

<i>ITEM</i>	DILLON Report Costs	HSI Immediate Costs	HSI Future Maintenance Costs
<i>2.1 to 2.4 Building Facades</i>	\$ 458,000.00	\$ 300,000.00	\$ 158,000.00
<i>2.5 Exterior Walls – Insulation & Vapour Barrier</i>	\$ 131,000.00	\$ 70,000.00	\$ 30,000.00
<i>2.6 Doors</i>	\$ 14,000.00		\$ 10,000.00
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Sub-Total	\$1,700,300.00	\$ 593,000.00	\$ 288,000.00
Contingency (15%)	\$ 255,045.00	\$ 88,950.00	\$ 43,200.00
Total (Not Including Tax)	\$1,955,345.00	\$ 681,950.00	\$ 331,200.00

These cost estimates are project from the Dillon Report but do not account for construction management, design fees, and scale effects. Furthermore, these cost estimates are for the minimum level of work required to continue to occupy the building. This may not meet the needs of future tenants and further discussion is advised. HSI has intentionally not evaluated the projected costs or alternative approaches in the Dillon Report as this would require further investigation beyond our present scope. We would be happy to discuss further evaluation if desired.