Multi-Year Infrastructure Plan
2014-2020
# EXECUTIVE SUMMARY

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1.0 EXECUTIVE SUMMARY

Canadian universities are experiencing three dominant infrastructure pressures within their administrative and academic operations: a growing deferred maintenance backlog of over 5 billion dollars (among facilities that average 50 years of age), replacement of aging facilities that no longer provide the functional requirements of contemporary educational or research programs, and increasing needs for capital expansion as they compete for students (domestically, nationally, and internationally), faculty, and research dollars (from Provincial and Federal government sources, funding agencies, and private sources).

For a number of years, the majority of universities have remained focused on short-term planning for facilities investments, deferring maintenance needs until a later date (but often without reliable data on facilities condition). This continued deferral of maintenance needs is placing greater annual strains on already limited budgets for Facilities Management.

New strategies to address capital and deferred needs are required and are critical to developing a sustainable model for funding facilities replacement and renewal, as well as strategic new facilities. At Memorial, systematic strategies for reconditioning facilities have been implemented. A focus on energy savings has already produced results and significant budget savings. Development of facility maintenance and inventory strategies has been completed, and cultures and awareness within the institution have changed regarding facility use and care. The operation and maintenance of facilities is highly efficient and effective but has reached its maximum value exercise. The next steps must include strategic development of dedicated reserve maintenance funds.

To accomplish the objectives set out in the various University plans, including the Enrolment Plan, the Strategic Research Intensity Plan, the Teaching and Learning Framework, the Research Framework, and the Public Engagement Framework, critical investments in various areas are now needed, a prime one being infrastructure renewal and expansion. Investments in new facilities must include amortization strategies and innovation regarding facility sustainability and development. The planning and design of new and redeveloped facilities must include a systematic process of functional planning, budgeting, conceptual design, elemental costing, detailed design, pre-tender cost estimating, public tendering, comprehensive analysis of tenders, contract award, careful contract management, and commissioning. This process will ensure no surprises and the construction of facilities that are efficient and effective to operate and maintain. Facilities must be purpose built yet flexible to facilitate ongoing changes in curriculum, research and technologies. The wide University community, including students, faculty, and staff, should be consulted for their requirements and ideas.

This document represents the Memorial University Multi-Year Infrastructure Plan within the Province of Newfoundland and Labrador. It reflects both its own academic and operational needs as well as the Provincial Government planning regimen, protocols, and processes regarding institutions in the province. This plan is devised and proposed in support of all Memorial University’s strategic exercises and plans and is but one of a series of integrated strategies that reflect the strategic value exercise of supporting a sustainable world-class University. The multi-year plan is designed to complement the key components of the mission and vision exercise including but not limited to:
   https://www.mun.ca/president/home/vision.php
2. Memorial University Research Framework
3. Memorial University Teaching and Learning Framework.
   http://www.delts.mun.ca/faculty/teachinglearning/TLF_docFNL_Apr12_updt.pdf
7. Strategic Research Intensity Plan 2014 - 2020

This plan is intended to guide the direction of the University over the next seven years in its efforts to address priority infrastructure building needs that meet and align with the strategic academic priorities of the University. It encompasses all the dimensions of capital planning at the University, including physical assets such as buildings, space, land, infrastructure, information and communications technology, equipment, critical maintenance, risk management, and renewal. The strategic importance of the maintenance and construction of the physical assets is reflected in the ability of the University to pursue cutting edge technologies and ingenuity in the modern digital age thus enhancing its ability to be innovative and strategically prepared to seek out and take advantage of research, educational, and operational opportunities.

In order to retain and grow this competitiveness and innovation, working relationships and partnerships are extremely important and valued. Memorial University works in partnership with the Government on a regular basis regarding operational and strategic needs of the institution and the province. University Executive and Senior Leadership have close working relationships with various Government Ministers, departments, and agencies on various projects as well as regular budget and resource discussions. These interactions provide open and objective opportunities and platforms for discussion and problem solving.

The University continues to have major challenges regarding aging infrastructure, particularly in St. Johns where life expectancy and deferred maintenance issues concern a campus that was established in the early 1960’s and has not been significantly retrofitted since that time. Although welcome strategic investments have been made in the past few years, the University Facility Condition Index (FCI) remains very high at 21.6%. This figure is considered unsustainable, expensive, and not cost effective, and poses some risks in terms of health, policies, and legal requirements. The resources provided by Government have been focused on this area. With numerous buildings on the campuses identified as requiring significant deferred maintenance, investment in new strategic capital facilities will ease some of the pressures currently being experienced.

This Infrastructure Plan proposes an innovative and strategic value approach to addressing and resolving the challenges of maintaining and sustaining a vibrant university that requires facilities and resources of
a world-class nature. Utilizing practices already adopted, and proposing new approaches and strategies such as reserve funds and amortization structures, Memorial confidently moves forward in the development of facilities of excellence.

Longer term strategic investments will require difficult choices, ensuring the maximum value for limited resources. Budgets must reflect realistic costs, sources of funding, cash flows, as well as need. Detailed business cases will also be required for each project and must include operating costs. This document serves to inform the Board and the wider stakeholder community of the infrastructure needs, how the University proposes to meet these needs, and how the Infrastructure Plan complements and enables other University plans and frameworks. The ongoing commitment of the Provincial Government is recognized as fundamental to the progress on this Plan.

1.1 Context

The continued growth of the University and the fulfillment of its vision, mission, values and multiple strategic plans will require a specific and prolonged focus on critically needed infrastructure. There are numerous major infrastructure initiatives that have been identified to date on the basis of their criticality in supporting and enabling the University to achieve its goals and aspirations as set out in a comprehensive and integrated set of planning documents. The totality of the infrastructure initiatives contained herein represents a massive infrastructure renewal project whose overall completion will extend past the seven-year horizon (2014-15 to 2020-21 inclusive) of this Infrastructure Plan. This is a high-level strategic plan whose eventual approval is not intended to signal omnibus approval for initiating the undertaking of all of the potential projects described herein. Rather, this document is designed to be a compendium and inventory of potential projects as we know them at the time of development of this Plan. In the process of identifying potential projects, the Plan seeks to establish approximate priorities and rough cost estimates for the various projects based on currently available information and the set of University planning documents. The Infrastructure Plan also identifies known and possible sources of funding, including the establishment of a University-financed infrastructure fund, the size of which will determine how many of the potential infrastructure projects can be undertaken and in what timeframe.

It is to be emphasized that the inclusion of a potential project in this Plan does not constitute formal approval of that project. Instead, the Plan provides a prioritized menu or blueprint from which to select individual projects for implementation following standard procedures involving a multi-phase approval process that includes detailed design and costing, Board approval, and, where necessary, government approval. It is also recognized that the timeline for undertaking and completing this Infrastructure Plan is dependent on numerous factors, not the least of which is funding, and that unanticipated factors may disrupt, accelerate, or decelerate its implementation or cause a reconsideration of the prioritization of projects. A long-term strategic plan, especially an infrastructure plan, should be reviewed and updated annually as projects are implemented, completed, or reprioritized. Updates will be made within the framework provided by the existing Infrastructure Plan and taking into account other influences including: the overall setting provided by all other strategic University plans and progress on their implementation; unanticipated closure or failure of a University building or facility; prevailing government programming,
policy, and priorities; any changes to the government funding model for the University; opportunities provided by potential donations in support of infrastructure; and status of the provincial economy.

2.0 INTRODUCTION

Memorial University has experienced continued and rapid growth in enrolment of both graduate and undergraduate students in the recent past and an emerging research intensification. These developments have been a reflection of a variety of strategies and public policy initiatives that include the Provincial Government supported tuition freeze policies, targeted expansion of selected disciplines and campuses, growth of reputation, the availability of incremental basic and applied research funding within the province, and quality and variety of educational experience being offered through the University. The University has invested in, and now enjoys, a national and international reputation for, quality and affordability, positioning itself favorably in a highly competitive market. Undergraduate student numbers have stabilized and remain relatively flat and are anticipated to remain so; however, graduate student numbers continue to grow annually, reflecting national trends towards growth in this area and with this specialized learning population. Consistent with graduate student growth is the demand on specialized facilities needs associated with research projects, specialized operations and supports. These trends are not expected to change significantly in the near future and place a strong challenge before the University to respond with quality as a driving force.

Enrolment

<table>
<thead>
<tr>
<th>Students</th>
<th>2003</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate</td>
<td>15,000</td>
<td>15,426</td>
<td>15,418</td>
</tr>
<tr>
<td>Graduate</td>
<td>2,000</td>
<td>3,265</td>
<td>3,495</td>
</tr>
<tr>
<td>Total</td>
<td>17,000</td>
<td>18,691</td>
<td>18,913</td>
</tr>
</tbody>
</table>

Increased graduate enrolment brings with it associated growth and opportunities in available research funds. Memorial has strategically applied its efforts in this matter, successfully witnessing extensive growth in external research funds coming to the University doubling in value in the past ten years alone.

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1 ASSOCIATION OF ATLANTIC UNIVERSITIES
2012-2013 PRELIMINARY SURVEY OF ENROLMENTS
Continued growth in research funding will be severely restrained by lack of appropriate and adaptable research facilities. Focused research is a vital component of the economic growth of the province. Without the necessary infrastructure, research funding can be expected to plateau.

2.1 Vision, Mission, and Values of Memorial University

Memorial University is the Province’s only university, a fact that makes it unique and requires it to uphold a tradition of excellence in education and access for its citizens. The Mission Statement captures this assignment clearly:

*Memorial University is an inclusive community dedicated to creativity, innovation and excellence in teaching and learning, research and scholarship, and to public engagement and service. We recognize our special obligation to the citizens of Newfoundland and Labrador.*

*Memorial welcomes students and scholars from all over the world and contributes knowledge and shares expertise locally, nationally, and internationally.*

Similarly, a Values structure has been devised that reflects strategic considerations and the University’s overall:

* Excellence  * Integrity  * Collegiality
* Inclusiveness and Diversity  * Responsiveness  * Accountability
* Freedom and Discovery  * Recognition  * Responsibility to Place
* Responsibility to Learners  * Interdisciplinary Collaboration  * Sustainability

A sustainable and relevant Vision:

*Vision: Memorial University will be one of the most distinguished public universities in Canada and beyond, and will fulfill its special obligations to the people of Newfoundland and Labrador.*

2.2 Accessibility

Reflecting the Act Respecting Human Rights, CHAPTER H-13.1, Memorial University of Newfoundland is committed to ensuring an environment of understanding and respect for the dignity and worth of each student, faculty, staff, and visitor and also to supporting inclusive education based on the principles of

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2 Into the Deep 2013
equity, accessibility, and collaboration. Specific to physical settings and under section 4.4, the University will ensure a social and physical environment that is diverse, inclusive and accessible to all. Where applicable, units must consult with the coordinating centre(s) to ensure that physical accessibility is included in designing new space, renovating existing space, and managing facility accessibility. These conditions are at the forefront of planning for new and renovated physical assets of the University at all times.

2.3 Planning Frameworks

Memorial University is an engaged university. The realization of the Multi-Year Infrastructure Plan as an essential framework strategy and document will assist the University in achieving campus environments that support and continue to embrace academic excellence through cutting edge learning environments and facilities. As an engaged institution, it embraces consultation with external and internal stakeholders. Comprehensive and detailed consultations since 2009 have resulted in the creation of three approved strategic interrelated frameworks essential to the growth and sustainability of a modern university. As part of its vision, Memorial commits to the strategies as outlined in its Vision, Mission, and Values document presented to and approved by the Board of Regents in July 2013:

2.3.1 Research Strategy Framework

The process commenced in 2009 and involved 110 consultations with external and internal groups. Approved by Senate in 2011, it comprises:

Goals
1. Attract, retain, support, and celebrate people engaged in and supporting research.
2. Support an environment of research excellence.
3. Engage with community partners and collaborators locally, nationally, and internationally to create, share, and apply research.
4. Support fundamental and applied research excellence in areas of strategic focus.

Research Themes (alphabetically)
1. Aboriginal Peoples
2. Arctic and Northern Regions
3. Community, Regional, and Enterprise Development
4. Creative Arts, Culture, and Heritage
5. Environment, Energy, and Natural Resources
6. Governance and Public Policy
7. Information and Communications Technology
8. Oceans, Fisheries, and Aquaculture
9. Social Justice
10. Well-being, Health, and Biomedical Discovery
2.3.2 Teaching and Learning Framework

This process commenced in 2011 and involved over 65 consultations with external and internal groups. Approved by Senate in 2011, it comprises:

Foundational Statement: Teaching and learning at Memorial University connects learners and educators to each other, our community, and our world in the service of knowledge generation and exchange and the advancement of society.

Principles
1. Build Relationships
2. Engage People
3. Create Synergies
4. Focus on the Learner
5. Provide Support
6. Commit to Quality
7. Foster Transformation
8. Value Contributions
9. Acknowledge Responsibility
10. Support Lifelong Learning

2.3.3 Public Engagement Framework

The process commenced in 2011 and involved over 900 consultations with external and internal groups. Approved by Senate in 2012 it comprises:

Definition:
Public engagement at Memorial encompasses collaborations between people and groups within Memorial and people and groups external to the University, i.e., the “public” – that further Memorial’s mission. Drawing on the knowledge and resources brought by all involved, public engagement involves mutual respect, mutual contributions, and mutual benefits for all participants.

Memorial’s four goals and related objectives provide the substance for moving toward the vision.

1. Make a positive difference in our communities, province, country, and world.
3. Cultivate the conditions for the public to engage with us.
4. Build, strengthen, and sustain the bridges for public engagement.
2.4 Strategic Initiatives

The University is committed to innovation and strategic approaches in facility development and deferred maintenance challenges and opportunities. Previous and ongoing initiatives include projects such as the $15 M Energy Performance Contract and institution of a world-class maintenance database. The future of deferred maintenance and building development will include internal reviews of budgets. This will help identify collaborative resources that are available for deferred maintenance and the development of a process of shared internal resources that maximize faculty and administrative initiatives by supporting the facilities which they use. This approach is driven by a planning process including:

1. Construction of world-class educational and research facilities, all campuses;
2. Refurbishment of world-class educational and research facilities, all campuses;
3. The Battery Hotel purchase and repurposing; and

2.5 Provincial Environment

Newfoundland and Labrador was expected to be the runaway leader in economic growth among all provinces in 2013, according to a report issued by the Conference Board of Canada. In 2014, Newfoundland and Labrador is expected to lead all provinces again with growth of 3.4%.[3] A recent report by RBC forecasts a robust growth of 6% for the province.[4]

While graduating provincial Grade 12 students continue to decline in population, growth of first-year students attending Memorial remains consistent. The value of Memorial University to the provincial economy continues to grow. A 2009 report by the Association of Universities and Colleges estimated the University impact on the GDP of the province at over $610.0 M.

2.6 Canadian Environment

The post-secondary environment in Canada has become fiercely competitive and endures various stresses and pressures from province to province. Newfoundland and Labrador has maintained low tuition rates to improve accessibility with notably positive results. Memorial has seen increases in research funds from outside sources, and the University’s contribution to the provincial economy continues to grow.

However, the Canadian dynamic for universities is changing. Alex Usher, president of Higher Education Strategy Associates, stated in the fall of 2013 that “the intellectual centre of gravity of Canada is shifting west much faster than people realize.” As Usher notes, the University of Alberta has successfully leveraged past support from the provincial government to achieve impressive results on the national stage. When the federal government awarded the first round of the new Canada Excellence Research Chairs, the University of Alberta received four chairs, the most of any institution in Canada. In December 2011, the announcement of new federally-funded, industrial research chairs saw the University of Alberta

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[3] Conference Board of Canada
receive six additional positions, bringing the university’s Faculty of Engineering to sixteen chairs, again more than any other institution.

2.7 International Environment

International competition is growing as nations and emerging universities seek both student education as well as research opportunities. Memorial is not immune to these forces and strategically promotes its programs as short-term economic contributors as well as factors that determine long-term, sustainable education and contributions to the economy.

Memorial has a large international student population at the graduate and undergraduate levels. As nations seek collaboration between institutions, the University is well placed to benefit from the realities of the market. These realities include demands for quality, accessibility, affordability, and security (from a societal and financial perspective). An important part of the formula requires world-class facilities and services to meet and exceed standards required of potential partners and collaborators. The competitive environment is recognized in the development of this Infrastructure Plan.

3.0 CURRENT DEFERRED CAPITAL RENEWAL PROGRAM

The University ensures funding provided from the Deferred Capital Renewal Program is directed to projects which maximize the benefits to improve facilities. Projects are approved and funded with the goal to achieve the highest function, longevity, and safety of the respective University infrastructure.

3.1 Principles of the Deferred Capital Renewal Program

The scope of the Deferred Capital Renewal Program (DCRP) is to include all work which is funded from the annual Provincial Deferred Capital Renewal budget allocation and undertaken as part of the multi-year planning program. The program is intended to:

1. Ensure that DCRP works are identified and tracked;
2. Ensure that work which is outside the scope of regular maintenance is prioritized;
3. Ensure that DCRP work projects are planned in advance; and
4. Ensure that variations in funding between the various disciplines and infrastructure interests are balanced over a multi-year cycle.

Eligibility Criteria for Funding Projects

Eligibility criteria are utilized to determine the rationale for approving projects under the DCRP. More than one eligibility criterion may apply to each project. Criteria to be considered include:

1. Impact on Academic Programs
2. Impact on Research
3. Life Safety / Code Compliance / Regulatory Compliance
4. Facilities Condition Index
5. Urgency of Project (See section following)
6. Operating Cost/Life Cycle
7. Maintains Building’s Functional Objectives
8. Environmental/Sustainability
9. Enhances Objectives of the Master Plan
10. Economic Advantages (ROI / Co-funding / “Financing”)

The University utilizes third-party software, VFA, to track life cycles of all major buildings, building systems, and major infrastructure. Regular audits are conducted to determine if systems need to be replaced at the end of their life cycle and to determine if any systems require replacement prior to the end of their life cycle. The Facilities Condition Index (FCI) is a metric which is utilized to measure the relative condition of a building or facility. This index provides a readily comparable value of the condition of buildings or groups of buildings. Higher FCI’s indicate greater liabilities associated with the building condition. See Appendix 1.

Through the use of these independent asset audits, building assessments, and the evaluation of the information in the VFA software, it has been determined that Memorial will have an annual capital deferred renewal requirement of approximately $26.0 M for the next fifteen years. In 2011, Government responded to requests by the University to approve a multi-year fiscal plan that would enable more substantial projects to be planned and undertaken while simultaneously approving increased funding to the program overall. While the increased allotment has been appreciated and well received, the University has applied it strategically to prevent an increase in the deterioration of the FCI and to maintain status quo.
### 3.2 Capital Deferred Renewal Program

<table>
<thead>
<tr>
<th>Year</th>
<th>Budget</th>
<th>Projects</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>2009-10</td>
<td>$4.0 M</td>
<td>40 projects</td>
<td>Memorial joined other Atlantic universities by jointly engaging VFA, an internationally recognized asset management software company. This allows the University to begin to baseline capital deferred renewal requirements, prioritizing the long-term program.</td>
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<tr>
<td></td>
<td>+Government</td>
<td>17 projects added Feb/10.</td>
<td>Additional projects were expanded in scope.</td>
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<td></td>
<td>Special</td>
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<td>Funding of</td>
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<td>$2.25 M.</td>
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<tr>
<td>2010-11</td>
<td>$5.4 M</td>
<td>33 small projects</td>
<td>The first year of a multi-year funding plan which was to see progressively greater amounts of funding.</td>
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<tr>
<td></td>
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<td>7 projects were phase I</td>
<td>(engineering design) of multi-year plans to undertake larger scope, high dollar value projects</td>
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<td>(engineering design) of</td>
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<td>multi-year plans to</td>
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<td>undertake larger scope,</td>
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<td>high dollar value projects</td>
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<tr>
<td>2011-12</td>
<td>$10.0 M</td>
<td>38 projects prioritized.</td>
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<td>5 projects were undertaken</td>
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<td>in excess of $500K and</td>
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<td>which scopes were large</td>
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<td>enough to address</td>
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<td>significant projects,</td>
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<td>assuming sequential annual</td>
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<td>funding would continue as</td>
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<td>per the three-year plan</td>
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<tr>
<td>2012-13</td>
<td>$10.0 M</td>
<td>5 projects pushed to the</td>
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<td>following year, scope of</td>
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<td></td>
<td></td>
<td>5 others reduced.</td>
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<td></td>
<td></td>
<td>44 projects prioritized,</td>
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<td></td>
<td></td>
<td>2 of which were single</td>
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<td></td>
<td></td>
<td>phased, large scale</td>
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<td></td>
<td></td>
<td>projects in excess of $2.0</td>
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<td>M which would have been</td>
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<td></td>
<td></td>
<td>highly inefficient to</td>
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<td></td>
<td></td>
<td>undertake in multiple</td>
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<td></td>
<td></td>
<td>phases over multiple years</td>
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<tr>
<td>2013-14</td>
<td>$10.0 M</td>
<td>42 projects totaling $14.4M.</td>
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<td></td>
<td></td>
<td>9 projects engineering,</td>
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<td></td>
<td></td>
<td>design and tender $9.3 M;</td>
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<td>2 projects $4.3 M tendered</td>
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<td>separately. 31 small</td>
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<td></td>
<td></td>
<td>remaining projects $4.7 M</td>
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<td>to be completed in fiscal</td>
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<td>year</td>
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### 3.3 Future: 2014 – 2020

Securing appropriate funding to address the annual $26.0 M capital deferred renewal for fifteen years would result in the Facilities Condition Index (FCI) declining from 21.6% to 12%.

The current overall FCI of Memorial is 21.6%, and the projected FCI for the next five-year period, with this current level of expenditure, will only result in the FCI declining to 20%.
The proposal of a five-year plan is based upon known priorities and projects and the life cycle evaluation from the VFA software. As such, many of the building components are not yet included in the five-year plan. To do so would significantly increase the amount of funds needed for these initiatives. Inflation will also increase the amount of funds needed.

<table>
<thead>
<tr>
<th>Location</th>
<th>Size Square Meters (Feet)</th>
<th>Replacement Value $</th>
<th>FCI Cost $</th>
<th>FCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corner Brook</td>
<td>38,845 (418,121)</td>
<td>124,666,852</td>
<td>26,656,908</td>
<td>0.21</td>
</tr>
<tr>
<td>St. John’s</td>
<td>328,455 (3,535,457)</td>
<td>1,271,641,111</td>
<td>271,789,292</td>
<td>0.21</td>
</tr>
<tr>
<td>Off-Campus Properties</td>
<td>24,278 (261,326)</td>
<td>89,151,576</td>
<td>23,221,755</td>
<td>0.26</td>
</tr>
</tbody>
</table>

The average FCI for Memorial University is 0.216. See Appendix 2 for the full Asset List Report

4.0 INFORMATION TECHNOLOGY

Memorial’s Information Technology Infrastructure serves to enable Research, empower Teaching and Learning, and facilitate the Administration and Operation of the University. Our Information Technology Infrastructure can also provide Memorial with differentiation from our competitors and a means of attracting new students and faculty through the quality of the IT-enabled services provided by the University and the innovation opportunities thus created. The Information Technology Infrastructure consists of four discreet, but related, layers:

- Foundational technologies
- Academic Systems
- Research tools
- Implications for Space on Campus

Each of these elements combines to help define a significant portion of Memorial’s “brand” or reputation as a distinguished university.

In the past, Memorial has demonstrated leadership in the use of technology, electronic media, and innovative use of the digital state of the art; however it is clear that a leadership position in the digital world is quite short lived unless investment continues to maintain that leadership position. For an IT Infrastructure to be effective, it must be as dynamic and responsive as today’s leading edge technologies and as flexible and capable as every new intake of students expects it to be. In IT, an infrastructure must be planned to be dynamic and continuously evolving, it cannot be static, and therefore to maintain effectiveness, the infrastructure must enjoy long-term, stable, and appropriate funding support.
4.1 Foundational Technologies

All Information Technology activities, whether related to Education, Research, or Administration, rely on data networks to transport data and information. In order to operate properly and service the needs of the stakeholders, Memorial must support four different actual networks. These are:

- MUNet which is Memorial’s internal network serving to transport data, video and voice communications between various campuses such as: St. John’s, Grenfell and the Labrador Institute as well as all on-campus inter-unit traffic;
- The commercial Internet which carries much of the traffic from Memorial to businesses, commercial content providers, government, and all of the student, faculty, and staff personal data transmission needs;
- CANARIE, a dedicated Canadian Research Network which connects all universities and many college systems plus the Federal Laboratories; and
- The Wireless (WIFI) network which, although theoretically a part of MUNet, has developed into such a ubiquitous need for students and which requires exponentially more throughput (HD video, smart phone video-conferencing, etc.) that it needs to be managed separately from the traditional wired MUNet.

In the last eight years, the annual growth demand for networking has exceeded 20% compounded annually. While the demand for the services of these networks has grown, Memorial’s ability to respond has been hampered by many factors, including financial and available bandwidth, which today has not been able to keep up. There are very few engineering and planning disciplines that could economically plan a static infrastructure that could accommodate a compound annual growth rate in excess of 20% over a sustained period of time.

Bearing in mind the fact that capacity lags demand and that future demand will continue to grow at current rates (or faster) for the foreseeable future, Memorial has embarked on a five-year plan to replace the currently installed network with a more capable one and to invest in an architecture that allows for scaling and growth on an economical basis. Funding required for the rebuild of the network is shown in the table below. These costs are net of contributions directly from Computing & Communications’ operating budget of $500K per year:

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<tbody>
<tr>
<td></td>
<td>$3.3M</td>
<td>$3.6M</td>
<td>$2.7M</td>
<td>$1.6M</td>
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In addition to the network, changes and development in the amount of data to be stored by the University and the types of data to be preserved will require additional, significant data storage capacity built into the IT Infrastructure. While the amount of data required for administrative purposes will not grow particularly fast, both the research and academic disciplines will require capacity to store amounts of data that will be in orders of magnitude larger than those required only a few years ago. Research from Gartner’s Enterprise Storage Management service has found that storage is increasing, on average, about 45% per year. Based on this level of growth, storage capacities must double every 18 months. For many
data centers, the growth rate is in excess of 100% per year. Universities encounter at least the same level of requirement or perhaps greater than experienced in the commercial sector due to the high level of data intensive research and also the growing use of video, images, and large databases in teaching and learning. Although Memorial will soon move much of our storage requirements to the “Cloud”, we will still have significant internal needs for at least the next four years. Required investments in the data centre and storage portion of our IT infrastructure are forecast to be as shown in the table below.

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<tbody>
<tr>
<td></td>
<td>$0.4M</td>
<td>$0.6M</td>
<td>$0.6M</td>
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The advent of BYOD (bring your own device), particularly for the student body, has brought with it a significant change in the need for physical IT spaces on campus. To a very large extent, the need for large, expensive computer labs that serve the needs of students in specific faculties or which provide access to commercial software has been replaced as a result of our highly networked world and the ability to deliver computing, software, and data to any device anywhere. Memorial has conducted an analysis which indicates that perhaps 50% of existing lab space on campus could be reclaimed if the proper technical underpinnings were in place. The reclamation of on-campus space through continued investment in IT infrastructure represents a significant return on investment for Memorial and is discussed later in this section.

4.2 Academic Systems

While Memorial has made a significant investment in Distance Learning as part of our Teaching and Learning Framework, the future requires more investment in the digital technologies that are now part of technology-enabled education. Distance Education will no longer be separate from more traditional approaches, but rather many disciplines will meld the benefits of direct classroom teaching with the vast array of educational resources available through the Internet. Bringing students, faculty and visiting lecturers into a classroom for collaboration will be commonplace in the near term and will require the investment in additional tools and services to ensure that the learning experience at Memorial is as rich as it is at any of our peer universities.

- Distance Education/Enhanced Classrooms
- Collaboration
- Access to Learning Resources
- Virtual Laboratories

4.3 Research Tools

The traditional research disciplines of Theoretical and Experimental have been joined today by Computational research which brings new capabilities and insights into the many problems ranging from Physics and Chemistry to Social Sciences and even Arts and Literature. The tricouncil funding agencies recognize the value of computational tools in new, innovative funding and have tailored many of their funding programs to the creation of technology-enabled platforms such as Compute Canada’s National
High Performance Computing platform and initiatives to harness the “Big Data” appliances and employ the sophisticated tools that are the engines of research in the 21st. century. These include:

- Visualization of physical life and mathematical models;
- “Big Data” stores that can be mined for new insights into disciplines such as genetics and health;
- High Performance Computing to process data or develop new models of science;
- External connections such as sub-sea arrays, the Large Hadron Collider, etc.; and
- Remote use of equipment

All of these are tools that Memorial’s researchers need and must access for Memorial to be able to meet the needs of our improved research output. Memorial has established itself as a leader in Atlantic Canada with regard to the provision of High Performance Computing (HPC) Infrastructure. Under the CFI initiated Compute Canada initiative, Memorial provides the administration, management, and leadership for the Atlantic Canada branch of the Canadian National HPC infrastructure. Not only does this leadership position establish Memorial’s “distinguished” position in the HPC marketplace, but there are direct economic benefits to Newfoundland and Labrador through the creation of new jobs, etc.

### 4.4 Implications for Space on Campus

Evolution of the IT infrastructure and the changing needs of students, faculty, and staff on campus bring the opportunity to make significant changes to the available or required space on campus. Careful investment in the IT infrastructure can free up expensive space on campus by repurposing many of the existing computer labs and by moving much of the existing “data centre” space to less expensive locations such as an industrial park.

**Computer Labs:** Many of the existing buildings on campus have large computer labs which are purpose-built to allow students to use University-supplied computers and software as part of their education. This delivery of digital technology is to a large extent no longer required as more and more students bring their own equipment, and they expect to use their equipment in the manner that they wish as part of their learning. Affordable laptops, notebooks, and particularly tablets, and even smart phones are causing traditional computer lab to be outdated and little used, and the technology exists, and is widely used, to provide software tools and data to a wide variety of end user devices outside of the formal and traditional computer lab. In the near term, Memorial will undertake a program to implement the network accessible “Virtual Computer Lab (VCL)” technology needed to replace at least 50% of the existing physical labs. This means that approximately 40,000 sf of useable space could be reclaimed on campus for classroom, traditional lab, or office space. The value of such reclamation of space, not to mention the reduced cost of management and support of the labs that will be closed, is very significant. In fact, if the cost of building the VCL tools were $250,000 (est.) and the net value of “new” space (net of renovations to the lab space) on campus was $75 per square foot, the net benefit to the University by implementing a VCL tool would be in excess of $2.7 M.

**Off-campus Data Centres:** There are many data centres on campus that house servers and other IT infrastructure such as storage (disk) and back-up facilities. No estimate is available of the total amount of
space currently used in such locations; however, many faculties and departments have such facilities. The most obvious are:

- Computing and Communications (2 major facilities)
- Engineering
- Science (several smaller units)
- Computer Science
- Medicine
- Facilities Management

And in addition, both Grenfell Campus and the Marine Institute have their own facilities. Most, if not all, of these facilities have environmental controls (air conditioning, power conditioning, and backup) and all need access to emergency power generators, although only the larger facilities do. It is technically very possible to achieve significant economies of scale by colocating the IT infrastructure in one, or perhaps at most, two locations. Further, the planners of new buildings will, in the absence of a strategy to centralize IT facilities, plan to build data centres and environmental support facilities as part of the build. An approach that takes all on-campus data centre equipment to a single central location which is served with proper environmental controls will yield economic, control, management, and risk reduction benefits to Memorial and will bring the same space reclamation benefits as identified above for computer labs.

One other consideration that will have a long-term impact on this strategy is the advent of cloud computing. While this new means of delivering IT services is in its infancy at the moment, Memorial has benefitted significantly from moving Student e-mail and collaborative applications to a Cloud.

5.0 CATEGORY 1 - CURRENT RENEWAL & REPLACEMENT INFRASTRUCTURE PROJECTS

In addition to new priority capital projects, there are a number of renewal and replacement infrastructure projects currently underway.

5.1 St. Johns Campus

5.1.1 Paton College & Burton’s Pond Apartments Upgrades

Previous to the construction of the New Residence towers, there were 1,522 beds available on the St. John’s Campus: 987 in the traditional Paton College dormitories and most of the rest in the Burton’s Pond four-bedroom apartments. This stock, dating from the 1960’s and early 1970’s, was not constructed to today’s standards or the standards of newer facilities at other universities with respect to ergonomics, fire and life safety, air quality, finishes, or décor. All of these units required major renovation upgrades.

The government supported the residence renovation projects in the University’s infrastructure program by announcing funding for these projects in 2009. As of March 2013, seven of the nine Paton College buildings have undergone building systems and interior architectural upgrades with some major exterior envelop elements also being addressed. Doyle Residence building was
tendered in the fall of 2013 and is currently under construction, and the remaining building is Hatcher House which is also currently under construction.

The Burton’s Pond Apartment buildings are the next phase of construction. It had been planned to renovate Gilbert Court and install smoke detectors in Cartier Court over the summer of 2014. Due to concerns over the risk of not getting the work completed for September 2014, with Doyle and Hatcher Residences also under construction, it has been decided that smoke detectors will now be installed in all Burton’s Pond Apartment bedrooms during the summer of 2014, a relatively new requirement. Gilbert Court will be renovated over the summer of 2015. Renovations to the remaining Burton’s Pond Apartment buildings will depend on the scheduling of the above work.

5.1.2 New Residence Towers

The availability of on-campus housing to students from other parts of Canada and the world is a significant factor in the decision of where to attend university. The University’s infrastructure strategy plan proposed the construction of a new residence at the St. John’s campus as a component of the residence projects. Approximately 500 beds in two dormitory-style buildings have been constructed on the western side of Burton’s Pond. The New Residence buildings’ western tower opened in September 2013 and the eastern tower in January 2014.

5.1.3 Genetics Research Centre and Faculty of Medicine Expansion

The Faculty of Medicine at Memorial University is committed to educating excellent physicians and health scientists with the knowledge, skills, and attitudes to work throughout Newfoundland and Labrador and conduct health research to advance the well-being of people in the province.

The expansion of the medical education program of the Faculty of Medicine and the Newfoundland and Labrador Centre for Interdisciplinary Research in Human Genetics will be accommodated in a new six-storey building adjacent to the Health Sciences Centre.

As part of the construction of the expanded Medical School and Genetics Research Facility, a tiered parking structure for 832 vehicles was erected to replace current parking and provide space for the expanded Faculty of Medicine, the Genetics Research Centre, and Eastern Health staff.

This new building will allow for an increased medical student class size from 64 to 80+ (started in 2013) with state-of-the art simulation and learning facilities. These learning facilities in this new Medical Education Centre will also be used for postgraduate education and continuing medical education/professional development for doctors and other health care providers from all over the province. As the number of medical graduates increases, residency programs will also be expanded. In the new building, Faculty of Medicine educational and related support units will occupy levels one and two.
The new building will provide space for the growth of leading edge genetic research activity in updated facilities. The new research space will also allow the number of health scientist graduate students, currently approximately 250, to expand.

The Genetics Centre area will be housed on levels three, four and five, with space on level six shelled in for future research. The research area will include both wet lab and dry lab research space.

Essential to this genetics research thrust is the partnership of the Faculty of Medicine and Eastern Health. Eastern Health has committed to invest in the ongoing interdisciplinary research facilities and staff, as well partner with the private sector to generate revenue through the clinical application of the outcome of the research. The development of facilities and the promotion of a community of interest and support for genetics research will have enormous benefit for the province and the various stakeholders. World-class researchers and technology will in turn foster an environment for increased economic activity in the province.

The new building, which will provide approximately 14,121 m² (152,000 sf) of additional space at a total cost of $56.0 M, is funded largely by the Provincial Government with $11.2 M coming from the Canada Foundation for Innovation (CFI) for the Genetics Centre portion. Newfoundland has a unique gene pool and excellent researchers at Memorial University and Eastern Health. In a highly rigorous and competitive scientific competition, CFI selected this Memorial University and Eastern Health partnership for one of only eight projects to be funded nationwide under the Research Hospital Fund.

There is an area of approximately 743 gsf on level six that will be shelled in as part of the main construction. The agreement for the funding of the new building did not include finishing and equipping this space that is planned for shared biomedical research. The main building construction contract needs to be completed before proceeding to finish this sixth floor space. Funding is not yet secured for this work or the biomedical shared research equipment.

5.1.4 Laboratory Life Safety Upgrades

Quadratec Inc. (now Stantec) was commissioned in 2009 to conduct a study of life safety issues associated with approximately 200 laboratories in various buildings at the University. The study looked at laboratories with chemical fume hoods in twelve buildings at St. John’s Campus and Grenfell Campus, Corner Brook. Safety issues pertaining to ventilation and exhaust systems associated with the safe operation of these hoods were discovered. As well, it was determined that there were issues pertaining to eyewash and emergency shower stations, chemical storage
areas, gas infrastructure, etc. An estimated cost to address these issues was approximately $13.5 M. This project is now 85% complete.

### 5.1.5 Ocean Sciences Centre Expansion

The Ocean Sciences Centre (OSC) has long experienced problems with the seawater intake system. There have been fluctuations in the surface water temperature at the intake resulting in problems maintaining most species and crumbling infrastructure that made the pump system unreliable and very difficult to maintain. The Provincial Government recognized this concern, and since 2007 had budgeted $1.0 M to assist in addressing that problem. This funding became the core financial portion of a Canadian Foundation for Innovation/Research and Development Corporation grant for a new, deep-water intake system and the construction of the Cold Ocean Deep Sea Research Facility (CDRF). This grant was the largest awarded to any institution in Atlantic Canada. The deep water intake system involved a 500 m directional bore that now has the intake system below the thermocline of Logy Bay, meaning that the water temperature will remain stable year round. The intake is also built into a subsea cliff, meaning that it is not vulnerable to scouring from icebergs that enter Logy Bay. This grant also funded a new pump system that is more reliable and easier to maintain than the original system. While the new seawater intake system stabilized existing research programs at the OSC, the CDRF added new capacity. It features a bio-containment facility which enables work on fish pathogens that threaten the aquaculture industry and on invasive species that threaten marine habitats throughout the North Atlantic. It also includes equipment that enables research on deep water marine organisms at pressures equivalent to 3000m depth – the only such facility in Canada and one of very few in the world. The CDRF also includes an imaging facility that enhances existing research programs at the Ocean Sciences Centre.

In combination with Research and Development Corporation (RDC), almost full funding came from external sources. A $14.0 M construction budget was put in place for this project, and the construction components associated with this project will be completed in early 2014.

### 5.1.6 C-CORE/Faculty of Engineering and Applied Science Expansion

**S. J. Carew Building Extension (FEAS)**

The construction of an approximate 1,115 m² (12,000 sf) extension to the Engineering building to accommodate collaborative research and development activities in ocean/offshore engineering was substantially completed in February 2014. The Faculty of Engineering and Applied Science (FEAS) has dramatically increased its research and development activities over the last ten years. As a consequence of this rapid growth, the FEAS was facing acute space constraints. This project consisted of constructing an additional floor on the northeast corner of the building to create the Suncor Energy Offshore Research and Development Centre. The construction project cost $6.85 M and was funded by a grant of $4.85 M from RDC and a contribution of $2.0 M from Suncor.

**Dr. Jack Clark Geotechnical Engineering Building Expansion (C-CORE)**
The construction of a 1,263 m² (13,600 sf) extension to the Jack Clark building has been substantially completed. The extension was carried out by adding two floors to accommodate collaborative research, development, and teaching activities in offshore natural resource development. The construction project cost $7.0 M and was funded by a grant of $4.0 M from the RDC, a contribution of $1.25 M from the Terra Nova project, a contribution of $1.25 M from the Hibernia project, and $0.5 M from C-CORE.

6.0 CATEGORY 2 – CURRENT & NEW PRIORITY CAPITAL PROJECTS

Capital deferred renewal will not address the critical shortage of advanced infrastructure so necessary for today’s teaching and research needs. To address these needs in the context of the University’s Vision, Mission, and Values, a major capital initiative is needed. This capital initiative includes major new priority capital projects.

6.1.1 St. Johns Campus

6.1.1 Core Science Facility

Over the past 50 years, Memorial has transformed from a university with a focus primarily on undergraduate education to one that accommodates the learning needs of a broad range of society while also establishing a vibrant, diverse, and growing research agenda. Over this same time period, scientific questions and problems have become more complex and their resolutions often require multi- and interdisciplinary approaches.

In this same time frame, electrical and mechanical systems within buildings that accommodate the laboratories of the Faculty of Science have started to fail, thus leading to the inescapable conclusion that new infrastructure is now required. In taking on such a major project, it is recognized that now is also the time to change how research and teaching is done at Memorial University in order for the University to become a national and international leader in scientific research and education.

The Core Science Facility is proposed to be located in Parking Lots 16 and 16A, just west of the Smallwood Centre, creating a gateway to the campus. In designing this building, it is recognized that it must function so that researchers and students can create and benefit from the synergy that exists between acquiring, applying, and conveying knowledge. To do so, the building will be made of communal research spaces dedicated to specialized research functions, in addition to individual research spaces for the Departments of Biochemistry, Biology, and Chemistry. This design achieves many goals. It provides economies of scale by eliminating the duplication of resources in individual research laboratories. It allows the institution to make clear its commitment to its strategic research plan by supporting core research functions within these shared areas. It will also provide a significant recruitment advantage by not requiring new faculty to establish their own research labs, thus allowing them to initiate their research programs months or years ahead of their peers at other institutions.
The Core Science Facility will also house the teaching laboratories of the Departments of Biochemistry, Biology, and Chemistry with the intention of integrating teaching and research. As the curriculum grows and evolves over the life of this building, this physical arrangement is designed to allow our undergraduate students to benefit from being within the research enterprise of Memorial University and vice versa.

Furthermore, as this will be a major public building, it is intended to be used by the University community in general to take advantage of the resources it provides as well as highlight and communicate to the public the activities that take place at Memorial University.

The Core Science Facility will also provide space to the Department of Computer and Electrical Engineering within the Faculty of Engineering and Applied Science in order to provide additional space for expansion of FEAS.

Approval was received from the Provincial Government to commence planning for infrastructure options to address capacity issues in the sciences for a new Core Science Facility. A major functional space planning study was completed in 2013, and a contract for design is proceeding.

6.1.2 Redevelopment of the Reid Theatre

The Reid Theatre is outdated and outmoded and requires a major redevelopment as it cannot function in a modern university as a cultural centre or a teaching asset in its current condition. The redevelopment would include the demolition of the existing interiors back to the main building structural components in consideration of hazardous asbestos material. The existing spaces that would be included in the redevelopment would include the lobby washrooms, vestibules, control booth, audience chamber, stage, dressing rooms, and theatre storage. The redevelopment of the theatre would also include new sound, lighting, and rigging systems. The audience chamber would also be redeveloped to include complete new interior finishes and seating. Modern smart classroom features would be added to allow the theatre to be used as a teaching facility and multipurpose room for the use of the wider University and public community.
6.1.3 Aboriginal Centre

Planning is underway to establish an Aboriginal Centre at Memorial University. Currently there are approximately 600 self-identified Aboriginal students on campus. The vision is to have a centrally located, highly visible, dedicated Aboriginal space on the St. John’s Campus. The space will allow for programming growth and other features including gathering and performing space, which could also serve as a lounge. It is also planned to have the facility house offices for the Aboriginal Resource Office staff, along with study rooms, a conference room, a kitchen, washrooms, student lockers, and a storeroom.

Events to be facilitated within the centre could include Aboriginal Diversity Celebrations, Sisters in Spirit Vigil, Aboriginal Student Orientation Day, talks by visiting Aboriginal leaders and Elders, and monthly sharing circles. Other events could include tutoring, studying, student advising, informal student gatherings, and activities of the Aboriginal Resource Office staff. Senate meetings and teaching may also occur within the facility.

There is work underway at this time to find a suitable location on campus. In keeping with the logistical and functional importance of this facility, a Request for Proposals was issued and awarded to consultants for the detailed architectural and engineering design. Full funding for the project is not yet in place.

6.1.4 Faculty of Arts Research Archival Facility

Memorial University’s Faculty of Arts is home to a number of archival spaces which contain unique collections reflecting the history, language, oral culture, folkways, and popular culture of Newfoundland and Labrador. Citizens of the province have entrusted these one-of-a-kind archival materials to Memorial University. The Arts Research Archives are, in a sense, an enactment of Memorial University’s “special obligation to the citizens of Newfoundland and Labrador” and can be a powerful instrument for the realization of Memorial University’s Vision, Mission, and Values as well as its planning frameworks for Teaching and Learning, Research Strategy, and Public Engagement. The Faculty of Arts Research Archives Report and Recommendations dated March 2013 summarized the various issues critical to the rationale for this facility.

Memorial University does not currently have one centralized and quality standard storage facility. A variety of collections are housed and utilized in various areas of campus under inconsistent archival conditions that would include temperature, light, atmosphere, and other controls for preservation of collections and removal of risks associated with care and use. The archives serve three related functions--a resource to researchers, a teaching tool, and a mechanism for public engagement. Classes are sometimes taught in the various archives to familiarize students with how to work with archival materials, and part-time work by students provides both labour for the archives and opportunities for students to gain skills.
To preserve the collection, a purpose-built facility is needed. This need in the immediate term is to prevent damage that could seriously threaten the survival of this significant resource. However, plans also must be developed to move forward with a purpose-built facility for the housing of the collection and the provision of office and work space for the archivist.

6.1.5 Library

Memorial University Libraries is comprised of five libraries, two resource centres, and a reading room located on all Memorial campuses and geographic locations (St. John’s, Corner Brook, Labrador, and Harlow). The libraries’ critical roles in supporting and facilitating teaching, learning, research, and engagement with the public are reflected in the longest opening hours of all campus buildings and the extremely heavy traffic through each library twelve months a year. All libraries have repurposed their spaces over the past several decades to respond to fluctuations in volume of students, new learning opportunities, changing research activities, and the emergence of electronic journals and books. In addition, all libraries have established quality staff-mediated services to contribute to the achievement of educational outcomes. For the most part, all libraries have maintained the physical integrity of their locations (whether free standing or embedded in another building) and have lived within the constraints of the imprint of their current structures. The continued development and embracement of electronic products has provided a short-term balance to offset the volume capacity limitations of adding new books and journals. While it is possible to repurpose space for most changing demands, the libraries share a common challenge with the Faculty of Arts Archives in an ongoing need for additional archival space to steward donations of rare or original content not otherwise available to the Memorial University community. To preserve and facilitate access to these unique items, the space must meet archival standards and specifications for temperature, light, humidity, etc.

6.1.6 Faculty of Engineering and Applied Science

The Faculty of Engineering and Applied Science (FEAS) is housed in the Engineering (S. J. Carew), Bruneau, and Earth Sciences buildings. Through the Engineering Expansion Strategic Initiative, FEAS will be doubling between 2012 and 2020. There are challenges that exist today such as a shortage of space including, in many cases, a shortage of appropriate types of spaces. This is compounded by the planned doubling of the Faculty. Given the urgency to find appropriate space and the increase in faculty, staff and students, time is of the essence. Recruiting the appropriate faculty/researchers is significantly dependent on the availability of appropriate space(s). The lack of space is also adversely impacting the ability to partner with potential funders for research.

Functional Program: A functional program for FEAS space was prepared by experienced consultants familiar with Memorial University’s environment. They have prepared many such space needs reports for a number of MUN Faculties/Schools including recently the Faculty of Science. It was prepared utilizing a user-group approach representing the various disciplines, future departments, and administrative units. Careful consideration was given to comparative
contemporary functional facilities, the consultant’s work elsewhere in Canada, and their knowledge of facilities in the United States. MUN’s space guidelines were also followed. The functional program identified a total program need of 51,799 \text{gm}^2 or 557,560 \text{gsf}. It should be noted that this document is a comprehensive approach to the current and longer term needs as opposed to previous estimates of need. This report was completed in November 2013.

Space: The current assigned and available FEAS space in the Engineering, Bruneau, and Earth Sciences buildings is 24,722 \text{gm}^2 (266,105 \text{gsf}) upon doubling of the Faculty. This compares with the documented functional program requirement of 51,799 \text{gm}^2 (557,560 \text{gsf}). The variance shows a shortfall of 27,027 \text{gm}^2 (290,916 \text{gsf}). This is in keeping with the notion that the space should at least double since there is a doubling of the Faculty, and currently there is a serious shortage of appropriate and contemporary space. The consultant’s analysis supports this conclusion.

Proposed Solution: To identify a potential solution, a number of spaces/strategies were considered including the following:

- the Core Science building, engineering allocation;
- vacated space in the Bruneau building;
- the area in the existing Engineering building currently occupied by both Computer Science and Technical Services; and
- the expansion of the existing Engineering building.

Taken together, this meets the shortfall in terms of square meters (footage). New construction (extension to the existing Engineering building) is the best strategy for expansion of the high bay labs for Civil, Mechanical, Ocean, and Naval Architectural Engineering due to the essential retained synergies between those disciplines, structural heights, and systems complexities. The other spaces, once vacated, will need some modifications.

Timing: The FEAS is currently in the process of recruiting faculty and expanding its programs, research, and student enrolments. These faculty members will need space for themselves and their graduate students and other researchers. Space will be needed for their research programs. Additional classroom space is needed as well as other support space. These space needs are well documented and supported in the functional program document. Given a current shortage of space and the need for more space, a timely solution is crucial. In addition to the academic needs, there are private sector funders who wish to form partnerships with the FEAS for which it (FEAS) does not have sufficient space. The potential to lose this support (industry partnerships, research projects, financial support, etc.) is significant if the space issues are not satisfactorily resolved. The space is also needed now as the FEAS has already begun its expansion process. The approach to the solution identified above recognized the need to add high bay space as well as other lab and office space as a priority. Thus, the combination of utilizing existing (to be vacated) space, new construction by way of expansion to the Engineering building for high bay labs, which would
have a relatively short construction period, and space in the new Core Science Facility, which would take a longer time period, would provide the most favorable time schedule given the constraints.

As mentioned previously, the FEAS is undergoing a major expansion by a government-funded strategic initiative in response to the need for more engineering capacity in the Province. This includes a major increase in its student enrolment and research capacity. From a baseline of 2011-12, it aims to increase undergraduate enrolment by about 50%, with approximately 500 additional undergraduates by 2020, double its graduate student enrolment, and hire 40 new professors and 24 new support staff through this decade. This includes up to 12 new faculty positions over the next 1-2 years, particularly focused on strategic areas of ocean, arctic, and offshore energy technologies. The Engineering Expansion Strategic Initiative supports the province’s economic growth and job creation in its thriving offshore oil, ocean, energy, mining, and information technology sectors.

6.1.7 School of Human Kinetics and Recreation

The School of Human Kinetics and Recreation (HKR) is entering an exciting new phase with an emphasis on growing research capacity in health and wellness through the lens of physical activity, while continuing to maintain our commitment to excellence in teaching. Their research capacity has grown with the recent hires of a number of research-focused faculty members, including two Canada Research Chairs. We have a strong Master’s program with a Doctoral program in development. The Physical Education (PE) building is one of the oldest buildings on campus and has not been able to accommodate this growth. The PE building was designed to facilitate pedagogy in Physical Education and centres around a large gymnasium. While the gymnasium is still an integral space for teaching in both the Physical Education and Recreation divisions, there is a pressing need for laboratory space. Approximately one third of our faculty do not have laboratory space, and the laboratory space they do have access to is also used for teaching large undergraduate labs. Office space for new faculty members is also needed and is currently limiting the ability to bring in new faculty. We have among the highest student-to-faculty teaching ratios on campus, yet we are unable to provide adequate office space for our teaching faculty. In addition, we need research and office facilities to accommodate growth in our graduate program. A space committee has been established that has conducted a needs assessment and protocol for space allocation. We have triaged our space needs to address faculty office needs first, research labs second, and teaching space third, working under the assumption that in addition to current classrooms, we can access teaching space across campus. There are several solutions for our current space needs: first, our current building could be renovated with additional spaces being added; second, we could partner with other groups to gain additional shared space in a new building; and third, we could rent laboratory space off site to develop community-based laboratories.
6.1.8 Athletics

Athletics is an important component of HKR. As outlined in the 2013 Presidential Task Force on Athletics, there is a need for better access to training facilities for our high performance athletes. There are also administrative space needs for Athletics. The administrative side of Athletics is supported within the Physical Education building. Currently staff and coaches in Athletics have either no access to office space or are located in small spaces that are distributed throughout the building. Athletics needs consolidated space that provides offices for all full-time staff and coaches and for athletic therapy services. Hoteling space for part-time coaches is also required.

With Canada Games potentially coming to Newfoundland and Labrador in 2021, we may have an opportunity to partner with the City of St. John’s and the Provincial Government to facilitate the building of new athletics facilities on the University campus. These buildings could be used to support high performance sport in the province, in addition to being a resource for our Memorial students. New athletics facilities could also be equipped with Human Kinetics laboratories that would bring exercise science to our high performance athletes.

6.1.9 Storage Facility, Mount Scio Road

In 2005, the University had 2,400 m² (25,833 sf) of storage at various older, nonpurpose-built buildings across the campus. Since that time, all of these structures have been or are slated to be demolished due to their advanced deterioration and structural instability. The University currently leases some interior storage and stores some items outside where they are subject to deterioration, theft, or vandalism. The Mount Scio complex location offers a convenient site for the construction of a purpose-built storage warehouse. There is adequate land available in the immediate vicinity of the existing buildings, utility services are readily available, and the complex is served by both Memorial security and grounds staff year round. The site can accommodate a 930 m² (10,018 sf) renovation and expansion to the former incinerator building which will replace the 1,100 m² (11,840 sf) Henrietta Harvey Warehouse. There will also be a need for storage space for boats and motors for the Ocean Sciences Centre and the Marine Institute. This could be an extension to the proposed facility. The design could also provide for a variety of uses from records storage to construction and renovation swing space. It will also allow for future growth of the building for records storage.

6.1.10 Pedways

The University has six pedestrian pedways which serve to interconnect various main University buildings. They are vital links between the north and south areas of the campus which is bisected by Prince Philip Drive (Parkway). The oldest two pedways were constructed as stand-alone elevated walkways in the early 1980’s to address vehicle-pedestrian concerns on the Parkway. The construction of subsequent buildings has led to the incorporation of the west structure into the pedway system. Pedestrian traffic flow studies have shown that the west pedway is a critical link, carrying as many as 600 people per hour at peak times. The east pedway remains stand alone. These two original structures have passed their useful life, and recent assessments have
determined that it is more economical to replace the structures than it is to renew them. As further campus buildings are built or contemplated, consideration will need to be given to enhancing the network of pedways.

6.1.11 Campus Master Plan

With an increase in infrastructure development, the campus is seeing increased pressure on its utilities, green space, accessibility to buildings, and availability of parking. Of serious concern also is the necessity of a long-term, orderly framework for the continued development of the campus. This includes a strategic approach to infrastructure construction and replacement. The age of existing facilities and condition highlight the importance of long-term planning as well as short-term plans. The orderly development of the campus in terms of facilities, roadways, green space, etc. can only be assured through a comprehensive and up-to-date master plan.

The availability of parking on the St John’s Campus is becoming an issue for consideration. With the construction of the Core Science building, there will be a loss of 390 parking spaces for the building footprint and the drop-off, pick-up, and circulation areas. The completion of the building will bring increased traffic to the campus (students, faculty, staff and visitors).

The repatriation of programs from Tiffany Court will add more parking demand to the campus. This will likely be offset by the relocation of programs to The Battery. As the campus grows with increased programs, the need for better roadways and traffic circulation and more vehicular parking will increase. The increasing vehicular traffic on the Parkway is also adversely impacting traffic management on the campus. An analysis of traffic and parking is needed as a component of an overall campus master plan.

Critical to the growth and stable operation of the campus is the availability and reliability of utilities. The need for energy security is particularly acute. Buildings can deteriorate without a continuous supply of heat in cold weather. This also requires secure sources of electricity. People also need to have confidence in the availability of utilities for continuous operation of research installations. Many research installations include animal models, and there are a number of Animal Research Centres on campus that are critically dependant on security of heating, cooling, electricity, water, etc.

A comprehensive master plan is needed to identify the current state of affairs, immediate needs, as well as provide a blueprint for future development.

6.1.12 Technical Services Building

For the past decade or more, Memorial University has experienced continued growth in research activity, and the Department of Technical Services has been undergoing corresponding growth in demand for its services. Technology improvements have enabled the department to keep pace with some of this growth, but unfortunately its current space allocation and configuration is significantly limiting the department’s ability to operate effectively. Technical Services operates
thirteen shops at various locations throughout campus. The last significant improvement occurred in the mid-1970’s with the construction of the S. J. Carew building. Much has changed since then. To address the current space limitations and to allow some capacity for future requirements, the department would require approximately 23 nm² (248 nsf) above its current allocation. It is proposed that the construction of approximately 3,300 nm² (35,521 nsf) of low cost, appropriately configured, industrial space be considered. This approach may enable some of the department’s existing locations to be vacated. Pre-engineered structures with minimum architectural features may provide a suitable industrial space at a reasonable cost.

6.2 Grenfell Campus

6.2.1 Energy Strategy

Emergency Power Generation and Distribution

The campus needs to have a secure source of emergency power and a reliable distribution system within the campus.

The range of systems impacted includes:

- Emergency lighting in all exits and exit routes
- Emergency lighting in all data / electrical rooms
- Data communications equipment and its cooling loads
- Power and lighting in various areas (CEP, service rooms, emergency operations centre)
- Future load capacity (limited electric heating in residence, laboratory fridges, freezers, gymnasium warming centre, etc.)
- Blue phone and security cameras
- Fire alarm systems & emergency notifications systems

A portion of the distribution work has been funded and is scheduled for completion this summer. The recent acquisition of an emergency generator and the addition of distribution panels, wiring, and feeders have improved the situation for a number of buildings. An additional piece of work to complete the Arts and Science building, which will cost in the order of $1.0 M, is anticipated to be completed this year. This initiative will ensure reliability of emergency lighting, heating, data, and communications systems, and air conditioning. The facilities are otherwise significantly deficient in terms of availability and reliability.

An additional investment in the order of $2.0 M is necessary to provide the same level of backup and redundancy to the remaining areas of campus.

6.2.2 New Residence

The original student residences at the Grenfell Campus (GC) had been operating at capacity for many years, primarily on the basis of domestic (i.e., Newfoundland and Labrador students) demand. Each year the campus was faced with a long waiting list of students seeking residence accommodation. The College of the North Atlantic, which has a campus located in the vicinity of GC, had a need for residence spaces as well. Compounding the shortage in spaces at GC is the plan to increase enrolment through the recruitment of additional students to existing programs.
and the addition of programs. The Campus has been engaged in a major recruitment program to attract students. A 200-bed residence was approved for construction and opened in September 2013, which has alleviated the shortage.

6.2.3 Arts and Science Extension

Construction of the Grenfell Campus Academic building was approved by the Province and the Board of Regents. This project received funding from the federal government’s Knowledge Infrastructure Fund. Construction commenced with groundwork, foundations, and steel tendered under different packages to assist in delivering the project according to strict deadlines imposed by the federal government. The original project came in over budget, and a decision was made to proceed with completion of the construction of the classroom, laboratory, and office space with the Atrium and foyer area being deferred. This strategy was designed to maximize the federal funding to the Province while maximizing the functionality of the project within the approved budget. The building, without the Atrium, was successfully completed on schedule and on budget at $27.0 M, thus meeting the conditions of the federal government program.

The University, in consultation and cooperation with the Provincial Government, outlined a successful funding strategy which enabled the construction of the Atrium with a budget of $6.0 M. The Atrium construction is completed.

6.2.4 Environmental Sciences Research Laboratories

Grenfell Campus proposed to establish new environmental sciences research laboratories on its campus. The purpose of this initiative was to build on existing capacity in the environmental sciences and to further develop expertise in analytical research, environmental sciences, and graduate studies at Grenfell Campus. The construction of environmental sciences research laboratories will serve the needs of University researchers, government agencies, municipalities, and local industries in key sectors.

$4.0 M was allocated to the project, and construction was completed in May 2013.

7.0 CATEGORY 3 – FUTURE PRIORITY CAPITAL PROJECTS

7.1 St. John’s Campus

7.1.1 Life Sciences Building (Professional Health Sciences Building)

The theme of Memorial’s strategic proposal for consideration in the 2013-14 government budget process was a two-fold consolidation: The consolidation of nursing education in Newfoundland & Labrador and the consolidation of the ongoing expansion of the professional health sciences (Nursing, Pharmacy, and Social Work) on the St. John’s Campus.

The expansion programs of the Schools of Nursing, Pharmacy, and Social Work on the St. John’s Campus are ongoing. All three expansions were funded by a specific Strategic Initiative (Growing
Health Care) in 2008-09. Each school is at a different stage of its planned expansion, and each has encountered or is encountering impediments to growth itself and to sustaining growth that has already occurred due to a lack of available space and lack of suitable space, respectively. Each School has become space bound within its assigned space on the St. John’s Campus, and each has been forced to lease off-campus space in a shared unit at Tiffany Lane over three kilometers from its on-campus location. The ability to recruit and retain faculty and staff is being negatively affected, and this will adversely impede the development of programs. The lack of space is also impeding the development of research due to limited available research space (laboratories, instrument rooms, etc.) and will limit the progressing expansion of thesis-based graduate enrolment (insufficient graduate student office space and research labs). Finally, the capability to meet, in proactive fashion, constantly advancing professional program accreditation standards is being eroded by space shortages, disjointed physical locations (Tiffany Lane), trailing-edge teaching and research laboratory infrastructure, and the attendant impaired ability to recruit PhD qualified faculty. Indeed, the expansion of seats in programs and thus the admission of students and the development of needed programs have been constrained as a result of the lack of available, suitable space.

The proposed new building, on the St. John’s Campus, could also house an Animal Research Centre (animal care facility) which would replace the existing facility in the Health Sciences Centre. A lower cost alternative solution will also be explored. The existing facility is at capacity and does not meet current codes or accreditation standards. Without a replacement facility, the University is in danger of losing its accreditation, resulting in a dramatic loss of research grants and the potential loss of necessary faculty. It was calculated that the new Professional Health Sciences building would require 38,250 m² (411,720 gsf) and cost $244.0 M in 1st quarter 2011 dollars.

7.1.1.1 Faculty of Nursing Consolidation (Current wording as per the Strategic Initiative 2013-2014 document)

A new governance model for nursing schools in the province is being considered. Under such a governance model, the Centre for Nursing Studies (CNS) would consolidate with the Memorial University of Newfoundland and Labrador School of Nursing (MUNSON) to form a new Faculty of Nursing. Within a new Faculty of Nursing, additional space will be required to accommodate the increased size of the School, new and expanded educational offerings, larger and better equipped classrooms, various seminar and meeting rooms, expanded research space, a simulation and clinical learning centre, and additional faculty and administrative staff space. An analysis of existing spaces, identification of space needs, the creation of a functional space program, and options for providing the required additional space were conducted, and the result has been the recommended expansion of the School of Nursing. The facility required would be approximately 14,864 m² (160,000 sf) in addition to existing space. Without consolidation occurring, current operations include facilities that accommodate for a small intake of students up to 35 maximum.

Actual intake Bachelor of Nursing (BN) numbers are 53 regular stream (4-year program) students and 32 fast-track students (24-month program). In addition, 12 Master of Nursing (MN) Nurse
Practitioner students and 20 distance MN students are admitted each year, and 4 PhD. students are admitted every two years. At the time of the preparation of this Infrastructure Plan document, only organizational consolidation is contemplated.

7.1.1.2 School of Pharmacy Expansion (Current wording as per the Strategic Initiative 2013-2014 document)

The School of Pharmacy is unique in Canada for being located in the same building as the University’s Faculty of Medicine and School of Nursing. This focused setting provides students in all health education programs with opportunities to engage in inter-professional learning and also facilitates direct patient care learning activities. As recently as five years ago, the demand for pharmacists was high, and graduation rates in North America could not keep up with the demand.

Originally designed to accommodate an annual intake of 25 undergraduate pharmacy students, the MUN School of Pharmacy currently enrolls 40 students. This additional growth is taxing available facilities which are now operating beyond capacity. The lack of space and state of the facilities are substantially affecting the pedagogical approaches faculty can take for student learning. Additionally, with more than half the faculty located off the main campus at Tiffany Court, there has been an erosion of the excellent student/faculty relationships which used to exist, and this separation further challenges relationship building. Research facilities (both wet lab and dry lab space) are totally inadequate and have negatively affected hiring of faculty.

Compounding these pressures is a further requested increase in enrolment. The Government of Newfoundland and Labrador, which has a goal of facilitating the education of a sufficient number of qualified pharmacists to meet the demands of the population of the Province, provided funding in 2009 to increase the number of seats by 20 places, effectively expanding the current class size from 40 to 60 students. Faculty and staff complements will also be increased to reflect the increased student enrolment. This expansion has not taken place because space is not available.

An additional factor which must now be considered is the need to revise the curriculum and move to the Doctor of Pharmacy as the entry level qualification. This will require a substantial change in teaching methods and spaces to accommodate such (e.g., small group clinical case teaching, enhanced professional practice labs, etc.). Such a program cannot be sustained in the current facilities, even if enrolment was not increased.

It should also be noted that the past two accreditation reports have stated the current space is inadequate to support the program. It is unlikely the School will receive full accreditation the next time it is reviewed (2016) if its infrastructure needs are not addressed.

To fully support this enrolment increase and to effectively address new and enhanced academic and research priorities, the University conducted a functional space planning study to identify the additional space required including instructional space, research areas, student study and support areas, as well as administrative space. The anticipated size of a new facility is estimated at 8,361 m² (90,000 sf) with a preliminary budget estimate of $50.0 M.
However, as an interim measure, consideration will also be given to utilizing the vacated Animal Care space for Pharmacy when the Animal Care building is built.

7.1.1.3 School of Social Work Expansion (Current wording as per the Strategic Initiative 2013-2014 document)

In the 1980’s, the School of Social Work relocated to St. John’s College which was built in the 1960’s as a student residence and has physically remained unchanged. This building has a facility condition index (FCI) of ~0.36, indicating that this structure is in serious need of infrastructure renewal. Deficiencies include lead in the water and a lack of heat or air exchange. A tender to make the necessary improvements is imminent.

In 2008, Government committed to the expansion of the School of Social Work which will strengthen the preparation of clinical leaders, supervisors, and managers. New faculty will be added, the Bachelor of Social Work degree will be redeveloped as a four-year program, and support will be provided to Child, Youth, and Family Services through specialized training and consultation.

In 2008, an accreditation review by the Canadian Association of Social Work Education (CASWE), the School of Social Work received a four-year accreditation rather than a solid eight-year accreditation. The primary rationale for awarding this accreditation status was related to the School’s physical facilities. The accreditation recommended “that the University undertake measures to address the quality of the physical space of the School of Social Work”. Failing to act on this accreditation citation could jeopardize reaccreditation. The School received reaccreditation in January 2014 on the premise that work on the building would commence in the spring of 2014.

In 2009, the Government of Newfoundland and Labrador provided funding through a Strategic Initiative, Growing Health Care, to increase the School of Social Work’s enrolment at both the undergraduate and graduate levels. Operational funding was provided to increase faculty and staff complement, but no capital funds were allocated to permit a physical expansion to an existing space-challenged facility.

The School investigated and developed a proposal to lease space and relocate the school. Due to a number of variables, with cost being the major deterrent, the plan was not approved. The School of Social Work has since leased minimal space, two classrooms and office space for four faculty, at Tiffany Court. The annual cost to lease this space off campus is $150,000.

The School of Social Work delivers two undergraduate programs -- a four-year Bachelor of Social Work program and a four-semester second degree Bachelor of Social Work program (202 students). The School also delivers a Masters of Social Work program (80 students) which doubled its cohort in 2009 in response to funding by government and a PhD. program (28 students) which is the only Social Work PhD. program in Atlantic Canada. This program attracts students nationally and internationally; however, space is the limiting factor in accepting students.
The School of Social Work building on campus has one classroom for 40 students, a second classroom that seats 20 students, and a small seminar room to seats 10-12 students. With current student enrolment of over 300 students, this space falls well short of required and appropriate space. The School of Social Work programs have been acknowledged for their innovation and blended face-to-face and teaching modalities. While leasing space off site has improved the critical space issue minimally, the physical challenges continue. Off-site campus space fragments the teachers, students, and programs. In September 2012, undergraduate classes had to be offered at Tiffany Court, thereby introducing transportation logistics and timetabling issues for students. Issues related to the physical facilities at St. John’s College continue to restrict the School of Social Work’s ability to progress. The physical conditions impact negatively on the School via students, programs, research opportunities, faculty recruitment and retention, and accreditation.

The School has experienced remarkable success in the delivery of undergraduate and graduate programs even with incredible space challenges. With current student enrolment of over 300 students and with a 25% planned enrolment expansion for undergraduate programs and 50% expansion for graduate programs, appropriate space is critical to support this direction. There is no flexibility is scheduling (programs are layered) and no space to facilitate case discussions, group work, and team learning activities. Research facilities are completely inadequate, and the use of learning technologies is almost nonexistent due to lack of infrastructure. Graduate students attend week long intensive institutes to supplement distance-based courses each semester. These institutes need to be on campus to facilitate and support students in their research areas through contact with academic supervisors, program staff, and pathway mentors. As graduate enrolments increase, the need for more institutes will increase. The reality is that undergraduate and graduate expansion will be determined by space.

The School of Social Work has strong connections to the community through a field program for undergraduate students that includes learning in both urban and rural areas. There is a partnership with Child, Youth, and Family Services (CYFS) to develop and share expertise in child welfare. Support for learning technologies, offices to support faculty, and meeting space is critical to foster this partnership and the continued positive impact on the health and well-being of the people of this province. The School has developed a strong partnership with Labrador and the Nunatsiavut government. Together, over the last four years, the School has trained social workers to provide services in Labrador. While this project ended in 2013, the networks remain strong. With appropriate facility and infrastructure, the School can expand education programs and placements to the Labrador coast where the need is great.

Based on a review by consultants in 2011, existing School space was identified as insufficient in both terms of quantity and quality to support both current and planned enrolment and research activities growth and contemporary practices of Social Work pedagogy, learning, research, and scholarship. It was further concluded that existing infrastructure will not support contemporary social work pedagogy at either undergraduate or graduate levels. New construction is required. A functional space planning study was completed in 2012. This plan laid out space requirements for expansion to the undergraduate and graduate enrolments, research activities, and community
engagement and service. The space requirement is 4,181 gm² (45,000 gsf) at an estimated cost of $27.0 M. An interim solution involves the renovation of St. John College and the partial use of Coughlan College.

7.1.1.4 Animal Care Unit Expansion (Current wording as per the Strategic Initiative 2013-2014 document)

The existing Health Sciences Centre animal facility needs to be replaced as it does not meet current building and accreditation standards for animal surgeries, behavioural space, animal housing, bio-containment, and Specific Pathogen Free (SPF) spaces. The infrastructure of the current facility, which is tied in to Eastern Health hospital infrastructure, is prone to failures that place the welfare of the animals and research at risk. Memorial’s Certificate of Good Animal Practice is in question. In addition, due to the growth of research activities in the Faculty of Medicine, Faculty of Science, and School of Pharmacy, this new facility is required. This facility was approved as a strategic initiative in 2012. A 2011 Animal Research Centre (ARC) Functional and Technical Program document received extensive stakeholder consultation.

The Vivarium on Mount Scio Road, which houses the unique Yucatan Swine used for research and medical postgraduate teaching programs, and the Biotechnology building animal facility (Departments of Biology, Biochemistry and Psychology) require architectural and engineering upgrades.

Memorial's main Animal Research Care (ARC) facility is now more than 40 years’ old. Since opening, the standards governing the care and use of research animals in Canada, which are set by the Canadian Council on Animal Care (CCAC), have been continually strengthened. Compliance with these standards is assessed through regular inspections and the issuing of accreditation reports by the CCAC. Memorial's existing ARC facilities are outdated and seriously deteriorated.

ARC is responsible for the regulatory, clinical, and operational oversight of all animal care and use in research and teaching at Memorial University. As with all universities across the country, the facilities, programs, and operations provided by the animal care and use program are indispensable, especially where medical and health sciences programs exist. At Memorial, the ARC supports and enables multidisciplinary biomedical, life sciences, and aquaculture research; undergraduate, graduate, and health professional teaching and learning; and community engagement.

The current Health Sciences Centre animal facility supports the Faculties of Medicine and Science and the Schools of Pharmacy and Nursing. The facility is outdated and decentralized, offering little in the way of research and teaching infrastructure. The facility was designed in the late 1960’s and constructed in the early 1970’s. Aging infrastructure has resulted in significant risk for both the animals resident in the facility and the people who work there. Furthermore, it no longer meets regulatory requirements. The animal facility is largely focused on animal housing. Animals are removed from the facility and taken through public hallways and on public elevators to have surgeries and procedures done in the research laboratories. This poses a health risk to the public.
Although investments have been made for capital equipment purchases and critical renovations, the design and footprint of the original facility preclude the development of core facility support services that will enable Memorial’s desired growth in biomedical research.

Major issues include:

- Animal odours and allergens in public hallways; significant loss of research personnel due to reactions to allergies
- Poor air quality
- HVAC systems tied into other building air handling units
- Risk of asbestos contamination from air in interstitial spaces leaking into the facility
- No redundancy in air handling resulting in high risk for catastrophic heat gains in the event of extended power failures
- Lack of appropriate large- and small-animal surgical O.R. and procedure spaces
- Lack of appropriate preoperative and recovery spaces, resulting in animal welfare issues and risks of disease transfer
- Lack of appropriate clinical support spaces such as radiology/diagnostic imaging
- Feral mice infestation of the interstitial space, leading to significant biosecurity risk to the many costly strains of mice housed in the facility
- Potential liability for staff working in a building that exposes them to allergens due to inadequate ventilation systems.

Recruitment and retention into the Faculty of Medicine’s Biomedical Sciences has been a challenge as a result of the poor facilities. The condition of the facilities and lack of core support services has resulted on several occasions in a negative impact on Memorial’s reputation and on our researchers’ ability to get funding. Likewise, Memorial’s ARC facilities are woefully inadequate when it comes to providing the precisely controlled environmental conditions needed for modern molecular biological research. This deficiency continues to put Memorial researchers at a significant disadvantage in the increasingly competitive world of Natural Sciences and Engineering Research Council (NSERC) and Canadian Institutes of Health Research (CIHR) funding programs. It is also nearly impossible to recruit the best researchers to a university whose ARC facilities are among, if not, the oldest and most deficient in the country. Memorial’s declining performance in national research competitions, especially health research programs, further highlights this issue.

The Canadian Council on Animal Care (CCAC) downgraded Memorial’s ARC accreditation status to Probation during the last accreditation assessment in 2009. Very few institutions across Canada have ever received this designation, so the seriousness is not to be underestimated. Its status was upgraded to Conditional Compliance in 2011 based on investments by Memorial into capital equipment purchases and essential interim renovations as well as a commitment to work towards a new facility to support Health Sciences faculties and schools for which functional planning documents are now complete. To correct this long-standing situation, support for a new facility is critical.
7.1.2 Redevelopment of Chemistry-Physics and Science Buildings

The new Core Science Facility will relieve the stress on the mechanical systems within the Chemistry-Physics and Science buildings. For that reason, the departments of Chemistry, Biology, and Biochemistry were identified as the units to move into Core Science. However, the expectation is that all Science departments will be removed from the Science building. Furthermore, the Henrietta Harvey building no longer meets the needs of the Mathematics and Statistics department, the Computer Science department needs to move out of the S.J. Carew building to facilitate expansion of the Faculty of Engineering, and the Faculty of Arts needs to consolidate its program. All these goals are to be met through the redevelopment of the Chemistry-Physics and Science buildings.

To meet this goal, the programming exercise conducted by Stantec in 2013 proposed that the Psychology department would relocate to the Biotechnology building, with nonlab components remaining within the Science building due to space limitations. Likewise, student advising space for other academic departments within the Faculty of Science is planned to remain within the Science building.

Demands placed upon the Chemistry-Physics building will require extensive renovation to meet the new configuration. The expectation is that the space created by the movement out of the Chemistry Department (approximately 20 faculty) will create the space to accommodate the departments of Computer Science and Mathematics and Statistics (approximately 55 faculty – an amount in excess of all the additional faculty associated with the full expansion of the Faculty of Engineering).

As renovations and repurposing of these spaces impacts a large amount of the University’s academic enterprise, it is appropriate that a campus master plan be developed in advance of this work to insure that we continue to make the best use possible of our resources. For example, is the proposed location of the Psychology department appropriate, or would they be better colocated with other disciplines relevant to the life sciences? Likewise, is the lost connection between Physics and Physical Oceanography limiting collaboration with the Department of Chemistry?

7.1.3 Faculty of Business Building

The Faculty of Business Administration is planning significant expansion to its graduate program enrolments, graduate program offerings, and research activities. Demand to expand the undergraduate programs is constrained by the availability of space and other resources. This expansion will require access to sophisticated teaching, classrooms, office space, and research infrastructure.

Based on a review of existing space capacities by AE Consultants in 2011, existing Business building space at Memorial has been identified as insufficient in both terms of quantity and quality to support both current and planned enrolment and research activities growth and contemporary
practices of Business pedagogy, learning, research, and scholarship. It was further concluded that existing infrastructure will not support the information technology necessary to support contemporary Business pedagogy at either the undergraduate or graduate levels. To accommodate these deficiencies, a project to include new construction, in addition to an extensive renovation of existing space, is needed. The functional program identified a need for 16,300 \text{ gm}^2 (175,452 \text{ gsf}) of space, including new construction and existing space. In the meantime, a functional space programming analysis is being contemplated.

7.1.4 Faculty of Medicine

In 2013, a study was completed which provided a comprehensive analysis of the overall needs of the Faculty of Medicine. This analysis recognized that the original Faculty of Medicine was built in the mid-1970’s (40 years ago) and has not had any updating or expansion to its infrastructure in the intervening years. The completion of the new building, which will provide additional genetics research space, was considered and included as an element in this overall space and functional analysis. The Faculty of Medicine has seen an expansion in teaching spaces and the medical school class size from the original to the current 80, the expansion of the residency program as well as the number of graduate students, and a proportionate increase in faculty and staff research growth.

The completion of the new building this year releases the pressure on the teaching spaces and provides space for the expanding genetics research programs, but it does not address the space needs of Community Medicine or Basic Medical Sciences.

The study showed a need for 1,138 \text{ gm}^2 (12,250 \text{ gsf}). Consideration should be given to utilizing a combination of existing space, space vacated by Nursing, Pharmacy, and Animal Care when the new Professional Health Sciences Facility is built, plus new construction (excluding the new building being completed in 2014).

7.1.5 The School of Music at Memorial University of Newfoundland: The Case for Expansion

In a highly competitive university environment, excellent facilities are key to attracting students and research intensive faculty. This is no less true of the School of Music than other facilities on campus, but our facilities are exceptional in their level of public engagement. The School of Music has both a highly regarded educational program and a vital rehearsal and performance facility for professional and community groups in St. John’s. One cannot lose sight of the very conditions for excellence that have brought the School to such prominence in the community, in the province, and in Canada.

Originally built in 1985 for 120 students, the School of Music has long since exceeded the physical capacity of the M.O. Morgan building. It also relies on 279 m² (3,000 sf) of leased space in the Arts and Culture Centre and four faculty offices that are housed in the Science building. The expansion of Music Education programs (e.g., Music Education as a Second Degree) has resulted in severe limitations to the ability to schedule Music classes. For example, the laudable “lab band”
program run by the Faculty of Education provides an excellent jump start for grade five beginner band students, but it takes up prime afternoon teaching time and every single classroom and rehearsal space in the building two days a week in both fall and winter semester. The limitations of space have become the roadblocks to our capacity to innovate and expand our programs.

Meanwhile, the programming has significantly expanded. There are now three active research centres: the Music, Media and Place (MMaP), the Bruneau Centre for Excellence in Choral Music, and the International Institute for Critical Studies in Improvisation. One result of this research intensity is that the School has become a destination for externally funded postdoctoral fellows who then require at least minimum office space. The opera workshop now attracts undergraduate and graduate students capable of producing excellent, full-scale operatic productions--crucial training that places them in top-tier graduate programs and successful careers. With growth in the Master of Music programs, students scramble to find adequate time in practice rooms, and it is a challenge to accommodate rehearsals for all the small chamber ensembles. Crucial space at the Arts and Culture Centre (for the MMaP and Ethnomusicology graduate programs), generously provided by the Provincial Government, is vulnerable to reallocation for the government’s other needs and priorities, and is only secure until June 2016 when their current five-year lease ends. Finally, with significant externally funded research in digital music and telematics music technology, composition is a major growth area in the School. The Memorial Electroacoustic Music Research Laboratory (MEARL) is, for the moment, state of the art, but it is housed in a room that allows only a minimal number of workstations.

Each year the M.O. Morgan building hosts visitors from across the city and around the world, in addition to 250 faculty, staff, and students who rely on it daily to provide appropriate space for performance, rehearsal, and teaching. For the more than 30,000 visitors who come to us annually, the building is the public face of Memorial University. Whether hosting an alumni event such as the President’s Golden Reception (for alumni of 50 years or more) or providing the first public concert opportunity for a gifted child, the School of Music brands Memorial University as a vibrant cultural centre.

Between September and April, over 100 public events--performances, master classes, and lectures--are produced as part of the educational programming and Music@Memorial concert series. In addition, the School manages concerts, rehearsals, receptions, and lectures for a wide range of community users: Kiwanis Festival, Rotary Music Festival, Opera on the Avalon, Sound Symposium, Tuckamore Festival, Shallaway choirs, Cantus Vocum choir, and the Newfoundland Symphony Orchestra, to name just a few. The building has acquired the status of a major public facility in which more than twenty professional and community music organizations hold regular performances and rehearsals. The School of Music relies on the revenue from these bookings (about $90K annually) to support its educational operations.

The facility is overcrowded and deteriorating. There are chronic leaks in the roof (one over Cook Hall lobby, the other over the stacks in the Music Resource Centre). The linked lighting system in the D.F. Cook Hall and Suncor Energy Hall is obsolete and in critical danger of malfunctioning
during a public event. A critical issue also is the restriction on growth and excellence that accompanies this overcrowding. The need for expansion is longstanding.

It is envisioned that an expansion to the School of Music would include:

- a large percussion rehearsal and storage facility;
- an opera atelier;
- new space for the MEARL;
- 20 new practice rooms;
- 2 chamber music studios; and
- 20 new offices for faculty, postdoctoral fellows, staff, and graduate students.

This expansion would facilitate:

- Significantly expanded opportunities for professional development and high-end productions in Opera and Music Theatre
- The creation of a world-class, interdisciplinary traditional music program (in cooperation with Arts) that would make Memorial a destination for advanced study and research on fiddle, accordion, folk singing, and other Newfoundland heritage music
- The ability to expand applied music offerings to include jazz programming and attract a new range of undergraduate students
- The ability to expand composition and music research offerings to include recording, film music, music cognition, and innovations in music technology
- The creation of much needed practice rooms for non-Music students, who are nonetheless serious musicians, to practice and develop their art
- The development of a Preparatory School to build capacity in the community, to make a strong bridge for students preparing to audition, and to provide employment for Masters-prepared graduates of our program

The School of Music began almost 40 years ago. Through audacious vision, perseverance, and most of all the great love for music at the heart of Newfoundland and Labrador culture, it has become a mid-sized, excellent school that enjoys a solid national reputation, that places students in top-tier graduate programs, and that launches graduates on successful careers. However, it requires a significant investment in infrastructure.

7.2 Grenfell Campus

7.2.1 Land Acquisition
As Grenfell Campus moves to increase research and graduate programming in Agricultural Research, it is expected that a parcel of land that can be developed as an experimental farm will be required. Ideally, the property would be located in the Humber Valley between Corner Brook and Deer Lake. The cost is estimated at approximately $1.0 M.

7.2.2 Western Regional School of Nursing Consolidation (Current wording as per the Strategic Initiative 2013-2014 document)

A new governance model for nursing schools in the province is being considered. Under such a governance model, the Western Regional School of Nursing (WRSON) would consolidate with the Grenfell Campus of Memorial University to form a new School of Nursing (Grenfell). To facilitate the consolidation and relocation of the WRSON to the Grenfell Campus will require the construction of a new facility. The Nursing program is currently located within the Western Regional Hospital which provides administrative space, teaching and clinical areas, and a student residence. Students also take other university coursework at the Grenfell Campus. The future of the current location is in considerable doubt with the development of a new regional hospital. In anticipation of the need for a new facility, a functional space plan developed in the fall of 2012 to assess the future needs for Nursing, as well as any affiliated program requirements by Grenfell. The mid-range projection for space requirements predicted a facility of approximately 35,966 m² (118,000 sf) to support an expanded undergraduate class, Masters programs, research growth, and new outreach opportunities.

8.0 CATEGORY 4 - SELF-FUNDING PROJECT: THE BATTERY

The University acquired this St. John’s landmark in March 2013 following approval by the Board of Regents and the Provincial Government in accordance with the Memorial University Act. The government also approved the University’s expenditure of up to $16.0 M for renovations to the space. The building and operations will be cost-neutral to the University. Funding will be provided from redirecting lease expenditures for off-campus space, the endowment fund, and revenue generated from University activities at the facility.

Planning is an ongoing process, but as of this date, a number of Memorial units have been identified as likely tenants including the Harris Centre, Genesis Centre, Gardiner Centre, and Office of Public Engagement.

The Battery will also include residence space for Memorial graduate students. A detailed plan is being prepared for The Battery to finalize what units will move there and when. This will be followed by a call for tenders for the necessary renovations.

9.0 CATEGORY 5 - MARINE INSTITUTE (MI)

9.1 Campus Master Plan

The Marine Institute requires a campus master plan to guide development of its physical plant.
The Marine Institute Campus is comprised of the following facilities:

- **Marine Institute Main Campus - Ridge Road, St. John’s**
- **Fisheries Bio-Processing Facility - Mount Scio, St. John’s**
- **Holyrood Marine Base – Town of Holyrood**
- **Southside Marine Base – Pier 25, St. John’s Harbour**
- **Offshore Safety and Survival Centre (OSSC) – Foxtrap Access Road, St. John’s**
- **Safety and Emergency Response Training Centre – Stephenville Airport**
- **Lewisporte Regional Fisheries and Marine Centre – Town of Lewisporte**

The Marine Institute operates from leased facilities in Stephenville and Lewisporte.

This master plan would incorporate the Institute’s mission statement, vision and strategic plan all within the overall context of Memorial University’s Strategic Frameworks. The plan must take into account space needs for industrial training, academic programs, research activities site analysis, facility inventory, and land use. The plan must also take into consideration functional space considerations. Development guidelines and implementation strategies are to form an integral part of the plan. Enrolment projections are to be considered to ensure facility assets match changing demands.

The scope of the master plan development for the Marine Institute will, as a minimum, include the following tasks:

- Prepare an integrated campus plan for the facilities and properties of the Marine Institute for the creation of a distinctive, functional, leading and innovative research and academic institution

- Review the framework for strategic planning at the Marine Institute and provide recommendations to ensure that the master plan supports and aligns with MI’s future strategic direction

- Ensure physical changes to campus sites take place in keeping with a vision of the campus as a whole

- Ensure physical changes to campus sites factor in “best in class” sustainable design, LEED principles, and the greening of MI

- Plan development while working with the Institute and the external community, exploring opportunities, and providing a conceptual plan and timeline for development
• Evaluate transportation issues, develop transportation options between Ridge Road and the St John’s Campus and between Ridge Road and the other Marine Institute locations in the St. John’s area, and prioritize the options with order of magnitude costs associated

• Prepare for each of the locations which make up the Marine Institute Campus:
  ➢ A vision for the physical location including buildings, open space and landscape
  ➢ A list of development priorities and related implementation issues
  ➢ Options for real estate acquisition if required for future expansion
  ➢ A synopsis of parking issues and a strategy to address any concerns

Funds of $125,000, shared equally between MI and the central University budget, have been allocated to engage a consultant to prepare the Marine Institute master plan.

9.2 Main Campus (Ridge Road)

9.2.1 Transfer of Ownership (Operations/Deferred Maintenance/Renovations)

The Marine Institute (MI) Main Campus building is owned, maintained, and operated by the provincial Department of Transportation and Works (TW). For the years 2010/11 to 2012/13, TW’s average annual expenditure at the facility was $1,748,300; however, its building operations and security standards are not up to the level appropriate for a world-class post-secondary institution. Accordingly, the MI is seeking to have the MI building and land, along with TW’s budgetary allocations, transferred from TW to MUN. Additional capital funding is also requested to address deferred capital requirements.

TW utilizes a capital asset planning software, Renewal Capital Asset Planning Process (ReCAPP), as developed by Altus Capital Planning Solutions. This data should be compatible with Memorial’s VFA capital asset system as on July 6, 2012, VFA Inc. of Massachusetts announced that it had acquired the capital planning division of Altus Group Ltd. TW is currently in the process of organising its ReCAPP data for migration into the VFA data format.

Per ReCAPP, in 2013, the level of deferred maintenance listed for the MI Main Campus building totaled $7,614,683 with 26.5% (i.e., $2,019,709) being ranked by TW as medium priority and the remainder ranked as low priority.

As well, there are improvements required at the MI building. The MI building is only partially air conditioned and according to a recent energy audit conducted by consultants for TW, many of the air conditioning units in place at the MI contain refrigerants such as R-22 which are known to deplete the ozone layer. As well, some ventilation equipment is no longer operational. Additional air conditioning is required in order that the entire MI Main Campus building is air conditioned.

The building also requires accessibility improvements. In 2007, as part of its detailed space utilization assessment, Sheppard Case Architects Inc. recommended the addition of three elevators: one in the east wing; one in the west wing; and, another at the core, adjacent to the
existing elevator, to deal with the building population and configuration. The consultant also advised that a review of the National Building Code relative to the occupancy loads indicates a deficiency of washrooms. This work has not been initiated, and the need for these improvements continues.

9.2.2 Expansion – Engineering Technology Centre (ETC) Building (Operations/Deferred Maintenance/Renovations)

The MI building is completely utilized. The numbers of students and staff have significantly increased since 1985. The level of research activity at MI has increased dramatically. The College of the North Atlantic’s Engineering Technology Centre, which did not exist in 1985, utilizes 521 m² (5,600 sf) of dedicated office and classroom space along with 1,729 m² (19,600 sf) of part-time usage classrooms and laboratory/shop space at the MI.

A detailed space utilization assessment of the MI building, completed in 2007 by Sheppard Case Architects Inc., concluded that the MI required an increase in floor area of 19% (i.e., an increase of 5,008 m² (53,883 sf)) to meet the demand as it existed at that time. Demands from all activity areas have further increased since 2007. This is in part due to the loss of use of a 1,159 m² (12,470 sf) building on Mt. Scio Place which was torn down by TW in 2009.

Various options have been discussed with Government to address the additional space requirements at the MI Main Campus. The most attractive option to all stakeholders is to transfer the adjacent 30,801 m² (331,576 sf) College of North Atlantic ETC building and land, which is also owned, operated, and maintained by TW, to the University along with an appropriate funding allocation. Under this scenario, the ETC would continue to occupy the facility as a tenant of MUN until such time that its programs are relocated to an alternate location.

The proposed transfer will result in the need for additional expenditures for operations, deferred maintenance, and renovations. For the years 2010/11 to 2012/13, TW’s average annual expenditure on the facility was $688,000. TW’s ReCAPP system lists the magnitude of deferred maintenance on the facility to be $1,759,865 with 70.5% of this amount (i.e., $1,240,323) ranked by TW as medium priority and the remainder as low priority.

Improvements are required at the ETC building. The ETC building is fully air conditioned, but the air conditioning units use the refrigerant R-22, a chemical which is required to be phased out per Environment Canada. The estimated cost to replace the four existing cooling systems at the ETC with new units (which would not use HCFC’s) is $252,580 in 2012 dollars. As well, there will be a need to renovate the ETC to facilitate the MI’s use of the building. In 2012, the estimated cost of the renovation was $7,600,000.

9.2.3 Energy Audit

TW engaged the consultant firm of MCW Maricor of Moncton, New Brunswick, to carry out energy audits of a number of its facilities, including the MI and ETC buildings, Ridge Road. Their reports
make recommendations that concentrate on conservation measures to reduce electricity consumption and provide an assessment of the payback periods associated with implementation of these measures. The recommendations include measures such as replacement of all metric T12 lighting to T8, T5 or LED technology; implementation of heat recovery options for several air handling units; reduction of air leakage and moisture reduction through an air gap sealing program; and training of operations and building managers; etc. The project costs and the magnitude of potential savings are summarized in the Table which follows:

<table>
<thead>
<tr>
<th></th>
<th>MI</th>
<th>ETC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Projects Cost (No HST)</td>
<td>$2,123,079</td>
<td>$438,108</td>
</tr>
<tr>
<td>Estimated Annual Energy Savings</td>
<td>$126,719</td>
<td>$20,068</td>
</tr>
<tr>
<td>Simple Payback</td>
<td>16.8 yr.</td>
<td>21.8 yr.</td>
</tr>
<tr>
<td>Annualized Operations and Maintenance Cost Reduction (O&amp;M)</td>
<td>$11,670</td>
<td>$3,500</td>
</tr>
<tr>
<td>Simple Payback with O&amp;M</td>
<td>15.3 yr.</td>
<td>18.6 yr.</td>
</tr>
<tr>
<td>GHG Emission Savings in tonnes of CO₂</td>
<td>1,087</td>
<td>163</td>
</tr>
</tbody>
</table>

9.2.4 Offshore Operations Simulator

Risk to both equipment and personnel remains a significant concern for offshore operations due to the inherent nature of working in an ocean environment and the effect of external forces and actions on ships and structures that are in close proximity to each other. The positioning and mooring of offshore units and structures for drilling or production remains one of the most critical items in any offshore operation. These types of operations come with a considerable amount of risk, not only for the environment, but also for the crew onboard.

The latest generation of simulators can now replicate the working control systems and external forces of offshore vessels. These class-approved simulators can be used to deliver advanced and specific training dealing with the supply and support of offshore units and production platforms and for ice management programs. Company operating guidelines and procedures can be developed and rehearsed with the simulators acting as a tool for reinforcement, allowing appropriate training to be delivered to ensure continuity in crew competence.

The simulator will be a commercial, off-the-shelf product purchased through a tendering process based on a functional specification designed in part and approved by the industry participants. The simulator will be fitted on a motion platform and will also have a sophisticated visualization system. The successful vendor was Kongsberg Maritime Simulation. The cost for purchase, installation, and programming for the simulator is $4.4 million.

Although various options were considered to house the simulator, the only viable option that met all space requirements was to build a new addition adjacent to the Centre’s Full Mission Bridge (FMB) Simulator. Sheppard Case Architects have been selected to prepare the building design and
oversee construction. A tender call is scheduled for May 2014. The estimated construction cost is $2 million, with scheduled completion in winter 2015.

Funding for this initiative was sourced from industry ($4.4 million), Federal Government ($750,000), and the Provincial Government ($750,000).

### 9.2.5 Laboratory Health/Safety Upgrades

A number of Marine Institute laboratories (Chemistry, Bio-Chemistry, Food Analysis, and Biology) are equipped with fume hoods which were installed when the building was built in 1984. These fume hoods do not meet current standards and need to be replaced. The Marine Institute was not included in the Memorial University Plan for Laboratory Life/Safety Upgrades for St John’s and Grenfell Campuses because the MI Campus is owned by the Provincial Government.

In 2010, QuadraTec Consulting Engineers was engaged to review the fume hoods and ventilation system serving Laboratories E1319 and E1321. It is a central exhaust system serving five (5) chemical fume hoods and one (1) perchloric acid fume hood, along with three exhaust canopies in Labs E1319 and E1321, plus exhaust for Biology Labs E1187 and E1188 and ancillary areas. The fume hoods are the “Auxiliary Air” type which have both exhaust and supply connections and were originally designed to operate at either high or low speed as selected by the operator.

The cost of upgrading this part of the system was estimated at $275,000 plus taxes. A full review of all fume hoods and exhaust systems and a plan to remediate are required.

### 9.2.6 Lab/Shop Technology Renewal

In the thirty years since the Marine Institute’s Ridge Road Campus was constructed, there have been various upgrades of specific equipment and facilities, but in the absence of a comprehensive planned investment in technology, the laboratories and shops are generally out of date. In many laboratories and shops, the equipment dates back to the 1980’s. This is not acceptable for an institute of technology, particularly one which purports to become “a world’s ocean institute setting the standard for education and training”. This situation must be addressed to enable the Marine Institute to properly prepare its students to work in the fast changing world oceans economy.

The Provincial Government has recognized this issue and in its three-year base budget adjustment for the Marine Institute has provided funds to support the renewal and maintenance of the technology infrastructure critical to education, training, and research at the Institute.

As part of the campus master plan exercise, the Marine Institute will develop a multi-year plan for Laboratory and Shop renewal.
9.2.7 Cafeteria Enhancement

In 2013, Food Systems Consulting Inc. completed a high level facility review to layout options for the redevelopment of Marine Institute cafeteria spaces.

The vision for café spaces is to support the academic and social needs of the student body by becoming an extension of the classroom, a place to do group work, socialize, and reenergize while remaining flexible enough to accommodate catering.

The findings were that food services at the Marine Institute are well managed, with a diligent focus on customer service balanced with an eye toward cost control. However, changes to the physical spaces must be aligned with the operating practices of food services, while maintaining a “students first” mindset and significant investment is required to upgrade the 1980’s era facility.

A number of specific operational and facilities related recommendations have been made. A sketch of the flow and location of the specific recommendations has been provided. The budget estimate, excluding the cost of disconnections, reconnection, freight and delivery, and set in place, was $359,000.

9.2.8 Parking Lot

Currently, the Marine Institute has 282 parking spaces in Parking Lot M1 for approximately 1,000 students plus various numbers of clients in industry courses and workshops, and another 147 parking spaces in Parking Lots M2 and M4 for over 300 faculty and staff.

The Pippy Park Commission has rejected requests to expand existing parking lots except for a small, expensive expansion below the current parking lot. At $660,000 for 77 parking spaces, this option was deemed too expensive to proceed.

Currently the Institute and Pippy Park are investigating the potential to expand the existing Golf Driving Range parking lot. The concept is to expand the lot to accommodate 70 cars. The preliminary cost estimate is $250,000.

9.2.9 Human Elements Laboratory for Marine Safety (HELMS) Building

The proposed Human Elements Laboratory for Marine Safety (HELMS) would be the first of its kind in Canada at this scale, versatility, and application. It would be housed primarily at the Marine Institute (MI) with smaller satellite research hubs in each of the partner centres (for example, Faculty of Medicine’s Human Experiential Learning, Performance, and Safety Lab), as well as a mobile research unit on an offshore facility (i.e., ship) for testing transfer from terrestrial to offshore environments.

The concept is an open-frame structure 10 m long x 4 m wide x 6 m high mounted on a 6 degree of freedom motion base. The open-frame structure concept is key to the versatility of the facility as it would enable the use of a wide range of customizable panels to be attached/removed to create the physical environment being simulated (passageway on a ferry or cruise ship, work deck
of a supply ship, or helicopter fuselage for instance). The facility will be outfitted with an array of kinematic, kinetic, and physiological sensors for measuring human performance and physiological response over a range of conditions and scenarios. The area surrounding the motion platform would contain a 360° projection system, surround sound, full lighting and visibility control (to simulate darkness or smoke in evacuation scenarios, for instance) and would be equipped with a climate control system capable of a range of temperatures, humidity levels, wind, and precipitation. An adjacent office and workshop area would be designed to house researchers, graduate students, and technical/maintenance personnel.

The preliminary cost estimate for the building expansion is $3.1 million and the cost estimate for purchase and installation of the simulator technology is $3.0 million. Funding is not approved for the project however an application is being submitted for funding through the Canada Foundation for Innovation.

9.2.10 Centre for Fisheries Ecosystems Research (CFER) Lab

To address the need for enhanced fisheries research capacity in Newfoundland and Labrador, the Marine Institute, with funding support from the Government of Newfoundland and Labrador, created the Centre for Fisheries Ecosystems Research (CFER) on July 2, 2010.

In its efforts to meet its mandate, CFER has grown significantly both in its number of employees and in its research activities. Since July of 2010, CFER has grown from one (1) Research Scientist and four (4) graduate students to a comprehensive unit of six (6) Research Scientists, five (5) Research and Technical Personnel (RTP), five (5) Post Docs, twenty-two (22) graduate students, and an Administrative Director and Administrative Assistant.

Since CFER was created in 2010, lab work has increased dramatically with the number of samples that need to be analyzed for CFER core research programs (such as the Celtic Explorer survey) and graduate student projects. This has made this lab space outdated and too small to enable CFER to carry out its research mandate. CFER will require a new lab with new equipment and will need to be large enough to accommodate our current complement of projects and students but also permit CFER to grow with the new graduate program.

**Estimated Space Required:** 36ft X 24ft. This will include an open concept space for benches and will include two rooms that will be separated and vented for storage of chemicals and for otolith processing.

**Equipment and Renovation Cost Estimate** The preliminary cost estimate is $500,000 assuming that appropriate space for development can be found at the campus. Funding is available from the CFER project fund.

9.3 Southside Marine Base

In 2013, the Marine Institute started the process of transferring the at-sea component of its safety and survival training from the Southside Marine Base to the Holyrood Marine Base. This move has been very
successful in reducing lost time due to weather because of the very sheltered area at Holyrood versus the open North Atlantic outside St John’s Harbour.

In conjunction with development of Phase II of the Holyrood Marine Base, the Marine Institute then wishes to consolidate all at-sea activities at that site. If this occurs, then the Southside Marine Base would be available for repurposing or sale.

9.4 Holyrood Marine Base

9.4.1 Phase IIA – Breakwater and Marginal Wharf

The Marine Institute is presently in the process of developing a functional marine base at the South Arm of Holyrood Bay. The South Arm is approximately one nautical mile long and a half nautical mile wide and lies at the end of the north-south oriented and five nautical mile long Holyrood Bay that opens off Conception Bay. As such, north and northeast winds and storm surges can generate waves in excess of 1.5 metres along this shore.

The proposed solution is to construct a hockey stick shaped breakwater/wharf with the blade tip pointing south and breakwater on the north side in common with the berths and harbour on the south. The total berth length is about 90 metres with depths below low water ranging from 3 to 7 metres. The average tide at Holyrood is about a metre, with the maximum being 1.42 metres.

The mission critical capabilities provided in this component of the Phase II development include:

- The ability to station and mobilize larger research and training support platforms on site
- Protection of shore based assets from waves and storm surge associated with extreme weather conditions
- Ability to deploy equipment and personnel that would otherwise be preempted by inclement sea conditions
- Increase the utility of the water lot; the sheltered basin would allow small vessels, prototype vehicles, and platforms to be operated and tested in situ without threat of disruption by wind conditions and sea state
- Enable personnel to conduct cold water survival training and research exercises with the protection afforded by the breakwater and wharf

In July 2013, the Marine Institute’s consulting engineers, SNC Lavalin, provided detailed drawings and tender ready documentation for the installation, including a Class A Estimate for the proposed work. The total project cost inclusive of project management fees and taxes is $8,452,822.62 ± 15%.

9.4.2 Phase IIB – Oceans Research and Training Building

The Marine Institute has completed due diligence and advance planning for Phase IIB at Holyrood Marine Base (HMB). Through numerous in-house consultations with stakeholders, internal users, the research community, the private sector, and the local community, the Institute was able to
provide consulting engineers and architects with the material to input in a site concept that addresses both functional and aesthetic components.

This project component involves a scale up of shore-based facilities and is comprised of a 3,716 m² (12,191 sf) main complex for research and teaching. Sheppard Case Architects were engaged in the fall 2011 to develop a preliminary design for the main building complex.

A summarized overview of the main complex attributes is provided below:

- Large high bay 3,500 ft² workshop with 16’ overhead doors and wharf access suitable for repair and maintenance of large platforms and equipment
- Seven 400 ft² shops with overhead doors and wharf access, to be used for electrical and mechanical activity in support of researchers and companies
- Two dry laboratories for electronic and computer activity
- One classroom with 25 student capability, one 75 person lecture theatre
- Interpretation/display area and small coffee shop
- Three meeting/conference rooms
- Office space for 45 people and ancillary washroom, storage, and mechanical spaces

The primary capability provided by Phase IIB is support of research and training on site. The proposed infrastructure would see the facility’s shops and labs used in support of research and development activity in ocean observation, ocean instrumentation, underwater vehicles, and ocean mapping. Research activity is presently being undertaken at the HMB by a range of graduate students in Engineering and Science, and this would be expanded to include graduate students from anticipated research-based Masters and PhD. programs at the Marine Institute. HMB will serve as the staging area for ocean technology and oceanographic missions conducted under contract for local industry and government as well as in support of research within Memorial University. The HMB facilities will attract visiting scientists to come to Newfoundland and Labrador to conduct collaborative research with local University scientists.

The estimated cost to construct the Oceans Research and Training building is $18.0 M.

### 9.4.3 Upgrade of Existing Wharf and Relocation of Evacuation Systems

The existing wharf at the Holyrood Marine Base was transferred to the University in 2008 from the Small Crafts and Harbours Directorate of the Department of Fisheries and Oceans. The wharf is usable for small craft operations but would need significant upgrading to allow relocation of the marine and offshore petroleum industry evacuation systems currently located at the Southside Marine Base.

SNC Lavalin estimates that the cost to upgrade the existing wharf to accommodate the evacuation systems would be $2.8 M.
9.4.4 Land Acquisition

The current parcel of land at Holyrood is sufficient for access to the sea; however, consideration should be given to acquiring additional land for the potential future ancillary buildings for the Marine Base. This land might be sourced from Crown Lands or the Municipality.

The Town of Holyrood has already made provision in its municipal plan for potential development of an oceans technology industrial park.

9.5 Mt Scio

9.5.1 Parking Lot and Access Road

The Bio-processing facility at Mt. Scio is accessed via a gravel roadway that is in a continuous state of disrepair. A one-time expenditure to pave the access roadway and parking area will reduce ongoing maintenance issues and cost. An estimate of this work is not completed to date.

9.5.2 Lab/Office Building Renovations

The Media Services facility is presently undergoing alterations to create lab/office space.

9.6 Foxtrap – Offshore Safety & Survival Centre

9.6.1 Transfer of Ownership(Operations/Deferred Maintenance/Renovations)

The Marine Institute’s Offshore Safety and Survival Centre (OSSC) is owned, maintained, and operated by the provincial Department of Transportation and Works (TW). In order to achieve its Vision 2020 Strategic Plan, the MI is seeking to have the OSSC facility and land in Foxtrap, along with TW’s funding allocation, transferred from TW to MUN. For the years 2010/11 to 2012/13, TW’s average annual expenditure at the facility was $705,800.

TW’s ReCAPP system lists the magnitude of deferred maintenance on the facility to be $741,034 with 39.6% of this amount (i.e., $293,140) ranked by TW as medium priority and the remainder as low priority. It is important to note that TW’s list focuses on building components rather than “teaching aides”. Accordingly, TW’s list does not include deferred maintenance for the fire field at the OSSC. Many of the components as erected on the fire field require significant repair and/or replacement.

The Fire Field building is in need of significant upgrade and a possible expansion. Its initial design failed to consider the need to train both male and females. This necessitated a later alteration of the original washroom, showers, and change room to divide it to serve both male and females. The resultant layout of the female washroom, shower, and change room as it now exists is barely functional and needs improvement.

There are also other improvements which are required. Oil contaminated water is retrieved from the fire field and processed through the pollution control building. Waste oil which may be
reburned is skimmed off and sent to an underground steel tank adjacent to the fire field which has been in place since 1992. Based on the age of the tank, its current condition is suspect and it requires replacement.

As well, per the nature of its design, should very high runoff be experienced at the fire field and the capacity of the pollution control building be exceeded, the material will be spilled. Further review is required to ascertain the magnitude of environmental issues or cost implications.

9.6.2 Energy Audit

TW engaged the consultant firm of MCW Maricor of Moncton, New Brunswick, to carry out energy audits of a number of its facilities, including the OSSC in Foxtap. Their reports make recommendations that concentrate on conservation measures to reduce electricity consumption and provide an assessment of the payback periods associated with implementation of these measures. The recommendations for the OSSC include measures such as a lighting retrofit and replacement, a building automation system upgrade, and an air gap sealant program. The project costs and the magnitude of potential savings are summarized in the Table which follows:

<table>
<thead>
<tr>
<th></th>
<th>OSSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Projects Cost (No HST)</td>
<td>$222,351</td>
</tr>
<tr>
<td>Estimated Annual Energy Savings</td>
<td>$18,124</td>
</tr>
<tr>
<td>Simple Payback</td>
<td>12.3 yr.</td>
</tr>
<tr>
<td>Annualized Operations and Maintenance Cost Reduction (O&amp;M)</td>
<td>$1,920</td>
</tr>
<tr>
<td>Simple Payback with O&amp;M</td>
<td>11.1 yr.</td>
</tr>
<tr>
<td>GHG Emission Savings in tonnes of CO2</td>
<td>176</td>
</tr>
</tbody>
</table>

9.6.3 Ship Structure Upgrade

The simulated ship structure is 25 feet wide by 56 feet long and primarily constructed from steel with both steel and concrete floors. The structure is two stories with both roofs accessible. The structure’s columns and beams consist of various I-beams, angles, and C channels. The walls and roofs are steel plates of varying thickness. It has special features representative of ships and is used for marine emergency safety training for mariners.

The ship structure was built in 1984. This structure has deteriorated significantly and requires either extensive repair or replacement. The structure is not currently in use, but a recent Transport Canada audit of regulated safety programs identified that the structure capacity is required to deliver the programs.

The cost demolition and erection of the north end of the mock ship train facility is estimated to be $750,000 +/- 25% to complete both the lower and upper levels of the mock ship. It is estimated that the overall cost would be reduced by approximately 25% if completing the lower level on the
9.6.4 Helideck Simulator

Offshore Installation Managers are required to practice and demonstrate their ability to command and control major emergencies on their platforms. One of these is an emergency on the helideck involving a crew change helicopter. As the sole provider of offshore helideck emergency response training in Newfoundland and Labrador, the proposed construction of a purpose-designed offshore helideck live firefighting facility will further augment the Offshore Safety and Survival Centre’s ability to deliver effective and relevant helideck emergency response training to the expanding offshore oil industry.

Landing and servicing large crew change helicopters on offshore helidecks is a daily occurrence on most offshore facilities. Due to the isolation of these facilities, it is required that a trained emergency response team be in place for all takeoff and landings. The intent of this facility is to provide a realistic venue for those personnel to practice helicopter firefighting and rescue techniques that would be required should an emergency occur on their platform.

The proposed helideck simulator consists of a scale-built landing surface complete with safety netting, fire monitor system, and a 10m diameter burn pan. Inside the burn pan there is a detailed scale model of an offshore crew change helicopter. This will allow instructional staff to create live fire scenarios that would be representative of the fire and rescue potential on an offshore helideck.

Engineering drawings and the tender package was completed in 2013 through a project funded by ACOA. Funding of $600,000 would need to be sourced to complete this project.

9.6.5 Helicopter Refueling Simulator

It is proposed to purchase and install a Helicopter Refueling Simulator at the OSSC fire field in Foxtrap. This simulator has been identified by the offshore petroleum industry as an important training aid for a very high risk activity which occurs daily on the offshore rigs.

The estimated cost of the project is $200,000. Funding would be sourced from the offshore petroleum industry.

9.6.6 Inventory Trailers

Trailers were installed over ten years’ ago adjacent to the fire field building to store inventory related to course delivery such as student safety equipment. Mould was identified in trailers in 2012 and the trailers were closed. Currently the inventory is being held in a converted classroom.

The University’s Department of Health and Safety and the OSSC’S Occupational Health and Safety Committee, as well as the Provincial Office of Occupational Health and Safety have all been involved in this issue over the past year. It is critical that these units be replaced.
The estimated cost to replace these units is $160,000. If the consolidated storage facility is built at Foxtrap, then this expense might be avoided by moving some larger equipment to the storage building and utilizing existing space for inventory.

9.6.7 Command and Control Trailers

The Marine Institute leases, at cost of $53,500 per year, a complex of trailers located adjacent to the rig structure for use in Command and Control Training for Hibernia Management Development Corporation (HMDC). This complex is no longer adequate for the training program and is an impediment to obtaining additional training for White Rose and Terra Nova oil fields.

It is proposed to purchase and install a complex to modular building adjacent to fire building designed specifically for the Command and Control Training. In 2013, Fougere Menchenton Architects were engaged to undertake preliminary design. They determined that the cost of a modular building would be $488,000 plus substructure, site development allowances, and taxes for a total cost of $997,000. A similar conventional framed building would cost $1,170,000.

Funding for this initiative would be through lease savings and revenue for additional courses for other offshore operators.

9.7 Stephenville Emergency and Response Training Centre (SERTC)

9.7.1 Relocation of Launching System

The Marine Institute has a lifeboat launching system located at Port Harmon. The owners of the Port have advised that they will be requiring that the launching system be moved.

The launching system is valued at about $250,000 and installation is estimated at $80,000. A decision will need to be made whether to relocate the system at Port Harmon or to move the system to another location.

9.7.2 Upgrade of Facilities

The Marine Institute leases two buildings from the Stephenville Airport Corporation to house SERTC employees, classrooms, and equipment. These buildings date back to the 1940’s and are generally in poor shape. There is also the very high likelihood of hazards such as asbestos and lead based paints.

A long term plan for facilities at Stephenville needs to be developed with the Stephenville Airport Corporation.

9.8 Storage

9.8.1 Consolidated Storage Building
The Marine Institute has experienced dramatic growth since 2005, when Vision 2020, the vision for the Marine Institute of the future, was launched.

The expansion of programs, as well as the loss of a storage building on Nagle’s Hill which was torn down by TW due to mold issues, has increased the need for storage space for boats, equipment, materials, and documents. To meet its storage needs, the Institute is leasing storage units and buildings in a number of locations in and around St. John’s. Currently, 680 m² (7,320 sf) of space is being leased at an annual cost of $107,802 (HST included). Additionally, there are other materials and documents stored within the Marine Institute and at TW facilities in Pleasantville.

The MI’s requirement for document storage may be met by utilizing the University’s proposed storage facility for Mt Scio. However, the MI will still require a consolidated storage facility to meet its current and emerging storage requirements, particularly for storage of boats and associated marine equipment such as nets, chains, buoys, and anchors.

A location at the OSSSC in Foxtrap has been identified and some preliminary engineering completed. Preliminary estimates by an Architectural Consultant have indicated that a structure of approximately 929 m² (10,000 sf) could be constructed for a cost in the range of $1.3 million. However, this estimate excluded design fees, fencing of an outside storage yard, the acquisition cost of storage racking and lift equipment, and HST. Once these items are considered, the total project cost is expected to be approximately $1.8M.

### 9.9 Vessel Fleet

Memorial University’s current sea going capability is largely the vessels operated by the Marine Institute.

The Marine Institute vessel fleet is comprised of the following:

- **M.V. Anne S. Pierce**
  - The Anne S. Pierce is a 35.5 meter, single screw, steel research and training vessel purchased by the Marine Institute in 2006.

- **M.V. Shamook**
  - The M.V. Shamook (2013-02) is a 24.9 metre (81’) steel, single screw former small research vessel acquired under charter from Fisheries and Oceans Canada in March 2013.

- **M.V. Atlanticat**
  - The M.V. Atlanticat is a 19.7 metre (65’) twin screw, aluminum wave-piercing catamaran built as a prototype fishing vessel for the Newfoundland and Labrador Inshore fishery.

- **R.V. Gecho II**
  - The R. V. Gecho II is a 9.75 metre (32’) Fibreglas Reinforced Plastic (FRP), decked inshore research vessel custom built in 2009 and equipped with twin 150HP Mercury outboard engines.

- **Narwhal**
  - The Narwhal is a 38’ larger Fast Rescue Craft (FRC) type rigid inflatable boat equipped with 2@90HP Mercury marine outboards.

- **Small Support/Auxiliary Boats**
BOSR Support Boat – The BOSR vessel is a 6.7 metre (22’) aluminum custom built platform for oil spill response training programs equipped with twin 50 HP Mercury Outboards.

Gecho – The Gecho is a 22’ decked Fibreglas Reinforced Plastic (FRP) vessel equipped with 2 @70 HP Johnson outboard engines.

Various zodiac and small speed boats.

- Special Purpose Training Boats
  - Six Fast Rescue craft – four different models of Zodiac type fast rescue craft with twin Mercury outboard engines or inboard diesel jet drive propulsion systems
  - Four enclosed lifeboats – two models of Schat Harding type Totally Enclosed Lifeboats (TEL).

In addition to the above, the Marine Institute has an annual charter arrangement with the Irish Marine Institute for the large (65m) offshore research ship Celtic Explorer. The Celtic Explorer charter cost is about $1 million for 35 – 40 days charter each year. The charter is used by the Centre for Fisheries Ecosystems Research to undertake offshore fisheries surveys and sampling.

The Marine Institute also periodically charters commercial fishing vessels to undertake fishing gear analysis and/or sample fishing for new species. These charters are typically for nearshore fishing vessels (10 – 20m).

9.9.1 Offshore Multi-Disciplinary Research Ship

As part of its funding agreement with the Government of Newfoundland and Labrador for the establishment of the Centre for Fisheries Ecosystems Research (CFER), the Marine Institute committed to conducting a thorough assessment of acquiring a multidisciplinary offshore research vessel, similar to the Irish Marine Institute’s RV Celtic Explorer, for long-term application following the initial three years of charter time outlined in the funding agreement.

A request for proposal (RFP) to conduct this assessment was advertised Canada wide through MERX and closed on October 31, 2011. The successful consultant was Tactical Marine Solutions (NL) (TMS).

Based on the analysis completed by TMS, there are two viable options for procuring a research vessel:

- **Build Option**
  Costs for building the vessel are estimated to be between $50-70 million CAD with a timeframe of 18 months to 2 years.

- **Charter Option**
  Costs are estimated at $2.5 million per year, this would provide approximately 100 days of ship time at an estimated $25,000 per day.

A briefing paper outlining the above “Options for Long-Term Access to an Offshore Research Vessel” was submitted to the Government of Newfoundland and Labrador in November 2012 and is currently under consideration.
9.9.2 Nearshore Multi-Purpose Research/Training Ship

The Marine Institute requires a multi-purpose research and training (30 – 40 meter) ship to meet the following mission critical needs:

- **At-Sea Training for Nautical Cadets** – students in the Nautical Science Diploma Program and the Bridgewatch Certificate Program require dedicated time on a training ship bridge as part of their programs;
- **At-Sea Training for Marine Engineering Cadets** – students in the Marine Engineering Diploma Program and the Marine Diesel Certificate Program require dedicated time in the engine room of a training ship as part of their programs;
- **At-Sea Training for Ocean Technology Students** – students in Ocean Mapping, Ocean Instrumentation and Remote Operated Vehicle Programs require dedicated time on a training vessel as part of their programs;
- **Ocean Technology Research** – The Centre of Applied Ocean Technology (CTEC) and companies in the ocean technology sector require a ship to undertake testing of new ocean technology which they are developing;
- **Ocean Mapping** – CTEC undertakes ocean mapping, both as a part of its own research program as well as in support of industry;
- **Ocean Monitoring** – CTEC’s major ocean monitoring program, SmartBay, operates a system of buoys in coastal Newfoundland which require a ship for buoy tending.

Over the past five years, the Marine Institute has used two vessels to address this need:

- **M.V. Anne S. Pierce**
  The Anne S. Pierce is a 35.5 meter, single screw, steel research and training vessel built in 1982 and purchased by the Marine Institute in 2006. Since that time the ship has been the primary training vessel for the Marine Institute. The vessel was converted in the summer of 2013 for additional use related to seabed mapping and support for SmartBay activities. The vessel has been well maintained but its age and configuration are limiting for the multiple training and research activities required by the Marine Institute.

- **F. V. Atlanticat**
  The F. V. Atlanticat is a 19.7 metre (65’) twin screw, aluminum wave-piercing catamaran built in 2002 as a prototype fishing vessel for the Newfoundland and Labrador Inshore fishery. The Atlanticat was used for ocean mapping activities in 2010-2012 and was intended to be lengthened to enhance sea keeping and ability to undertake buoy tending. However, detailed review of the vessel by naval architects, including catamaran specialists, determined that planned modifications to the general arrangements and lengthening of the vessel (for the purpose of extending its range and capability in the offshore) would be prohibitively costly – up to $2.5 M without guarantee of success. The situation was further exacerbated
by inflation in the current marine service/shipyard market and Transport Canada mandated revisions relating to changing vessel class.

In 2013, the Marine Institute engaged Tactical Marine Solutions to undertake a prefeasibility study on options for a nearshore, multi-purpose training and research vessel. They determined that: (i) there are existing designs for vessels which could meet Marine Institute needs; (ii) that the estimated cost for a new build based on a working concept similar to a 30 - 35 metre modern small offshore supply vessel with aft working deck space, cranes, and winches is $18 M, and (iii) that there is an ample supply of recent vintage (2005+) vessels as described in (ii) available on the international used boat market at a cost of $7-$10 million.

It is proposed that the Marine Institute proceed with plans for acquisition of a new or used nearshore, multi-purpose research and training ship. This plan would include disposal of the F.V. Atlanticat in 2014, identification of capital funding in 2014/15, purchase/build of ship in 2015/16, and the disposal of the M.V. Anne Pierce in 2016/17.

9.9.3 Nearshore Training Vessel

The Marine Institute requires a medium sized (25 – 30 meter) ship to support ongoing marine and offshore safety and survival training. This training involves some 2,000 personnel per year including students in Marine Institute education programs such as Nautical Science, Marine Engineering, and Ocean Technology.

The former CGGS Shamook is a 23.2 meter vessel built in 1975. It was used by the Department of Fisheries and Oceans (Newfoundland Region) until 2012 as a research platform for a wide range of fisheries and oceanographic research.

In March 2013, the Marine Institute concluded an agreement with the Government of Canada to lease the former CCGS Shamook for an initial nine-month period at a cost of $1. The Shamook was outfitted by the Marine Institute during the summer of 2013 and alterations made to meet Transport Canada’s requirements to move to “cargo” vessel class which is needed to undertake training activities. The vessel has been used since September to support ocean safety training exercises operating from the Holyrood Marine Base. The performance of the vessel has been superior in this role and has enabled the release of the Anne Pierce for ocean mapping activities.

In November 2013, upon request of the Marine Institute, the Government of Canada approved extension of the lease agreement to December 2014 under the same conditions.

An independent Condition and Valuation Survey of the Shamook by Allswater Martine Consultants determined that the vessel was in overall good condition. A valuation survey of the vessel by the same firm concluded the March 2013 value of the former CGGS Shamook to be $160,000.

Discussions with Canadian Coast Guard (CCG) officials have indicated that they would not wish to continue leasing the vessel past 2014 but that they are open to an offer to purchase the vessel. It would be expected that a proposal in the $50,000 to $70,000 range would be acceptable.
It is proposed that the Marine Institute commence negotiations with CCG towards concluding an agreement to purchase the former CCG Shamook.

9.9.4 **Inshore Research/Training Vessels**

The Marine Institute has a need for two inshore research/training (8 – 10 meter) vessels. One vessel is needed to support inshore fisheries and ecology research primarily undertaken by the Centre for Fisheries Ecosystem Research. Currently, this role is filled by the R. V. Gecho II, a 9.75 metre (32’) Fibreglas Reinforced Plastic (FRP), decked inshore research vessel equipped with twin 150HP Mercury outboard engines. The Gecho II is a highly sophisticated inshore fisheries research vessel custom built for the Centre for Fisheries Ecosystem Research (CFER) to conduct research in coastal bays with unique habitats, inshore spawning, and nursery habitats. Its availability to other users is tightly controlled because of the sensitive and expensive scientific equipment carried.

A second vessel is required to support activities of multiple users at the Holyrood Marine Base. The base provides internal and external clients with support vessels to use in Holyrood Harbour and Conception Bay for ocean technology equipment trials, shadowing AUVs/ROVs, and support for a variety of academic and training programs.

Purchase of a new vessel similar to the Gecho II will cost $125,000.

9.9.5 **Specialized Training Boats (Offshore Safety and Survival Centre)**

The Offshore Safety and Survival Centre (OSSC) offers a comprehensive range of safety and emergency response training courses to the offshore petroleum, marine transportation, fishing, and land-based industries.

Important elements of these programs are mock marine emergency exercises conducted in Freshwater Bay outside St. John’s Harbour or at Holyrood Arm, and include:

- ship muster and abandonment drills, where clients plunge from the deck of the support ship in immersion gear, assemble, interlock and maneuver as a group in-water;
- life raft deployment, capsize, and boarding from in water; and,
- re-entering the support ship by means of a Jacob’s Ladder or scramble net.

Clients are also trained as coxswains in the operation of fast rescue craft, lifeboats, and their respective launching systems.

The exercises require a variety of emergency and support vessels, which depend on the specific model of the Safety of Life at Sea (SOLAS) certified equipment at client installations. Consequently, the OSSC maintains six (6) FRC’s (i.e. four (4) different models of Zodiac type fast rescue craft) and two (2) models of Schat Harding type Totally Enclosed Lifeboats (TEL) in providing Basic Survival Training (BST), Offshore Petroleum Industry Lifeboat Coxswain (OPILC) and Fast Rescue Craft Coxswain Training courses.
The boats described below have been acquired by the OSSC over the past number of years, either through existing procurement mechanisms or through donation of surplus equipment from industry/DFO/CCG:

**Fast Rescue Boats**

1. Zodiac 749 (diesel jet drive), age 13 years – replacement in 1-4 years, version of motor no longer made, parts difficult to source.
2. Zodiac 749 (diesel jet drive), age 4 years – replacement in 5 - 9 years.
3. Zodiac 733 (2x150 Hp outboards), age 8 years – replacement in 5-9 years.
4. Zodiac 590 (2 x 50 Hp outboards), age 20+ years - obtained from CCG prior to 2002, replacement in 1 – 4 years.
5. Zodiac 640 (diesel outdrive), age 20+ years - obtained from CCG in 2004, replacement in 1 – 4 years.
6. Norsafe Merlin (diesel jet drive), age 8 years - obtained from Husky in 2013, unknown at this time if serviceable, or for what period of time.

**Life Boats**

1. Schat Harding MCB24 totally enclosed lifeboat (TEL) – age 13 years
2. Schat Harding MCB24 TEL with bow thruster – age 7 years
3. Open lifeboat and davit – unserviceable – to be removed from embarkation deck at Southside Marine Base at earliest opportunity
4. Whittaker TEL and davit – age unknown (prior to 2002) – unserviceable – has not been used since prior to 2002.

OSSC personnel are currently preparing a long-term strategy for maintenance and replacement of specialized fast rescue craft and lifeboats. Notwithstanding this effort, there is a requirement to replace one fast rescue craft in 2014/15 and one in 2015/16 each at a cost of $300,000 each.
# APPENDIX 1

## Five-Year Capital Deferred Renewal Plan

<table>
<thead>
<tr>
<th>Discipline Breakdown</th>
<th>CDRP Year 14/15 $</th>
<th>CDRP Year 15/16 $</th>
<th>CDRP Year 16/17 $</th>
<th>CDRP Year 17/18 $</th>
<th>CDRP Year 18/19 $</th>
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</thead>
<tbody>
<tr>
<td>Architectural &amp; Civil Priorities</td>
<td>13,502,000</td>
<td>10,831,800</td>
<td>13,655,500</td>
<td>15,487,900</td>
<td>13,236,600</td>
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<tr>
<td>Mechanical Priorities</td>
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<td>9,602,000</td>
<td>7,365,000</td>
<td>7,270,000</td>
<td>8,475,000</td>
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<tr>
<td>Electrical Priorities</td>
<td>6,986,000</td>
<td>5,310,000</td>
<td>7,655,000</td>
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<td>Central Utilities Priorities</td>
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<td>3,520,000</td>
<td>377,900</td>
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<td>Grenfell Campus Priorities</td>
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<td>Harlow Campus Priorities</td>
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<td>663,000</td>
<td>1,800,000</td>
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<tr>
<td>Totals</td>
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<td>32,606,300</td>
<td>31,915,650</td>
<td>31,878,900</td>
<td>31,044,400</td>
</tr>
</tbody>
</table>

*Battery Facility Priorities* | 1,586,000 | 1,610,000 | 1,000,000 | 1,675,000 | 800,000 |

*Separate funding source for the Battery Facility for deferred maintenance work. Not included in above totals.*

Note: Due to expenditures of the past three-year plan of $8.0 M/year, the funding required to achieve an FCI of 12% in 15 years has been reduced from $32.0 M to $26.0 M per year.
APPENDIX 2

Asset List Report by Campus
Corner Brook Campus

Reporting Currency: CAD
Adjustment Factor: 0.95

Region Name: ALL REGIONS
Campus Name: Memorial University of Newfoundland - Corner Brook

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>Asset</th>
<th>Age</th>
<th>Use</th>
<th>Size (sq ft)</th>
<th>Replacement Value</th>
<th>PCI Cost</th>
<th>PCI Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts &amp; Sciences</td>
<td>Multipurpose Room</td>
<td>38</td>
<td></td>
<td>188,500</td>
<td>61,751,760</td>
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<td>Chemical Storage</td>
<td>Storage - Reel and Film Materials</td>
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<td>Classroom / Training</td>
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<td>Forest Centre - Storage Building</td>
<td>Storage - General</td>
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<td>Maintenance Shed</td>
<td>Storage - Vehicles</td>
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<td>Asset</td>
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<td>Use</td>
<td>Size</td>
<td>Replacement Value</td>
<td>PCI Cost</td>
<td>PCI</td>
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<td>---------------</td>
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<td>-------------------</td>
<td>----------</td>
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</tr>
<tr>
<td>SWGC - Chalet #1</td>
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Subtotal for Building: **418,131**

| Campus Name: Memorial University of Newfoundland - | 124,485,812 | 36,654,038 | 0.21 |


### Off-Campus Properties

**Reporting Currency: CAD**

**Region Name: All Regions**

**Campus Name: Memorial University of Newfoundland - Off Campus Properties**

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<th>Asset Type: Building</th>
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<th>Date</th>
<th>Size</th>
<th>Replacement Value</th>
<th>PCI Cost</th>
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<td>Size</td>
<td>Value</td>
<td>PCI Cost</td>
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**Total Cost:** 251,526

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**St. John's Campus**

**Asset List Report**  
*By Name*

**Reporting Currency: CAD**  
Adjustment Factor: 0%

**Region Name: ALL REGIONS**

**Campus Name: Memorial University of Newfoundland - St John's**

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<tr>
<th>Asset Type</th>
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<th>Use</th>
<th>Size</th>
<th>Replacement Value</th>
<th>PCI Cost</th>
<th>PCI</th>
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## Asset List Report
### By Name

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<th>Asset</th>
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<th>Replacement Value</th>
<th>PCI Cost</th>
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<tr>
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<th>Use</th>
<th>Stats</th>
<th>Replacement Value</th>
<th>PCI Cost</th>
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### Asset List Report
**By Name**

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<th>PCI Cost</th>
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APPENDIX 3

Excerpt from Strategic Research Intensity Plan 2014-2020

List of Priority Space, Infrastructure, and Equipment Needs
<table>
<thead>
<tr>
<th>School / Faculty / Campus</th>
<th>Priority Space, Infrastructure &amp; Equipment Needs</th>
</tr>
</thead>
</table>
| ACENET                                   | Equipment to ensure power back-up & continuity of service  
                                          | Equipment for additional storage and retention of data                                                                                                                                                                                                                                                                                   |
| Animal Care Facility                     | New, low-cost facility, built to suit, required to maintain accreditation; upgrades to the other animal care facilities                                                                                                                                                                                                                                                                  |
| CREAIT Network                           | As Memorial grows in research intensity, the need for shared lab space and resources will increase, and effective use and development of CREAIT Network space will enable efficiencies in the face of growing demands. Equipment and space needs for this shared facility will need to be adjusted.                                                                                     |
| Faculty of Arts                          | Modern building space to re-integrate faculty and research dispersed across campus                                                                                                                                                                                                                                                                                                             |
| Faculty of Business                      | Space and equipment for students working areas, new faculty offices, and research facilities for faculty and students                                                                                                                                                                                                                                                                   |
| Faculty of Engineering and Applied Sciences | Space restrictions for doubling of the faculty.  
                                          | Additional engineering space in the Core Science Facility, Bruneau Centre, and SJ Carew building expansion                                                                                                                                                                                                                           |
| Faculty of Medicine                      | Shortage of laboratory and office space available for research personnel  
                                          | Lack of large equipment infrastructure for research                                                                                                                                                                                                                                                                                    |
| Faculty of Science                       | New building with significantly enhanced research capability, including research laboratory and office space  
                                          | Significant deferred maintenance at the Ocean Science Centre, with critical needs relating to secure surface seawater supply and inadequate classroom capacity                                                                                                                                                                           |
| Labrador Institute                       | Equipment to complete functionality of existing laboratories (high priority on a new fume hood)                                                                                                                                                                                                                                                                                       |
| Marine Institute Campus                  | Arctic-capable research ship                                                                                                                                                                                                                                                                                                                                                                  |
| School of Human Kinetics & Recreation    | New, low-cost space for expansion of research laboratories and offices  
                                          | No control of space shared with The Works                                                                                                                                                                                                                                                                                           |
| School of Music                          | Space required for teaching and research activities.  
                                          | Faculty scattered in different buildings: 4 offices in Science; Ethnomusicology graduate program and MMaP in leased space at Arts and Culture Centre (MMaP space lease ends June 30, 2016)  
                                          | Inventory and replacement plan for aging equipment                                                                                                                                                                                                                   |
| School of Nursing                        | Space required for teaching and research activities.                                                                                                                                                                                                                                                                                                                                                     |
| School of Pharmacy                       | Space required for teaching and research activities.                                                                                                                                                                                                                                                                                                                                                     |
| School of Social Work                    | Space required for teaching and research activities.                                                                                                                                                                                                                                                                                                                                                     |
| Technical Services                       | New, low-cost facility, built to suit, to provide needed space for expansion for the Faculty of Engineering and Applied Science (in SJ Carew building), and consolidate operations dispersed across campus for enhanced efficiency                                                                                                   |
## APPENDIX 4

### 2014-15 List of Capital Projects – Information Technology

**Legend:** Black - MUN Contribution, Red - CC Funds

**Date:** 4/25/2014

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