Acknowledgements

The Memorial University Campus Master Plan was commissioned by the University in 2005 and has been developed in keeping with University's philosophy of community engagement and collegiality. The Plan was built on a collaborative process that engaged a broad spectrum of the University and was prepared under the overall leadership of Darrell Miles, Director, Facilities Management, Keith Hiscock, Assistant Director, Facilities Management, and the Campus Master Plan Steering Committee.

Additional consideration goes to the staff of Memorial University who diligently supported the team throughout the preparation of the plan, with particular thanks to Genni Howell and Maria eSilva in the Facilities Management Department.

**Members of Steering Committee:**
- Darrell Miles – Director, Facilities Management
- Keith Hiscock - Assistant Director (Develop. & Renewal), Facilities Management
- Dr. Michael Collins - Associate Vice-President (Academic)
- Dr. Chet Jablonski - Dean of Graduate Studies
- Christine Burke - Acting Director, Housing
- Roger Drinkall – Vice-President Internal, Students’ Union
- Daniel Ingram - Graduate Students’ Union

**Consultant Team:**
- Brook McIlroy Planning + Urban Design
  - Anne McIlroy, Partner-in-Charge and Project Manager
  - Calvin Brook, Partner and Design Lead
  - Antoine Belaieff, Senior Planner
  - Jana Joyce, Landscape Architect
  - Darlene Montgomery, Landscape Architect
  - Shawna Ginsberg, Campus Designer
  - Tsugumi Kanno, Designer
  - Lauren Aarntzen, Designer

Marshall Macklin Monaghan
- Jim Gough, Transportation Engineering Project Manager
- Andrew Brown, Transportation Engineer
Preface

A University in a Park

Since 1925 the Memorial University of Newfoundland has become a highly respected institution in the City of St. John’s as it occupies a prime location of approximately 175 acres within Pippy Park on the plateau of land bounded to the north by Mount Scio, and to the south by the residential district located between Elizabeth Avenue and Empire Avenue. The University’s natural setting and the winter climate that pervades much of the academic year have over time shaped the existing campus as a place where opportunities to experience outdoor spaces and views to the landscape have been impeded. The Campus Plan Update builds on opportunities to connect the Campus to its outdoor setting through a renewed approach to building design and weather-protected outdoor spaces. The Plan articulates a vision for a pedestrian oriented, compact campus of buildings and open space which recognize the reality of local climate and yet help the campus to embrace its role as a University within a Park.

Provehito in Altum

Memorial University plays a unique role in Newfoundland and Labrador as the Province’s and Atlantic Canada’s largest university. Memorial’s motto, Provehito in Altum (launch forth into the deep) captures the university’s spirit of adventure for learning and leadership and can also be translated into a bold and progressive approach to physical campus growth. The first impression of the campus is fundamental.

Accommodating Growth

Memorial is actively growing as an institution of higher learning, expanding its research activities and attracting an ever-larger contingent of graduate students. Two thirds of local high school graduates chose Memorial University and in less than a decade, Memorial has added over 35 percent more graduate students. If the Campus was fully developed, the Campus could eventually accommodate a population in excess of 30,000. This growth will also attract more international and out-of-province students, graduate students, professional education and training, research and distance education. Immediate physical impacts will include the need for more campus residences, teaching facilities and common space.

The Campus Plan balances the vision of the future campus with reality and reflects the fact the university has a large number of existing buildings that cannot all be upgraded in the short term. Parking is key concern for the expanding University. Due to the climate, the potential for increased walking and cycling is limited, and transit service throughout the City and Region struggles to compete with the convenience of driving. The Campus Plan proposes a variety of opportunities to improve access to campus including opportunities for mitigating the presence of large surface parking areas and eventually through replacement with parking structures located at the periphery of campus. The strategic location of buildings, trees and other structures including weather protected colonnades and bridge ‘buildings’ over the Parkway are also directed to improve microclimate conditions for pedestrians.

As Memorial increasingly focuses on research and graduate programs, its space requirements will not only increase, but change as well. Members of the campus community will require more flexible spaces – meeting rooms that can become classrooms and vice-versa; informal public spaces conducive to impromptu meetings; instructional space equipped with the latest technology; labs that can be easily retrofitted as needs evolve, and generally space that is highly adaptable.

Supporting Excellence

Although it will guide the physical development of the campus the Campus Plan operates in the broader context of the series of strategic directions including the University’s Strategic Framework Plan. The Campus Plan’s intent is not to prescribe growth, but to guide it, ensuring that the Campus grows rationally, seizing opportunities to complement the fabric of existing campus buildings. Academic and research priorities translate into physical requirements and as enrolment, faculty and staff continue to increase, the Campus Plan should be flexible enough to respond to core needs in an efficient manner as well as continue to respond to the Strategic Vision for the university even as it evolves and is rethought over time.

A key mandate of the Campus Plan process was to thoroughly analyze and suggest improvements to the Campus’s accesses, internal circulation patterns and edges, so that getting to and moving about the Campus remains efficient, safe and environmentally-friendly, fostering a collegial and pedestrian-focused atmosphere.
View to the South East across the Memorial Campus towards St. John’s Harbour.
The Campus Plan was constructed on a foundation of community consultation. The input of members of the campus community was obtained through a variety of methods:

1. **Individual interviews** – representative members of staff, faculty, student government and campus service providers were interviewed.

2. **Meetings with the Steering Committee, the Board of Regents and University Executives** – a number of meetings were held to receive valuable guidance, feedback and advice.

3. **Workshop** – participants actively debated key campus planning issues.

4. **Open Houses** – five open houses were held during which key concepts were presented to members of the campus and feedback received.

5. **Website** – the website was updated at intervals to inform the campus community of the evolution of the proposed design concept allowing the members of the campus community to provide direct feedback to the design team.

---

**Objectives of the Campus Plan**

The necessity for Memorial to provide the best learning, teaching and working environment for its students, staff and faculty has lead to the need for a comprehensive physical plan that is closely tied to the university's Mission and Strategic Framework. Increasingly, the opportunity to attract more research uses to the campus will drive the growth of the Campus. To fulfill these important requirements, the University commissioned a Campus Plan Update and has selected a team of architects, planners, urban designers, landscape architects and transportation engineers to undertake the year-long process. The primary objectives of the Campus Plan include:

1. **Provide a feasible and flexible physical framework to accommodate growth over the next ten to fifty years through recommendations for the placement of new buildings and facilities, and their relationship to campus open spaces.**

2. **Identify opportunities for high-quality open spaces and a safe, functional and attractive pedestrian network.**

3. **Guide the design of new buildings and significant additions to ensure that they fit within their environment and create safe and animated people-friendly spaces year-round.**

4. **Analyze space utilization and recommend strategies to use space more efficiently in the short term in existing buildings, as well as in new buildings.**
# Table of Contents

## ACKNOWLEDGMENTS

PREFACE

1. BACKGROUND
   1. Introduction & Context
   2. History of the Campus
   3. Today’s Campus – Analysis & Opportunities
   4. Current and Proposed Projects
   5. Campus Planning Principles
   6. Campus Community Consultation
      1.6.1 Summary of Consultation
   7. Space and Schedule Analysis
      1.7.1 Rationale
      1.7.2 Scope
      1.7.3 Space Inventory
      1.7.4 Allocation and Management Issues
      1.7.5 Room Utilization
      1.7.6 Station Utilization
      1.7.7 Scheduling Pattern
      1.7.8 Other Scheduling Issues
      1.7.9 Scheduling Recommendations

2. THE CAMPUS PLAN CONCEPT
   2.1. Introduction – Applying the Campus Plan Concept
   2.2 Key Structuring Elements of Campus Development
      2.2.1. Context
      2.2.2 The Key Structuring Elements of the Campus Plan
   2.3 The Campus Precincts
      2.3.1. The South Central Campus
      2.3.2. The South East Campus
      2.3.3. The South West Campus
      2.3.4. The North Central Campus
      2.3.5. The North East Campus
      2.3.6. The North West Campus
   2.4 Streetscape, Campus Edges and Gateways

3. BUILT FORM AND ARCHITECTURAL CHARACTER
   3.1 Objectives and role of guidelines
      3.1.1 Guidelines and the architectural commissioning process
   3.2 Key Building Elements
      3.2.1 Creating a Cohesive Campus Environment
      3.2.2 Sensitivity to heritage
      3.2.3 Scale and massing
      3.2.4 Façades
      3.2.5 Roof forms and materials
      3.2.6 Landmark elements
      3.2.7 Entrances
      3.2.8 Orientation and connections to outdoor spaces
   3.3 Materials
      3.3.1 The Materials Palette
   3.4 Storage, Servicing and Utilities
   3.5 Breezeways and colonnades
   3.6 Designing for Collegiality
   3.7 Clustering vs. Dispersion
   3.8 Design of Offices and Classrooms
      3.8.1 Introduction
      3.8.2 Flexibility of Space
      3.8.3 Offices
      3.8.4 Classrooms
   3.9 Accessibility
      3.9.1 Context
      3.9.2 Barrier-Free Design
      3.9.3 Physical Realm Recommendations
      3.9.4 Implementation Process
   3.10 Art Strategy
4. OPEN SPACE NETWORK

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Introduction</td>
<td>132</td>
</tr>
<tr>
<td>4.2 Open Space Structuring Framework</td>
<td>134</td>
</tr>
<tr>
<td>4.2.1 Edge Related Open Spaces</td>
<td>136</td>
</tr>
<tr>
<td>4.2.2 Internal Campus Open Spaces</td>
<td>140</td>
</tr>
<tr>
<td>4.3 Campus Circulation</td>
<td>142</td>
</tr>
<tr>
<td>4.3.1 Vehicular Circulation</td>
<td>142</td>
</tr>
<tr>
<td>4.3.2 Pedestrian Circulation</td>
<td>142</td>
</tr>
<tr>
<td>4.3.3 Bicycle Circulation</td>
<td>142</td>
</tr>
<tr>
<td>4.4 Gathering Spaces</td>
<td>144</td>
</tr>
<tr>
<td>4.4.1 Quadrangles, Courtyard and Gardens</td>
<td>144</td>
</tr>
<tr>
<td>4.4.2 Flexible Open Spaces and Greens</td>
<td>144</td>
</tr>
<tr>
<td>4.4.3 Residual Spaces</td>
<td>144</td>
</tr>
<tr>
<td>4.5 Landscape Design Guidelines</td>
<td>146</td>
</tr>
<tr>
<td>4.5.1 Wind and Weather</td>
<td>146</td>
</tr>
<tr>
<td>4.5.2 University Schedule and Construction</td>
<td>146</td>
</tr>
<tr>
<td>4.5.3 Surface Parking Areas</td>
<td>148</td>
</tr>
<tr>
<td>4.5.4 Paving</td>
<td>152</td>
</tr>
<tr>
<td>4.5.5 Service Areas</td>
<td>158</td>
</tr>
<tr>
<td>4.5.6 Grading</td>
<td>158</td>
</tr>
<tr>
<td>4.5.7 Planting</td>
<td>160</td>
</tr>
<tr>
<td>4.5.8 Recommended Palette</td>
<td>164</td>
</tr>
<tr>
<td>4.5.9 Lighting</td>
<td>172</td>
</tr>
<tr>
<td>4.5.10 Site Furnishings</td>
<td>172</td>
</tr>
<tr>
<td>4.5.11 Wayfinding and Signage</td>
<td>174</td>
</tr>
<tr>
<td>4.5.12 Public Art</td>
<td>174</td>
</tr>
<tr>
<td>4.5.13 Protection and Preservation of Natural Features</td>
<td>176</td>
</tr>
<tr>
<td>4.5.14 Maintenance Program</td>
<td>176</td>
</tr>
<tr>
<td>4.5.15 Safety and Security in the Landscape</td>
<td>176</td>
</tr>
</tbody>
</table>

5. TRANSPORTATION & PARKING

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 Introduction</td>
<td>180</td>
</tr>
<tr>
<td>5.2 Issue Analysis</td>
<td>180</td>
</tr>
<tr>
<td>5.3 Access &amp; Circulation</td>
<td>184</td>
</tr>
<tr>
<td>5.3.1 Sidewalk Design</td>
<td>184</td>
</tr>
<tr>
<td>5.3.2 Crosswalk Design</td>
<td>184</td>
</tr>
<tr>
<td>5.3.3 Drop-off Areas</td>
<td>184</td>
</tr>
<tr>
<td>5.3.4 Dedicated Right-Turn Lanes</td>
<td>185</td>
</tr>
<tr>
<td>5.3.5 Improvements to the Westerland Road/Clinch Crescent Area</td>
<td>185</td>
</tr>
<tr>
<td>5.3.6 Russell Road Area</td>
<td>185</td>
</tr>
<tr>
<td>5.3.7 Intersection of Livyers Loop and Morrissey Drive at Prince Philip Drive</td>
<td>185</td>
</tr>
<tr>
<td>5.3.8 Intersection of Irwin’s Road and Livyers Loop at Prince Philip Drive</td>
<td>186</td>
</tr>
<tr>
<td>5.3.9 Morrissey Drive</td>
<td>186</td>
</tr>
<tr>
<td>5.3.10 Elizabeth Avenue Widening</td>
<td>186</td>
</tr>
<tr>
<td>5.3.11 Livyers Loop Options</td>
<td>186</td>
</tr>
</tbody>
</table>

5.4 Parking

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.4.1 Context</td>
<td>188</td>
</tr>
<tr>
<td>5.4.2 Future Parking Demand</td>
<td>188</td>
</tr>
<tr>
<td>5.4.3 Parking Improvements</td>
<td>188</td>
</tr>
<tr>
<td>5.4.4 Parking Prices and Organization</td>
<td>192</td>
</tr>
<tr>
<td>5.4.5 Parking Management</td>
<td>196</td>
</tr>
</tbody>
</table>

5.5 Planning for Alternatives

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5.1 Organization</td>
<td>198</td>
</tr>
<tr>
<td>5.5.2 Transit</td>
<td>198</td>
</tr>
<tr>
<td>5.5.3 Campus Design for Transit</td>
<td>200</td>
</tr>
<tr>
<td>5.5.4 Pricing &amp; Competitiveness with Parking</td>
<td>202</td>
</tr>
<tr>
<td>5.5.5 Service Improvements</td>
<td>203</td>
</tr>
</tbody>
</table>

5.6 Carpooling

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.7 Cycling</td>
<td>204</td>
</tr>
<tr>
<td>5.8 Telecommuting</td>
<td>204</td>
</tr>
<tr>
<td>5.9 Concluding Remarks</td>
<td>204</td>
</tr>
</tbody>
</table>

6. SUSTAINABILITY

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Definition</td>
<td>206</td>
</tr>
<tr>
<td>6.2 Purpose</td>
<td>206</td>
</tr>
<tr>
<td>6.3 Sustainability in Universities</td>
<td>206</td>
</tr>
<tr>
<td>6.4 A Comprehensive Approach</td>
<td>208</td>
</tr>
<tr>
<td>6.4.1 Involving the Community</td>
<td>208</td>
</tr>
<tr>
<td>6.4.2 A Bottom-Up Approach</td>
<td>208</td>
</tr>
<tr>
<td>6.4.3 Lifecycle Costing</td>
<td>208</td>
</tr>
<tr>
<td>6.4.4 Sustainability and Incentive Systems</td>
<td>208</td>
</tr>
<tr>
<td>6.4.5 Sustainability in the Curriculum</td>
<td>208</td>
</tr>
<tr>
<td>6.4.6 A Proactive Approach</td>
<td>210</td>
</tr>
<tr>
<td>6.4.7 A Supportive Environment</td>
<td>210</td>
</tr>
<tr>
<td>6.4.8 Monitoring Systems</td>
<td>210</td>
</tr>
<tr>
<td>6.4.9 Towards Measuring Memorial’s Environmental Impact</td>
<td>210</td>
</tr>
<tr>
<td>6.4.10 The Mount Allison Example</td>
<td>210</td>
</tr>
</tbody>
</table>

6.5 Campus Sustainability Initiatives

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5.1 Buildings</td>
<td>212</td>
</tr>
<tr>
<td>6.5.2 Green Roofs and Roof Gardens</td>
<td>216</td>
</tr>
<tr>
<td>6.5.3 Open Space</td>
<td>218</td>
</tr>
<tr>
<td>6.5.4 Parking and Transportation</td>
<td>220</td>
</tr>
<tr>
<td>6.5.5 Procurement</td>
<td>222</td>
</tr>
<tr>
<td>6.5.6 Processes</td>
<td>222</td>
</tr>
<tr>
<td>6.5.7 Getting Students to Participate</td>
<td>223</td>
</tr>
<tr>
<td>6.5.8 Waste Reduction and Management</td>
<td>223</td>
</tr>
</tbody>
</table>
Background
I. BACKGROUND

I.1. Introduction & Context

With 175 acres, over 18,000 students and 2,600 faculty and staff, the St. John’s Campus of Memorial University of Newfoundland is the largest of Memorial’s campuses, among secondary education institutions in Newfoundland and Labrador and Atlantic Canada. Founded in 1925, the Campus has grown rapidly in the postwar period, resulting in a collection of relatively uniform brick buildings.

While no significant land acquisition opportunities are available in the vicinity of the Campus, the Plan demonstrates that infill opportunities do exist on campus, particularly in the North Campus, but also in the Core Campus where most of the current activity on campus is concentrated. The displacement of surface parking lots with proposed development and infill opportunities has required close collaboration between the team’s designers and transportation engineers, resulting in an integrated solution that will see the emergence of a compact and more walkable campus.

This document is intended to inform campus growth over the next 25 to 30 years, but it is recommended that it be updated every 5 years to reflect change in academic priorities, the fiscal context and other external pressures.

This document is subdivided into seven chapters, each building on the other six.

Chapter 1: Background – presents an analysis of the Campus today with its strengths and opportunities as identified by the Consultant Team through consultation, on-site analysis and background research.

Chapter 2: Campus Plan Concept – introduces the campus plan framework: what are the key structural elements of the campus that have informed the design of the concept, and that will influence the future evolution of the campus. This chapter presents the concept plan element by element, including new buildings and open space elements.

Chapter 3: Built Form Guidelines – makes a series of recommendations on the functional and aesthetic design of new buildings.

Chapter 4: Open Space – builds on the discussion of proposed open spaces in chapter 2 with detailed recommendations on open space design for all seasons, with the goal of creating a compelling park-like setting that reinforces the prestige and functionality of the campus for its population and visitors.

Chapter 5: Transportation – presents a series of recommended improvements to the Campus’s boundary roads, accesses and internal circulation network, along with a set of policy initiatives to encourage alternative modes of transportation.

Chapter 6: Sustainability – provides the framework for the preparation of a Sustainability Plan at Memorial, a plan to set campus growth within a progressive framework of coordinated long-term economic, social and environmental viability.

Chapter 7: Implementation – summarizes all the recommendations made in the document and suggests their prioritization to ensure that the momentum brought about by the Campus planning process is built upon.
The Arts and Administration Building will remain the primary front entrance to Memorial University.
1.2 History of the Campus

Memorial University was founded in 1925 on Parade Street with an enrolment of just 55. The original College was dedicated to Newfoundlanders fallen during the First World War, and subsequently to the victims of the Second World War. Memorial's inception as a University in 1949 almost coincided with Newfoundland entering the Confederation. Memorial's first university degrees were awarded in 1950. Since then, the desire to make undergraduate university education in the arts and science widely available to the people of Newfoundland resulted in rapid student and faculty growth.

Eventually, with no room to grow on the Parade Street campus, the University moved in 1961 to the current Elizabeth Street campus where the first professional degree programs in nursing, medicine, social work and engineering were established. The sixties saw the transformation of Memorial University from a primarily undergraduate university to a comprehensive, research-based institution and a boom in enrolment from 1,907 at the beginning of the decade to 7,239 at the end.

Enrolment remained relatively stable during the 1970s but increased despite a challenging fiscal situation from 9,375 in 1978 to a peak of 18,632 in 1992. The subsequent years witnessed a decline to 15,864 in 1998 before rising slowly since then with a renewed emphasis on graduate studies and the establishment of highly specialized research uses on campus.
The Physical Campus

The original Elizabeth Street Campus was comprised of only four buildings upon opening: Physical Education, Science and Engineering, Arts and Administration, and the Library. The University’s original yellow brick Arts and Administration Building and the Library buildings still form a visible entry to campus. Residences and a dining hall were started soon after and other buildings were added in the 1960s to keep up with escalating enrolment, such as Education (1966) and Chemistry-Physics (1967). Additional residences were built in 1964 (Doyle) and 1967 (Barnes, Burke, Curtis, Blackall, Hatcher, and Squires). A student building was added in 1968.

The University inherited several small buildings built in the 1960s (St. John’s College, Coughlan College and Queen’s College) in the north east quadrant of the campus fronting on to Prince Philip Drive which provide a sense of local heritage to this section of the campus.

The 1970s also witnessed significant growth, particularly with the addition of the Health Science Centre and the Engineering and Applied Sciences Building, thus firmly establishing Memorial's prominence in the sciences. The Burton’s Pond Residences were built in 1974, adding about 50 percent more residence space on campus. No residences have been built since then.

Growth slowed down after the early 1980s, but significant buildings have been added since then, including the Queen Elizabeth II Library in 1981, the Earth Sciences Building in 1990, the University Centre in 1999 and most recently the INCO Innovation Centre in 2005.
1.3. Today’s Campus - Analysis & Opportunities

The public road system generally defines a series of six Campus Districts. These districts help to describe areas of the campus while recognizing that the ability to knit the Campus more closely as a whole is a primary objective of the Campus Plan (see Section 2).

The Campus continues to grow with major projects including the INCO Innovation Centre, completed in 2005. This project reflects the kind of contemporary architecture that provides orientation in this part of the campus and makes it memorable. The following section provides both an appreciative and critical analysis of the Campus and identifies key opportunities for future enhancements.

A Vibrant Core

The core campus south of Prince Philip Drive is comprised of buildings between Allandale and Westerland Road and results, when weather permits, in a highly walkable campus precinct between the buildings of the historic centre and the residential buildings and daycare centred on Burton’s Pond. Large surface parking lots and the field adjacent to Burton’s Pond have the potential to be realigned or redeveloped as areas for new residential buildings. The area has developed as a prime campus area comprised of original and contemporary buildings, many of which frame outdoor courtyards (i.e. Toulinguet Close, Patton College courtyard), and spaces that facilitate pedestrian movement through and between closely spaced buildings.

Recent infill buildings in the core, including the INCO Innovation Centre and the University Centre, combined with the library and Science building, provide an opportunity to develop a new campus ‘Common’ in the heart of the core. The removal of most of the parking in the area and the redefinition of the space through landscape, seating, and special lighting improved steps to the Student Centre will redefine the area as a physical and symbolic heart for the whole of the University. Small additions to buildings framing the Common will further animate its edges through glazed building edges with common study and student/faculty meeting areas. The “Munnel” or underground pedestrian tunnel system supplements at grade and outdoor pedestrian circulation through a well used system year round.

North Campus Integration

In contrast to the historic pattern of the core campus, buildings north of Prince Philip Drive tend to be larger, more spread apart and defined by parking areas, internal campus circulation and poorly defined access and views to the natural landscape around Long Pond. Access across Prince Philip Drive is difficult for pedestrians and the chain link fence barrier generally requires the use of the overhead pedways to cross safely. The environment of the North Campus is influenced more by the road network and large buildings and as a result is less hospitable to pedestrians. Arctic Avenue in particular is heavily congested with buses and cars, adding to the difficulty of navigating between buildings on foot.

The Health Sciences Centre has evolved into a major building complex with the recent Janeway Children’s Health Centre surrounded by an expansive surface parking area. Future Health Science expansion to the east has the opportunity to draw the area closer to the surrounding campus community and proposed campus expansion north of Prince Philip Drive and west of the University Centre and NRC Institute for Marine Dynamics.

The escarpment and Long Pond should be viewed as an opportunity to create stronger visual and physical links, including connections to the Grand Concourse trail network that traverses the University lands. Currently buildings back on to the landscape where service, loading and some outdoor storage takes place. New buildings and additions in the area of the old College buildings (St. John’s, Coughlan, Queen’s, Field and Spencer Hall) should emphasize exposure and access to this spectacular part of the campus. Open space and surface parking areas present possibilities to extend and improve on the existing setting through opportunities for similarly scaled academic and residential buildings.
The University Centre has been designed as a bridge building between the north and south portions of the Campus.

Toulinguet Close is one of Memorial’s most attractive open spaces.

The North Campus is physically separated from the South Campus by Prince Philip Drive. Its atmosphere, particularly close to Long Pond, is quieter and less compact than the south areas of the Campus.
Parking and Transportation

Except for a small amount of structured parking in the Earth Sciences building, parking on campus generally exists as broadly distributed surface parking lots, with some metered parking on internal campus roads including Phelan Road, Livyer’s Loop, Arctic Avenue and Kerwin Place. A number of surface parking lot sites on campus such as those fronting on to Prince Philip Drive (Lots 16 and 27) and south of the Field House at Elizabeth Avenue (Lot 40) have the potential to become major new building locations within the five to ten minute walking distance required between academic buildings.

As these sites develop, the issue of parking should be addressed in the context of a series of parallel initiatives, including improved transit, carpooling, increased parking fees, satellite parking lots, below grade structures and the development of structured parking garages located at the periphery of the campus.

Elizabeth Avenue, Westerland Road, Allendale Road and Prince Philip Drive form the major campus perimeter roads. The internal campus road network is defined primarily by Irwin’s Road for east west access in the south and Arctic Avenue in the north. Connections to Prince Philip Drive from Allandale Road and Westerland Road are generally poor and have resulted in multiple traffic accidents. The proximity of Irwin’s Road running in parallel to Prince Philip Drive is particularly challenging at the intersections resulting in difficult vehicular and even dangerous pedestrian crossing.
Parking already occupies a significant proportion of land on campus, and users find the current supply inadequate.
**Campus Street Edges**

Campus edges are important as an interface with the City, projecting a positive identity of the University to the general public and providing clear and safe points of access to members of the Campus Community and visitors.

**Allandale Road:**

Allandale Road forms the eastern boundary of the Campus and connects the Campus to the Trans-Canada Highway and Downtown St. John's. A key issue is the prominent presence of the Arts and Culture Centre on the corner of Prince Philip Drive and Allandale Road. Although it looks like the building is part of the University, it is not, and the opportunity to locate a sign or design features specific to the University does not exist. South of the Arts & Culture Centre, Memorial presents a quiet face to the rest of the City with the Burton's Pond Residences, which are turned inwards to the rest of the Campus.

**Westerland Road:**

Westerland Road generally forms the western boundary of the Campus between the Field House and the Aquarena. Westerland Road connects the campus to Prince Philip Drive and the North Campus and is a major transit route for buses dropping off at the University Centre on Arctic Avenue. Westerland Road is defined by large surface parking areas to the west (Lot 3) and the large blank wall of the Field House and setback of the Education building to the east. The lack of built form, landscape treatments and wind buffers at the edge of the road makes walking unpleasant.

**Prince Philip Drive:**

Prince Philip Drive is a busy arterial that bisects the Campus and connects the Campus to all other points on the island. Prince Philip Drive will continue to be a busy arterial road through the Campus, but it could become a road that expresses the “University in a Park” theme. Opportunities to improve the image and function of Prince Philip Drive include a new bridge building as well as new buildings that better frame and animate the road, marking the presence of Memorial and signalling to traffic that it is within the Memorial Campus and Pippy Park.

**Elizabeth Avenue:**

On the south, Elizabeth Avenue is a two lane collector that runs parallel to Prince Philip Drive between Freshwater and Torbay Roads. The character of Elizabeth Avenue is of a locally scaled street, particularly in contrast with Prince Philip Drive. The street is framed by mature street trees, private homes and, on the Memorial side, the original campus buildings, residences and broad setbacks, partially planted with attractive hedges of Saskatoon Berry bushes. There has been some pressure to widen Elizabeth Avenue to relieve traffic pressures, taking land on the University side.

The campus is strongly defined by ‘green’ landscaped setbacks along its primary edges including the broad, intermittently treed setbacks along Elizabeth Avenue and Allandale Road and the wetlands which create a broad swath of open space in the foreground of the Health Sciences Centre and continuing north across Clinch Crescent into Long Pond. These green edges are an important part of the objective to reinforce Memorial as a ‘University in a Park’.
Campus Gateways

Landmark buildings and structures, including the University Centre bridge, the Memorial Tower, the INCO Innovation Centre, the old colleges and Paton College, are among many other campus elements that reinforce a sense of orientation and arrival to the Campus. Arrival points form the edges and major campus intersections however are poorly defined. Landscape elements also have the potential to more consistently and powerfully define a sense of arrival on campus, and though there are significant areas of successful planting, campus landscaping is often fragmented and would benefit from greater integration as part of an university wide planting strategy.

The Campus Plan provides a context for strengthening the assets, buildings and landscape that currently exist by proposing a series of consistent elements such as landscaping, lighting and signage as a means of defining the major gateways to campus. These gateways are further defined through built form elements such as buildings, bridges and campus markers that collectively contribute to a positive face to the surrounding community. Gateway structures and buildings are also a prime opportunity to create integrate LEED (Leadership in Energy and Environmental Design) and other related building and site planning practices to showcase principles of environmental sustainability and the Campus In a Park setting.

Open Space to Connect the Campus

The campus open space system is based on a system of formal and informal spaces, including courtyards (Toulinguet Close, Paton College courtyard), sports fields, walkways, gardens and the landscapes surrounding Long Pond and Burton’s Pond. The relatively consistent orthogonal pattern of the existing Campus provides key opportunities for strengthening north south and east west pedestrian connections. These connections should be balanced with the sense of enclosure and discovery provided through campus courtyards, gardens and complex spaces that exist on campus and continue to be extended in the design of new buildings and open space.

The wind has made a visible mark on the campus landscape as the form of trees are shaped by it and many appear to ‘lean’ into its prevailing direction. Pedestrian comfort on campus is directly affected by opportunities to buffer the wind through the location and design of buildings, structures and landscape. The placement of strategically located wind breaks can be done through built form and tree placement that reflect both the formal patterns of building and road alignments as well as the informal patterns that reflect pedestrian desire lines, strategic views and mitigation of high winds.

Significant opportunities exist to strengthen the network of campus courtyards and open space as a primary ordering and orientation device for the Campus. A primary objective for the Core Campus is the Creation of ‘Memorial Common’, a newly defined formal open space that should become a symbolic and physical heart of the whole campus.

Weather protected pedestrian connections are provided through the above grade pedways and below grade tunnel system. This system should be maintained and in certain strategic locations, such as across Prince Philip Parkway, future connections should be provided as pedways or below grade to new residences at Burton’s Pond. This network should be extended with a greater emphasis at grade-level, weather protected walkways that are in the form of colonnades, or preferably as a well glazed building edge that provides a combination of circulation and common social spaces that can open up to outdoor areas in good weather and contribute to the animation and safety of these areas.

Toulinguet Close is a beautifully scaled courtyard in the South Central Campus
Figure 1.4: Campus Edges

Figure 1.5: Campus Open Spaces
1.4. Current and Proposed Projects

Context

Prior to the commissioning of the Campus Plan, a number of campus improvement projects were contemplated by the University. While some are already at an advanced stage of planning, others have been identified as required but without budget or timeline. The summary below is based on a document entitled “Memorial University of Newfoundland Infrastructure Financing Strategy – April 14, 2005”.

Throughout the document, the Campus Plan Concept acknowledges these initiatives and integrates them where appropriate into the Campus Plan recommendations. When this is not the case, alternative approaches are suggested.

Overview of Projects

Residences Upgrade - $52 million

Available and attractive residences are crucial in attracting students from across the Province and beyond and are a keystone of Memorial’s mission to provide accessible post-secondary education in Newfoundland and Labrador, particularly outside of St. John’s. Residences also form part of a comprehensive out-of-province recruitment strategy. Out-of-province student enrolment is anticipated to increase by 1,600 or 94 percent by 2010 and international enrolment by 1,200 or 171 percent. Existing residences are at capacity and demand exceeds supply by 25 to 30 percent.

Overall, the following need for new residences was identified:
- Construction of 750 new residence beds $28 million
- Upgrade of Burton’s Pond Apartments $ 7 million
- Upgrade of Paton College Residences $17 million
- Total $52 million

Sciences Research Building - $60 million

Research funding at Memorial University has increased by 111 percent between 1999 and 2004 and is anticipated to grow by another 35 percent to $100 million by 2010. In parallel, it is Memorial’s goal to increase the number of graduate students by 77 percent or 1,700 by 2010. For these goals to be fulfilled, new infrastructure is necessary in the form of laboratory space in a variety of areas.

The project cost is estimated at $60 million, including $15 million from the Canada Foundation for Innovation.

Business Building Expansion - $10 million

A number of factors require the expansion of the Business Building, including growing enrolment, growing demand for business graduates in the Province, demand for research – all supported by the opportunity to secure private financial support for such a project. The current building is fully occupied and there is no opportunity to repurpose any of the existing space.

The proposed 45,000 square foot expansion can be located adjacent to the existing building and could provide the opportunity to link the Business Building through a covered walkway to the rest of the campus. The cost of this project is estimated at $10 million, $5 million of which could be secured from private sources.
Memorial University Campus Plan

Paton College is part of the most memorable and valued buildings on Campus.

The Science Building is one of the Campus’s four original buildings.

The Faculty of Business Administration Building will be expanded to respond to growing enrolment demand.

The Science Building is one of the Campus’s four original buildings.
**Health Science Teaching and Research Space - $10 million**

The faculties of Medicine, Pharmacy and Nursing are experiencing significant space pressures caused by changes in program delivery, growth in research and the number of graduate students. The following initiatives have been proposed:

- **Faculty of Medicine:** the area above the animal care facilities can accommodate an additional 8,000 square feet for new faculty, researchers and graduate students.
- **Family Medicine Clinic:** an 8,000 square foot addition is proposed to the Health Science Centre to accommodate this growing field.
- **Consolidation of Applied Research Space:** another 8,000 square feet could be added to the Family Medicine Addition to accommodate offices currently located off-site and in the Health Centre.
- **School of Pharmacy:** an expansion is required, but the necessary space could be accommodated in the space vacated by the uses slated to move to the expansion described above.
- **School of Nursing:** additional office, research and instructional space is required.

**Health Sciences Centre (HSC) Research Space Expansion - $4.5 million**

A need has been identified to increase interdisciplinary research space between Memorial and the Health Care Corporation of St. John’s. A 13,000 square foot addition to the Janeway Children’s Health and Rehabilitation Centre has been proposed for non-wet laboratory space to be used by the Clinical Epidemiology, Genetics and Bio-Ethics research groups.

The cost of the facility would be shared among Memorial ($2m), the Health Care Corp. ($2m) and ACOA ($0.5m).

**Library Expansion - $10 million**

A space planning study was conducted, which led to the identification of the need for a new addition to the Queen Elizabeth II Library. The addition would accommodate the Newfoundland Studies Collection, the Newfoundland Studies Archives, group study and social space.

**Parking Facilities - $8 million**

Prior to the Transportation Study conducted as part of the Campus Plan, the need for additional parking was identified in the Infrastructure Financing Strategy. The trend towards more graduate and part-time students as well as the outward expansion of St. John’s are resulting in growing parking needs.

Prior to the preparation of the Campus Plan, it was determined that $8 million was required to provide 450 additional surface spaces. The Campus Plan proposes two new parking garages, underground spaces under new buildings, as well as new surface and on-street parking spaces. Please refer to Chapter 5 for additional details.
The library has outgrown its current facility and needs new study and collection spaces.

The Campus Plan emphasizes a balance between parking provision and alternative modes of transportation to the Campus.

A number of additions are proposed to the Health Sciences Centre Complex.
1.5 Campus Planning Principles

1. **Campus Development should implement the long-term directions of the Strategic Plan but demonstrate flexibility to accommodate future needs;**

The Campus Plan does not replace the University’s academic and strategic planning functions but implements them by suggesting ways to accommodate the goals and objectives of the University community in the physical realm. Demographics and the state of the economy dictates undergraduate enrolment, while government and industry support determines the viability of research programs. Care should be exercised not to respond only to immediate needs, but rather to identify a variety of development opportunities that can respond to different needs over time. The Campus Plan is a foundational document created to support the implementation of key policy initiatives contained in the following University documents:

- The Strategic Framework Plan
- The Mission Statement
- The Infrastructure Financing Strategy, April 14 2005
- The Key Strategic Issue (KSI) Papers

2. **Campus Development should help fulfill the aspirations of the Campus Community and focus on excellence in teaching and research;**

The Campus Plan operates at the broader context of Memorial University’s core role and purpose. Academic and research priorities translate into physical realities. The Campus Plan should be flexible enough to respond to these evolving needs while providing certainty that a high quality and prestigious campus image will be achieved. The quality of the physical development should convey a sense of excellence and reflect the unique attributes and character of the local community.

3. **The Campus should be welcoming and accessible to visitors and members of the Community at large;**

The University operates within the broader context of the City of St. John’s and the Province of Newfoundland providing a focus for economic development, employment and an array of community services in the areas health, recreation, athletics, culture and continuing education.

The Campus should be perceived as a year-round welcoming environment providing ease of orientation and clearly marked access to student and visitor services, recreational facilities and other community use facilities such as the Works recreational facilities. As a result, it is crucial for the University to promote itself as belonging to all Newfoundlanders.

The University’s civic role and stewardship in the community also require that the campus edges positively interface with the surrounding community and Pippy Park. The setting, scale and design of new buildings, the development of outdoor spaces and circulation networks should be integrated with the surrounding community.

4. **New buildings should respond to their context;**

New buildings should be positioned strategically to integrate into the campus fabric, including buildings, open spaces and the surrounding context, and frame a functional and attractive pedestrian network. They should complement existing buildings and seamlessly integrate within the campus fabric but seize opportunities to create new campus landmarks and improve the campus edges to portray a dynamic and prestigious image of Memorial to the outside world.
This new residence at the University of Maryland was designed to fit within the existing campus and create a residential atmosphere.

Facilities like Cook Recital Hall are instrumental in consolidating the University’s role as a cultural venue in St. John’s.

Memorial is closely connected to Downtown St. John’s and will play an increasingly important role within the City as a whole.
5. **The Campus should encourage collegiality and a rich social life;**

A rich cultural and intellectual life on campus is a fundamental element of the University’s recruitment strategy and an important step to welcoming the community on campus. Through the addition of compelling cultural, study and communal spaces, and the improvement of outdoor spaces, the Campus should become a vibrant area throughout the day and in all seasons and offer an unparalleled setting for learning, collegiality and social life that balances clustering and interdisciplinary interaction. As the campus develops and redevelops, new communal spaces should be added to existing and new buildings in easily accessible and clearly visible locations to encourage informal interaction among all members of the campus community. New study spaces for groups and individuals should be interspersed throughout the Campus. A series of small café outlets should be provided with these spaces.

6. **The Campus’s park setting should be emphasized;**

Existing and new open spaces should be seen as key organizing elements of the Campus and be designed as an integral part of Memorial’s unique identity. The many functions of open spaces should be recognized, including extensions of indoor spaces, amenities for social interaction and athletics, circulation, unique identity of the campus and sense of place year-round and ecosystems. Natural features, particularly in the North Campus, should be celebrated and protected.

7. **The Campus should be pedestrian-friendly and encourage a balance among transportation modes;**

Over time, the Campus should rationalize vehicular accesses to limit opportunities for conflicts between pedestrians and vehicles, redesign parking lots to limit their visual impact, strengthen pedestrian routes on campus and in general encourage transit and carpooling.

8. **The Campus should be accessible to all;**

Students with disabilities represent about 7 percent of the college and university population in Canada, while it is believed that about 13 percent of the working age population has a disability. Many barriers continue to keep eligible students from attending university. All development and redevelopment on campus should seek to improve accessibility to students, staff, faculty and visitors with a broad range of disabilities. Existing buildings should be retrofitted and new buildings designed to allow the Campus to become as welcoming to students, faculty, staff and visitors with disabilities as all others over time.

9. **Campus growth should be based on the principles of sustainable development;**

The University is committed to becoming a model of environmental responsibility through its operations, teaching and research and the physical development of the Campus.

The key elements of this principle include:

- Addressing energy use, water conservation and treatment and improving waste management through innovative land-use planning, building, landscape and utility design and operations.
- An enhanced focus on public transit, pedestrian and cycling facilities, compact development and residences and services with walking distance as a means for reducing automobile use both on and off campus.
- The adoption of sustainable development guidelines, environmental assessment protocols, lifecycle costing and procurement procedures.
- The initiation of a University-wide campaign promoting green education.

10. **The Campus should recognize the needs of its diverse constituencies;**

The Campus can and should accommodate the needs of various constituencies: Canadian and international, aboriginal and non-native, able and disabled, undergraduate and graduate, student and faculty/staff, community member and visitor, etc. The involvement of a broad cross-section of stakeholders and constituencies can help inform the campus design and operations and avoid future retrofit costs. Preference for flexible designs can help address future needs.
A Collegial Campus - here, the University Centre cafeteria

A "University in a Park" Setting - the Elizabeth Avenue frontage

A Pedestrian-friendly Campus - path leading north to the Inco Centre Courtyard

An Accessible Campus - here, an accessible entrance to the University Centre

A Sustainable Campus - cyclist in the Core Campus

An Accommodating Campus - the Daycare
1.6 Campus Community Consultation

The Campus Plan was constructed on a foundation of community consultation. During the summer and fall of 2005, the consultant team obtained input and feedback from the University community through a variety of channels:

- Individual interviews – representative members of staff, faculty and student government were interviewed on a one-on-one basis by members of the consultant team.

- Meetings with the Steering Committee, the Board of Regents and University Executives – a number of meetings were held with the Steering Committee to receive valuable guidance, feedback and advice.

- Workshop – at a participatory workshop held on September 15 2005, participants actively debated key campus planning issues in groups. First, participants were asked to list key priorities for the campus on ‘post-it’ notes, which were then gathered and grouped by theme. They were then asked to debate issues following the guidance of a questionnaire.

- Open Houses –open house sessions, open to all members of the community, were held on September 15 and November 15 during which key concepts were presented and feedback received. At each session, key concepts corresponding to the phase of the project were presented by members of the consulting team and boards were shown to display key concepts. A questionnaire was made available to allow participants to provide written feedback.

- Website – the website was updated at regular intervals to inform the campus community of the evolution of the proposed design concept and allowed members of the campus community to provide direct feedback to the design team.

1.6.1 Summary of Consultation

Feedback received from members of the University Community has brought forth the key issues, concerns and opportunities to be addressed by the Campus Plan. This input was received through a variety of channels, including questionnaires, e-mails, one-on-one interviews, open house discussions, etc.

General Objectives of the Campus Plan

- The Plan should support the University’s strategic goals
- The Campus should be designed to enable long-term aspirations and objectives as they emerge from the Strategic Plan.
- The Plan should provide a framework for growth and renewal
- A framework should be provided to ensure that new buildings:
  - Are functional and capable of accommodating a variety of uses over time
  - Embody the desired image of academic excellence
  - Integrate well with the rest of campus
  - Preserve open space
  - Are easily accessible to and designed with the input of users with disabilities.

Community’s Priorities for the Campus

Address Shortages and Improve Space Utilization

- Severe shortages in office, gathering and faculty spaces have been identified which either already constrain current or are likely to lead to a future inability to expand growing programs. Please refer to the Space and Schedule Analysis for more details.
- Improvements to scheduling practices would improve efficiency while acknowledging the needs of users. Better utilization over the day, the week and even the year (summer) was mentioned. More even utilization can help justify more services like cafés and shops, with expanded operating hours.
- Better collaboration between departments and with the Administration would ensure the best utilization of Campus facilities.
A shortage of gathering and study spaces has been identified on campus. (The Library)

Open houses were an opportunity to engage the campus community at key stages of the process. (Inco Centre).
Make the Campus More User-Friendly

The Campus should be made more user-friendly, with:
- New and renovated instructional and meeting spaces that are more multi-purpose in nature with moveable partitions and furniture.
- Strategically-located meeting spaces – some for faculty and staff only – with durable, comfortable and functional furniture and wireless coverage.
- More food service outlets and cafes dispersed in locations with natural light near high traffic areas that are conducive to informal meetings.
- Additional services and amenities at all hours of the day to serve the needs of on-campus residents and encourage students who live off-campus, faculty and staff to stay on campus longer over the course of the day.
- Consolidated student services – including bringing the Registrar’s Office together with Student Services and a reception area in a prominent area of the Campus – e.g. on the ground floor of the Arts and Administration Building.
- A Visitor Information Centre to serve as a point of arrival on Campus and improved wayfinding, particularly from the edges of the Campus.

Enhance Open Spaces

A renewed emphasis should be placed on communicating the Campus’s situation within Pippy Park. The Campus should be made more welcoming, parking less prominent and outdoor spaces more functional and beautiful, while establishing an identity consistent with Memorial’s reputation for academic excellence. A coherent design approach should be developed for the Campus with engaging existing and new open spaces, a consistent set of materials, lighting, furniture and plantings.

Memorial’s history, that of its alumni and its dedication to Newfoundlanders fallen in the two world wars should be made more prominent on campus.

The interfaces between indoor and outdoor spaces should be well thought-out with protected walkways, abundant glazing and entrances aligned with paths and other entrances. The climate should be taken into account.

Improved gateways should be considered to better mark one’s arrival to the Campus through their presence at its edges.

Become More Environmentally Friendly

As a major repository of knowledge, employer, purchaser and owner of real estate, Memorial has the opportunity to act as environmental leader, for example in its operations, and design and maintenance of buildings and open spaces.

Balance pedestrian and vehicular circulation

The safety of pedestrians should be a primary objective throughout the Campus. Cars are currently too prominent on campus and their presence should be balanced with the needs of pedestrians and other modes of transportation by rethinking vehicular access and circulation on campus. Outdoor and weather-protected pedestrian links should be expanded, providing alternatives to the tunnel system, which is perceived as convenient but congested, unsightly and circuitous. Improved connections to the northeast campus (Business, Queen’s College, etc…) were often mentioned. The design and maintenance of pedestrian networks should take the needs of the disabled into account.

The reach and frequency of transit service to the Campus should be substantially improved and shelters located throughout the Campus. Improvements should be considered in addition to the adoption of a UPASS (a pass that is part of all students’ tuition).

Address the Parking Issue

Parking is a major concern for all Campus users. The potential for increased walking and cycling to the Campus is limited, and transit service from outlying areas is currently limited. In addition to significant improvements to transit services, above-ground and underground parking structures should be considered to replace surface lots and add parking capacity, but potential locations should be studied carefully. In parallel, the public should be made aware of the actual cost of providing parking, and pricing policies should reflect these costs. It was proposed that this issue be studied more in detail by a representative committee of various campus users who would take ownership of the issue.
The new Computer Science Building at Dalhousie University contains a number of group and individual study nooks and informal meeting spaces.

The multi-purpose court in Paton College is a good example of attractive and functional outdoor amenity space. (Paton College)

Transit should be encouraged to relieve parking facilities and reduce emissions. (Elizabeth Avenue stop).

A well-designed and maintained pedestrian network is especially important in winter. (Burton’s Pond Residences)

The Aquarena’s success has been putting stress on its parking facilities.
1.7 Space & Schedule Analysis

1.7.1 Rationale
The purpose of studying space resources and scheduling practices is to assess the adequacy of existing space resources in accommodating desired uses and to ensure that existing space resources are used efficiently.

1.7.2 Scope
The Campus Plan process has analyzed data readily available and derived conclusions that can prompt further discussion, investigation and potentially the assignment of new resources to gather data and refine existing processes.

- **Room utilization.** Within the schedule prepared by the registrar (which excludes all facilities controlled at the departmental level), the utilization of rooms over the schedule was analyzed, i.e. the number of hours rooms are used on average over the course of the week.

- **Station utilization.** Within the schedule prepared by the registrar (which excludes all facilities controlled at the departmental level), the utilization of stations over the schedule was analyzed, i.e. the average proportion of seats occupied.

- **Scheduling pattern.** An analysis of scheduling patterns was performed on the registrar’s schedule to examine how current scheduling practices affect the efficiency of space utilization.

1.7.3 Space Inventory
To measure the utilization of space, a standard practice is to compare the total amount of space available in a given category to pre-established standards (e.g. Council of Ontario Universities or adaptations. Memorial has developed its own standard, which the Space Manager is responsible for). Applying the standard to evaluate space resources requires that each room on campus be measured and assigned to a standard use code. All rooms within a use code are then tallied and mapped to the standard. This analysis is ongoing.

Unlike many universities, Memorial has a space manager on staff who is making progress in the assembly of data and has a good understanding of day-to-day space utilization on campus. Issues are thus addressed as they arise.
Space Needs by type

Based on discussions with members of the university community, issues exist with the quantity and quality of space at Memorial:

1. Residences – There are currently 1,522 beds available on campus. The Memorial Housing and Feasibility Study, St. John’s Campus, August 19th 2003 identifies that an additional 1,000 beds are needed through a phased construction programme.

2. Instructional Space – classrooms under 100 seats are most popular. A particular issue around classrooms is the frequent mismatch of facilities to class size because of technology. Often, the desired set of tools is only available in facilities that exceed the necessary size. Ideally, most classrooms and meeting rooms should be equipped with standard equipment including a projector, computer, screen and blinds, particularly classrooms in the 60-70 seat range. In general, the shift towards more graduate programs will require smaller classrooms with moveable furniture than large amphitheatre-type spaces with fixed furniture. However, demand is also growing for very large classrooms (200+) – existing ones are consistently booked.

3. Research space – In general, research programs are growing, but they cannot be accommodated. There is a need for additional Science, Health Science, Biochemistry, Biology, Psychology, Chemistry and Biochemistry Research space.

4. Swing Spaces – As in other universities, a growing need is emerging for ‘swing space’ – meeting rooms and flexible space that can be assigned to special projects, visiting faculty and researchers. Space should be reserved for professors on sabbatical, preferably in each building.

5. Communal Spaces – As discussed in the Summary of Consultation, a shortage of small and dispersed social spaces exists throughout the Campus.

6. Storage space – Storage Space is at a premium in every building.

7. A multi-purpose performance space (for films, lectures, performances), perhaps with gallery space, is desired.

Space Needs – department-specific:

1. The School of Music is growing so rapidly that its space needs are becoming critical. It needs additional performance, research and office space.

2. Education may have some underutilized space because of its configuration.

3. Engineering needs office space and a venue large enough to accommodate the entire first-year class.

4. Psychology and Education require more space, although their enrolment varies from year to year.

5. Computer Science will soon need additional space.


7. Medicine needs office and research space.

8. The quality of space seems to be somewhat poorer in the Mathematics, Biology, Biochemistry departments – with particular concerns regarding the adequacy of laboratory space in the latter two.

9. Vice-president units are growing, but space has not been keeping up. Within the Administration, Student Recruitment will also soon require additional space.

10. Facilities Management is also short of space for large projects and offices.

11. Technical Services – as research uses expand, so does demand for technical services. Technical Services also perform a useful role in bringing new technology application to Newfoundland and transferring technology and skills to small businesses in St. John’s and beyond. Additional space is desired in vicinity of the Chemistry-Physics, Sciences, Inco Innovation and/or the Engineering buildings.

12. Publications units are spread and should be consolidated either on-campus or off-campus, with adequate storage space.

13. Student societies have long required additional space, including a common boardroom.
1.7.4 Allocation and Management Issues
- Space guidelines in place, e.g. “all space belongs to the University” are not well accepted.
- Some departments control their own space – it is a legitimate practice. Flexibility allows for informal meetings, different time slots and specialized equipment. However, it can be inefficient to hold up a large and well-equipped room to hold a discussion. One exception is Education, where space is often not used efficiently, but not released for other use.
- Memorial has recently adopted a policy to address the retention of space by retired faculty. This policy includes provisions for the reversal of space to Facilities Management in certain circumstances. In practice, however, space is redeployed within individual departments. The effectiveness of this policy should be reviewed in collaboration with departments to ensure adherence.

1.7.5 Room Utilization
Room utilization is the average utilization of each room over the total number of hours that the University is open during the week. For the purpose of providing standards, the Council of Ontario Universities assumes an average utilization of 34 hours per week. Paulien and Associates, an American firm that specializes in the analysis of space resources, recommends an average use of 30 to 40 hours a week.

Among facilities controlled by the registrar, classroom Utilization at Memorial was found to be an average of 22 hours and a median of 20 hours, with a minimum of 15 hours and a maximum of 33 hours. This low utilization level may reflect that space may be scheduled by other offices other than the registrar. Centralized data gathering may help better understand room utilization and allocate space to departments based on need.

1.7.6 Station Utilization
Station Utilization represents the utilization of available seating in all available classrooms over the schedule, when the room is in use. For example, if half of the available seats are occupied in every class and every session, the overall station utilization will be 50 percent. In determining space standards for classrooms, the Council of Ontario Universities assumes a utilization of 67 percent. Paulien and Associates recommends a utilization target of 60 to 70 percent.

Low station and room utilization result in the need for more classrooms to deliver the same number of classes to the same number of students. Fewer classrooms are needed – thus saving money, space and energy – if the number of students enrolled in each course more closely matches the number of seats and if the classroom is used over more hours during the week.

The average Station Utilization of classrooms at Memorial was found to be 62%, ranging between 32 and 134 percent. The figure of 134% may point to inaccuracies in the data provided by the Registrar.
Figure 1.6: In the above diagram, each bar represents a group of students who begin and end a class at the same time (in this case, Fall Mondays in 04-05). The bulk of students take classes defined by the orange bars, but a substantial number of classes start and end at different times. This creates difficulties in assigning facilities and taking classes outside of one’s department.

Figure 1.7: In the chart at left, each navy blue bar represents the approximate number of students enrolled in classes at any given time (in this case, Fall Mondays in 04-05. Registrar tracked classes). Campus facilities are theoretically capable of accommodating more students outside of peak times (in light blue).
1.7.7 Scheduling Pattern

Based on the schedule provided by the Registrar, the total number of students present on campus at any given time was analysed. Ideally, the pattern should be somewhat uniform throughout the week, illustrating a consistent use of facilities. If one assumes that university facilities can accommodate peaks, utilization below the peak represents theoretically underutilized capacity.

Using the registrar’s schedule, the scheduling patterns indicate that presence on campus is highest between the hours of 9 to 4. Tuesday and Thursday show a drop in campus population between the hours of 12 to 1 whereas the decline in campus population on Wednesday and Friday is evident only at 1. Every day of the week except Friday, the campus is well used between 4 and 9, but campus use is minimal on Fridays after 5:00pm.

In Figure 1.6, each bar represents a group of classes that starts and ends at the same time. The dark bar represents the bulk of the student body. The light bar represents non-standard time blocks.

When classes do not all start and end at the same time:

- Classes start before others have ended, so students in the first class cannot take the class that start while they are still in class.
- The second group of classes cannot access the rooms used by the first group.
- When the first group ends, the rooms can stay empty for a period of time too short to be usable (e.g. 30 minutes).
- The argument that each department can have its own schedule is less and less workable as students take cross-disciplinary degrees.
- Therefore, a standard schedule like Figure 1.8 is preferable, which accommodates 9 blocks of one hour, 6 blocks of 1.5 hours or 3 blocks of one hour in a standard day, plus an evening session of 1x3 hours, 2x1.5 hours or 3x1 hour. The ability to use lab facilities is enhanced as three blocks of 3 hours are created in the core teaching hours.
- In general, all departments should adopt the same schedule and schedules should be coordinated by each faculty and department.

1.7.8 Other Scheduling Issues

- Mismatches are common. For example an instructor has a class of 60 and needs certain technology. This technology is only available in a class with 120 seats, where half goes to waste.
- The inventory of rooms is not centralized. Each department “owns” some rooms but most feed back information to the registrar. Sometimes free space is made available, but sometimes not. For example, the Faculty of Business owns eight well-equipped classrooms and no central access to this space is available.
- Scheduling requests are only coordinated by some faculties (i.e., Science but not Arts).
- In general, the previous year’s schedule is used to generate the new schedule, leading to inefficiencies being carried over from one year to the next.
- Ad-hoc bookings are done through an old mainframe system.
- Business is the only faculty that does not follow the slot system because it holds no classes on Fridays. Since Friday classes are typically paired (with Mon. and Wed.), the empty space is of little use to other departments.
- Some space is very undesirable and hard to book. Sometimes for minor issues, like the absence of window treatments.
- At times, the type of seating is inadequate (i.e., flip-up tablets, fixed desks). The ideal case setup would be to have moveable chairs.
- Once an instructor is provided access to technology, there is reluctance to taking it away in a subsequent semester. Once a professor has a slot, he/she can keep it unless major changes to programs are made. This has tended to create a sense of ownership.
- Computer labs are difficult to access for staff training.
Figure 1.8: Ideal Scheduling Pattern
1.7.9  Scheduling Recommendations
The following recommendations are proposed as part of an approach to increase the utilization of space. Improvements to the academic schedule can lead to substantial efficiencies in the use of classroom and laboratory space, while clear procedures can ensure that space is used efficiently and allocated fairly. Key principles should include:

- Matching each class to the most appropriate facility;
- Making facilities as versatile as possible. Often, matching a class to the facility with the closest size is not possible because of the equipment necessary. As a result, a class of 30 may have to be accommodated in a classroom of 60 for that reason;
- Smoothing out peaks and troughs in use over the week by scheduling more classes early and late in the day and on Fridays;
- Ensuring that classes start and end according to a unified grid.

i)  “unbundle” class times
Currently, class times are usually “bundled”, that is, a class is scheduled at the same time on Monday, Wednesday and Friday or Tuesday and Thursday for the entire term, for example, from 8:00 to 9:00. Class times should be “unbundled”, so that no commitment is required to teach at 8:00 on multiple days (e.g. Monday, Wednesday and Friday). For example, a class then could be scheduled for Monday at 8:00, Wednesday at 9:00, and Friday at 10:00.

ii) standardize the schedule
Blocks of time in use on the same day should be standardized across the institution to ensure compatibility among programs and disciplines. The standard schedule would extend from 8:30 to 5:30 and allow for six uniform blocks of 90 minutes, nine blocks of an hour, or three blocks of 3 hours for certain uses (e.g. labs). An additional block would be scheduled from 6 to 9 pm.

iii) explore the use of less popular time blocks
Afternoons, and particularly Friday afternoons are currently less used than other time blocks. Although lab utilization was not analyzed at Memorial, labs in most universities tend to be mostly scheduled in the morning. Less popular time blocks need to be promoted to better balance the use of facilities over the schedule and minimize bottlenecks, both in the use of academic facilities and parking. The spring and summer sessions could also become more heavily programmed to ultimately become full-fledged semesters, allowing students to expedite their studies and take advantage of campus amenities during the summer months.

iv) computerize the scheduling and space allocation system
Space allocation and scheduling are currently performed in a manual and at times decentralized fashion, resulting in time-consuming processes to identify and reserve meeting space, and less than optimal schedules.

It is recommended that Memorial consider the acquisition of a campus-wide scheduling system. The system would optimize the relationship between space, equipment, time, faculty and students, both for recurring events like classes, and one-time events like lectures and meetings. The software could be customized to enforce processes, accommodate preferences and automatically request approvals when needed.

- For scheduling, the software would allow the registrar to run a variety of scheduling scenarios before finalizing the schedule for a given year and may be able to accommodate waiting lists, which are currently maintained manually.
- Bookings would coincide with a consistent time grid to minimize the creation of unusable time blocks. For ad hoc bookings, an automated space reservation system could be used to allow university users to see what facilities were available and when, and book space themselves. To maintain controls, the system would be configured to restrict access to space types to certain users.
- Another significant advantage of such a system is the availability of usage reports that allow Administration to analyze usage patterns and utilization statistics centrally, even if departments continue to control access to specific space. Additional data can result in improved space allocation decisions and the charging of space resources to each user as outlined in the next section. There are numerous off-the-shelf scheduling software packages available on the market, specifically tailored to universities.
Efficiency should not be overemphasized. Flexible - or ‘swing’ space is important, as is allowance for communal space and spaces that provide a sense of openness.

(Dalhousie University, Computer Science Building)
2. THE CAMPUS PLAN CONCEPT

2.1. Introduction – Applying the Campus Plan Concept

The role of the Campus Plan is to help accommodate the goals, aspirations and visions of the University community by identifying and analyzing opportunities for growth and physical improvement. The rate of growth and extent of campus transformation will be a product of funding and programming opportunities. The Plan illustrates a scenario depicting the full ‘build-out’ of the Campus and though this scenario may not actually happen within the next 50 or even 100 years with a comprehensive plan, the University can undertake individual projects with the assurance that each project fits within a cohesive long-term vision. The Plan can prevent lost opportunities, for instance a building placed in the middle of what could be a premier open space.

In addition to the Campus Plan, it will be crucial for Memorial to coordinate the Plan with the Strategic Framework Plan as it evolves and with facility or department-specific studies undertaken to clearly understand the adequacy of current facilities and the need for new construction. Detailed department or building-focused space studies will help Memorial assess how it uses space currently, how space can be used more efficiently and how much net new space will be required to implement the objectives of the Strategic Plan. While an overview is provided in Chapter I, detailed space studies can also help define the precise space needs associated with each type of new initiative. In summary, the Campus Plan provides Memorial with a physical framework that will allow the University to comprehensively plan and design new facilities and open space that collectively create an inspiring and beautiful campus environment.
Figure 2.1: Aerial View of the Campus
2.2 Key Structuring Elements of Campus Development

2.2.1. Context
Although the 175 acre campus was once located in St. John’s periphery, the City has now grown around it and the Campus is now well connected to Downtown St. John’s and other areas of the City. Areas to the east and south of the Campus are primarily low-density residential, while the area to the west is occupied by a variety of large-scale institutional uses including Prince of Wales Collegiate and the Health Sciences Centre Complex, some of which is occupied by Memorial. North of the Campus is the open space portion of Pippy Park, a 3,400 acre land reserve which encompasses the Campus within its boundaries.

2.2.2 The Key Structuring Elements of the Campus Plan
The Campus is relatively compact and well-connected by a network of pathways, tunnels and overpasses but visual and physical links to Long Pond and Pippy Park are not easily visible by the placement of buildings, and as a result the opportunity to experience these areas as key campus amenities is reduced. The Campus is bisected by Prince Philip Drive which forms a significant physical and psychological barrier. The diameter of the red circle on the plan (Figure 9) represents a 10 minute walk from edge to edge, representing an important measure for the campus community moving between classes. The following major Campus Plan ‘moves’ are summarized by the following structuring elements.

1. Integrating the University in its Park Setting
The University’s location in Pippy Park benefits from the proximity to attractive natural features that will be protected from development in perpetuity. Some buildings have been allowed to be sited without a strong relationship to pedestrian pathways or open spaces as organizing elements. As a result, the sense of a cohesive campus environment is sometimes lacking.

Other characteristics and issues include:

- The University lacks a large iconic open space.
- Parking lots are usually not screened and visually prominent.
- Too many interstitial spaces are simply grassed and not landscaped.
- Vegetation is underused as windbreaks.

Key directions of the Campus Plan include:
- Prince Philip Drive is transformed as a landscaped ‘parkway’. A ‘green bridge’ extends pedestrian access between new buildings across the Parkway, provides common university space and provides a new landmark gateway structure. The chain link barrier is replaced by a centre raised median of planted majestic columnar oaks that retain their leaves in winter. The edges of the parkway allow for cyclists and pedestrians to travel safely within the boulevard between a double row of trees.
- Buildings embrace outdoor space and connections to the natural landscape
- The Campus edges are defined by landscaped setbacks which assist in screening surface parking areas.
- Outdoor spaces have sheltered building edges.
- The wind is harnessed as a campus resource through wind turbines integrated into gateway markers at the primary campus intersections
- The Campus landscape plan is developed as a ‘Demonstration Landscape Setting’ for the City as a whole.
Figure 2.1: Aerial View of the Campus: the red circle illustrates an approximately 5-minute walking distance from centre to outer edge or 10 minutes from edge to edge through the centre.
Figure 2.2: The Campus Plan Concept

Brook McIlroy Inc
Figure 2.3: The Campus Plan Concept (model view from the south west)
Figure 2.4: The Campus Plan Concept (model view from the north east)
Figure 2.5: The Campus Plan Concept (model view from the north west)
2. **Defining a Compact Walkable Campus**

The existing pedestrian network on Campus has not benefited from comprehensive planning. Therefore, the Campus Plan addresses:

- Improvements to conflicts with vehicles with heavy traffic volumes throughout the Campus;
- The creation of clear, legible and continuous outdoor pedestrian networks;
- The creation of consistent paving materials;
- ‘Desire lines’ that cross parking and grassed areas;
- Improved connections to transit stops;
- Improved lighting and wayfinding;
- Barrier Free Accessibility along pathways and to primary building entrances.

The dominance of vehicles in the north campus area in the vicinity of Arctic Drive does not provide a welcoming outdoor pedestrian environment. The climate on campus makes walking difficult in the winter and limits the scope of landscaping opportunities. Gaps in the weather protected walkway system and vehicular conflicts result in difficulty navigating these areas of the Campus by foot.

An important component of the pedestrian network is the ‘Munnel’ or underground tunnel system centred around an east-west spine that fans out to most buildings south of Prince Philip Drive.

Overhead walkways link the south campus to the north campus, including a wide overpass that encompasses the University Centre.

- Campus expansion is focused within its current boundaries, rather than allowing Campus sprawl and compromising walking distances between buildings and campus resources.
- Gateway Markers are designed to signal arrival at key campus intersections
- A large 10 to 20 metre landscaped setback at Elizabeth Avenue buffers existing and realigned surface parking areas.
- Elizabeth Avenue’s width is maintained and the street is enhanced with landscaped edges and streetscape amenities (e.g. banners and improved lighting) that support a strong campus identity.
- The Campus is redefined through bold new pedestrian scaled outdoor spaces. The ground plane is developed with a common series of elements including uniform paving, raised planters/seating areas, bollard scale lighting and trees which act to define space, accommodate pedestrians, buffer wind and generally improve microclimate conditions.
- Pedestrian Circulation is protected and sheltered through the existing and proposed overhead pedways and below-grade ‘Munnel’ system, and at-grade colonnades and interior building edge connections.
Figure 2.6: The 10-minute walking circle defines a reasonable campus precinct for walking.

The green edge on Elizabeth Avenue should be preserved and extended between Allandale Road and Westerland Road.

This existing tree-lined path near Paton College is an excellent precedent for other campus pathways.
3. **A Reconfigured Campus Road Network**

Currently, access to the Campus is primarily by private automobile, with little carpooling observed. As a result, surface parking is a prominent use on Campus. A shortage of parking is currently perceived on Campus and fee increases are resisted. In the future, increased demand can be expected with the growing suburbanization of St. John’s, making transit increasingly difficult to provide efficiently.

The road configuration on Campus promotes conflicts between pedestrians and vehicles, and access from public roads, particularly at the Prince Philip Drive intersection, resulting in congestion, stacking issues and occasional accidents.

The internal roadway system of the University should have the following characteristics:

- **Low traffic volumes assisted by parking provisions provided at the perimeter of Campus.**
- **Clear, consistent wayfinding signage.**
- **Well-signed, visible pedestrian crossings identified by feature paving indicating pedestrian priority at all intersections.**
- **The ability to accommodate cyclists and parking at building entrances and where feasible, within buildings in dedicated security monitored areas.**
- **Low traffic speeds, reinforced by incorporating metered parking as a natural deterrent to speeding or other traffic calming measures if necessary.**
- **The provision of adequate bus stops and associated waiting areas throughout campus.**
- **Well-lit, frequently located emergency call kiosks.**

Specific access, circulation and transportation issues are discussed in Chapter 5 – Transportation.

---

**South Campus**

1. Irwin’s Road is realigned parallel to Prince Philip Parkway to facilitate east west campus circulation and mitigate traffic problems at intersections connecting with Livyer’s Loop and Prince Philip Parkway.

2. Pedagogues Close is extended north to connect with Irwin’s Road directly east of the Education Building, eliminating the section of Irwin’s Road that extends in front of the Education Building and connects to Westerland Road.

3. Livyres Loop is retained as a one way (clockwise) campus road controlling left turn movements on to Prince Philip Drive through right in, right out only movements.

4. A new two-way north-south road is created as Russell Road Extension. Bollards are used to control access to Livyres Loop to allow the flexibility to prevent north-south cut-through traffic.

5. The east-west driveway located parallel to Elizabeth Avenue is extended east to connect to the new Russell Road Extension.

6. Phelan Road is realigned as an extension from Russell Road. Existing surface parking is redistributed north of the green buffer along the Elizabeth Avenue frontage.

7. Burton’s Pond Road is extended and realigned parallel to Elizabeth Avenue. The road is framed by existing and proposed campus buildings to the north and provides access to surface parking areas the south.
Figure 2.7: Current South Campus Configuration

Figure 2.8: Proposed South Campus Configuration
North Campus

8 Arctic Avenue is redefined by new buildings fronting on both sides.

9 Transit access is dedicated to the south side to mitigate conflicts with other vehicles. Metered parking for cars adjacent to the University Centre is removed to improve transit access and facilitate pedestrian flow to the north.

10 The eastern arm of Morrissey Drive is extended directly south to connect with Prince Philip Drive and replaces the intersection directly to the east, reducing traffic circulation in front of the Colleges.

11 Clinch Crescent remains in its current configuration, but is landscaped and ‘greened’ as an important entry road to the Health Sciences Centre Complex, Mt. Scio Road and the landscape beyond.

12 Kerwin Place is redefined as a primary north south road that extends the strong north south pedestrian alignment that is defined to the south in the core campus area. This connection provides an important alignment that visually and physically defines a new link across Prince Philip Drive that continues directly north between the NRC-Institute for Marine Dynamics and Engineering and Applied Sciences.
Figure 2.9: Current North Campus Configuration

Figure 2.10: Proposed North Campus Configuration
4. A Balanced Parking Strategy

Currently, surface parking lots are dispersed in large and small lots throughout the University Campus with the larger lots typically adjacent the Campus perimeter roads, including Elizabeth Avenue, Prince Philip Drive and Westerland Road.

Parking provisions should not be solely based on need resulting from an increased campus population, but instead met through a variety of expanded opportunities including transit, carpooling, walking and cycling to campus. A strong sensibility raised with the University stakeholders was the desirability of making the Campus as pedestrian, and to some degree, as cyclist friendly as possible, minimizing conflicts with vehicles. The Campus Plan accomplishes this by focusing parking on the periphery of Campus, closer to the adjacent public road system.

The parking strategy recommends that where new buildings are built on top of existing surface lots, that parking be replaced in new structured facilities, either in the new building itself or within the two proposed parking structures at the south west and North West areas of the Campus. Surface lots are realigned and screened by green buffer and landscaped setback of Elizabeth Avenue. This will reduce the number of vehicles having to travel through campus to access parking. Additional short-term parking is recommended to be permitted along internal campus roads (except during large snowfalls) to provide convenient parking close to buildings with minimum visual impact.

A detailed table of proposed changes is provided in Appendix B.
Figure 2.11: Existing and Proposed Parking
5. Collegial Campus Buildings

In the two decades following its establishment on the current Campus, the Memorial Campus has grown rapidly. In doing so, the following has occurred:

- The original mid-century institutional architectural style featuring tan brick and stone accents has been ignored;
- A variety of architectural styles have been introduced;
- Buildings have often been constructed without regard to the establishment of a coherent pedestrian network or open space system, or even the alignment of entrances to facilitate walking between buildings.
- Shifts in the alignment of buildings (e.g. Education and Chemistry/Physics) impede some direct pedestrian routes.
- Buildings have not been designed to frame streets and pathways, or mark important corners.
- New buildings are proposed to infill sites throughout the Campus within the 10 minute walking zone. Well glazed interior common areas face on to outdoor space and provide opportunities to open up in warmer weather.

2.3 The Campus Precincts

For ease of analysis, the Campus has been subdivided into six precincts:

1. South Central Campus: bound by Elizabeth Avenue on the south, Prince Philip Drive on the north, Westerland Road on the west and the Russell Road extension on the east

2. South East Campus: bound by Elizabeth Avenue on the south, Prince Philip Drive on the north, Russell Road extension on the west and Allandale Road on the east

3. South West Campus: bound by Elizabeth Avenue on the south, Prince Philip Drive on the north, a new public road on the west and Westerland Road on the east

4. North Central Campus: bound by Long Pond on the north, Prince Philip Drive on the south, the old colleges district on the east and Clinch Crescent on the west

5. North East Campus: bound by Long Pond on the north, Prince Philip Drive on the south, the old colleges district on the west and Allandale Road on the east

6. North West Campus: bound by the escarpment edge on the north, Prince Philip Drive on the south, the eastern and western sections Clinch Crescent

Each precinct will be discussed in sequence to supplement the Campus Plan description.
Figure 2.12: Campus Plan Precincts
2.3.1. The South Central Campus (48.2 acres)
The South Central Campus is presently comprised of 15 buildings within approximately 48 acres.

The area includes the four original buildings: Arts and Administration, Mathematics, Human Kinetics and Recreation and Science. The forecourt of the Arts and Administration Building still evokes an important gateway to campus and Toulinguet Close is a beautifully landscaped outdoor courtyard, which is well connected by walkways and the buildings that face on to it. The South Central Campus represents the historical and academic heart of the University centred on the proposed 'Memorial Common'.

Parking and vehicular circulation is a key issue for the internal campus area. Russell and Phelan Road are poorly configured in combination with their adjoining surface parking lots (Lots 15, 15b and 15c) and north south 'cut-through' and drop-off traffic compromises pedestrian access, particularly between this area and the student residence area to the east. Irwin’s Road cuts across the front of the Education Building and it's proximity to intersections at Prince Philip Drive create dangerous turning movements for vehicles and pedestrians crossing Prince Philip at grade.

The Master Plan for the South Central Campus focuses on the strengthening of the compact, pedestrian scale quality that exists. Opportunities to improve the image and access throughout this area and adjoining areas of the Campus are recommended through a balance of building additions and new buildings, landscape and open space treatments, reconfigured surface parking areas and campus road network.

Existing Facilities

- Academic Buildings: Arts and Administration, Mathematics, Music, Science, Chemistry and Physics, Biotechnology, Education, School of Human Kinetics and Recreation;
- Other Buildings: Field House, Queen Elizabeth II Library, INCO Innovation Centre, University Centre (south side), Facilities Management, South Campus Boiler Plant and a Storage Warehouse;
- Open Spaces and Outdoor Facilities: The field east of the Field House, The Arts and Administration Forecourt, Toulinguet Close, The Chemistry Building Courtyard, Memorial Common;
- Parking: See chart on Page 51.
Figure 2.13: The South Central Campus
The South Central Campus Plan

The Placement and configuration of new buildings and additions takes into consideration the currently planned additions to the Library, Music, Science and potentially the Arts and Administration Buildings. These projects have the opportunity to define a linked system of formal open spaces, quads and courtyards, and weather protected building connections and common spaces as the primary organizing device of the South Central Campus.

The primary building additions and new buildings for the South Central Campus include:

Buildings fronting on to Elizabeth Avenue

1. Arts and Administration (Fig. 13, No. 9-1, 9-2)

Two 3 storey building additions of approximately 3,000 sm (33,000 sf) each frame a ceremonial entry forecourt as the historic and symbolic front door of campus. These buildings are proposed to extend the administrative role of the University, and possibly free space in the Arts and Administration building for other faculty use such as the Faculty of Arts. Some uses proposed for the new buildings include the President's office, meeting and administration space, Student Services, a relocated Faculty Club, University Registrar and a common space directly adjacent to a bus drop-off location on the eastern building addition.

2. Mathematics Expansion (Fig. 13, No. 12)

A three storey approximately 4,000 sm (43,000 sf) expansion to the Mathematics building would replace the existing Storage Building and ideally, if required, provide additional space for the Mathematics Faculty or for another faculty such as the Faculty of Arts. The building could be constructed as a free-standing building or addition. All exposed edges of the building should provide weather protected internal or external circulation in the form of a colonnade. The north frontage facing Toulinguet Close should incorporate large amounts of glazing and indoor common areas to allow the Campus community to visually engage the courtyard and in the summer months have direct access to the courtyard.

3. School of Music Expansion (Fig. 13, No. 13)

The two storey expansion to the School of Music is intended to address the acute lack of classroom, office, practice studio, exhibition and library space as well as create a newly defined main entrance and atrium space. The expansion to the south and east of the existing building provides a prime opportunity for the building to present an improved sense of arrival to campus and the Music School from the proposed Russell Road extension, emphasizing the strong role of the Music School with the broader local and international community.

The west side of the Music School should develop a stronger at-grade connection to Toulinguet Close.

4. Toulinguet Close Pavilion (Fig. 13, No. 11)

A single storey 445 sm (4,800 sf) courtyard pavilion is proposed to be located at the centre of Toulinguet Close. The pavilion contains common areas for socializing and studying and a small café which could serve healthy food alternatives in keeping with its garden location. The architecture of the pavilion should be highly glazed, allowing views that give a sense of connection to the courtyard. In warmer weather the east side of the pavilion should open to a small patio containing garden tables and chairs where the floral and outdoor setting can be enjoyed and even enhanced through music or other performances by the adjacent Music School.
Figure 2.14: The South Central Campus (partial)
5. Library Expansion (Fig. 13, No. 8)

A Library addition of approximately 7,000 sm (75,000 sf) is to be constructed over a twenty year time frame. The physical collection is growing, while the journal collection is decreasing. The 4 storey addition is proposed to the south and west of the existing building with a glazed at-grade entrance on the west and south building façades.

Expansions to the Library need to be considered in conjunction with the changing role of campus libraries. No longer are libraries seen as repositories for collections, but more as a common campus place that offers a range of flexible uses including social spaces, and places for quiet and communal studies and research. Distance education will require that users can eventually access restricted library resources including databases and online journals from off-campus computers. A student would require a NetID to authenticate them as a valid member of the Memorial community.

It is essential that improvements to the library provide greater access to paper-based and electronically-based information and appropriately furnished quiet work and common spaces.

6. Computer Services (Fig. 13, No. 10-1)

A two storey addition of approximately 2,300 sm (25,000 sf) to the west side of the Science building to replace Computer Services which is currently housed in a temporary building. This addition will provide a more positive face to the INCO Innovation Centre and the open space in between. The building addition should carefully integrate with the occupied spaces and the western elevation of the Science building. The grade level of the building should contain common study areas and a weather protected building edge on the west side. A large amount of glazing on the west, north and south elevations is recommended as a counterpoint to the brick of the Science building and to extend a sense of transparency and views towards Memorial Common and the University Centre beyond.

7. The Science Building Courtyard Infill (Fig. 13, No. 10-2)

An approximately 12,760 sm (137,000 sf) four storey infill building is proposed for the Science building courtyard as an option to the Science building expansion. An alternative option is being considered for the proposed building site (No. 5), a gateway building site on the north east corner of Clinch Crescent and Prince Philip Drive. The Science building infill option will occupy the existing large building courtyard which is currently being used for surface parking and result in an exciting and progressive form of architecture.

8. Future Academic Building (Fig. 13, No. 7)

A four storey approximately 11,200 sm (120,500 sf) new building on the south side of Prince Philip Drive, north of the existing Library. The building is one of several future academic buildings recommended to replace existing surface parking areas and use the slope of the land to integrate structured parking. The future building (No. 6) to the north of Prince Philip Drive will be directly connected with a new ‘green’ bridge building, forming a highly visible landmark campus structure that symbolizes the sustainable development aspirations of the University (See Chapter 6, Sustainability).
Figure 2.15: The South Central Campus (partial)
Figure 2.16: 3D view of the South Central Campus seen from the south

Figure 2.17: 3D view of Arts and Administration Building seen from the South

Figure 2.18: 3D view of building framing Prince Philip Drive in the Central Campus seen from the West
Figure 2.19: 3D view of Memorial Common seen from the east

Figure 2.20: 3D view of Memorial Common seen from the north

Figure 2.21: 3D view of proposed Academic Building No. 7.
The South Central Campus Open Space Plan

The South Central Campus is considered, from an open space perspective, to be the core of the campus. Here is where the highest quality of landscaped open space should be achieved as the core area will be the most visited and visible space on the campus. This district is where the character of the campus can be the most expressive and achieve the biggest impact.

The most imposing element on the campus, during all seasons, is the wind. All aspects of the open space design should respect the constant windy conditions and find ways to make the campus open spaces more comfortable for pedestrians. The campus plan has taken the design a step further and used the wind and wind direction as the basis for patterns in the south central district landscape plan.

Significant opportunities exist to strengthen the network of campus courtyards and open spaces as a primary ordering and orientation device for the Campus. North-south and east-west connections will be defined and strengthened to provide organization and clarity to the pedestrian circulation pattern. Common elements and visual cues such as coordinated site furnishings, paving materials and colours, signage and way-finding and similarly designed seating areas will ensure that pedestrians will be aware that they are within the campus core.

The reorganization of the open space in this district makes accommodations for new gathering spaces. Each space should be themed in relation to the surrounding context and framework provided by each space’s unique surroundings. Concepts should range from new and innovative to time-tested and traditional depending on the sensitivities of the site, the use of the surrounding buildings and the opportunities for historic references.

The following new gathering spaces have been created as part of the campus plan:

Memorial Common (Fig. 19)

A primary objective for the Core Campus is the Creation of ‘Memorial Common’, a newly defined formal open space designed as a symbolic and physical heart of the whole campus.

The formal space enclosed by the Student Centre, the Library, the INCO Innovation centre and the science buildings will be the largest formal gathering space on the campus. The expanded and realigned podium at the base of the Student Centre will provide opportunities for a bosque of trees at the base of Memorial Tower, to provide some transition from the high tower to pedestrian scale and to provide wind break from west winds. A Memorial Garden and ramp anchors the west side of the podium, leaving the centre area to address the campus green below. The open space at the base of the steps can be used as an events stage, and, when no event is underway, the wide steps can be used for sitting and informal gathering, taking advantage of the southern exposure.

The central portion of Memorial Common incorporates a campus green with seating areas and walkways. Existing deciduous and evergreen trees are retained and intensified to create wind buffers.

A certain amount of vehicular access is necessary to provide basic service and delivery functions to existing and proposed buildings. As illustrated in the Campus Plan, vehicular access areas are to be de-emphasized both physically and visually. As a rule, vehicular access areas and routes should be considered a secondary function to pedestrian movement. The parking area on the east side of the plaza will reflect a continuation of patterns and materials that are used throughout the entire Memorial Common. Edges of the vehicular areas will be defined by permanent metal bollards spaced 2.75m on centre. The bollards are spaced to provide demarcation of the parking spaces. Some of the bollards will be removable so that emergency and service vehicles can gain access to the inner areas. The south end of the parking area and turn loop will be defined by a row of square cut boulders that can double as a seating area. A focal feature in the centre of the turn loop will provide a landmark visible on axis to the east-west walkway extending towards Paton College.
The Campus Plan Concept

Memorial University Campus Plan

- Planting to frame Student Centre
- Retaining wall
- Sweeping accent bands to emulate wind patterns and direction (granite pavers)
- Expanded podium events staging area / Granite paving
- Parking court access drive
- Precast concrete unit pavers: Limestone Blend
- Service area
- Parking court defined by bollards
- Focal feature / Public art
- Link to east / west corridor
- Seating aligned with east / west corridor
- Rectangular cut boulders double as seating element
- Seating aligned with north / south corridor
- Seating area aligned with east / west corridor
- Link to Memorial Common
- Retain existing tree stands intensify with additional planing
- Precast concrete unit pavers: Sandstone Blend
- Accent Paving bands granite pavers
- Seating aligned with north / south corridor

Figure 2.23: Memorial Common

Figure 2.24: Courtyard between Library and Human Kinetics
Courtyard between Library and Human Kinetics (Fig. 24)

The new open space area located between the library and the School of Human Kinetics building is designed to retain the significant existing tree stands and incorporate the treed areas into one large planting area. The plant material is intensified to enhance the wind buffering aspect of the planting. The courtyard incorporates seating areas and nodes, including a raised seatwall feature surrounding a grassy knoll. The knoll and grid of trees is intended to provide visual interest in the winter months. This courtyard is part of a major east west corridor in the core area.

Courtyard on north side of Arts and Administration (Fig. 25)

This enclosed space surrounded by a raised planter, is out of the way of corridor movement and loading ramp for the INCO Innovation Centre and provides opportunities for quiet, passive uses. This location is recommended for permanent and/or temporary public art displays.

Symbolic Entry Court Arts and Administration (Fig. 26)

To create a more ceremonial entrance to the campus, access from Elizabeth Avenue to the Arts and Administration building will occur through the realigned entry loop. The realigned entry loop and turn around will be improved with a high quality pavement, including the crosswalk area. The streetscape along the realigned loop will be animated with tree planting, lighting, banners, seating nodes and way-finding elements. Gateway features will be incorporated to signal the arrival at the Memorial campus. Access from this area to the internal campus occurs at the bus layby and waiting node area on the east side and at the parking court on the west side. Both these areas connect to a major north-south corridor.

Natural stone gardens walls will be used to retain grades and will double as a seatwall. Narrow courtyards adjacent to each new addition on the west and east side will be provided for spill out areas for bistro tables to animate the space.

Toulinguet Close (Fig. 27)

The campus plan proposes that Toulinguet Close remain as is and suggests only a few improvements. Much of the plant material is overgrown or has come to the end of its lifespan. The planting plan should be re-assessed and renovated to improve its appearance, health and safety issues. The paving should be upgraded to a higher quality pavement such as unit pavers. New durable, site furnishings such as benches, lights, bollards and trash cans should be installed. A spill out area associated with the new pavilion building should be provided in the lower area. This area would be used for bistro table seating for the proposed coffee kiosk. In the upper area, the campus plan proposes removing portions of the hard paving and replacing them with lawn area and ornamental tree planting. The shrub and perennial planting area, like the lower gardens should be assessed and renovated to improve its appearance and impact.
Music Garden (Fig. 28)

As Phelan Road is extended to Elizabeth Avenue, the Music Garden will be in a highly visible location. This open space has the opportunity to present a high quality image to visitors and the community. The courtyard also provides an important link to major east-west connections and should contain wayfinding elements.

The parking court should appear to be part of the courtyard and should reflect a continuation of patterns and materials that are used in the remainder of the courtyard. The edges of the parking area will be defined by metal bollards and square cut natural stone boulders that can be used as seating elements.

The landscape forms in the Music Garden will respond to the theme of music. The Music Building and its extension provides wind protection and seatwalls, raised planters and intense landscaping are designed to create a sense of enclosure.

Education Building (Fig. 29)

The removal of the existing roadway and creation of a turning loop creates the opportunity for an open space forecourt to be located on a major corner of campus. The forecourt anchors the NW corner of the district, incorporates a primary gateway feature and provides the transitional landscape to relate the existing building to its surroundings.

The courtyard on south side of Education Building, protected from the wind and located at the terminus of a major east-west connection, provides an area for outdoor classrooms, studying or informal gatherings.

Chemistry Building (Fig. 30)

Like the Educational Building forecourt, the Chemistry Building forecourt, anchors the NE corner of district and provides opportunities to establish the campus image at a major intersection. A portion of the forecourt can be used for outdoor classrooms, and for public art displays.

The internal courtyard of the Chemistry Building is challenged by its lack of code access. However, the courtyard is highly visible from the internal classrooms and should be developed as a visual garden, with the only access being provided to maintenance staff. A Chinese Garden theme for this courtyard is currently being explored by the University and the campus plan is in agreement.
Link to east / west corridor
Seating
Formal entry area with granite accent paving
Precast concrete unit pavers: Limestone Blend
Enclosed garden areas with garden walls and planting

Parking court defined by bollards and rectangular cut boulders
Signage
Landscape forms to support music theme
Link to east / west corridor

Forecourt area with new turn around loop helps anchor corner of south central district.
Opportunities for public art / educational interactive features
Spin out area for interior building uses - well protected from wind.
Shrub and ground cover planting
Tree planting
Concrete paving with natural stone accents
Link to major east / west corridor
Street tree planting along access drives

Chemistry building forecourt anchors north east corner of south central district

Screening / buffer planting
Small plaza space incorporating public art and outdoor classroom space. Concrete paving with natural stone accents
Internal Chinese garden / visual garden
2.3.2. **The South East Campus (Fig. 31, 28.3 acres)**

The South East Campus is primarily dedicated to the Campus daycare, sports field and campus residences in a series of small scale buildings. The most memorable of these are the Georgian style four storey Paton College residences which frame a beautifully scaled and landscaped outdoor courtyard with its main dining hall at the north end. The Paton College residences include 987 beds of the total 1,522 beds on campus in the form of singles, doubles and four bedroom suites.

The two storey Burton's Pond residences are attractively situated by Burton's Pond and the south east University gateway. These residences are by contrast to Paton College, much simpler structures. The five residences contain 535 beds. Each residence building frames its own internal courtyard, all of which require upgrading. Improvements to the entrance stairways are soon to be constructed for three of the five residences. The provincially owned Arts & Culture Centre is located at the south west corner of Prince Philip Parkway and appears to form part of the Campus; however it is completely separate from the University. Clarke Place is a residential cul-de-sac in which Memorial owns four of the seven houses.

The focus of the South East Campus is the tranquil Burton's Pond. The informal pathways that meander around its edges make it a unique place on campus to enjoy its quiet, contemplative natural setting. The CSU Childcare Centre located at the north end of the pond is nicely situated for the children to enjoy direct views of the pond.

**Existing Facilities:**

- Paton College including: Main Dining Hall, Rothermere, Bowater, Doyle, Barnes, Squires, Burke, Blackall, Curtis and Hatcher
- CSU Childcare Centre
- Burton’s Pond Residences including: Baltimore, Cortereal, Cabot, Cartier, Gilbert and Guy
- Four Clarke Place Residences including 202 Elizabeth Avenue, 4 Clarke Place, 6 Clarke Place and 10 Clarke Place.
Figure 2.31: The South East Campus
The South East Campus Plan (Fig. 32)

The existing residential and natural setting of the South East Campus is retained in the introduction of new buildings, outdoor spaces and landscape elements. Burton’s Pond remains the focus, and while the need to provide more compact residential development is important in this area of campus, it is also important to retain the fine grain residential character as it exists. The total new beds provided for the South East Campus total 836, with an additional 432 beds proposed for the North East Campus within new residences. In total, this scenario would account for the approximately 1,000 new beds recommended by the Memorial Housing Feasibility Study, St. John’s Campus plus an additional 268 beds, for a total of 1,268 new beds on campus.

The primary new buildings and facilities proposed for the South East Campus Plan include:

1. New Residences (Fig. 32, No. 19-1, 19-2)

A five storey approximately 21,750 sm (30,000 sf) residence including 147 four bedroom suites totalling 588 beds. The ground floor contains approximately 35 of the residential suites, with the remainder dedicated to student common rooms and meeting rooms that can be used both by the University or rented for conferences.

The location of the building is designed to frame the realigned field and provide views and a positive eastern frontage to Burton’s Pond.

2. New Residences: (Fig. 32, No. 20)

Should the University eventually acquire all existing Clarke Place residences (3 are remaining), a four storey approximately 9,000 sm (97,000 sf) residence is recommended including 62 four bedroom suites totalling 248 beds. The ground floor contains student common and study areas. Dining facilities would be available through existing or proposed new residences.

3. Burton’s Pond Commons (Fig. 32 No. 21)

A two storey approximately 1,560 sm common room facility. The building architecture should be contemporary to complement the Burton’s Pond residences.
Figure 2.32: The South East Campus
Figure 2.33: 3D view of the South East Campus seen from the south

Figure 2.34: 3D view of the proposed new Burton’s Pond Residences
Figure 2.35: 3D view of the South East Campus seen from the north

Figure 2.36: 3D view of the old and new Burton’s Pond residences seen from the south east
The South East Campus Open Space Plan

The South East Campus open space system is comprised of distinct existing elements such as Paton College, Burton’s Pond, six residential buildings and a sports field. The Campus Plan preserves the existing fabric of buildings and open space, and further connects them to adjacent campus areas.

Paton College (Fig. 38)

The Campus Plan does not propose any major changes to the Paton College open space. The space surrounding the buildings responds well to the location’s programmatic needs. A strengthened connection is made to Memorial Commons to the west and includes the installation of a crosswalk at Livyers Loop. Stronger pedestrian crosswalk connections are made across Livyer’s Loop to Burton’s Pond and the proposed residential building.

Burton’s Pond (Fig. 39)

Burton’s Pond is one of the most significant open space elements on the campus and should be the main unifying element in the South East District. The Campus Plan proposes a boardwalk along the west side of the pond, pulling the open spaces away from the roadway. The boardwalk will also provide a north south connection between Paton College and the residential buildings to the south. The pathway around the pond will be maintained and enhanced with intensified planting and improved paving materials. Interpretive signage could inform people of the significance of the pond’s ecological role and describe the flora and fauna that can be found there.

Burton’s Pond Residence Courtyards (Figs. 36 and 39)

The Burton’s Pond residential buildings provide excellent opportunities to establish unique garden areas within each protected courtyard. Courtyard gardens do exist, however, they should be assessed and renovated to maximize their aesthetics and appropriateness for residential use. The gardens can incorporate improved seating and shelter elements and can include interesting plant materials that require a more sheltered location. The campus plan proposes to upgrade the entrance to the campus from the Elizabeth / Allandale intersection which will include a campus gateway feature.
Berms to align perpendicular to prevailing wind direction

Landscape berm with intensive landscaping to buffer winds and contain get away sports equipment

Connection to core campus

Connection to north / south corridor

Boardwalk with overhead trellis

Pedestrian node with shelter, seating and way finding element

Connection to east / west corridor

Pedestrian link to bus stop on Elizabeth Avenue

Figure 2.37: Proposed Residential Buildings and Open Field

Figure 2.38: Paton College

Figure 2.39: Burton’s Pond and Residential Buildings
2.3.3. **The South West Campus (Fig. 40, 13.8 acres)**

The South West Campus is comprised of the Aquarena, Alumni House and Printing Services. The area includes other non-university owned lands including St. Augustine’s Church at the north west corner of Westerland Road and Elizabeth Avenue, a private residence (McPherson property) between the Aquarena and Alumni House and the CBC lands at the south west corner of Westerland Road and Prince Philip Parkway. These private lands somewhat diminish the exposure and profile of this area of the campus.

The Aquarena and Field House facilities are referred to as the “Works” and are a separate incorporated entity from the University. Parking needs by the outside and the University community are high. The 1,400 spectator seats in the Field House alone contribute to the need for parking. The Works is considering an addition to the Aquarena to accommodate exercise and change room facilities and the addition of a ‘drive-through’ Tim Horton’s. The franchise is currently owned by the Works.

The outdoor track north of the Aquarena historically has not been a well used facility due to its location and exposure to the wind. The track is gradually being increasingly used for parking by the Works (approximately half) and the remainder by the University.

**The South West Campus Plan (Fig. 40)**

The South West Campus is defined by the Aquarena which is directly linked through an overhead pedway to the Field House on the east side of Westerland Road. Until opportunities arise to purchase privately owned lands, the area is constrained by limited development opportunities. The Master Plan considers a scenario in which the private residence currently for sale is acquired by the University. The Transportation and Parking Plan has identified this as a potential location to locate a structured parking facility for use by the entire University community. A new north south road linking Elizabeth Avenue to Prince Philip Drive is recommended to provide direct access to the garage and alleviate already significant traffic turning north on to Westerland Road.

The campus community expressed mixed views on the retention of the Playing Field. It is generally seen as both underused and also a valuable open space asset that should be protected. The Master Plan shows the retention of the field, in favour of defining it as a paved surface parking area. Suggested improvements to the field include the use of artificial turf and the use of perimeter berming and dense landscaping to deflect the wind. Should the University decide to remove the field, further investigation should be undertaken to determine the viability of this site for a structured parking facility (larger than the structure proposed in this plan). Alternatively, the site could be used to expand Works or University buildings that would front on to Westerland Road and the new north south road.

1. **Parking Garage (Fig. 40, No. 1)**

A four storey parking garage of approximately 18,000 sm (194,000 sf) providing 120 parking stalls on each level totalling 480 stalls.

The at-grade level of the garage should provide positive frontages to the Aquarena and the proposed north south road. These building edges should consider the inclusion of active uses including small scale retail or complementary uses to the Works.

2. **Aquarena Expansion (Fig. 40, No. 2)**

A two storey approximately 2,800 sm (30,000 sf) expansion to the Aquarena. Immediate plans include the addition of a fitness centre and change facilities within 465 to 930 sm (5,000 to 10,000 square feet). The remainder of the expansion would accommodate other future recreational needs.
Figure 2.40: The South West Campus
Figure 2.41: south 3D view of the South West Campus
Figure 2.42: north 3D view of the South West Campus looking up Westerland Road from Elizabeth Avenue
2.3.4. The North Central Campus (Fig. 43, 52.2 acres)

The North Central Campus represents one of the greatest challenges to the Campus Plan. Increasingly the area has and will continue to become a principle campus gateway; however there exists a poorly defined campus of buildings and outdoor spaces, much of which does not invite public attention or interface with the everyday life of campus. The North Central Campus comprises a variety of important University and other buildings of varying sizes largely related to the fields of Science, Research and Technology. The character and scale of this area of campus is in direct contrast to the large buildings found in the South Campus. Significant amounts of parking, internal circulation for buses, service vehicles and cars characterizes this part of campus. The buildings often present inactive elevations to pedestrians. Walkways are often poorly defined, lacking and discontinuous. The broad spaces between buildings, unlike in the South campus where the building fabric is more tightly connected, can make moving outdoors between buildings unpleasant in the winter.

University owned buildings include the University Centre which bridges the North and South campus over Prince Philip Drive, the Earth Sciences CERR building (also connected by overhead pedways), Engineering and Applied Sciences, the Centrifuge Centre and C-Core buildings, the Business Administration Building and the Utilities Annex. The NRC Institute for Marine Dynamics is not owned by the University and is the largest of all building complexes in the North Central Campus.
Figure 2.43: The North Central Campus

- Utilities Annex
- NRC-Institute for Marine Dynamics
- Engineering and Applied Sciences
- Business Administration
- Earth Sciences CERR
- University Centre
- 4
- 5
- 6
- 7
The North Central Campus Plan (Fig. 44)

The challenge in this area is to provide a strong and ‘imageable’ west gateway to the University; efficient and high volume access from Prince Philip Drive, including improved transit access from Arctic Avenue while creating a more public sequence of outdoor space leading through the north campus in all directions, but in particular to the natural landscape surrounding Long Pond.

The buildings proposed for the North Central Campus are primarily focused on the three parking lots (Lots 16, 16a and 27) occupying the large open quadrant of land north east of Prince Philip Drive and Westerland Road. Development of these lands will provide a substantial change to the image of the campus from the west and therefore these new sites will have excellent visibility and opportunities to create landmark building sites symbolic of the contemporary, progressive directions of Memorial University. It is important that quality of architecture and site design provide a strong relationship to the campus fabric.

The primary building additions and new buildings for the South Central Campus include:

1. Parking Garage / University Administration or other (Fig. 44, No. 4)

The second of two proposed parking facilities on campus. A four storey parking garage of approximately 27,000 sm (291,000 sf) providing 188 parking stalls on each level totalling 752 stalls.

The parking garage is proposed as a mixed use structure in which at grade opportunities for University administration, offices or other opportunities related to the proximity of the Health Science Centre. These active at-grade uses should primarily be located within weather protected building edges of the Clinch Crescent and Arctic Avenue frontages.

2. Future Academic Building (Fig. 44, No. 5)

A four storey approximately 15,600 sm (168,000 sf) new building on the north east corner of Prince Philip Drive and Clinch. The building is one of several future academic buildings recommended to replace existing surface parking areas and use the slope of the land to integrate structured parking and provide building frontage onto both Prince Philip Drive and Arctic Avenue. The site is an option for the Science Research Centre also being contemplated within the Science building courtyard.

3. Future Academic Building (Fig. 44, No. 6)

A four storey approximately 15,600 sm (168,000 sf) new building on the north of Prince Philip Drive and west of the University Centre. The building is anticipated for future academic uses.

The building will be directly connected with a new ‘green’ bridge building (6/7-1), forming a highly visible landmark campus structure that symbolizes the sustainable development aspirations of the University. The bridge building is recommended to include uses that maintain the building’s public function such as food services, common rooms or support uses relating to the future academic buildings that they connect.

4. Business Administration Expansion (Fig. 44, No. 14)

A 3 storey building of approximately 4,000 sm (43,000 sf) plus a single storey link building on one level of approximately 540 sm (5,800 sf). The physical link to the Engineering and Applied Sciences building is intended to forge collaborations for projects of mutual interest. The building link would include office and meeting space as well as incorporate the Gateway Enterprise Outreach Programme, estimated to occupy approximately 100 sm (1,000 sf).

5. Business Administration Future Expansion (Fig. 44, No. 14-1)

A 3 storey building of approximately 1,015 sm (11,000 sf) future expansion either for the Business School or for future academic expansion. The building frames a new outdoor courtyard.
Figure 2.44: The North Central Campus (partial)
Figure 2.45: Conceptual section of proposed Academic buildings 5 and 6, and their relation to Arctic Avenue and Prince Philip Drive.

Figure 2.46: 3D view of the North Central Campus seen from the north
Figure 2.47: 3D view of the North Central Campus seen from the south

Figure 2.48: 3D view of Arctic Avenue looking east
The North Central Campus is physically separated from the South Central Campus by Prince Philip Drive. Open space flow is interrupted as crossings can only occur at overhead pedways or at signalized crossings, making visual connection to the north part of the campus ever more important. The close proximity of this area to Pippy Park presents the opportunity to pull the park-like setting into the campus framework and create a more contiguous natural environment. Intensifying existing planting, reinforcing windbreaks, and planting street trees along all access routes and parking areas will assist in creating the desired aesthetic in the open spaces.

The Student Centre North (Fig. 49)

The Campus Plan proposes upgraded treatments at the University Centre that is a continuation of the Memorial Commons aesthetic that has been established in the South Central District. The purpose is to reinforce the strength of this major north-south connection. This open space serves as a bus-top staging area and also serves as a minor parking area. Enhanced paving and crosswalks will provide greater control to bus, service and other vehicles and improved pedestrian priority.

Arctic Avenue Terminus (Fig. 51)

The east terminus of Arctic Avenue will focus on a landscape open space that is located adjacent to the Business Administration Expansion Building. This open space will be protected from the strong west winds by a shelter with wind screen and intensified planting.

Connections to Pippy Park (Fig. 50)

The central proposed primary north south green link to Long Pond and Pippy Park occurs along Kerwin Place. The Campus Plan proposes enhanced paving along the roadway, intensified landscaping and the creation of a wind shelter and wayfinding elements at the intersection of the east sidewalk and the Grand Concourse Trail (South Shore Long Pond Trail). An additional north south connection to Pippy Park is proposed along Morrissey Drive although it takes a detour at the C-Core Building and Centrifuge Centre. All connections to Pippy park should be well signed. The edge of naturalized landscape in the park should be allowed to expand into the campus grounds.
Figure 2.49: The Student Centre North

Figure 2.50: Connections to Long Pond and Pippy Park

Figure 2.51: Arctic Avenue Terminus
2.3.5. The North East Campus (Fig. 52, 16.3 acres)

The North East Campus, which contains the old College buildings, has perhaps the most potential to create a significant new focal area for the North East Campus as it directly connects to trails and open space surrounding Long Pond. Morrissey Drive is the main campus road which provides direct access to the college buildings and the series of parking lots (Lots 19, 21 and 62) located centrally among the buildings. The Colleges include residences and some academic and administrative uses. The five College buildings are part of the University’s original land holdings and include:

- **St. John’s College**
  - School of Social Work 95%
  - Admin. offices 5%

- **Coughlan College**
  - Residences
  - Student Services
  - Student Aid (provincial government service – leased from Memorial)
  - Math Learning Centre (would like to move – insufficient space)

- **Spencer Hall**
  - Genesis Centre (commercialization of research)
  - Computer and Communication (software developers)
  - International Centre (international collaboration)
  - Harris Centre (soon to be moved here – provincial collaboration projects)

- **Feild Hall**
  - International grad student residence
  - Student bar

- **Queen’s College**
  - Theology – 1 floor
  - Anthropology – 3 floors

- **Splash Facility at the edge of Long Pond**
  - Storage for Human Kinetics
Figure 2.52: The North East Campus
The North East Campus Plan (Fig. 53)

The somewhat dispersed locations of the College buildings are refocused within a central formal green space called ‘Long Common’ to associate its important connection to Long Pond, that replaces a parking lot (Lot 22) and is centred in a new north south open space connection between Prince Philip Drive and Long Pond. The building additions also frame new outdoor courtyards. The lands surrounding Long Common are in-filled with 4 storey buildings anticipated to include a combination of campus community uses on the ground floor and residential buildings above. The entire development will have a pedestrian and neighbourhood scale (similar to Paton College) and a sense of enclosure that will provide a more hospitable community atmosphere.

The ground floor of buildings could also contain a daycare, café, convenience grocery store and other common facilities to be used by the whole campus community. A total of approximately 432 residential units suitable for both graduate and undergraduate students would be provided. The calculation of beds is based on four bed suites; however the 3 to 4 storey building format provides enough flexibility to accommodate a broad range of housing needs in a variety of suite sizes including undergraduate, graduate and married students, as well as families.

Much of the existing at grade parking has been replaced with buildings. It is anticipated that the grade change that slopes down toward Long Pond could integrate at least 2 levels of partially below grade parking.

1. Future Residence Building (Fig. 53, No. 15-1)

A four storey approximately 8,720 sm (94,000 sf) residence with approximately 15 four-bedroom suites on each floor providing approximately 240 beds. The building frames a new outdoor courtyard which is lined by colonnaded space. The building is recommended to have a combination of common rooms or circulation space to allow pedestrians to use the interior and edge of the building for circulation.

2. Future Academic and Residence Building (Fig. 53, No. 15-2)

A four storey approximately 11,000 sm (118,000 sf) with approximately 12 four-bedroom suites on each floor providing approximately 192 beds. The building frames an new outdoor courtyard. The building is also recommended to have a combination of common rooms or circulation space to allow pedestrian circulation and access to the new courtyard.

3. St. John’s College Expansion (Fig. 53, No. 16)

A three storey approximately 2,160 sm (23,000 sf) potential Academic Building Expansion for the School of Social Work.

4. Academic or Residence Building (Fig. 53, No. 17)

A four storey building of approximately 2,160 sm (23,000 sf) that could be either an extension of the Field Hall residences or complement the academic uses of Queen’s College, which houses Anthropology and Theology.

5. Academic or Residence Building (Fig. 53, No. 18)

A four storey building of approximately 2,720 sm (29,000 sf).
Figure 2.53: The North East Campus (partial)
Figure 2.54: 3D view of the North East Campus seen from the north
Figure 2.55: 3D view of the North East Campus seen from the south

Figure 2.56: 3D view of the proposed residences (15-1 and 2) seen from the north
The North East Campus Open Space Plan

The close proximity of the North East Campus to Pippy Park presents the opportunity to pull the park-like setting into the campus framework and create a more contiguous and expanded natural environment. Intensifying existing planting, reinforcing windbreaks and planting street trees along all access routes and parking areas will assist in creating the desired aesthetic in the open spaces.

Long Common (Fig. 57)

Long Common is proposed as a new Campus open space to provide a continuous open space between the North East Campus and the natural setting of Long Pond to the north. Long Common (south) is a formal, level campus quad lined by trees and active building edges. Landscape elements in the centre of the Common are limited to low shrubs and gardens to maintain views to the Pond. Long Common (north) slopes towards Long Pond as a less formal open space in keeping with its proximity to the natural areas around the pond. Wild flowers could be planted in summer.

The campus plan capitalizes on views to Long Pond and creates north-south view corridors to the park, aligned with Livyers Loop. This view corridor is defined by the future academic and residence buildings between Coughlan College and the Business Administration Building. The terraced landscape will provide visual and physical access to the park and will incorporate gardens and seating areas appropriate for the proposed building uses.

Improved links to the Grand Concourse Trail are proposed at Long Pond.
Figure 2.57: Open Space including Long Common between Future Academic and Residence, St. John’s College and Coughlan College.
2.3.6. **The North West Campus (Fig. 58, 15.5 acres)**

The North West Campus is comprised by the Health Sciences Centre Complex. Only 15.5 acres of this almost 70 acre area of land is owned by the University but there is a integral connection between Health Sciences and the University. The Health Sciences Centre houses the following organizations related to the delivery of health care services and education including: The General Hospital; Janeway Child Health Centre; School of Medicine; School of Nursing; School of Pharmacy; and a wide range of other related support services. The original building was constructed in 1973 with minimal upkeep since then. Over the last five years, research has doubled and is expected to double again over the next five years. A three phased expansion of the Health Sciences Centre is anticipated. The Phase 1 expansion for research is proposed as approximately 750 sm (8,000 sf). The Phase 2 expansion could take place at the animal care facility. Two additional floors could be added to the existing atrium. The Phase 3 expansion for family and medicine clinics includes approximately 1,500 sm (16,000 sf).

**The North West Campus Plan (Fig. 58)**

The Campus Plan shows a three to four storey expansion to the Health Sciences Complex (No. 3) of approximately 10,000 sm (108,000 sf). This area would provide for long term Health Sciences expansion and as a significant building addition would allow for a more comprehensive hospital development to occur rather than small, incremental additions over time. The location of this expansion is intended to improve the image of the existing building and to screen the large surface parking area off of Clinch Crescent. The building expansion brings the perceivable location of Health Sciences closer to the University and is also in close proximity to the proposed parking garage and proposed academic buildings east of Clinch Crescent.

*Figure 2.58: 3D view of the North West Campus seen from the north west*
Figure 2.59: The North West Campus
The North West Campus Open Space Plan

This area of the Campus presents a strong physical and visual connection to the natural environment. Views to the natural area in front of the Health Sciences Centre are open along Prince Philip Drive and Westerland Road. Views to Pippy Park and Shamrock Farm along Clinch Crescent are also attractive and should be preserved and enhanced. Physical connections to both these areas should be explored and Connections to Pippy Park

The green link to Pippy Park will primarily be along the east side of Clinch Crescent and will include a connection at the intersection of the sidewalk and the Grand Concourse Trail. Improvements to Clinch Crescent includes a widened sidewalk and street tree planting. If possible, the west side of Clinch Crescent will also be improved by creating a wider buffer between the roadway and the Health Sciences Centre parking areas.

Improving the Pedestrian Environment

Improvements to the pedestrian environment in this area should include windbreak planting, improved crosswalks, wider sidewalks, intensified landscaping and the inclusion of a walking trail within the natural area south of the Health Sciences Centre.
Figure 2.60: Connections to Pippy Park

Figure 2.61: Health Sciences South

Pippy Park connection
North / south connection to Pippy Park
Enhanced street tree planting

Wetlands
2.4 Streetscape, Campus Edges and Gateways

Elizabeth Avenue (Fig. 62)
Elizabeth Avenue is a residential street that borders the campus along its south side. The broad boulevard on the campus side provides opportunities to enhance the campus image by intensifying the planting and improving the streetscape with a double row of trees and installation of new site furnishings, including university banners, pedestrian-scaled lighting and feature paving.

Westerland Road (Fig. 63)
Westerland Road is a wide, open roadway surrounded by large scale buildings and parking areas. The open space plan proposes to improve the aesthetics and scale of the pedestrian experience by installing sidewalks on both sides and planting a double row of street trees.

Allandale Road (Fig. 64)
Allandale Road is a residential street that borders the campus along its east side. Although residential in nature, Allandale sustains heavy traffic and will benefit from intensified planting and improvements to the streetscape, such as a double row of trees and the installation of new site furnishings.

Prince Philip Drive (Fig. 65)
Prince Philip Drive is a prominent feature of the Campus. Considered to be in a zone of its own, the parkway open space design will include a double row of street trees on both north and south sides, banner poles, and other site furnishings to animate the space. The centre median will be upgraded with a raised planter that will be intensively planted with a variety of trees and shrubs. The addition of large quantities of deciduous and evergreen trees will be to have an affect upon wind mitigation.
Figure 2.62: Elizabeth Avenue, proposed plan and section
Figure 2.63: Westerland Road, proposed plan and section
Figure 2.64: Allandale Road, proposed plan and section
Figure 2.65: Prince Philip Drive, proposed plan and section
3 built form & architectural character
3. **Built Form and Architectural Character**

3.1 **Objectives and role of guidelines**

This chapter constitutes a set of planning and design guidelines based on the principles outlined in Chapter 2 for the campus as a whole and for each of the Campus’s districts. These guidelines cannot substitute for a proactive and creative design and review process.

### 3.1.1 Guidelines and the architectural commissioning process

- For significant commissions, an endowed design competition should be considered. In an endowed competition, the University agrees to partially compensate pre-selected entrants for their effort. This can promote the participation of high-calibre entrants and a high quality of submissions.

- A peer-review process should be considered for significant commissions as well, whereby a diverse group of architects, urban designers, users and planners, some from out of town if possible, would be invited to lend their expertise to the design of new buildings or additions.

- The guidelines provided in this document should act as a base for discussion and future elaboration.

- These principles and guidelines are not intended to stifle creativity and prevent solutions that respond to unforeseen circumstances. However, they should not be violated without justification.

3.2 **Key Building Elements**

#### 3.2.1 Creating a Cohesive Campus Environment

A strong, purposeful relationship between buildings and outdoor spaces and pathways is perhaps the greatest element in creating a cohesive campus. While many universities have chosen to create cohesion through uniform building ‘styles’ and use of materials, this can equally create awkward building designs and in some cases monotony. In the case of Memorial, where multiple architectural styles exist, there should be adherence to the principles of:

- Architectural excellence and innovation;
- Diversity;
- Contemporary expression, and
- Definition of public spaces should define the Campus strategy to achieve cohesion.

#### 3.2.2 Sensitivity to heritage

Respect for heritage should not be limited to the oldest buildings on campus. Each building, regardless of age, should be respected as a coherent whole. Every new building on campus should be seen and designed with contemporary building practices and should avoid literal duplication of heritage styles. Instead, compatibility with the existing built form should be achieved through building placement, appropriate massing and architectural excellence.

Elements within older buildings, particularly the four original buildings (Arts and Administration, Science, Physical Education and the Library - now Mathematics), that are distinctive or unique to their era – like tan brick, stone lintels and tall ceilings – should be preserved and replaced if needed with identical elements as much as possible. Deteriorated architectural features should be repaired rather than replaced where possible. Repair or replacement should be based on research related to the original design and construction method.

Prior to undertaking repairs, a complete record of the architectural features of the building should be compiled. This will provide an invaluable record should any feature be damaged or lost during the repair work.
Memorial’s original buildings have formed the visual character of the Campus. New buildings and additions should be complementary to these buildings through similar massing, fenestration and materials.

This addition to a century-old building on the University of Toronto campus blends in with the massing and character of the original building and enhances its contemporary use.
3.2.3 Scale and massing
The scale and massing of buildings greatly influences the “sense of place” on campus. While proportion refers to the relationship of dimensions of forms and space, scale refers to how the size of the building elements are perceived relative to proportions of the human body. The roofline, proportion and visual mass of a building affect the overall building form, and when consistent, a high degree of unity between buildings on campus can emerge, even if a variety of architectural styles coexist.

While it is acknowledged that all projects are unique and therefore require specific and individual attention, there are a number of design principles that should be adhered to.

- The massing of new buildings and additions should reflect the building’s role, for example framing a quadrangle, or addressing Elizabeth Avenue, Prince Philip Drive or Allandale Road.

- Where feasible and appropriate, building floor plates should be narrow to ensure access to natural light and ventilation, which reduces power consumption and enhances quality of life for occupants. This is especially important in the case of residences.

- In larger buildings, atria should be included to introduce natural light, air circulation, visual orientation, and indoor common spaces for use during winter months.

- Large and long buildings should incorporate articulations in massing to provide variation that is scaled to complement surrounding buildings.

- A building’s scale and massing needs to be proportionate to the three to four-storey architecture currently represented on the campus.

- Buildings should be tall enough to define adjoining spaces. This will generally require at least a 3 storey or approx. 14 m. building height. Taller buildings above four storeys should be evaluated on their own merit but should avoid overwhelming existing structures and channelling winds, and minimize shadows on campus open spaces.

- Buildings above four storeys should include elements such as building stepbacks or detailed rooflines to reduce the perception of height from the ground, e.g. the proposed residence at Burton’s Pond.

- Designs of new structures should express the highest standards of contemporary design while complementing campus open spaces and existing buildings.

- New additions and renovations should incorporate a material palette and composition complementary to the original structure.

- The design of all new building space should consider flexibility to ensure a variety of potential uses in day-to-day operations and the potential for modifications over time.

3.2.4 Façades
- In the Newfoundland climate, it is particularly important that buildings be visually engaging and transparent at the ground level, and wherever possible, pedestrian circulation corridors ‘wrap’ the outer edge of these ground floors and integrate sheltering elements for pedestrians such as canopies, breezeways and colonnades.

- The ground floor of all buildings should vertically align with the surrounding area and should avoid split-level designs. On a slope, the front and back of a building can provide entrances on different floors.

- The use of bright and vibrant colours can be used to enliven façades, but in general this should be limited to key interior spaces that are visible from the outdoors through large windows.

- Façades should incorporate, where appropriate, projections, recesses or windows to articulate the façade and provide relief to long and flat surfaces. These articulations should coincide and mark public areas of the building such as outdoor courtyards, entrances, indoor lounges, meeting rooms and cafés.

- Windows should facilitate two-way visual connections between indoor and outdoor areas through the use of clear or low-E coated glass. Tinted and mirrored glass should be avoided.

- Architectural detailing should be used to highlight window and door frames, cornices and corners.
The Science Building complements Toulinguet Close well with its large windows and intimate scale.

An atrium provides much-needed indoor amenity space in the Arts and Administration Building.

The Field House presents a blank wall to the field. Existing blank façades should be screened with trees, vines or other planting designs.

The new building at Howard University complements the older building at left and follows the shape of a pathway with abundant glazing. The roof overhang further frames the outdoor space.
• Where blank walls are unavoidable, they should be carefully designed to avoid an appearance of neglect. Blank building walls that front onto surrounding outdoor walkways, courtyards or open spaces can lead to ‘dead’ zones on the Campus that can be both unsafe and detract from the ‘public’ character of the University.

• Where blank walls are considered to be unavoidable due to the nature of the building program, consideration should be given to the use of frosted glazed panels or clerestory windows as a supplement or replacement to solid walls.

• Architectural definition of solid exterior walls should be considered a key design exercise. Opportunities to use material patterns, signage, landscaping - such as vine-clad walls - should be explored.

• The addition of interior corridors at the building perimeter; breezeways and colonnades flanking areas of a building façade can provide both a purpose and visual animation to these building edges.

• Dated corner stones, dedications, building names and other inscriptions should be used to visually convey the history of the campus.

• The foot or base of buildings should be landscaped. Concrete footings should not be exposed.

3.2.5 Roof forms and materials
• Rooflines should emphasize main entrances and visual termini.

• Where flat roofs are used, projections or setbacks may be used to distinguish the roof from the façade.

• The colour of roofing materials should reflect a natural palette or incorporate a planted or ‘cool roof’ design. On sloped roofs, only high quality materials should be used included standing seam metal roofing, copper, lead coated copper, zinc or slate.

• Planted or “green” roofs should be encouraged as they keep water away from stormwater sewers, absorb carbon dioxide and provide insulation on a year-round basis. Green roofs can be retrofitted on existing roofs, can be designed to be maintenance-free and typically last longer than conventional roofs. Please refer to Chapter 6 - Sustainability for details.

• Rooftop mechanical equipment should be fully enclosed or screened and integrated into the architectural composition of the building.

• Roofing materials should be selected for their low environmental impact, such as no or low Volatile Organic Compound (VOC) components.

3.2.6 Landmark elements
Landmark elements may be used to mark strategic sites such as a key gateways or to terminate important view corridors – for example anchoring the ends of primary pathways or quads, accentuating primary frontages and marking main building entrances. Landmark architectural features may be taller tower-like elements such as the Memorial Tower, or lower elements relative to building mass, such as the circular corner of the INCO Innovation Centre.
Roof overhangs can animate a long façade and project shade onto glazed areas in the summer. (Foster City, CA)

Landmark features contribute to the character of the campus and perform an important role in orientation. (University of Windsor)

Entrances should be prominently located and marked by canopies or breaks in the façade. (McGill University)

Gushue Hall is a fine example of a well articulated façade and prominent entrance.
3.2.7 Entrances

- Entrances should feature clear architectural expression to mark their location and aid with orientation, including highly-contrasting materials and features to assist the visually impaired.

- High quality materials including stone, copper and wood and architectural elements such as light fixtures, roof overhangs, porches, canopies, colonnades and breezeways should be used to mark entrances.

- Entrances should reinforce visual termini or key open spaces.

- Entrances of buildings adjoining a common open space should be aligned to minimize walking distances.

- Buildings should have multiple entrances coordinated with access to outdoor areas and adjacent buildings.

- Entrances should project or be recessed from a façade to articulate the façade and create shadow lines.

- Entrances should be highly transparent, either through the use of a glazed doorway or a doorway set into a glazed surround. The ground floor should be aligned with the exterior grade to maximize accessibility. Split-level designs should be avoided.

- Highly visible signage should be located outside each main building entrance.

- Entrances should be connected to a social space or lobby to create a sense of arrival and to accommodate informal meetings and awaiting area. Directional information should be provided by the entrance.

- All entrances should be easily accessible to wheelchairs and include an automatic door opener.

3.2.8 Orientation and connections to outdoor spaces

- Buildings should be organized to frame and animate public areas including streets, pathways and open spaces.

- Main façades should face primary open spaces, streets and paths.

- Perimeter areas of ground floors should be programmed to encourage active uses that support social gathering.

- Multiple entrances should be provided to encourage permeability, but front doors should respond to main open spaces, paths and nearby buildings.

- Hallways and public uses within buildings should clearly connect with outdoor pathways, streets and open spaces.

- Where possible, exterior materials should continue into lobbies to aid in pedestrian orientation and navigation.

- Common spaces for studying or socializing should be clearly accessible and provide views to the outdoors to encourage use and enhance the quality of the space.

- Blank façades should be avoided as much as possible, especially at the ground floor level, and should minimize exposure to public areas of the campus like streets, paths and open spaces. Vines and planting design should be used to minimize the negative impact of blank walls where they cannot be avoided.

- To foster a secure campus environment, dead-end spaces should be avoided. The ground level of all buildings should be well-lit and transparent.
This courtyard at the University of Toronto welcomes arrival through coordinated pathway planting and broad entrance doors.

The Earth Sciences Building does not currently address open spaces attractively or support pedestrian activity at Prince Philip Drive.

This reading room is visually connected to the outdoors on two sides. (Boston, MA). A new pavilion building in Toulinguet Close should have a similar scale and transparency.
3.3 Materials

The Campus’s four original buildings and Paton Collage are known and admired for their architectural quality and sense of permanence.

Materials used on campus should be selected to complement the materials used in existing buildings, particularly the Campus’s oldest buildings.

- Materials and colours should generally convey a sense of permanence. Life cycle costs should be optimized through the use of durable, low maintenance materials and finishes.

- Wood and aluminium windows are preferred. Vinyl window systems should be avoided. Clear glazing with low-E coating should be utilized. Tinted or mirrored glass should be avoided.

- The selection of materials should be in accordance with the Campus Building Materials Palette (see section 3.3.1).

- The University is a long term Owner/Operator of the building infrastructure on the campus. The life expectancy of any new building or renovation should reflect this commitment:
  - 100 years for the structure and inaccessible components
  - 50 years for the building envelope, except roofing.
  - 25 years for shingle or membrane roofing material (metal roofing material should provide a 100 year life expectancy)
  - 25 years for interior components
  - 30 years for mechanical systems (without major upgrades or replacement)
  - 30 years for electrical systems

- Design features should assist access to systems for ease of maintenance and repair.

- Building materials selected in accordance with the Campus Buildings Materials Palette should comply with the National Building Code and other legal restrictions.

- “Green” materials that are accepted under LEED® standards should be chosen even if LEED compliance is not sought. Materials that use toxic chemicals during fabrication and/or disposal, such as vinyl, should be avoided.

- Additional materials can be introduced, but should be reviewed to ensure compliance with the intent of the guidelines.

A great variety of materials used in their natural state already exists on the Memorial Campus. They should form a basis for a Campus materials palette.
### 3.3.1 The Materials Palette

The chart provides a guide to the selection of appropriate materials for new campus buildings.

<table>
<thead>
<tr>
<th>Cladding</th>
<th>Solid Brick</th>
<th>Stone</th>
<th>Synthetic Stone</th>
<th>Concrete</th>
<th>Pre-cast Concrete</th>
<th>Glass Curtain Wall</th>
<th>Metal Panel Curtain Wall</th>
<th>Terracotta Panels</th>
<th>Copper</th>
<th>Wood</th>
<th>Multi-toned Brick</th>
<th>Stucco</th>
<th>Vinyl Siding</th>
<th>Metal Siding</th>
<th>Cinderblock</th>
<th>Plastic panelling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Windows</th>
<th>Wood</th>
<th>Aluminum</th>
<th>Vinyl</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Roofing</th>
<th>Slate</th>
<th>Copper</th>
<th>Zinc</th>
<th>Standing Seam Metal Panel</th>
<th>Built Up Asphalt</th>
<th>Flat Roof Membrane</th>
<th>Wood Shingle</th>
<th>Asphalt Shingle</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
<td><img src="1" alt="preferred" /></td>
</tr>
</tbody>
</table>

**Notes:**

1. Natural metal colours are preferable.
2. Wood cladding is suitable for small, feature pavilion buildings. Wood is a suitable material for elements such as breezeways, colonnades, canopies, and as part of the exterior building composition.
3. The use of light-reflective surfaces and green roof systems in association with flat roofs is encouraged.
4. Wood shingle roofing may be appropriate for small pavilion buildings.

**Legend**

- ![preferred](1) Preferred Material
- ![preferred](2) Acceptable - use with caution
- ![preferred](3) Not Permitted
- ![preferred](4) Notes describing condition of use

*Table 3.1: Materials Palette*
3.4 Storage, Servicing and Utilities

- Service areas should be located away from public spaces and appropriately screened through planting and fencing composed of materials integral to the architecture of the building.

- Decentralized loading areas should be provided to allow for sensitive deliveries (time-sensitive, valuable or dangerous materials, etc.) to be made to each building.

- The convenience of decentralized refuse collection should be balanced with the need to minimize truck traffic on campus. Where possible, refuse storage areas should be located close to vehicular streets (as opposed to pedestrian paths), and consolidated among buildings with indoor connections if practical.

- Driveways for service areas and pocket parking lots should be shared to make efficient use of the campus street network.

- Servicing areas should not be used as parking for service vehicles.

- In new buildings, refuse collection areas should be fully enclosed. In existing buildings, enclosures should be built, as shown in the photograph on the right below.

- Each building should be designed to incorporate sufficient storage.

3.5 Breezeways and colonnades

A system of interconnected pedestrian walkways should be integrated in all new building projects and added to existing buildings where possible. Located at grade, breezeways create an interface between the indoors and the outdoors. These glazed corridors that run along the outside envelope of buildings can mitigate climatic challenges faced by the campus without jeopardizing the vibrancy of campus life. During the summer months, the breezeways can open up to the outdoors to become a colonnade. Because tunnels and above-ground pedways remove pedestrian traffic from the ground level, they reduce the animation and safety of the campus. For this reason, at-grade breezeways that flank outdoor courtyards, quads and pathways are preferable.

To create a pedestrian-friendly environment and minimize a tunnel effect, colonnades and breezeways should not be wider than they are tall; columns should be widely spaced out.

Colonnades directly parallel or perpendicular to prevailing winds should be avoided. In this case, breezeways are preferred.

3.6 Designing for Collegiality

Increasingly, the traditional learning experience that takes place in classrooms, laboratories and the Library is complemented by more informal exchanges taking place in common spaces such as group study rooms, lounges and even hallways. The following principles can assist in the design of attractive and popular common spaces:
Colonnades should be combined with active building edges to help animate their use. This colonnade in the North Campus is deep and would benefit from greater connections to interior building uses.

Breezeways already exist on the Campus as important weather-protected links between buildings.

This breezeway flanking the perimeter of a building opens in the summer months and is enclosed in the winter. (York University)

In this colonnade at the University of Toronto, a low wall is combined with a colonnade to serve as a seating area.
Accessible

Campus common spaces should not be tucked away in “leftover” space at the rear or in the middle of buildings. Instead, common spaces should be located near main entrances and have a relationship to the outdoors, e.g. the University Centre. Common spaces should be highly visible from indoors and outdoors, and be located on heavily travelled routes. However, spaces for group work are increasingly popular, and they should offer privacy and tranquillity.

At Grade

In order to be easily accessible and visible, common spaces should generally be located on ground floors. Therefore, split-level buildings should be avoided whenever possible.

Shared

Public spaces should serve several purposes or be located next to other public uses, such as a lounge, café, transit waiting area and meeting place. For example in the proposed east addition to the Arts and Administration Building (No. 9-2) where a lounge and café would be a well-placed social amenity for those waiting for or arriving from a bus.

Comfortable

Spaces should be designed to be welcoming with furniture that is comfortable, durable, easy to maintain and move – and suited to the intended activities in the space. Spaces should be well-lit and designed to dampen noise. While some spaces should be marked for group discussion and social interaction, others should be earmarked for silent study and/or reserved for faculty and staff.

3.7 Clustering vs. Dispersion

In campus planning, the benefits of clustering vs. inter-disciplinary mixing is a recurrent issue. The benefits of clustering are clear: collegiality is enhanced, collaboration is more efficient, departmental identity is reinforced and equipment can be easily shared.

In practice, perfect clustering is difficult to achieve in an existing institution. Over time, departments grow organically and space is secured as it becomes available, even if the location is not optimal.

Compared to some other universities, Memorial benefits from some well clustered departments whereas others, such as Arts, are spread between many buildings. The relatively compact campus allows reasonably easy access among buildings.

Going forward, the following recommendations are made:

- Group each department’s administrative, office and research facilities into its own area as a long-term goal for Memorial – seizing opportunities to do so as buildings are renovated and/or expanded. In the meantime, rationalization should take place where minimal changes can lead to greater concentration.

- Create and preserve flexible or ‘swing’ space. Swing space should be made available to special projects, allowing to temporarily establish ‘war rooms’, provide space for visiting faculty or creating a satellite office for a Memorial faculty member.

- Though inefficient at first glance, the creation of satellite offices is increasingly common on Canadian campuses. Satellite offices can be shared or designed according to ‘hotelling’ practices (see section 3.7.3 for a definition and discussion).

- Provide functional common spaces at regular intervals. Common spaces as simple as a corridor alcove should be provided in every building to act as meeting points that can accommodate informal meetings and discussion among faculty, staff and students.

- Continuing to encourage a compact campus is crucial to support collegiality and support for inter-disciplinary research. Even the best clustering strategies cannot predict all future inter-disciplinary collaboration.
One of the most functional common spaces on campus is the combined social space and transit shelter at Arctic Avenue. This concept should be repeated.

Example of social space at Dalhousie University. Comfortable furniture, adequate lighting and daylighting, and a coffee shop make this space especially attractive.

This alcove in UPEI’s library is bathed in natural light with excellent views to the outdoors.
3.8 Design of Offices and Classrooms

3.8.1 Introduction
Universities are unique institutions in the breadth of their mission and assets, which is reflected in the variety of spaces they use. In addition to classrooms, labs and offices, other resources are needed, such as a daycare, maintenance shops, athletic facilities, and residential facilities. This section will explore some of the trends affecting key types of university spaces including classrooms and common spaces, with the objective of identifying the potential retrofitting of existing spaces at Memorial and integration of these trends in the planning and design of new buildings. Doing so will help ensure that the University community enjoys modern amenities and facilities that are efficient and versatile.

3.8.2 Flexibility of Space
Universities and other organizations are increasingly considering more flexible layouts to emphasize the sharing of information and versatility in human communication – both in the activities that space accommodates in its current configuration and over time. Representatives of the faculties of Education and Arts expressed the desire for the ability to respond to evolving programmatic needs, organizational changes and technological updates. For example, office areas can be designed to vary the number and size of workstations through the use of moveable wall partitions; social areas can be outfitted to allow productive meetings to take place, for example with wireless access and moveable furniture; with adequate equipment in place, classrooms can be used to host conferences and external meetings. Generally, space should be designed to accommodate a variety of uses and facilitate conversions to other types of space. It is important that potential future users of all spaces, including representatives of faculty, staff and students become involved at the onset of the conceptual design process.

3.8.3 Offices
Many university departments (Arts, Music, Education) expressed a general concern for the lack of suitable office space for staff at all levels. While it is generally recognized that professors and assistant professors require an individual office, some universities have explored open concept layouts for administrative staff and junior instructors. It is important to note that a critical success factor is the involvement of staff in the design of the workspace. The need for privacy can be addressed by providing easily accessible meeting rooms for private conversations and plenty of locked storage space. The two main types of layout are compared in Table 3.2.

‘Hotelling’ is an increasingly popular concept to accommodate a transient workforce. A certain proportion of space is reserved for generic workstations with lockable storage, a telephone and an Ethernet jack or wireless access. When required, the guest or temporary worker is assigned the workstation with a portable computer and a temporary extension attached to the telephone. In a university setting, this type of space can be assigned to visiting faculty, temporary workers assigned to an internal project, or employees normally working from home and sharing the workstation with other remote workers.
<table>
<thead>
<tr>
<th></th>
<th>Individual Offices</th>
<th>Open Concept Layout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Privacy</td>
<td>Doors guarantee privacy</td>
<td>Less privacy in work spaces, but small meeting rooms are provided for private phone calls and meetings.</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Less opportunity for spontaneous exchanges, and layout may not correspond to changes in corporate organization</td>
<td>More opportunity for spontaneous exchanges; layout can change to reflect corporate organization, favouring relevant exchanges</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Walls and doors consume materials, energy and space</td>
<td>Circulation areas and necessary “privacy” rooms consume space</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Little flexibility. Layout reflects desired organization at one point in time</td>
<td>High degree of flexibility. Workstations can be moved to reflect organizational needs.</td>
</tr>
<tr>
<td>Quality of work space</td>
<td>More privacy and personal space</td>
<td>Greater access to natural light</td>
</tr>
<tr>
<td>Security</td>
<td>Inherently secure if doors are locked</td>
<td>Corporate security policies (e.g. “clean desk policy”) necessary</td>
</tr>
</tbody>
</table>

Table 3.2: Comparison of Individual Offices to Open Concept Layout
3.8.4 Classrooms

Size
At Memorial, a stronger emphasis on graduate programs is leading to a growing demand for smaller classrooms. However, instructors often mention a desire to have access to classrooms both larger and smaller than currently available rooms – between 40 and 100 seats. In the future, the mix of classrooms is a crucial decision to be made as part of academic planning in consultation with faculty and student representatives.

Seating
University administrators tend to prefer fixed seating for its efficiency and low operational cost as furniture does not require constant repositioning and replacing as “shrinkage” occurs. Instructors and students at Memorial expressed the desire to be able to move desks depending on the format of the class, including a traditional row layout, clusters for group discussions, “U” or “L” layouts for class discussions, and a scattered format for exams. However, since a sequence of classes is unlikely to require the same layout on the same day, classrooms with moveable furniture need strong policies to ensure that at the end of each class, the furniture be replaced in a previously agreed upon layout. The combination of fixed desks and seating should generally be avoided to ensure the comfortable accommodation of all body shapes and sizes, and access to students in wheelchairs.

Shape and Light
After World War II, it was generally believed that windows were distracting to students. A new emphasis on energy efficiency in the 1970s further reduced the use of windows in educational facilities. Today, new standards such as LEED encourage access to natural light and ventilation in all types of spaces, including classrooms. It has been found that the quality of space greatly reduces absenteeism, which can lead to savings even greater than energy savings reaped from the LEED design. Therefore, whenever possible, classroom buildings should be designed to ensure access to windows.
Increasingly, instructors seek classroom spaces that accommodate flexible group work arrangement. (University of Prince Edward Island)

Attached furniture is becoming less popular as it prevents flexibility in classroom layout and the accommodation of different body shapes and sizes. (Memorial)

Classrooms that can double as meeting rooms create space efficiencies. (University of Lethbridge)

Modern classrooms integrate technology and moveable furniture. (Saint Mary’s University)
3.9 Accessibility

3.9.1 Context
In 2005, thirteen percent of the working age population reports having a disability, and seven percent of the student population are disabled. Obstacles remain for disabled students to access post-secondary education in many Canadian universities. Therefore, it is crucial not to focus exclusively on the existing disabled population on campus but also consider potential students, staff and faculty with disabilities. This is particularly necessary due to the lack of close-by alternatives to Memorial University in the Province.

Memorial’s size and climate make it a challenging environment for the disabled. Many buildings are not accessible or conveniently accessible, travel between buildings can be difficult or circuitous, redundancy is sometimes missing (e.g. in elevators) and only a men’s residence is accessible.

The concept of accessibility for persons with disabilities has been considerably broadened to include all types of barriers, including learning disabilities but the emphasis of this Plan is on the physical realm, and hence physical barriers will be addressed here.

3.9.2 Barrier-Free Design
Barrier-free design should become a priority in every new construction and renovation project and should include outdoor spaces and parking with wide and smooth surfaces that are well-lit, free of obstacles and snow and ice in the winter.

A review mechanism should exist as part of the decision-making process to ensure that all reasonable opportunities to improve accessibility are pursued before design is finalized.

Planning for barrier-free design will result in significant savings by ensuring that necessary accessibility features are embedded in an original design rather than as a retrofit. Integrating barrier-free design early in campus planning processes raises costs marginally, while retrofits tend to be complicated and costly.
Retrofitting ramps is costly and often less than aesthetically pleasing. Generally, the slope and width of ramps should allow wheelchair users to use them without assistance. (Memorial)

This ramp was designed together with the building and incorporates plantings. (University of Toronto)
3.9.3 Physical Realm Recommendations
The following recommendations address specific issues on the St. John’s Campus and should be addressed in parallel with other issues covered in the CSA or McGill Standards:

- Distances: intensification should continue to be encouraged to shorten distances between buildings.

- Circulation: although extending the Munnel to all buildings may not be practical, ease of circulation to new buildings should be considered, with covered bridges or walkways and ramps rather than elevators where possible.

- An accessible women’s or co-ed residence should be considered.

- Reserved parking spaces in sufficient numbers should be provided both in surface and covered lots.

3.9.4 Implementation Process
The following steps are recommended as a process to promote and implement accessibility on campus.

1. Identify an advocate
Identify an advocate on the Board of Regents and/or among senior management who is specifically interested and knowledgeable in cross-disability issues to work closely with the Blundon Centre. This individual will be responsible for keeping accessibility at the fore of campus planning across departments. The mandate for this role includes an obligation to actively consult with external community-based disability groups to allow for comprehensive cross-disability and/or technical input that extends beyond representation of a specific group of campus users.

2. Agree on standards and do not reinvent the wheel
Accessibility standards from other universities should be reviewed and a set of standards should be prepared and adopted based on Memorial’s unique circumstances. Examples include the University of Toronto standards, the McGill University standards and the Canadian Standards Association (CSA) standards. The standards can then be distributed to designers retained by the University at the onset of each project.

3. Prepare and adopt a plan
A long-term plan for retrofits should be prepared and adopted, including priorities, timelines and budgets. In terms of scope, the plan should consider the outdoor campus environment, all facilities and buildings for students, campus visitors, faculty and staff, and the interiors of buildings. To be effective, the plan should be realistic and include a funding strategy – including external fundraising. A portion of the on-going capital and maintenance budget should be reserved for universal design retrofits in addition to any new funds that might be obtained for such projects. Each year, the Committee will report on progress through a report.

4. Establish a review process
For major additions and new buildings, designers should meet with the Blundon Centre and students with disabilities, who should then be able to review proposed designs as the project progresses.

5. Explore a student levy
In collaboration with student organizations, the possibility of a universal design levy should be explored. Such levies have been instituted at a variety of institutions in Canada following a student referendum, and the funds have been apportioned through a variety of mechanisms that include student representation. For example, students at Queen’s University are charged $3 per year. The University could convey its own commitment by matching the funds raised, while explaining that its funding formula does not allow the University to undertake the necessary work without the contribution of students. It is also important to communicate the intent of the levy to the student population to prevent any type of resentment towards students with disabilities. Finally, improvements should be publicized to ensure that students see clear applications of their contributions.

Sources:
- The McGill Standards for a Barrier-Free Campus and Universal design, Office of Student Disabilities, McGill University, June 2004.
- University of Toronto Design Standards, Facilities and Services Department, University of Toronto, [undated].
Built Form Guidelines

Memorial University Campus Plan

Disabled parking should be located close to buildings and designed with users in mind as shown above.

Primary Campus pathways should be clear of snow and ice to accommodate wheelchairs and carts, and minimize the risk of falls.
3.10 Art Strategy

A Plan for Art should be commissioned to achieve the following:

- Carefully evaluate Memorial’s current art holdings;
- Assess the level of protection and conservation required for each piece;
- Establish a framework to guide the appropriate exhibition of art both indoors and outdoors;
- Consider the appropriateness of outdoor sculptures in primary outdoor spaces, including Memorial Common, Toulinguet Close, the front of the Arts and Administration Building and the proposed common at the Northeast Campus.
- Consider the concept of ‘buildings as art’ and the inclusion of artwork in the design of new buildings.
- Establish targets for donations and a plan to achieve it;
- Evaluate the desirable conservation facilities on campus;

As part of the above Plan for Art, the practice of setting aside one percent for art should be considered, whereby one percent of the cost of each new building or addition is reserved for art installation inside and outside the building. Publicizing this objective would allow Memorial to raise funds specifically for this initiative. A commitment to art would further contribute to the prestige of the institution.
The Cabot Monument in Toulinguet Close is the most well-known and prominent item of Public Art on Campus.

Saint Mary’s University operates a popular Art Gallery on Campus.

This art piece enlivens the atrium in the Arts and Administration Building.

Cape Breton University owns a large art collection and displays pieces throughout the Campus.
4 open space network
4. OPEN SPACE NETWORK

4.1 Introduction

Landscape and open space features have the ability to provide the most memorable visual image of the Memorial University campus. The landscape in particular makes a powerful first, and lasting impression and can be important in establishing an image of quality which ultimately will assist the University in recruitment and retention of faculty, students and staff. The Campus Open Space Plan identifies ways to manage and protect existing campus landscape assets and direct future landscape design that is environmentally and financially sustainable and that addresses Campus Planning and design objectives.

The concept for the Memorial campus open spaces encompasses four major directions:

1. **A Campus in a Park:** The Memorial campus is uniquely located within the boundary of C.A. Pippy Park. The significance of the University’s location needs to be expressed and celebrated so that all who visit the campus will be aware of the distinctness of the ‘campus in a park’ connection. Green links will be established to strengthen the physical connection to the park and to conserve park-like settings in the expanding campus development. Landscaping on the campus will be intensified and strengthened to enhance the visual perception of the park’s presence within the University boundaries.

2. **Living Memorial:** There are opportunities within the campus open spaces to tell the human story behind the memorial aspect of the University. Built in the memory of the Newfoundlanders who participated in the Great Wars of 1914-1918 and 1939-1945, the University has become a growing and evolving monument. As time progresses, it is important that these stories be recorded and expressed so that historic and individual causes and sacrifices are not forgotten.

3. **Provehito in Altum:** The University’s motto, Provehito in Altum (Launch forth into the deep), captures the spirit of the adventure of learning. This sense of adventure and progressive thinking inspires the direction of the open space design. New and exciting spaces are proposed that will provide dynamic and innovative places to meet friends, to study or to simply to get from one class to another.

4. **Wind and Weather:** The most imposing presence on the campus, during all seasons, is the wind. All aspects of the open space design should respect the constant windy conditions and find ways to make the campus open spaces more comfortable for pedestrians. The Campus Plan has taken the design a step further and used the wind and wind direction as the basis for patterns in the landscape.

The Campus Plan defines landscape to include all the major elements of outdoor space:

- Circulation routes (vehicular and pedestrian)
- Parking and service areas
- Outdoor gathering spaces (courtyards, quadrangles and gardens)
- Site furnishings (seating, trash receptacles, lighting, banner poles, bollards)
- Built elements (trellises, fences and walls)
- Plant material (trees, shrubs and groundcovers)

**Potential Partnerships**

For the implementation of the Campus Plan open spaces to gain momentum, partnerships may be explored with the following entities:

- **Botanical Gardens:** Local source of seed grown and propagated plant material and compost
- **City of St. John’s:** The Memorial Campus becomes a test ground for tree species new to the area

**Guiding Landscape Design Principles:**

The following Guiding Landscape Design Principles define the key directions behind the proposed Open Space Network for the Memorial Campus.

**Guiding Landscape Design Principles**

1. Provide a greater sense of organization and clarity of the Campus Landscape
2. Establish a cohesive concept or theme for open space designs
3. Expand the network of quads, courtyards and corridors as the principle structuring framework of the campus
4. Facilitate social and collegial interaction within the campus
5. Minimize the impact of vehicles and parking areas
6. Enhance the Campus image and define the campus edges and gateways
7. Maintain campus safety
8. Create a visitor-friendly campus
Heavy snowfall creates significant challenges to campus accessibility. (Memorial)

The clock tower is a powerful memorial to those who gave their lives in the two World Wars.

Provehito in Altum should also apply to the design of open spaces. (Saitama Plaza, Japan)

The Campus's location in a Park is a significant asset.
4.2 Open Space Structuring Framework

In order to strengthen the quality of the campus layout, certain corridors and open spaces should be preserved, reinforced, or created. The structure created by open spaces, buildings and connecting corridors will provide the basis for landscape, lighting, walkway and gathering area treatments. Landscape treatments of this structure will reinforce and enhance the visual qualities of the campus.

Existing Corridors and Open Spaces to be preserved and/or enhanced:

- Memorial Common
- Paton College Gardens
- Toulinguet Close
- Elizabeth Avenue Boulevard
- Burton’s Pond Area
- Pippy Park Interface
- Health Sciences Centre Open Space
- Sports Fields

Detailed descriptions of the concepts for the above spaces is contained in Chapter 2 - Concept.
Figure 4.1: Main Campus Open Spaces

- Memorial Common
- Health Sciences Centre
- Open Spaces
- Playing Field
- Sports Field
- Elizabeth Avenue Boulevard
- Burton’s Pond Area
- Field
- Paton College Gardens
- Toulinguet Close

The Open Space Network
4.2.1 Edge Related Open Spaces

Edge related open spaces are comprised of the frontages where the Campus meets the community and are where the character of the University will make its biggest impact. These spaces are shared by the surrounding community both physically and visually. Structurally, edge related open spaces take their cue from the pattern of City streets and sidewalks, the location of existing and proposed campus buildings and the configuration of the existing adjacent Pippy Park. Open spaces at the edge will project contextually appropriate, high quality landscapes and promote the image of the campus for visitors and the surrounding community.

The edge related open spaces are organized into the following zones (see Figure 4.2: Edges and Gateways):

- **Elizabeth Avenue Frontage**: See Chapter 2 for Details.
- **Westerland Road Frontage**: See Chapter 2 for Details.
- **Allandale Road Frontage**: See Chapter 2 for Details.
- **Pippy Park Interface**: See Chapter 2 for Details.

**Entries and Edges**: Entries to the campus are locations that offer opportunities to signal arrival at the University and establish a strong sense of place. The edges of the campus should define the boundary between the University and the surrounding areas as an inviting, yet dignified “face to the community”. The Campus Plan recommends improvements to the public roads (Elizabeth Avenue, Prince Philip Drive, Westerland Road and Allandale Road) through landscaping, university banners, pedestrian-scale lighting, etc. The banners could include photos of prominent alumni and alumnae who have made significant contributions to their field or society.

**Primary Gateway Features**: Located at the intersections of Prince Philip Drive and Westerland Road and Prince Philip Drive and Allandale Road, primary gateway features mark the western and eastern limits of the campus along Prince Philip Drive. The Campus Plan envisions a vertical wind turbine, in combination with a landscape feature to mark these locations.

**Secondary Gateway Features**: The secondary gateway features mark the limits of the campus at Elizabeth Avenue and Westerland Road and Elizabeth Avenue and Allandale Road. Secondary gateway features will be smaller in scale than the primary gateways and will respond to the residential nature of Elizabeth Avenue.
Gateway features can be designed as tall, internally lit structures that glow at night. (Los Angeles International Airport)

Secondary gateway features will respond to the finer building scale and residential interface along Elizabeth Avenue. (University of Toronto)

Gateway features can incorporate unique lighting and a public art component. (Louisville Waterfront Park, Kentucky)
**Formal Entry Points:** Formal entry points are the most significant, highly visible entrances to the campus. They are at:

- Arts and Administration Building
- Arctic Avenue University Centre
- Paton College Dining Hall

These points of entry serve students, staff, and faculty and provide directions for pedestrian and vehicular circulation. These are also the entrances most likely to serve visitors and off-campus commuters and should perform a ceremonial role. The entrance area at the Arts and Administration Building is considered the primary formal entrance to the campus. A gateway feature should be located to provide instant recognition from within a vehicle as an indication of arrival at a major entryway and should include the University crest and signage.

**Day-to-Day Entry Points:** The day-to-day entry points to the campus serve both pedestrian and vehicular circulation. These entries are mostly used by students, faculty, and staff, who enter the campus on foot or by car. Generally, people who are familiar with the campus use these entrances. The day-to-day entry points should be perceived as secondary entrances to the campus in the hierarchy of gateway designs. Day-to-day entry points are located at:

- Clinch Crescent Road and Arctic Avenue
- Westerland Road and Pedagogues Close
- Prince Philip Drive and Livyers Loop
- Burton’s Pond Road and Alandale Road
- Elizabeth Avenue and Russell Road
Figure 4.2: Edges and Gateways

- Primary Gateway
- Secondary Gateway
- Symbolic Gateway
- Day to Day Entry Points
- Residential Edge
- Parkway Edge
- Park Edge
- Internal Thoroughfare

The Open Space Network
4.2.2 Internal Campus Open Spaces

Internal open spaces are the areas accessible upon entry into the campus itself. These spaces are enclosed by campus buildings as courtyards, forecourts and gardens and provide student and faculty oriented circulation and programming. The removal of most of the vehicular access and storage from the inner and outer edges of the campus will provide the majority of the physical space to improve the internal open space structure of the campus.

The internal campus open spaces focus on primary pedestrian circulation that traverses the site on a north-south and east-west axis. Secondary and tertiary walkways provide further access for students and faculty. The purpose of the hierarchy of circulation is two-fold: to provide a greater sense of organization and clarity for way-finding and to create a striking and dynamic landscape pattern that will assist in the rationalization of existing and proposed gathering spaces.

The internal campus open spaces are organized into the following zones (See Figure 4.3: Open Space Zones):

- **Core Campus** – The Core Campus area is centralized and incorporates open spaces servicing the student centre, the library, the Arts and Administration building, the INCO Innovation Centre and the Science building. The core campus area will receive the highest quality of landscape treatment as it will be the most visited and visible space on the campus. This is where the personality of the campus can be the most expressive and achieve the biggest impact.

- **Building Related Landscapes** – Open spaces associated with specific buildings should take their cue from the context and framework provided by each space’s unique surroundings. Concepts should range from new and innovative to time-tested and traditional depending on the sensitivities of the site, the use of the building and the opportunities for historic references. One example of a building related open space can be found at the Music Building, where the proposed Music Garden would use the theme of music to determine the forms and programming for the space.

- **Residential** – The residential zone is characterized by a variety of medium scale residential buildings and their associated landscaping. Open space improvements in this area will appeal to the building design and scale and will be appropriate for residential use. Areas for sitting, studying and meeting with friends will be incorporated. Parking and service areas will be visually minimized and sheltered connections to other areas of the campus and community will be incorporated.

- **Campus to Park/Park to Campus Links** – will occur along the established roadway network with the exception of the green link between the north east and south east districts, which will occur along a pedestrian-only corridor. Where the link is to occur along sidewalks, upgrades will include street tree and shrub planting, new site furnishings and lighting and installation of way-finding elements. Where space allows, additional landscaping is proposed to ‘green’ the entire corridor surrounding the roadway.

- **Open Fields** – Two and potentially three field areas will remain within the campus boundary, one at the Field House and Recreation Building and the other at the new residential building to the east of the Facilities Management Building. The third field at the Works will require further consideration as to its future use. The edges of both fields will be planted with additional trees to provide windbreak and barriers to getaway sport equipment.

- **Prince Philip Drive Streetscape** – Considered to be in a zone of its own, the parkway open space design will include a double row of street trees on both north and south sides, banner poles, and other site furnishings to animate the space. The centre median will be upgraded with a raised planter that will be intensively planted with a variety of trees and shrubs. The additional of large quantities of deciduous and evergreen trees will help with wind mitigation.
Figure 4.3: Open Space Zones

Open Space Zones
- Core Area
- Open Field / Athletics
- Campus to Park / Park to Campus Link
- Pippy Park
- Residential
- Parkway Streetscape
4.3   Campus Circulation

By helping to define and differentiate circulation routes, the landscape can improve wayfinding and give identity and scale to the campus. Currently, there is little difference between pedestrian, service vehicle and vehicular traffic routes at Memorial. Pedestrian paths through the campus are constructed of a variety of materials and have been installed on a per-case basis without the benefit of an overall plan and most are in need of repair. The rationalization of these path systems will enable pedestrians, bicycles and service vehicles to move more smoothly on specifically designated paths. The circulation system will be better defined and will become more attractive with coordinated paving materials and supporting planting and lighting. Additional details on paving materials and pathway design are provided below.

4.3.1  Vehicular Circulation

One of the basic concepts of the open space plan is to remove as much vehicular circulation and storage functions from the interior of the campus as is possible. A certain amount of vehicular access is necessary to provide basic service and delivery functions to existing and proposed buildings. As illustrated in the Campus Plan, vehicular access areas, especially in the Core areas, are to be de-emphasized both physically and visually. For example, Livyers Loop becomes a one-way system that is not directly accessible to the Russell Road Extension, therefore minimizing ‘cut-through’ opportunities through the centre of the Campus. As a rule, vehicular access routes should be considered a secondary function to pedestrian and bicycle movement. Access for emergency vehicles should be reviewed with the appropriate departments and should be constructed in such a way that surfaces can sustain heavy vehicles.

4.3.2  Pedestrian Circulation

Currently the pedestrian network relies on a system of interior pathways constructed of many different materials. Areas of neglect have been the pedestrian connections from the edge of related open spaces to the interior open space of the campus, building-to-building connections, connections from parking areas and organized north-south and east-west networks. For example, the existing campus network does not have clearly defined east west and north south corridors. The path from Elizabeth Avenue through to Prince Philip Drive is not direct and is interrupted with parking areas and changes in paving materials. The east west corridor from Pedagogues Close through to Paton College and Burton’s Pond is not easily navigated.

The Campus Plan focuses on the creation and preservation of a high-calibre, organized pedestrian priority environment. The circulation system, as an organizing factor, will lend meaning, order and clarity to the campus. The design objective for walkways is to make them clearly recognizable as continuous corridors so that the driver, cyclist, or pedestrian will be able to easily comprehend connections between campus destinations within the campus and out to the surrounding community. These linear links have been prioritized according to their location, projected function, capacity, and their importance in the overall design. Lighting, plant material, and site furnishings will further define spatial corridors and give them a visual hierarchy. For example, major east west and north south corridors will receive the same pavement treatment. Seating areas will be aligned along the corridors and will include distinctive light poles, banners, benches and way finding elements.

Walkways on campus are of particular importance because of their space-linking function. These walkways can be memorable places as they sequentially reveal the individual campus areas and buildings through harmonized linked spaces. This experience will vary with each type of walkway design. Walkways should be considered in the larger context as opportunities to enrich the campus and should therefore be designed on a campus-wide basis, not on a project by project basis. The Campus Plan reveals a series of walkways that will incorporate different environments, for example, major north south corridors will exhibit an urban setting with hard paving and site furnishings, whereas walkways proposed around Burton’s Pond and Long Pond will be softer and more natural materials and will reflect the close proximity of a more natural environment.

4.3.3  Bicycle Circulation

Cycling should be given consideration in the design of gathering spaces and walkways throughout the campus. Links to existing and proposed bicycle trails and the City of St. John’s at large should be created to provide safe and easily accessible cycling routes. The Campus Plan does not propose any dedicated bike paths as the Campus is compact enough to avoid dedicated bike trails which are space-consumptive. Cyclists can park at the edge of campus or follow vehicular routes over short distances to the core campus. Wider paths can be shared by pedestrians and cyclists. Bicycle storage areas should be dispersed near campus entrances and building entrances but should not be a prominent element in the landscape. Where possible, locate bicycle storage areas in secure, sheltered areas.
Figure 4.4: Existing Pedestrian Network

Figure 4.5: Proposed Pedestrian Network
4.4 Gathering Spaces

In addition to the many existing courtyards, gardens and social spaces on campus, gathering spaces should be designed for passive safety with clear sight lines from adjacent buildings and for the elimination of isolated zones.

Gathering spaces are traditionally the central organizing spaces of the campus; they should represent and symbolize the heart of the University. Although gathering spaces should be comfortable and inviting, their formal nature should also be recognized. Gathering space design should take its cue from the context and framework provided by each space’s unique surroundings. Concepts should range from new and innovative to time-tested and traditional depending on the sensitivities of the site. The Campus Plan proposes a range of new or improved gathering spaces, which are described in detail in Chapter 2:

- Memorial Common
- Courtyard between the Library and Human Kinetics
- Arts and Administration Forecourts
- Toulinguet Close (with new pavilion)
- Music Garden
- Education Building Forecourt
- Chemistry Building Forecourt and Internal Courtyard
- Paton College
- Burton’s Pond Residential Courtyards
- Student Centre North
- Long Common

The selection of tree, shrub and groundcovers species and the way in which they are planted should convey a significance corresponding to the role of that space and the time of the year that the space is likely to be used. The plant material should conform to a formal plan that accentuates and enhances pedestrian routes and seating areas, frames and marks building entrances and emphasizes views through the space to the landscape beyond. All plant material should be selected for form and interest in all seasons. All campus gathering spaces should be planted with material that reinforces the geometry of the space in the winter months and provides some buffering from the constant winds.

4.4.1 Quadrangles, Courtyard and Gardens
Quadrangles, courtyards and gardens are places where people are most likely to congregate, these places can provide opportunities for more highly detailed, civic design solutions. Walls, lighting, seating and paving are dominant elements within these spaces and their expression should be sympathetic to the existing and proposed architectural styles in materials, form and composition. Memorial Common, Paton College and Toulinguet Close are examples of this type of campus open space.

4.4.2 Flexible Open Spaces and Greens
Flexible open spaces on the campus should rely on building forms, use of large shade trees, organized walkways, simple furnishings and paving to establish their structure. Spatial edges should be flexible to allow for a diversity of uses. Examples of flexible open spaces and greens are Memorial Commons Green, West and East Fields and Long Common.

4.4.3 Residual Spaces
Residual and connecting spaces should be emphasized through landscape design and building massing to better link, both visually and functionally, various parts of the campus. Residual spaces that exist between walkways and buildings, at building entrances and near emergency exits, for example, should be treated with as much attention to detail as gathering spaces. Grading, lighting, planting and safety concerns should all be considered.
Open spaces take shape through the interplay of paved areas and plantings blending trees and shrubs. (Northeastern University, Massachusetts)

Seating areas are important - they provide social spaces in addition to existing indoor spaces and furnish courtyards and open spaces. In the St. John’s climate, it is important to integrate seating areas in planters or architectural features of buildings instead of clusters of benches that would remain unused for most of the year. (Mississauga, Ont)

Quieter areas, for example near residences (Burton’s Pond) can have a more naturalized character.
4.5  Landscape Design Guidelines

Landscape design guidelines establish general criteria to be used to direct future site design as the Campus Plan is implemented. While each new project will present its own set of unique opportunities and constraints, design guidelines help ensure that all projects developed over time can exhibit consistency in materials, forms and character while simultaneously allowing flexibility for positive innovation. The goal is to achieve an integrated, coherent campus environment regardless of when each project is constructed.

4.5.1  Wind and Weather

Pedestrian comfort on campus is directly affected by opportunities to buffer the wind through the location and design of buildings, structures and landscape. The placement of strategically located wind breaks can be done through built form and tree placement that reflect both the formal patterns of building and road alignments as well as the informal patterns that reflect pedestrian desire lines and strategic views.

St. John’s climate impedes full growth of plant material. Existing trees on campus that are doing well become important elements in providing a semi-mature framework to future planting. New planting should concentrate on intensifying existing plantings, which will then improve the microclimate for additional planting.

4.5.2  University Schedule and Construction

New development proposed for the campus should be ultimately timed to correlate to the University’s curriculum and new construction should take place at times least disruptive to the school year. Typically, new landscape projects should be tendered in the winter months with a construction start date scheduled at a time co-ordinated with the end of the school year. Ideally, the majority of the construction should be completed during the summer months when the campus is less populated. Any newly finished projects should be secured and protected from theft or vandalism. New or sensitive planting areas (for example, a naturalization installation) should also be protected until the planting has become established enough to sustain the intended use.
Substantial tree stands exist on the Memorial Campus. Trees usually succeed when planted in clusters and in sheltered locations.

Planters can be used to provide a little more soil and stability to shrubs and trees in hard landscapes. (Memorial)

Trees can act as a windbreak in the winter and contribute to a dramatic landscape. (Memorial)

Isolated and exposed trees will require more time to grow. (Memorial)
4.5.3 Surface Parking Areas
With new development identified by the Campus Plan, some existing large surface parking lots will be removed or replaced over time. Surface parking is generally to be located at the periphery of the Campus, minimizing the amount of vehicular circulation permitted in the campus core. A number of small ‘pocket’ surface lots will be retained (i.e. the Memorial Common, Paton College, the old colleges, etc.) and opportunities to expand street edge parking are encouraged.

All new surface parking areas should incorporate an adequate number of disabled parking spaces and identify designated motorcycle parking spaces. Parking preference should be given to highly fuel-efficient vehicles and registered carpoolers.

As new pocket parking lots are developed, the following guidelines should be observed to de-emphasize the parking area’s appearance.

Signage
All parking areas should be identified on the campus map. Special parking spaces (for example, VIP parking, disabled parking or motorcycle parking) should be designated by either a change in the paving material or by the use of a sign. All signage should be legible yet creatively and tastefully designed and belong to a campus wide signage concept.

Screening and Planting
Parking lots should be screened with intensive groundcover, shrubs and tree planting to minimize their visual impact. Healthy existing trees near or within parking areas should be preserved. All opportunities to plant evergreen plant material along the perimeter of parking areas or within internal islands should be pursued.

Paving Materials and Edges
Parking area surface materials should be selected to support the nature of the pedestrian oriented campus. Although making a clear distinction between pedestrian and vehicular areas is an important issue, parking lot surfaces should blend well with surrounding pedestrian spaces. Surface materials such as unit pavers may be a preferable alternative to large expanses of asphalt. Combinations of materials, such as concrete with unit paving banding or unit paving with natural stone can also be considered.

Smooth concrete curbs should be proposed to contain vehicles, direct surface runoff and provide solid edges for snow removal equipment. Poles should be used to mark edges in need of protection prior to abundant snowfall. Parking courts, such as the one located within Memorial Common, should be defined with free-standing metal bollards and square cut boulders instead of curb-type structures.
A variety of plantings can be used to screen parking spaces. Grasses maintain their shape in the winter. (Niagara-on-the-Lake, ON)

Evergreen shrubs are appropriate for year-long screening. (Montréal, QC)

Simple grasses can be effective in screening and can be combined with low masonry walls. (Montréal, QC)

Directional signage should be provided by each parking facility. (Niagara-on-the-Lake, ON)

Narrow landscape strips can be used to separate parking areas from walkways. (University of Toronto)

Alternative paving materials can be used in improve water infiltration and aesthetics of parking areas.
**Lighting and Security**

Lighting should be selected to minimize light pollution and produce white, colour accurate lighting (metal halide). Tall standards should be replaced with pedestrian-scaled standards and low bollards. Lighting should be adequate to provide good visibility in night-time conditions. All parking areas should contain at least one emergency telephone or beacon. Please refer to the lighting section of the landscape guidelines for more detailed information.

**Aisles and Internal Pedestrian Network**

Pedestrian access that must cross parking areas should be directed to well designated pedestrian scaled walkways. A change in paving materials and appropriate lighting, signage and vertical markers for identification in the winter months should accompany all such walkways. This crosswalk detail should be consistent throughout the campus where pedestrians and vehicles intersect.

**Drainage**

Runoff water should not be allowed to overwhelm storm sewers and should be captured on-site in swales. New surface parking areas, with the exception of parking courts, should be designed to drain into vegetated or grassy swales. The swales filter the runoff and then slowly release the water into the ground or into the existing storm water system. Semi-permeable pavers should be considered for new parking area paving to allow some storm water to percolate before being collected in swales.

*Figure 4.6: Vegetated swales can fulfil the dual purpose of filtering run-off and providing screening for parking lot areas.*
Pedestrian crosswalk link should take priority

Paving should appear to be part of the pedestrian environment

Drainage should be collected in vegetated swales

Enhanced paving should mark parking area entrances

Interior planting areas should break up large expanses of pavement

As many existing trees as possible should be retained

Parking areas should be screened to de-emphasize the presence of vehicles

Interior planting areas should break up large expanses of pavement

Figure 4.7: Plan of a generic pedestrian and environmentally friendly parking lot.
4.5.4 Paving

Paving is intended to assist in the organization of the Open Space network while being a background element that allows the activity of the surrounding use to predominate. Pavement materials should always be used in their primary forms and not as an imitation of other materials. All paving materials should be selected for their ability to withstand St. John’s climate and heavy salting in the winter months. Pavements should be designed to maximize pedestrian safety and to accommodate people with disabilities. Vehicles will occasionally traverse most pavements within the campus; therefore, new pavement design should take vehicle use into consideration.

Subsurface Conditions

It is recommended that the existing subsurface conditions be investigated prior to any new pavement being installed. Underlying causes of the existing pavement failure may continue to cause problems for future pavements. It is essential that subsurface preparation and base material selection and installation be done properly for the new pavement to be successful. Including geotechnical investigation in the construction process will provide accurate information for the design of an appropriate pavement section.

Demonstration plots of various hard paving materials may be installed to find the best pavement section solution. Finding a level of comfort with alternate paving materials may greatly improve the paving palette for the campus.

Walkways

As the Campus Master Plan demonstrates a hierarchy of walkways, there should also be a corresponding hierarchy of paving materials. The following is the recommended palette of materials and colours:

Primary Walkways (Major north-south, east-west connections):

- Minimum 6.0m wide to accommodate emergency and service vehicles
- High quality easily recognizable paving materials such as, unit pavers, natural stone, concrete paving
- Unit pavers minimum 60mm unit thick in areas of exclusive pedestrian use Install on concrete base or use 70mm to 80mm thick pavers where paving will sustain vehicular use Paving colour palette: to be determined
- Specify texturized surfaces to reduce slipping

Secondary Walkways (Building to building connections):

- Minimum 3.0m wide High quality unit pavers Paving colour palette: to be determined

Tertiary Walkways:

- Minimum 2.0m wide
- Unit pavers or natural concrete paving with broom finish
- Location to be measured against overall plan
- Location to respond to path of desire

Streetscape Paving:

- Minimum 2.0m wide High quality concrete paving, natural colour, broom finish Areas of enhanced paving to be unit paving or natural local stone
- Crosswalks to be paved with texturized, interlocking unit pavers
Unit Paving Installation

Unit paving to be used in pedestrian areas should be installed over a minimum of 30mm of sand or limestone screenings bed over a minimum of 150mm of granular material. Pedestrian grade unit pavers should be at least 60mm in thickness.

Unit paving to be used in vehicular areas should be installed over a minimum of 30mm of sand or limestone screening bed over a minimum of 150mm of granular material over a 300mm depth of a structural granular layer. Vehicular grade unit pavers should be at least 80mm in thickness. Installing unit paving in a herringbone or other ‘inter-locking’ patterns will enhance the strength of the paving.

Any unsuitable subgrade material should be removed and replaced with the appropriate fill material. Unit paving should never be installed on inadequate subgrade.

Edges of unit paving that abuts soft areas such as planting beds or lawn will need to be restrained with metal edging or concrete flush curbs.

The joints of the pavers should be swept with polymeric sand to improve the stability and longevity of the pavement.

Figure 4.8: Typical Construction Detail: Pedestrian Unit Paver Installation

Figure 4.9: Typical Construction Detail: Vehicular Unit Paver Installation
Primary pedestrian walkways should be constructed of high quality and easily recognizable paving materials such as, unit pavers, natural stone, or concrete paving. Paving should be designed to accommodate use by emergency and service vehicles.

Seating areas should be incorporated in key locations. These areas will include benches, lighting, trash receptacles, planting and enhanced paving. Site furnishings should be located in groupings out of the way of the main pedestrian flow to make snow removal more efficient and to allow passage of emergency and service vehicles.

To reduce clutter, trash receptacles can be attached to light poles and elevated from the ground to assist with snow removal.

High quality benches

Primary pedestrian walkways should be lined with shade trees planted 6 to 8 m on centre. Recommended species are: Red Maples, Beech, American Elm and Red Oak.
Seating areas include a bench and trash receptacle and are located outside the main walkway for ease of snow removal. Elements are installed on a paving pad to reduce maintenance and maintain aesthetics.

Tree and shrub planting should line secondary walkways where possible.

Figure 4.11: Secondary Walkways, proposed plan and section

Figure 4.12: Tertiary Walkways, proposed plan and section
Paving for Gathering Places

Paving for gathering spaces can react specifically with the unique concept and purpose of the space and its context. A high quality, classic palette of materials will prove successful over time. Natural stone, unit pavers in non-custom colours and finishes and natural concrete paving will provide a timeless aesthetic that will be appropriate now and in the future.

Patterns and detailing in the paving to create interest should respond appropriately to the use and scale of the space. For example, patterns and detailing for a large gathering space will have a larger scale that those of a smaller, more intimate courtyard. Large, plain expanses of paving should be avoided.

Parking Area Paving

Although making a clear distinction between pedestrian and vehicular areas is an important issue, parking lot surfaces should blend well with surrounding pedestrian spaces. Surface materials such as pre-cast concrete unit pavers are proposed for these areas. Combinations of materials, such as concrete with unit paving banding could also be considered. Breaking up large expanses of parking paving with sensitive design of patterns and colours with help in the de-emphasizing the appearance of the parking area. A change in colour or change in unit can be used instead of pavement paint to mark the parking spaces.

Paving patterns with horizontal bands may also assist in slowing traffic in narrow or straight access routes. A change in paver colour, unit or texture should occur at all pedestrian crossings.

The use of a turf-stone type paver in some parking areas may be worthwhile. This product is installed in conjunction with a sod forming grass and once established, will give the parking area a ‘green’ look. Please note, however, that this surfacing does not usually withstand snow removal practices. Temporary parking or parking areas that are only used in the fair months might be appropriate locations for this pavement type.

Service Area Paving

Some thought should go towards improving the appearance of the necessary service areas and routes. These areas should be perceived as being part of the pedestrian realm and should blend well with adjacent pedestrian pavements. Break up large expanses of paving with changes in colour, unit or materials. Paving in service areas should be washable and easily drained. Pavement section design should be appropriate to withstand heavy vehicles.
The creative use of paving materials can enrich the pedestrian environment by providing detailing and emphasis at an human scale. (University of Toronto)

Paving in gathering areas should specifically relate to the purpose, context and concept of the space. Materials should be chosen for their proven durability in the St. John’s climate.

The preferred material for most walkways should be a simple and durable paver.
4.5.5 Service Areas

Efficient service areas are critical to the operation of the University, but they should not detract from the pedestrian experience on the campus. Service areas including loading docks, dumpsters, tanks and at grade mechanical units should always be screened to the greatest extent possible. Exterior bin and dumpster storage areas should be consolidated and completely surrounded by a permanent screening feature with gates. The screen should be an opaque material such as wood or metal and should be at least 2.5m in height. The design and detailing of the screen should be well thought out and appropriate for its context.

4.5.6 Grading

Site grading should recognize existing drainage patterns while functionally solving drainage problems that may exist as a result of ground plane alternations during construction. Likewise, site grading should be sympathetic to existing landforms while providing appropriate transition of architectural elements to grade. Site grading should also provide for an uninterrupted flow of vehicular and pedestrian traffic through the University. The plan should direct and provide adequate flow of surface runoff to swales and catch basins while gracefully contouring the land to blend with the existing conditions of the site.

Sensitive use of site grading can provide aesthetic qualities for development. It can soften or highlight rigid architectural lines, create private spaces, screen objectionable views and add interest to flat sites that have little or no topographic interest. Drainage then becomes an integral part of the overall Campus Plan that fulfills basic functions while being visually attractive.

Site grading should always provide barrier free access to all of the university’s facilities. Design of barrier free access should be an integral part of all new site works and should not appear as an afterthought.
Refuse containers should not be visible from public areas. In the community at right, a dedicated building was erected to house the containers. (Calgary, AB)

Tanks and transformers need to remain accessible, but they can be screened with planting. Plant material should be installed at an appropriate size that will achieve a screening effect in the short and long term. (McGill University)
4.5.7 Planting
Trees and other planting should be considered as design elements that define basic spatial order and can, in turn, significantly influence the quality of campus life. The designed placement of plant material in conjunction with existing vegetation and the arrangement of buildings is the crucial design element for campus. Plants are alive - thus their maintenance requirements, fragility and lifespan should constantly be acknowledged and accommodated.

Soil Preparation
The Memorial Campus as a whole has a very shallow layer of acidic topsoil, with very little organic matter. As a standard practice, the campus currently imports balanced topsoils for new planting areas and supplements existing planting areas with compost, when available, and horticultural limestone to adjust the pH levels. In accordance with this practice, the guidelines recommend preparing all new planting beds with a minimum of 30cm of pH balanced topsoil for areas of shrub and groundcover planting. Tree pits should be prepared separately and should be oversized to allow room for a 30cm layer of topsoil between the root ball and existing soils.

Planting Structure and Scale
The size and growing speed of trees, shrubs and planting beds should be considered carefully with respect to the proportional relationship to campus buildings, roads, walkways, topography, and nearby spaces. Tall, stately trees in rows along edges of formal open spaces and connecting corridors; or large clumps and sweeping masses of smaller trees and shrubs should be considered when planting on a campus wide scale.

Smaller trees and shrubs and perennials are appropriate choices at a courtyard or garden scale or at building entrances where people tend to congregate. Overly intricate planting design is out of character and scale with the campus setting. Plant material will be more effective both visually and physically when planted in large striking masses.

In the winter months the plant material is often the only showing major landscape element that gives a space its structure. Attractive, sturdy winter plant forms will give life to a space when the landscape is otherwise dormant.

Plant Selection
The selection of plant material should be predicated on its particular design function in the landscape. Landscape plans should specify plant material that is mostly indigenous to the natural plant communities of St. John’s. In cases where non-invasive exotic plants are used to enhance the landscape, planting should be limited to those species that are able to withstand the particular microclimate of the Memorial campus and require neither the use of fertilizers nor pesticides.

Plant selection should consider enhancing the campus appearance during specific time periods and have a ‘Best Show’ timed to University events:

Autumn: student arrival and school year commences – provide fall foliage display
Winter: landscape dormant - provide winter interest with fruit, bark and form, microclimate
Spring: Students emerge, landscape wakes – provide spring show with early blooms and leaves
Summer: Graduation, recruiting – provide summer blooms and foliage contrasts
Shrubs can play a structural role in the landscape even in the winter. (Montréal, QC)

Adding colour to the Campus is very important for example with red and yellow twig dogwood. (Saint Mary’s University)

Saskatoon Berry bushes have been successful as hedges on campus. (Memorial)

Vines animate and furnish blank walls. (University of Toronto)

Shrub roses can also be used to frame pathways. (McGill University)
**Trees**

It is important that trees begin to establish a pattern or theme that will tie the campus together. Major trees or general canopy trees form a structure and add a feeling of permanence to a campus. Trees may be used for mass, to define, accent or to soften architectural elements, and to further define circulation routes and the spatial quality of open spaces. Planting size for major trees should be a minimum of 70mm caliper for deciduous trees and a minimum of 150cm height for evergreen trees.

Mature trees at Memorial lend a sense of history, permanence and strength to the institution’s image and begin to establish a framework for wind buffering. Existing trees on campus that are doing well become critical elements in providing a semi-mature framework for future planting. New planting should concentrate on intensifying existing arrangements, which will then improve the microclimate for any future planting nearby.

There is no general pattern of existing tree groupings on the campus. Tree groupings appear inconsistently, varying between formal arrangements along street edges to sporadic placement throughout the campus. There are many opportunities to use formal, geometrically arranged plants along streets and arterial walkways, in courtyards and quadrangles.

Trees should be selected for their form and colour through all seasons and should be chosen to support the thematic concept of the area in which they will be planted. Tree dedications should be actively pursued to connect alumni to a renewed campus and tree identification labelling may be considered to provide a further educational experience. Paton College gardens sets a good example for this type of garden interpretation.

The lifespan and growing speed of trees should be well understood. A variety of species should be selected to ensure a continued positive appearance even as each species expires at different intervals - or even at different times of year. Avoiding a monoculture can also mitigate the potential effect of species-specific diseases.

**Shrubs and Groundcover Planting**

Shrub and groundcover planting is an important part of the landscape palette and can contribute greatly to the campus appearance by providing a level of dynamic change that cannot be exhibited by the larger trees. Because of higher maintenance requirements, shrub and groundcover planting should occur in fewer but larger areas to maximize the visual impact. Primary areas are building entrances, quadrangles, gardens and building foundations. The consolidation of shrub and groundcover planting will have an appropriate scale for the campus.

The use of masses of low maintenance plant material at key locations can:

- Define edges
- Soften or accentuate architectural features
- Direct traffic flow
- Screen undesirable views
- Ameliorate grade differences
- Stabilize slopes

Simplicity of plant character in keeping with the architectural palette will create a unified composition properly scaled to the size and style of the building.

**Vines**

Deciduous and semi-evergreen vines create visual interest on both contemporary and traditional buildings on campus. Leaves often emerge green in the spring and mature to spectacular fall colours. Most vines are drought tolerant and will grow in a variety of soil conditions. Vines can soften or articulate architectural edges, animate blank facades and help naturally cool buildings in the summer months.

**Naturalization**

Areas of naturalization in close proximity to the Pippy Park interface will provide good opportunities to introduce and test the success of naturalized planting areas on campus. Many plant species that occur naturally in Pippy Park are available and will perform well in a naturalized planting. In cases where non-invasive exotic plants are desired for a particular trait (for example, intense fall colour, bank stabilization), planting should be limited to those species that are able to withstand the particular microclimate of the Memorial campus and require neither the use of fertilizers nor pesticides.
Trees along pathways have many advantages: they act as a windbreak, create shade and provide visual clarity and continuity. (Left: University of Toronto; Right: Memorial)

“Edible landscapes” are always very popular. (Memorial)

Native prairie grasses can be used in interstitial spaces instead of turf grass to facilitate maintenance and lend an area a more natural character. (University of Windsor)

The monotony of a façade can be broken with trees. (McGill University)
4.5.8 Recommended Palette

Coniferous Trees

**Balsam Fir (Abies balsamea):** Symmetrical evergreen tree with soft fragrant needles, grows to a height of 20m.

**Larch (Larix laricina):** Open, pyramidal tree with attractive cones and branch pattern in the winter. Larch loses its needles in the winter. Grows to a height of 25m.

**Red Spruce (Picea rubens):** Broadly conical evergreen tree with lustrous bright or dark green needles. Grows to a height of 21m.

**Black Spruce (Picea mariana):** Medium sized evergreen tree with a distinctly conical shape and blue-green colouring. Grows to a height of 12m.

**White Spruce (Picea glauca):** Hardy, shapely tree with dark green foliage. Excellent specimen tree and wind buffer. Will tolerate exposed areas. 25m height.

**Eastern White Pine (Pinus strobus):** Fast growing, open conical shape with soft green needles. Excellent for windbreaks, screening and as a specimen. Grows to a height of 18m.

**Red Pine (Pinus resinosa):** Broad, oval shaped crown atop a straight trunk with dark green glossy foliage. Grow to a height of 12m.

**Eastern White Cedar (Thuja occidentalis):** Dense, pyramidal tree with short branches ending in flat horizontal sprays. Grows to a height of 20m.

**Hemlock (Tsuga canadensis):** Slow growing, dark green evergreen with a soft, graceful habit.

**Austrian Pine (Pinus nigra):** Rapid growing densely branched conical from when young, umbrella shaped with age. Long dark lustrous green needles, tolerates range of soil conditions and road salt. Grow to 18m in height.

**Scots Pine (Pinus sylvestris):** Hardy, rapid growing, pyramidal evergreen tree adaptable to many kinds of soils, with blue-green coarse foliage. 18m height.

**Silver Fir (Abies concolor):** Large excellent specimen conifer with medium growth rate and narrowly pyramidal form. Tolerant of urban conditions. 20m height.

**Douglas Fir (Pseudotsuga menziezii):** Medium green pyramidal conifer useful for windbreaks and screening. Grows to a height of 20m.
Tsuga canadensis
HEMLOCK

Abies concolor
SILVER FIR

Pseudotsuga menziesii
DOUGLAS FIR

Pinus sylvestris
SCOTS PINE

Pinus nigra
AUSTRIAN PINE
Deciduous Trees

Large

Red Maple (*Acer rubrum*): Fast growing, rounded-pyramidal tree with yellow to scarlet fall colour. Grows to a height of 16m.

Sugar Maple (*Acer saccharum*): Slow growing, long-lived tree with rounded form. Dark green leaves turn shades of yellow, orange and red in the fall.

Beech (*Fagus grandifolia*): Smooth gray bark and glossy bluish-green leaves that turn golden-brown in the fall. Grows to a height of 30m.

Fastigiate English Oak (*Quercus robur* ‘Fastigiata’): Distinct pyramidal form with dense tight upright branches. Rapid grower hold leaves into the winter. Suitable for windbreaks, narrow space. 15m height.

Red Oak (*Quercus rubra*): Fast growing, broadly pyramidal tree that is well adapted to urban conditions. Dark green lobed leaves turn dark red in the fall. Grows to a height of 16m.

American Elm (*Ulmus Americana*): Broad vase-shaped tree with dark green leaves that turn yellow in the fall. Grows to a height of 26m.

Little Leaf Linden (*Tilia cordata*): Dense pyramidal tree with small, dark green heart-shaped leaves that turn yellow in the fall. Tolerates urban conditions. Grows to a height of 16m.

Aspen (*Populus tremuloides*): Fast growing, narrow-pyramidal tree with lustrous dark green leaves that turn bright yellow in the fall.
Small to Medium

Dolgo Crabapple (Malus ‘Dolgo’): Upright spreading ornamental tree with pink buds opening to large fragrant white flowers. Brilliant crimson fruit. Height 10m.

Dogberry (Sorbus decora): Small, slow-growing ornamental tree with dark green compound leaves. White flowers followed by red fruit. Fall colour is deep red. Hardy, disease resistant tree. 8m height.

Sumac (Rhus typhina): Wide, spreading, multi-stemmed tree with bright green leaves turning orange red in the fall. Drought tolerant. 2.5m height.

Grey Birch (Betula populifolia): Medium sized, multi-stemmed tree with smooth reddish brown bark, turning white with age. 10m height.

Ironwood (Ostrya virginiana): Medium sized, slow growing ornamental tree with green leaves turning pale yellow in the fall. Disease and pest resistant. Grows well in the shade. 12m height.

White Birch (Betula papyrifera): Fast growing, graceful tree with peeling white bark. Dark green foliage turns yellow in the fall. 13m height.
Shrubs

Serviceberry or Chuckley Pear (Amelanchier): Graceful, upright narrow multi-stemmed shrub with greyish green leaves that turn brilliant red-orange in the fall. Fruit is attractive to birds. 6-8m in height.

Dogwood (Cornus): Multi-stemmed, suckering shrub with green leaves turning maroon in the fall. Dark red branches attractive in the winter. Excellent for stabilizing slopes, 2m height.

Witchhazel (Hamamelis): Large shrub with small yellow flowers in late September. Green foliage changes to orange-yellow in the fall. A sturdy plant good for naturalizing or mass planting. 5m height.

Rhododendron: Broadleaf evergreen shrub with open irregular habit. Beautiful, large flowers bloom in May/June. 1.2 to 2.0m height.

Rugosa Rose (Rosa): Useful shrub for massing and accent planting. Fuschia flowers bloom throughout the summer and fall. Shrub is thorny. 1.2m height.

Spiraea: Hardy, low growing shrub with reliable flowering. Select from green leaved or yellow leaved varieties. Excellent for massing. 1.0 to 1.5m height.

Weigelas (Weigela florida): Tolerant, medium green shrub with ruby-red flowers in early summer and sporadically until fall. Erect, upright shrub with rounded habit. 1m to 1.5m height.

Laburnum (Laburnum x watereri): Upright oval, large shrub with bright green foliage and golden yellow clusters of flowers in May. 3m in height.
**Wild Raisin (Viburnum cassinoides):** Upright spreading shrub with large white flower. Fruit enjoyed by wild life. Found in wet habitats, thickets, clearings, forest edges and along streams and ponds. 1m to 3m in height.

**Sea Buckthorn (Hippophae rhamnoides):** Ornamental shrub with silvery green foliage and bright red berries in the fall. Drought tolerant. 2.5m height.

**Snowberry (Symphoricarpos albus):** Broad rounded shape with bluish green foliage. Dainty white flowers followed by white waxy berries. Reddish-orange fall colour. 1.5m height.

**Winterberry (Ilex verticillata):** Oval, rounded rich green shrub with excellent dense winter form. Noted for its profusion of bright red berries and brilliant fall colour. 2m height.

**Euonymous (Euonymous alatus):** Outstanding shrub with corky ridged bark noticeable in the winter. Green foliage turns brilliant red in the fall. Ideal for borders, screens and large hedges.

**Junipers:** Low growing evergreen shrubs with coarse, prickly foliage. Useful for massing and groundcovering. Often have a purplish winter tone. 0.5m to 1.2m height.

**Bearberry (Arctostaphyllos uva-ursi):** Low, spreading evergreen shrub excellent for groundcover. Dark green leaves turn brilliant red in the fall. 15cm height.

**Heaths (Erica):** Low growing, early spring flowering shrub excellent for groundcover. Prefers acidic soils. 30cm height.
Grasses

**Fountain Grass (Pennisetum):** Medium to fine textured grass that takes on a graceful mounded form. Drought tolerant and suitable for mass plantings. 1.25m height.

**Tufted Hair Grass (Deschampsia):** Low mounding tufting grass with flowers on long graceful stems over dense clumps of dark green foliage. 0.80m height.

**Feather Reed Grass (Calamagrostis):** Distinctive, upright growing grass with flowers turning buff in the winter. Good winter form. Drought tolerant, excellent for massing. 1.2m height.

**Maiden Grass (Miscanthus):** Large growing, fountain-like grass with interesting flower heads extending above the foliage. Fine textured. 1.5-2.0m height.

**Blue Lyme Grass (Elymus):** Clump forming grass with bright blue arching leaves. Suitable for slope stabilization and massing. 0.60m height.

**Ribbon Grass (Phalaris arundinacea):** Bright green and white foliage with freely spreading habit. Tolerant of many soil conditions, excellent ground cover and drought tolerant. 90cm height.

**Cotton Grass (Eriophorum angustifolium):** Tall creeping grass appropriate for naturalization with cotton tuft-like seed heads late in season. Spreads by rhizomes. Approximately 80cm height.
**Perennials**

**Daylilies:** Trustworthy, dependable flowering perennial with bright green strap-like foliage. Flower colour varies per cultivars. Excellent for massing and naturalizing. Flowers from mid summer to frost.

**Hosta:** Broad, heart shaped leaves emerge in the spring to form dense mounds of foliage. Flowers extend above mound in late summer. Chose from variegated and blue tinged varieties.

**Lavender:** Medium sized, silver-green foliage with bluish pink flowers. Excellent for borders and massing. Foliage is fragrant. Drought tolerant. 60cm height.

**Shasta Daisy:** Free flowering perennial with white flowers and yellow eye. Attractive in massing. 60cm height.

**Vines**

**Boston Ivy (Parthenocissus tricuspidata):** Maple-leaf shaped leaves in dark green turning bright red in the fall. Grows well on vertical surfaces.

**Virginia Creeper (Parthenocissus quinquefolia):** Creeping vine with dark green foliage turning bright red in the fall. Excellent for groundcover.

**Plant Recommendations by Use:**

**Street Trees:**
- Linden
- Red Maple
- Red Oak

**Windbreaks:**
- Austrian Pine
- White Spruce
- Douglas Fir
- Larch
- Eastern White Cedar

**Median Planting on Prince Philip Parkway:**
- English Oak
- Larch
- Austrian Pine
- Rugosa Rose
- Sea Buckthorn
- Sumac

**Experimental Plant Species to test:**
- Magnolia
- Carpinus
- Prunus
- Pyrus
- Cercidiphyllum
- Ginkgo
- Fraxinus
4.5.9 Lighting
Light fixtures, in addition to providing for safety and security, should be installed as design elements to provide visual continuity between different campus areas. Lighting should be pedestrian-scaled, produce natural light and minimize light pollution. Heritage replica standards should be avoided because of the architectural diversity already present on campus. Lighting should be integrally designed as part of the built environment and should reflect a balance between lighting needs and the contextual ambient light level and surrounding nighttime characteristics of the campus. In particular, light pollution and trespass onto neighbouring properties should be minimized. Recommended light level guidelines and uniformity ratios established by IESNA (Illuminating Engineering Society of North America) should be considered when determining appropriate lighting design solutions. The Royal Astronomical Society of Canada also provides guidance on avoiding unnecessary light pollution.

A hierarchy of fixture styles should be selected for the campus—one for streetscapes, one for walkways and one for parking areas. Low level bollards may be introduced in key areas. Streetscape lights should have a mounting height of 7-9m, should be placed approximately 30m apart and should be equipped with banner arms. Pedestrian lights should have a mounting height of 3.5 to 4m and be installed 15-20m apart. All new lighting should be coordinated with tree spacing. Light pole and bollards should be located in sodded or planting areas adjacent to paved areas to reduce the occurrence of base damage from snow removal equipment.

4.5.10 Site Furnishings
In general, site furniture should be located in main gathering spaces such as quads or courtyards, as well as at main entrances to all campus buildings. Furnishings should be placed and oriented so that they do not obstruct pedestrians, emergency or maintenance vehicles.

To support the visual unification of the campus and to reduce maintenance and simplify replacement, site furnishings should be consistent throughout the university grounds. Campus furniture should be selected for its durability, its compatibility with the cold climate and its availability for additional purchases in the future. Colours and materials of site furniture should be coordinated as much as possible. For aesthetic and maintenance purposes, natural finishes should be encouraged.

Seating Elements & Benches
Benches and seating areas should be located outside of the main pedestrian flow. Benches should be located throughout the campus, in clusters in the more frequented areas like the quads and courtyards. Seating areas and benches should be located in sunny exposures whenever possible. Seating should be provided for both large and small groups. Benches should be sited and maintained so that they can function all year round. Otherwise, benches should be removed during the winter months. Lightweight metal furniture can be used on patios for ease of storage during the winter. Lighting and recycling bins should be located nearby.

Seating elements other than manufactured benches may be utilized. Precast concrete blocks or slabs, square cut boulders and seatwalls make interesting and durable places to sit.

Waste Receptacles
Garbage containers should have separate divisions for various recyclable materials. All waste disposal should be integrated into one container. Garbage and recycling containers should be located throughout the campus with a design consistent complementary of other site furnishings.

Bicycle Racks
Bicycle racks should be provided at or near the entrances of all buildings and should be clearly visible from the main entrances. Bicycle racks should be located and oriented in such a way that they do not impede pedestrian movement.

In the absence of ample and conveniently located bicycle racks, fences and railings are often used as bicycle storage. For this reason, bicycle racks should be provided in clusters throughout the campus.
Site furnishings should use materials durable in their natural finishes to reduce maintenance and should take their cue from the space in which they are located. Natural materials and colours should be preferred. (Left and Right: Montréal, QC)

Seating elements can take advantage of sun exposures. Stone is a very durable and locally available material. (Left and Right: Toronto, ON)
4.5.11 Wayfinding and Signage
The ways in which a university provides directional guidance on campus creates a visual identity that is readable, accessible and engaging and serves to encourage interaction with the campus environment. Signage is a form of welcoming and an important safety feature.

While indoor signage is currently up-to-date and clearly visible, outdoor wayfinding could be improved with maps and directional signage located at all points of arrival. Signs should also be provided to direct motorists to visitor parking spaces, along with information on parking pricing and time limits.

Additional directional signage should be provided at key intersections.

Naming rights to buildings, courtyards walkways, promenades and even parking lots can form the basis of a fundraising program.

4.5.12 Public Art
Outdoor art should be integrated throughout the campus, at highly visible locations and in a variety of forms. Art should enhance the campus users’ experience and broaden their knowledge of the University, the city at large and Atlantic Canada’s rich history. Art on the campus provides the opportunity for the University to promote local artists and draw support and visitors from the surrounding community.

Interpretive displays and signage, sculpted or patterned landforms and plantings should be as much a part of the University’s outdoor art strategy as more traditional art forms.

For new work, contracts with artists should specify maintenance and installation requirements of the work, whether the work is permanent or temporary.

Outdoor spotlighting should illuminate the work.

Outdoor art should be incorporated into the Campus Plan so that it acts like signage and enhances the pedestrian experience.

Ideally, permanent or temporary works would be integrated into the new courtyards and quads or at the view termini of the many new corridors or breezeways as proposed by the Campus Plan.
Maps already on campus: more should be added and their design coordinated.

Markers such as pathway bollards and building plaques add character to the Campus.

A slender and contemporary design should be adopted for maps. The map itself is printed and can be easily replaced as the campus evolves. (Baltimore, MD)
4.5.13 Protection and Preservation of Natural Features
A thorough site evaluation should be performed prior to the commencement of new construction. Any existing features should be investigated in terms of their significance to the aesthetics, ecological or hydrological function, history and heritage of the immediate site and the site’s position in the larger context of the campus. Elements worthy of preservation:

- Existing trees and large shrubs
- Existing swales or creeks
- Significant topographic features
- Built features such as walls, fences, piers

Elements deemed worthy of preservation should either be properly protected during construction or if adequate protection cannot be provided, the element should be moved.

4.5.14 Maintenance Program
One of the largest challenges for landscape improvements on a large campus is that of maintenance. Not all areas will receive the same level of landscape care. The maintenance plan should be updated to determine each area’s level of required maintenance. For example, open spaces in the campus core should receive the highest level of attention to keep the landscape in peak condition. In contrast, areas of the campus that are closer to Pippy Park that are proposed to be naturalized may receive less attention and intensive physical maintenance. In all cases, efforts should be made to select landscape materials that are durable and as maintenance free as possible.

It has been expressed that the number of trained facilities management staff dedicated to the upkeep of the campus grounds is not sufficient for the size of the campus. As a result, many of the landscape areas have become overgrown and unsightly. Additional qualified staff should be considered to assist in the management of the campus’s expanding open spaces for any campus growth to be a success. The introduction of a horticulture or landscape architecture program into the University’s curriculum may spark a renewed interest in this line of work.

4.5.15 Safety and Security in the Landscape
The composition of elements should adhere to the principles of design for defensible space: clear visibility should be maintained at the ground plane, site lines into the space from adjacent buildings and areas should be preserved and traffic patterns should avoid dead or isolated zones.

- Eliminate secluded and dead-end spaces
- Provide emergency call stations or bollards
- Provide clear views into and out of spaces
- Eliminate hiding spaces near doorways and dark pockets
- Provide colour accurate lighting (metal halide) on pedestrian routes
- Schedule regular maintenance for all lighting and emergency features to ensure constant operation
Emergency beacons are useful and their installation should continue. Passive surveillance should not be neglected: for example, buildings should feature abundant glazing on the ground floor and pathways located within views of active indoor spaces. (Memorial)

The presence of bodies of water and wildlife requires special care in campus maintenance and construction activities. (Memorial)
5 transportation & parking
5. Transportation and Parking

5.1 Introduction

On university campuses, the issue of transportation is closely tied to land use in the form of roads and surface parking lots and the safety and convenience of access to and circulation within the campus.

Building on the discussion in Chapter 2 – Campus Plan Concept, and the recommendations of the Traffic and Parking Study prepared by Marshall Macklin Monaghan as part of St. John’s Campus Master Plan Update, this Chapter proposes a set of strategies to rationalize accesses to the Campus and circulation patterns within the Campus to foster a pedestrian-friendly environment and make the University easy to navigate.

At Memorial, as on many other campuses, complaints about a parking shortage are growing. At the same time, the realization that large asphalted areas are neither aesthetically pleasing nor environmentally friendly is growing. In addition, new buildings may trigger more parking demand while at the same time resulting in the displacement of surface parking lots.

This chapter is based on the premise that parking should not drive the University’s plans for expansion and modernization, and that a proactive approach to transportation issues must be taken. This chapter, based in part on analysis performed by Marshall Macklin Monaghan, Transportation Engineers (MMM), provides further analysis on the current situation and provides a set of recommendations to address access, circulation and parking issues, as well as how to encourage other modes of transportation.

5.2 Issue Analysis

The following issues have been identified through analysis of the physical environment and conversations with campus stakeholders.

Parking supply and demand

Users have complained about a shortage of parking. Analysis performed as part of the campus planning process have confirmed that Memorial’s 3,500 parking spaces are very well used, with a significant demand peak between 8:00 and 9:00 am. However, there is limited space to add a large amount of surface parking on campus.

Availability of Alternatives

Many campus users cannot take transit to the University because of the lack of service in their community or inadequate frequency. In turn, the lack of demand is not prompting Metrobus to add capacity.

Intersections

According to analysis conducted by MMM, the majority of the intersections are operating with acceptable Levels of Service. However, concern for the following two intersections should be noted:

- Allandale Road at Prince Philip Drive
- Clinch Crescent at Arctic Avenue

These intersections, both essential in providing vehicular access to campus, are operating close to or at capacity during the morning peak hour. Observations on-site confirmed the high level of demand at these locations, relative to the available capacity.

The following areas of congestion were also noted from on site observations during the morning peak period:

- The intersection of Westerland Road at Elizabeth Avenue, especially the northbound left turn.
- The intersection of Westerland Road at Prince Philip Drive, especially the northbound left turn.

Pedestrian routes are often confusing.
Figure 5.1: Access and Circulation Issues (1 of 2)

- Traffic cutting through campus
- Limited pedestrian access across Prince Phillip Drive
- Intersections are not pedestrian oriented
- Traffic cutting through campus
Collisions
At the intersection of Allandale Road at Prince Philip Drive, there were 44 and 40 collisions in 2003 and 2004, respectively. The consistency and number of these collisions raises concern that action should be taken to improve the operations at this intersection. A safety audit is being undertaken by the City of St. John’s to address this intersection.

Infiltration
Approximately 15% of southbound trips and 11% of northbound trips were identified to be traversing the campus en route to another destination. These trips add to congestion on campus and increase the possibility of conflicts with pedestrians.

Walking and cycling
Many intersections are not pedestrian oriented, and there is an overall lack of pedestrian priority. Sidewalks are generally narrow (typically 1.5 m in width). Numerous intersections have dedicated right turn lanes, which give priority to vehicular access over pedestrians (e.g. Westerland and Allandale at Elizabeth, Allandale at Prince Philip).

During the winter, the lack of snow removal by the City prevents students from using sidewalks throughout the University area, primarily along Elizabeth Avenue from Churchill Square to Freshwater Road. As a result, students must walk on the roads, and this raises issues in terms of pedestrian safety, comfort and capacity. Snow accumulation also affects the ability of pedestrians to reach the call buttons at pedestrian crosswalks.

Cycling is currently not well supported. There are a few bicycle racks of relatively low quality on the campus and no other cyclist support systems. The City does not provide any cycling priority on-street, and there are no dedicated off-street cycling trails.

Future Concerns
Traffic volumes along Prince Philip Drive are expected to increase, and improvements along the University frontage will be needed to maintain the flow of traffic while ensuring the safety of pedestrians. Traffic flow along Westerland Road/Clinch Crescent is also a concern, and so is public transit reliability, primarily at Arctic Avenue and at Elizabeth Avenue, where buses must make turns.

Traffic Evolution
It is expected that the student population will grow from 16,840 to 20,500 by the year 2010, which amounts to a 22% increase. However, it is expected that the growth in volume of traffic will not increase as fast as enrolment for the following reasons:

- The growth in campus population will come from off-island students who are less likely to drive and/or can be encouraged not to bring cars on campus.
- Alternatives to single-occupant driven vehicles will be encouraged, e.g. carpooling and transit use;
- Transit improvements will be actively sought as a reliable alternative to driving;

The Need for Action and Collaboration
Through discussions with stakeholders and the City of St. John’s, it appears that neither the status quo in access and circulation or the provision of extensive parking facilities are viable options by themselves:

- Any significant increase in parking on campus will have an impact on congestion, both on campus, at access points and on the surrounding road network. This may trigger the need for expensive roadwork that would further increase traffic and emissions. A lack of alternatives is also forcing students to acquire an automobile, which constitutes an additional barrier to higher education.
- An increased reliance on transit will also require a financial commitment by the City of St. John’s as every ride is substantially subsidized. As ridership increases, so do costs.
- Accommodating all new enrolment in campus residences is not feasible, and does not address travelling patterns of new faculty, staff and part-time students.
- Finally, a curb on the growth of the University because of transportation concerns would be both unprecedented and undesirable for its consequences on broader provincial goals, including economic development, research and development growth, and an educated workforce.

As a result, the preferred approach is the promotion of alternative modes to the private automobile (transit, bike, walking and carpool), through incentives to these modes and disincentives to auto use. This approach must be explored collaboratively and proactively by Memorial and the City of St. John’s.
Figure 5.2: Access and Circulation Issues (2 of 2)

- **Limited reserve capacity from outer ring road**
- **Congested access point**
- **Awkward intersection results in limited capacity**
- **Northeast area has limited accessibility**
- **Transit accessibility is compromised**
- **Lack of complete internal circulation system, some vehicles must use city streets**
- **Limited reserve capacity from outer ring road**

*Other: Poor Bicycle Facilities*
5.3 Access and Circulation

5.3.1 Sidewalk Design
To enhance pedestrian access and safety in any redeveloped parking areas, sidewalks of minimum 3 metres should be specified as campus streets are rebuilt to provide a safe and comfortable walking environment and to allow for snow storage.

5.3.2 Crosswalk Design
Solutions for improving pedestrian crossings at intersections include clear pavement marking and signage, adequate lighting, as well as textured and coloured pavement at crossings to clearly signal these areas to both pedestrians and motorists. Curb cuts should be included at all crossings, to ensure universal accessibility. The use of feature paving or where necessary the use of raised crosswalks should be considered to slow traffic and enhance pedestrian safety and security. These crosswalks should only be implemented on internal campus streets so that transit services are not negatively impacted. Emergency service providers should be consulted with respect to the design of raised crosswalks.

Pedestrian call buttons at crosswalks should be located to be accessible even in periods of high snow accumulation. As the crosswalks are reconstructed to provide additional priority, the call buttons should be relocated to separate poles placed back from the road. This would also benefit users in wheelchairs throughout the year.

Pedestrians should not be required to action a call button to obtain a green light as is currently the case on Prince Philip Drive. Also, countdown signals could be installed to clearly indicate the remaining time available to cross and signal to motorists that even through the pedestrian signal may be flashing, pedestrians still have time to cross.

5.3.3 Drop-off Areas
Drop-off areas should be improved. The recommendations are as follows:

a. A new drop-off and bus stop should be provided at the proposed east wing of the Arts and Science Building where an enclosed common and waiting area will be located. This should replace the existing transit stop at Elizabeth Avenue in front of the Arts and Administration Building. A formal drop-off area should be provided along the circular drive at the front entrance of the Arts and Administration Building.

b. The drop-off area in front of the Education Building causes significant congestion on Westerland Road in the morning. The extension of Pedagogues Close to Irwin’s Road and closure of the intersection of Irwin’s Road at Westerland Road should be considered to improve traffic and transit operations on Westerland Road.

c. It is recommended that the area at the Science Building and along Phelan Road be reconfigured to provide a structured pick-up/drop-off area on the west side, immediately south of the Science parking access route. The Science Building permit parking in the quad should be controlled by an access gate to eliminate the problem of drivers blocking this access while waiting to pick people up.

d. A drop-off at the north east corner of the INCO Innovation Centre is proposed in conjunction with a limited amount of surface parking to the north at the eastern edge of Memorial Common.

e. A drop-off at Morrissey Drive at the north end of Long Common.

f. Drop-offs to new buildings fronting Prince Philip Drive should be provided on Arctic Avenue to the north and Pedagogues Close Extension to the south.

g. Drop-offs to the new residences west and east of Burton’s Pond should be located at the north end of each building along Livyer’s Loop and Burton’s Pond Road.
5.3.4 Dedicated right turn lanes
The dedicated (channelized) right turn lanes on Elizabeth Avenue at Westerland Road and Allandale Road should be removed when reconstruction occurs to slow down traffic and provide a more pedestrian-friendly environment.

5.3.5 Improvements to the Westerland Road/ Clinch Crescent Area
Pedestrian connections along Westerland Road/Clinch Crescent between the Aquarena/Field House and the parking facilities north of Prince Philip Drive (and leading to the Hospital) should be improved. As part of any future developments along this route, consideration should be given to integrating another elevated walkway across Prince Philip. In addition, shelter for pedestrians from the “horizontal rain” and wind is recommended along Westerland Road and Clinch Crescent. This may take the form of colonnaded buildings, potentially combined with plantings or other windbreak installations.

5.3.6 Russell Road Area
To improve access and safety, facilitate traffic operations on Elizabeth Avenue and establish a gateway into the campus, Russell Road should be reconfigured to align with Phelan Road to the north and Rodney Street to the south. In addition, exclusive left turn lanes should be provided at the Elizabeth/Russell intersection.

5.3.7 Intersection of Livyers Loop/Morrissey Drive at Prince Philip Drive
At the intersection of Livyers Loop/Morrissey Drive at Prince Philip Drive, a widening is recommended to improve safety impacts due to the overlapping southbound and northbound left turns.
5.3.8 Intersection of Irwin’s Road/Livyers Loop at Prince Philip Drive
The Irwin’s Road/Livyers Loop intersection is extremely close to Prince Philip Drive. It is recommended that Irwin’s Road be realigned south at this location to clearly separate the two intersections and provide more space for pedestrians at the intersection.

5.3.9 Morrissey Drive
In order to optimize traffic flow in the northeast quadrant of campus, Morrissey Drive should be separated from the parking lots as much as possible. It is recommended that the break in the median on Prince Philip be closed and the existing access be relocated to the west. A new signalized intersection is recommended midway between Morrissey Drive/Livyers Loop and Allandale Road. This intersection would accommodate development in the northeast quadrant of campus and facilitate pedestrian crossings of Prince Philip Drive. A two-phase pedestrian-activated traffic signal would be installed, with an elevated enclosed crosswalk as an alternative.

5.3.10 Elizabeth Avenue Widening
It is understood that the City of St. John’s has developed designs for a widening of Elizabeth Avenue along the southern edge of the campus. This project would also involve a reconfiguration of the Freshwater Road intersection to make Elizabeth Avenue the “through” connection at this location.

Although a widening of Elizabeth Avenue may be beneficial from Westerland Road to Freshwater Road to alleviate congestion during peak periods and improve transit schedule adherence, much of the traffic on Prince Philip Drive is destined to the Hospital or University, so it is not clear that a widened Elizabeth Avenue would actually alleviate much of this traffic from Prince Philip Drive. Also, it is not clear that five lanes are required.

A widening of Elizabeth Avenue at the University edge would not only be detrimental to the character of this important gateway to the Campus and walkability along its southern edge, but could create excess capacity. This would likely attract more demand, potentially involving more traffic infiltration through campus, resulting in a future congestion level that would prompt a need for further road improvements.

Prior to proceeding with a widening, it is recommended that the City undertake a broad update of the needs for Elizabeth Avenue, based on updated travel demand forecasts, on an option for a three-lane cross-section. The third turning lane would provide improved storage for vehicles turning at Westerland Road, Russell Road and the proposed north-south road to the western edge of Campus;

5.3.11 Livyers Loop Options
To minimize cut-through traffic and simplify operations at the intersections adjacent to Prince Philip Drive, an alternative for Livyers Loop (and Irwin’s Road east of Livyers Loop) would be to operate this loop as a one-way street. There are two options:

1. Operate the entire loop as one-way: Operating the section of Livyers between Prince Philip and Phelan as one-way street would make this an unattractive through route, and add to the demands on City streets and through heavily used intersections. In addition, it would likely direct more traffic through the residential area, creating potential pedestrian conflicts.

2. Preferred Option: Livyers Loop as one-way either clockwise or counter-clockwise between the Livyers/Irwin’s Road intersection and the Phelan Road intersection. The north-south section between Phelan/Russell Road and Prince Philip Drive would remain two-way. This would simplify operations and enhance safety at the Prince Philip intersection. The easterly access onto Prince Philip Drive should at least be redesigned to restrict eastbound right turns into campus, to avoid an unsafe situation. A preferred option would be to close this access, as it does not conform to acceptable design standards.

The change in operation on Livyers Loop to one-way may result in increased vehicular speeds which can be addressed through road design. Elements should include wider sidewalks on Livyers Loop, and possibly a raised intersection table at the junction of Livyers Loop and Phelan Road. That measure would assist in discouraging cut-through traffic on Livyers/Phelan/Russell, and signal to drivers that this is a pedestrian-priority area.
Memorial University Campus Plan

- Extension of Pedagogues Close to Irwin’s Road and closure of intersection of Irwin’s Road at Westerland Road.
- Structured Drop-off area by the Science Building and control of access to the Quad parking area.
- Extension of Morrissey Drive and creation of a new signalized intersection.
- Reconfiguration of Irwin’s Road, and Livyer’s Loop at Prince Philip Drive.
- Closure of the existing driveway.
- Removal of dedicated right-turn lanes.
- Continuous alignment of the east-west ‘front entrance drive’.
- Potential widening of Elizabeth Avenue to Westerland Road only.
- Removal of dedicated right-turn lanes.
- Livyer’s Loop: 1 or 2-way operation.
- Alignment of Russell Street with Phelan Road and Rodney Street.

Figure 5.3: Proposed Transportation Improvements
5.4 Parking

5.4.1 Context
As on many university campuses, members of the Memorial community perceive that there is a shortage of convenient parking. This concern was evident at the campus plan consultation events. However, compared to other universities in the Atlantic Region and elsewhere in Canada, Memorial’s parking prices remain reasonable. Memorial now lacks a major open space that could be used for parking. The long-established practice of maintaining a low price of parking thanks to subsidies from tuition and government grants is also being questioned.

With the impetus to add new buildings under the Campus Plan and limited scope to serve these buildings with surface parking or road capacity to accommodate more traffic, a compelling opportunity exists to consider alternatives, including the following concepts explored further in this section:

- Changes to parking fees to encourage other modes and carpooling;
- Construction of structured and/or underground parking;
- Changes to the management of parking and usage patterns; and
- Promotion of alternative modes (i.e. walking, cycling, improved transit, carpooling) through other policies and programs.

5.4.2 Future Parking Demand
The 15% increase in enrolment by 2010 is not expected to result in a proportional increase in parking demand. Due to the anticipated drop in university-age population in the province, most of the increase will be composed of out-of-province students who are unlikely to bring a car on campus. Conversely, if parking demand were allowed to grow at the same rate as enrolment, there would be a need for over 500 additional spaces. There is not sufficient land on campus or nearby to accommodate a surface lot of that size and enrolment growth beyond that date would not only strain Memorial’s ability to provide affordable parking, but also cause congestion and pollution beyond the campus borders.

5.4.3 Parking Improvements
A key principle underlying the parking plan’s recommendations is that parking provision should not be allowed to grow faster than the campus population and total square footage. Instead, a significant proportion of new demand for transportation should be fulfilled by alternative modes as outlined below. The Parking Plan (see Figure 4) identifies a series of new buildings and additions and new parking facilities in a combination of surface, underground and above-ground structured facilities.

Structured Parking
With consideration being given to build a parking structures on campus to serve the demand, a cost analysis was carried out to predict what rates could be expected to be required for full cost recovery for the garage. There are two possible locations which are being considered for parking garages, which can be seen in Figure 89. The first site, designated Garage A, is on top of existing parking lot #27 located on the north side of campus in front of the Utilities Annex. This would be a four level structure totalling 752 parking spaces. The second proposed garage would be located behind the Aquarena. This proposed Garage B would be on 4 levels, with a total of 480 parking spaces. The cost estimate summary for these two structures is shown in Table 1.

Advantages of structured parking:
- Structured parking facilities are land-efficient.
- Covered levels do not require snow removal.
- Structured parking facilities can be connected to buildings.
- Structured parking facilities can be designed to be attractive, with plantings or surrounding by a building façade.
Figure 5.4: The Proposed Parking Plan
Disadvantages:

- Structured parking facilities are permanent, unlike parking lots. Their construction signals a long-term commitment to the parking use and precludes use for academic buildings in the long-term.

- Parking structures are significantly more costly to build and maintain, particularly if a demanding aesthetic mandate exists.

- In the short term, the cost of structured spaces can be blended with that of surface parking. As more and more surface lots are replaced with structures, the cost of parking will have to rise to cover the additional costs.

- The production of cement, which is used in the construction of parking structures is extremely energy-intensive.

- The cost of construction per space is high and the cost of net new space is even higher, since structured parking often displaces surface parking.

- Other universities (e.g. Stanford University) have found it more cost-effective to subsidize other modes of transportation or actually to pay campus users not to drive than to build a parking structure.

Advantages of below-grade parking

- Most land efficient – preserves open spaces;

- Can be built to take advantage of the slope to reduce excavation – which is less costly than full underground parking;

- Invisible – does not require screening;

- No snow removal required;

- Connected to buildings

Disadvantages:

- Underground parking is the most expensive way of providing parking. In the short term, the cost of underground spaces can be blended with that of surface parking. As more and more surface lots are replaced with structures, the cost of parking will have to rise to cover the additional costs.

- Less liked by users who may feel less safe. This has been addressed by municipalities and universities with reserved spaces for women with extra lighting, close to entrances and equipped with surveillance cameras and emergency telephones.

Below Grade Parking

In addition to these multi-level parking garages, parking similar to the CERR building is proposed under the three proposed buildings, effectively at grade within the sloped section of Prince Philip Drive. Two of these buildings are located on the north side of Prince Philip Drive, west of the University Centre. These buildings would each have 96 parking spaces, totalling 192 new spaces. The third would be located below a proposed new academic building just north of the Library and would contain 60 new spaces. The cost estimate summary for these parking structures is shown in Table 1.

A second set of below grade parking structures would be included in the proposed Residence and Residence/Academic Building in the North East Campus, split between the two buildings, as shown in Figure 4. Each building would contain 60 below grade spaces, totalling 120 new parking spaces. The cost estimate details for this project are shown in Table 1.

Surface Parking

New surface parking lots would also be added to the campus, primarily consolidated along the Elizabeth Avenue frontage behind a ‘greened’ landscape setback. Similar to the structured and below grade estimates, a price estimate for surface parking has been completed. The new at-grade parking lots are shown in Figure 4, along with the existing parking lots that would be removed. A tabulation of these values shown on the figure would reveal that 663 new parking spaces would be added, while 1,775 parking spaces would be removed, partially as a result of new buildings which themselves contain underground or structured parking, producing a net decrease of 1,112 spaces. The cost estimate summary for the surface parking lots is also shown in Table 1.
On-Street Parking
Due to its convenience and minimal visual impact, the Plan also proposes that campus streets be available for short-term metered parking to a greater extent than is the case today. On-street parking provides short-term convenient parking close to buildings and a buffer between the road and the sidewalk. 12 spaces would be removed and 211 added, resulting in 199 net new on-street parking spaces.

Summary
All proposed Campus Plan parking projects result in a net increase of 689 spaces. Should the University decide to invest in the construction new parking projects, a large capital investment would be needed. Students, staff and faculty should be prepared to pay higher rates in order for the investments to be recovered.
5.4.4 Parking Prices and Organization

The total cost of parking maintenance for the year 2004-05 was just over $900,000, while the average annual permit price was $60.15. The cost of maintenance can be broken down to a per space annual cost of $257. As a result, Memorial uses tuition and government grants to subsidize parking.

Efforts should be made to balance the gap between cost and revenue for the following reasons:

a) Curb demand for parking;

b) Recover the cost of providing parking to eliminate the need to use government grants and tuition to subsidize parking, and

c) Reach a level capable of supporting parking structures and underground parking facilities.

To determine the approximate cost of new parking lots or structures, a cost per space strategy should be used. The capital cost for various forms of parking can be broken down as follows:

- $20,000 /space for an above-grade garage
- $25,000 /space for below-grade parking
- $2,200 /space for surface parking lots

Using these rates, the capital investment for each parking project can be determined. Next, the estimated annual operating cost can be determined using the per space maintenance cost of $257. The capital cost for the constructions has been amortized over a 25-year period using an interest rate of 6%. Thus, the total annual cost for each project has been determined, as well as the yearly cost per space. The average yearly cost per space was broken down into a monthly cost of $87, which could serve as an approximate ultimate target for annual parking revenue per space.

Pricing Structure

An increase in parking rates will encourage campus users to switch to transit, carpooling or walking. An adjustment in the parking fee structure would also help to improve operations. In general, fees should be structured to discourage all-day single occupant vehicle trips.

Although a detailed stratified price structure is not defined here, the following suggestions could be taken into consideration. Typical practice would be to shift the higher cost permits into the structure (i.e. faculty and staff) or force occasional visitors to use it.

The monthly cost values shown in Table 1 can be used as a guide in defining the rates for parking in the various facilities. The University may wish to calculate semester rates based on these values, depending on the users of the specific facilities and applying an “oversell” ratio of up to 40% to reflect the fact that users are never all using parking facilities concurrently.

Principles

1. A restructuring of parking fees would be the key to improving and expanding parking facilities at the University. The University should raise parking fees for all lots and structures to at least the cost of transit or the cost of construction plus maintenance ( whichever is higher); a premium for the structured parking could be applied. This would have a substantial effect on mode split, and could potentially lead to a substantial capital cost savings, if it can defer or remove the need to construct a parking garage.

2. Designating some parking for car pool users at reduced rates will also encourage people to carpool. The preferred parking should be the closest to building entrances (aside from parking for those with a disabled parking permit). The approach would be to “start off small”, designating a trial number of carpool spaces. In order to ensure proper use of carpool parking spaces, enforcement would be required.

3. The time periods for parking meters on campus should be reduced from the current eight hour limit. This is by far the longest time limit our team has encountered for metered parking. Metered parking typically is used for short-term parking, to encourage turnover. In the longer term, the permitted time should be reduced to two hours to further support transit use.
### Table 5.1: Calculation of parking costs

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of Spaces</th>
<th>Estimated Cost / Space</th>
<th>Total Capital Cost</th>
<th>Est. Annual Maint. Cost</th>
<th>Amortized Annual Capital Cost over 25 yrs</th>
<th>Total Annual Cost</th>
<th>Cost/Year/Space</th>
<th>Monthly Cost (12 mo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Parking - surface</td>
<td>867</td>
<td></td>
<td></td>
<td>$222,943</td>
<td>$222,943</td>
<td>$257</td>
<td>$21</td>
<td></td>
</tr>
<tr>
<td>Existing parking - structured</td>
<td>224</td>
<td></td>
<td></td>
<td>$57,600</td>
<td>$57,600</td>
<td>$257</td>
<td>$21</td>
<td></td>
</tr>
<tr>
<td>Parking Garage Structure B</td>
<td>480</td>
<td>$20,000</td>
<td>$9,600,000</td>
<td>$123,429</td>
<td>$742,235</td>
<td>$865,664</td>
<td>$1,803</td>
<td>$150</td>
</tr>
<tr>
<td>Parking Garage Structure A</td>
<td>752</td>
<td>$20,000</td>
<td>$15,040,000</td>
<td>$193,371</td>
<td>$1,159,743</td>
<td>$1,353,114</td>
<td>$1,799</td>
<td>$150</td>
</tr>
<tr>
<td>At grade Below Buildings Arctic</td>
<td>192</td>
<td>$20,000</td>
<td>$3,840,000</td>
<td>$49,371</td>
<td>$296,894</td>
<td>$346,265</td>
<td>$1,803</td>
<td>$150</td>
</tr>
<tr>
<td>Below Building - N Library</td>
<td>60</td>
<td>$20,000</td>
<td>$1,200,000</td>
<td>$15,429</td>
<td>$92,779</td>
<td>$108,208</td>
<td>$1,803</td>
<td>$150</td>
</tr>
<tr>
<td>Underground Parking Garage NE</td>
<td>120</td>
<td>$25,000</td>
<td>$3,000,000</td>
<td>$30,857</td>
<td>$231,948</td>
<td>$262,806</td>
<td>$2,190</td>
<td>$183</td>
</tr>
<tr>
<td>Surface Parking</td>
<td>663</td>
<td>$2,200</td>
<td>$1,458,600</td>
<td>$170,486</td>
<td>$112,773</td>
<td>$283,259</td>
<td>$427</td>
<td>$36</td>
</tr>
<tr>
<td>Total</td>
<td>3358</td>
<td></td>
<td>$34,138,600</td>
<td>$863,486</td>
<td>$2,636,373</td>
<td>$3,499,859</td>
<td>$1,042</td>
<td>$87</td>
</tr>
</tbody>
</table>

*Existing parking is assumed amortized*

*On-street parking is omitted from calculations - cost is assumed part of street reconstruction*

Surface parking is a dominant feature of the Campus. The Campus Plan proposes strategies to balance parking needs with other improved modes of transportation.
Approach

- Parking fee increases should be introduced in a phased manner over a five-year period with the objective of respecting the ‘user-pay’ principle to ensure that tuition fees and grants are not used to pay for parking that only some campus users benefit from. For example, the University of Victoria recently adopted this policy based on the premise that government grants and tuition cannot subsidize parking and is increasing rates by 40 percent the first year and 20 percent the three subsequent years. The University of Manitoba has also adopted the policy that parking is self-financing. Any new underground or parking garage spaces provided should be substantially more expensive to reflect the amortized value of construction and maintenance.

- The cost of parking is increasingly featured prominently in collective bargaining agreements. It may be worthwhile for the University to invite union representatives on a task force to discuss parking and transportation issues jointly. In addition to social justice, protecting the environment is an official mandate of most unions.

- A variety of passes should continue to be offered. While a large percentage of revenue being derived from daily, weekly and monthly passes may make planning difficult and result in unfavourable cash flow, keeping a number of spaces for short-term passes may have the following two advantages:
  - Increased revenue per space;
  - Encouragement of transit.

- Other universities with waiting lists for parking spaces and relatively inexpensive parking have found that users are reluctant to rely exclusively on transit and thus apply for a parking pass. Once they have paid for the parking pass, they feel obliged to use it, and do not take transit as originally intended. The availability of daily or weekly passes can help comfort transit users that parking will be available if they need it occasionally.

- Increasing the price of parking is a difficult task as parking is generally viewed as an essential service that should be free. Therefore, it is recommended that a Parking Task Force be charged with the study of alternatives with the mandate to consult with their constituency. Different recommendations should be carefully evaluated by the Task Force. Parking should not be discussed in a vacuum but in the context of land use, necessary capital projects and alternative transportation options. As discussed above, collaboration with other large employers and the City should be sought on citywide transportation issues – which have a significant bearing on parking demand on campus.

- Smoothing peaks in the teaching schedule can also help better distributing the demand for parking.

On-street parking spaces should be provided wherever possible: they provide additional parking throughout the Campus, can buffer pedestrians from traffic when a sidewalk is provided, and can also act as a traffic-calming feature. (Memorial)
<table>
<thead>
<tr>
<th>University</th>
<th>Student</th>
<th>Faculty/staff</th>
<th>Parking Garage</th>
<th>Carpool Rate</th>
<th>Daily Rate</th>
<th>Meter (per hr)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of British Columbia</td>
<td>-</td>
<td>$76.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$12.00</td>
<td>$1.50</td>
</tr>
<tr>
<td>University of Washington</td>
<td>-</td>
<td>$84.92</td>
<td>-</td>
<td>-</td>
<td>$18.00</td>
<td>$10.00</td>
<td>-</td>
</tr>
<tr>
<td>University of California in Los Angeles</td>
<td>-</td>
<td>$42.75</td>
<td>-</td>
<td>-</td>
<td>$38.25</td>
<td>$8.00</td>
<td>$1.75</td>
</tr>
<tr>
<td>McMaster University</td>
<td>$27.00</td>
<td>$64.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$15.00</td>
<td>-</td>
</tr>
<tr>
<td>University of North Carolina</td>
<td>-</td>
<td>-</td>
<td>$30.42</td>
<td>$96.00</td>
<td>-</td>
<td>-</td>
<td>$1.00</td>
</tr>
<tr>
<td>University of Guelph</td>
<td>$62.45</td>
<td>$68.30</td>
<td>-</td>
<td>-</td>
<td>$51.17</td>
<td>-</td>
<td>$2.00</td>
</tr>
<tr>
<td>University of Ottawa</td>
<td>$40.43</td>
<td>$80.20</td>
<td>-</td>
<td>-</td>
<td>$128.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Simon Fraser University</td>
<td>$12.60</td>
<td>$68.51</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$45.68</td>
<td>-</td>
</tr>
<tr>
<td>Carleton University</td>
<td>$18.25</td>
<td>$61.08</td>
<td>$25.58</td>
<td>$42.83</td>
<td>$24.50</td>
<td>$61.08</td>
<td>-</td>
</tr>
<tr>
<td>Queens University</td>
<td>$32.00</td>
<td>$44.00</td>
<td>-</td>
<td>-</td>
<td>$33.00</td>
<td>$10.00</td>
<td>$2.00</td>
</tr>
<tr>
<td>York University</td>
<td>$80.50</td>
<td>$115.00</td>
<td>-</td>
<td>-</td>
<td>$115.00</td>
<td>$126.50</td>
<td>-</td>
</tr>
<tr>
<td>University of Calgary</td>
<td>$3.50*</td>
<td>$70.00</td>
<td>-</td>
<td>-</td>
<td>$5.00*</td>
<td>$9.00*</td>
<td>$1.75*</td>
</tr>
<tr>
<td>University of Alberta</td>
<td>$81.75</td>
<td>$87.00</td>
<td>-</td>
<td>-</td>
<td>$97.00</td>
<td>$107.00</td>
<td>-</td>
</tr>
<tr>
<td>University of Waterloo</td>
<td>-</td>
<td>$25.00</td>
<td>-</td>
<td>-</td>
<td>$28.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>University of Saskatchewan</td>
<td>$15.25</td>
<td>$31.25</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mount Saint Vincent University</td>
<td>$12.62*</td>
<td>$20.00*</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$6.16</td>
<td>$1.15</td>
</tr>
<tr>
<td>University of New Brunswick Fredericton</td>
<td>$8.75*</td>
<td>$15.00*</td>
<td>$15.00*</td>
<td>$20.50*</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>University of New Brunswick Saint. John</td>
<td>$8.75*</td>
<td>$12.50*</td>
<td>$11.75*</td>
<td>$15.00*</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Saint Mary’s University</td>
<td>$16.67*</td>
<td>$18.75*</td>
<td>$16.67*</td>
<td>$18.75*</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dalhousie University</td>
<td>$11.50</td>
<td>$37.83</td>
<td>$12.75</td>
<td>$37.83</td>
<td>$71.11</td>
<td>$85.32</td>
<td>-</td>
</tr>
<tr>
<td>Average</td>
<td>$32.39</td>
<td>$62.59</td>
<td>$19.67</td>
<td>$49.73</td>
<td>$69.75</td>
<td>$105.19</td>
<td>$37.22</td>
</tr>
<tr>
<td>Memorial University</td>
<td>$3.00</td>
<td>$20.83</td>
<td>$3.00</td>
<td>$20.83</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Notes: All rates are per month for easy comparison; All rates taken from most recent available data, 2004-2005 and 2005-2006. *Rate calculated based on multi month pass
1 Recent increase in rates
2 Reduced rate for electric vehicles
3 Recent increase in rates; carpool priority parking
4 Low and high rates for parking garages are for student and staff respectively
5 Low and high rates for West Campus and Main Campus respectively.
6 Garage rates are Daily, Low student rate and Carpool rate are both daily per entry rates
7 Taxes included; recent increase in rates; reserved parking for ride sharing, at reduced rate

Table 5.2: Parking Cost Comparison
5.4.5 Parking Management

Management System
The parking management system should be reviewed to modernize the control systems and reduce field work required for parking management staff. Permit parking lots can be controlled by automatic gates and meters can be replaced by pay-and-display systems which are both cost-effective and more sustainable (being solar-powered). Recent innovations allow users to pay for meter time by cell phone.

Parking Supply for Specific Groups
- Parking for drivers with a “disabled” parking permit is regulated under the provincial Building Code; depending on the University’s population, a higher ratio may be considered. This parking should be provided in close proximity to building entrances wherever possible, and there should be a clear, safe and accessible path from the parking to the building.
- Other universities have limited the right of on-campus residents (all or only first and second year) to park vehicles on campus. In some cases, universities have invited “car-sharing” cooperatives to provide vehicles on campus. The vehicles can be booked online by the hour and no staff is necessary for the day-day functioning of the program.

Signage
Clear directions and instructions for visitors with respect to the parking system would be beneficial in minimizing traffic conflicts and incidence of parking on neighbourhood streets. This will become more important if parking is concentrated in one segment of campus. Signage should also guide pedestrians from the garage(s) to important campus destinations.
Textured crosswalks (here in a parking lot) are useful to clearly mark pedestrian routes across streets or parking lots. (Niagara-on-the-Lake)

Disabled parking spaces require additional clearance space, as shown above.
5.5 Planning for Alternatives

5.5.1 Organization
Decision-making regarding parking should be linked to broader campus planning and transportation objectives. Just as parking is provided as a service to users, other modes should be facilitated as well. It is important to collaborate closely with the City of St. John’s on the planning of services. Recommendations include:

- Promote the formation of a Transportation Management Association (TMA) with other large area employers such as the Hospital System and the provincial government. The TMA should meet regularly with the City and collectively plan for transportation in a holistic fashion, recognizing that all modes are tied to one another and related to metropolitan planning decisions. For example, demand should be analyzed in a pooled fashion and recommendations made jointly to Metrobus. Carpooling efforts could also be better coordinated, as well as parking pricing. Coordination of parking and transit would allow drivers to park off-site and catch a shuttle to their final destination.

- Regardless of whether the Transportation Management Association becomes reality, a Travel Demand Management strategy should be developed to minimize travel by single occupant vehicles, requiring that transportation would be managed holistically at the University. This should include regular monitoring of progress towards sustainability (for example, on an annual or bi-annual basis).

- Transportation alternatives should be promoted by staff and student transportation coordinators who would help commuters plan routes, provide information about alternatives, promote carpooling, etc.

5.5.2 Transit

The Role of Transit
As the opportunity to provide surface parking on campus diminishes and Memorial has an increasing number of out-of-province students, transit will play an increasingly important role in Memorial’s transportation strategy.

To ensure a greater role for transit on campus and achieve a change in attitude, transit must be more competitive with the private vehicle. To accomplish this, the travel time, reliability and the accessibility of transit to campus buildings must be improved, particularly in comparison with the private automobile.

An analysis of trip origins of students, faculty and staff shows that a large proportion of campus users commute from neighbourhoods in relative proximity to the Campus. It will be important to encourage as many of these users to take transit, while acknowledging that a minority of users will have to continue to drive to the Campus.

Current Situation
It is understood from Metrobus staff that there is generally reserve capacity available on the bus routes. Improvements to transit access from the south are key to improving ridership, based on population distribution. It should be noted that Metrobus is planning to undertake a route review in the near future. Improving access to the University should be an objective of that study.
Understanding Users

Three distinct transit user groups can be identified and should be catered to separately:

- **On-campus residents** – an effective transit system can replace the need for residents to have a car on campus. This group most benefits from a system that runs nights and weekends, mainly to downtown and shopping facilities. The University can also limit the number of parking permits available to on-campus residents;

- **Students living on their own** – this group is mostly composed of off-island students and is the easiest group to serve, due to their ability to choose a place of residence based on the availability of transportation alternatives.

- **Students living at home** – this is the most difficult group to serve because its members are likely to be scattered geographically. This population is also most likely to own and use a car.

---

Figure 5.5: Home Postal Codes
Implementing Change
Transit improvement must be an evolutionary process, with coordination of changes between MUN, Metrobus and the City of St. John's. MUN can assist Metrobus by informing them of impending changes that may affect transit ridership (such as parking rate increases), so that Metrobus can add extra service to cope effectively. It would be advisable to involve Metrobus in the spring of each year to plan for changes proposed for September of that year. To accommodate the needed increases in service, Metrobus can be expected to request action with respect to the transit priorities identified above.

In addition to Metrobus and the City of St. John's, Memorial can create a Transportation Management Association with other large trip generators like the Hospital and Provincial Government in the region should be explored to help enhance the quality of transit services.

5.5.3 Campus Design for Transit
1. Transit service can be improved by prioritizing bus access on Arctic Avenue and Elizabeth Avenue. This may improve the efficiency of the bus service, and as a result could attract new users.

2. Installation of traffic signals at the intersection of Clinch Crescent and Arctic Avenue. This would improve future traffic operations, and permit introduction of transit priority at this key intersection on the bus routes to the University Centre.

3. Proper signage and high quality pavement markings (preferably unit pavers installed with a proper base) also need to be implemented for the transit station on Arctic Avenue at the University Centre, so that traffic will respect the priority of the buses. In the longer term, as transit use grows, the space may need to be reconfigured to create two separate lanes for buses, with appropriate shelters and sidewalks;

4. Over the longer term, consideration should be given to make Arctic Avenue a transit priority corridor. At Clinch Crescent, a queue jump lane for buses turning left should be considered;

5. The Campus Plan includes a new road parallel to Westerland Road, west of the Aquarena. This would present an opportunity to separate transit vehicles from the general traffic stream, to further prioritize transit. At the intersection of Elizabeth Avenue and Westerland Road, the eastbound left turns should be restricted to buses only. Cars would be redirected to the new route road parallel to Westerland Road, extending between Prince Philip Drive and Elizabeth Avenue. This new road will give access to the proposed parking garage located west of the Aquarena;

6. A new bus stop and shelter along Elizabeth Avenue are also recommended to improve transit access on the south side of campus adjacent to the existing and proposed residences. The location would be adjacent to the Arts and Administration Building. This would require buses to enter campus via the reconfigured central access driveway;

Bus waiting areas should ideally be integrated within buildings. Standalone shelters should be selected to be functional and to blend in their surroundings. (Toronto)
Transit prioritization on Arctic Avenue and Elizabeth Avenue

Signage and pavement improvements at the University Centre; Arctic Avenue as transit corridor

Signal at Arctic Avenue and Clinch Crescent

Potential bus stop

Transit prioritization with redirection of automobile traffic to new road west of the Aquarena; eastbound left turns from Westerland Rd for buses only.

Figure 5.6: Transit Improvements
### 5.5.4 Pricing and Competitiveness with Parking

The most important transit initiative is to increase the parking cost. Increasing the parking cost to at least the cost of transit is a fundamental principle of equity. As previously discussed, the current parking fees do not cover the cost of parking maintenance. A cost reflective of the amortized cost of constructing and maintaining parking should be implemented.

**Reduced Fares**

Using passes or reduced fares can help to promote the use of transit among students, faculty and staff. A UPASS is an appropriate tool to increase ridership among students, while discounted passes can be effective with faculty and staff—potentially provided to those who agree not to purchase a parking pass.

A UPASS for Memorial to increase transit use, a study should be conducted in collaboration with Metrobus to determine the feasibility of a universal bus pass for all students, and the possibility of discounted passes for faculty and staff; these passes are paid for as a mandatory part of tuition (or offered to staff at the same price as parking). Based on recent Canadian experiences in Victoria, London, Hamilton, Guelph, Vancouver and Halifax, a twenty-five percent to fifty percent increase in undergraduate ridership could be expected following the implementation of a UPASS system, but the Canadian Urban Transit Association reports that the introduction of the UPASS at Saint Mary’s resulted in a 100% increase in transit ridership to the Campus (CUTA Issue Paper 8, August 2004).

In Canada, UPASS fees vary greatly:

- Brock University: $147 per academic year
- Simon Fraser University: $98 per semester
- Queen’s University: $40.41 per academic year
- Trent University: $236.90 per academic year (includes some parking)
- University of Victoria: $56 per semester
- Guelph University: $55.19 per semester
- McMaster University: $67.93 per academic year
- University of British Columbia: $176 per year
- Dalhousie University: $58 per semester
- Saint Mary’s University: $115 per academic year

This compares advantageously to the $63/month or $220/semester (student pass rate – available only for a full semester) currently charged by Metrobus for a monthly adult pass. The low price of the pass is premised on mandatory participation based on the argument that everyone benefits from lower congestion and access to parking, even those who don’t take the bus. Students with disabilities who cannot take transit should be exempt. It is important to note that the UPASS should be priced high enough to accommodate service improvements. Other universities have priced the UPASS to have it approved by students in a referendum, but the revenue thus collected did not allow the transit authority to accommodate demand or improvements. Selected discounts can be arranged for holders of the U-pass to encourage its use. This can involve discounts on merchandise, meals at campus facilities or campus entertainment events, as well as at off-campus businesses.

In most instances, the UPASS program is voted in by students through a referendum, but in some cases, UPASS programs have been initiated by the municipality. One month after the introduction of the program, Calgary Transit found that overall transit usage to and from the University of Calgary had increased by 38% over the previous year. In parallel with the UPASS, it is crucial to expand transit services to ensure that a large majority of students have access to transit, either directly from home or at transfer points. A feasibility study tailored to Memorial should analyze projected use and service level needs during peak periods and provide recommendations for a funding structure. It is very important not to set the price of the UPASS too low, as it would further constrain metrobus from adding service to respond to additional demand and serve as many areas of the City as possible.
For faculty and staff who pay no tuition, a different payment strategy is needed. Different pricing strategies exist:

1. Free for every employee. Ideal, but costly and potentially perceived as unfair by students.

2. True cost – likely uncompetitive with the subsidized parking pass.

3. Same as parking pass – appears as a ‘level playing field’, but ignores the strong attractiveness of the car.

4. Free for every employee that declines a parking pass. General pricing would be the same as the parking pass. For maximum effectiveness, beneficiaries should be able to purchase daily or weekly parking passes as backups to ensure high take-up. Other universities with parking shortages have found it worthwhile to “pay users not to drive”.

In parallel, a partnership agreement or strategy with the City should be considered to advocate a long-term public transportation plan for the region.

5.5.5 Service Improvements

- Collaboration with Metrobus would improve its presence on campus, with information kiosks at all transit stops that provide schedule and route information. Further, home postal code information for students, faculty and staff can be further analyzed to re-orient transit routes and service levels to accommodate Memorial’s needs;

- A committee should be created with representatives from Facilities Management, students and staff representatives and Metrobus, to move these ideas forward. Involving staff and students will ensure that improvements suit their needs. This committee can be a precursor to the Transportation Management Association described earlier.

Improvements to transit service are key to promote greater use by the campus community. (Memorial)
5.6 Carpooling

Carpooling can be effective in reducing parking demand but needs encouragement. In addition to higher rates, carpooling should be promoted with:

- Promotion of the concept based on information derived on geographical analysis (trip origin of students, faculty and staff).
- Reserved and discounted spaces with adequate enforcement
- An online matching web site (a number of Canadian sites like http://www.carpool.ca, http://www.carpooltool.com exist that can be readily used – but the service needs to be publicized)
- A system of “guaranteed ride home” for family emergencies (the University promises to pay for a taxi in case of emergencies for registered carpoolers. In use at several universities and abuse is rare.)

5.7 Cycling

Better cycling facilities were a recurrent theme during Campus Plan consultation. Although not a viable alternative year-round for all, cycling should be encouraged since a large proportion of the campus population lives within cycling distance and this healthy mode of transportation can be part of a solution to reduce automobile dependence.

A staged evolution to increased cycling is recommended, as follows:

1. As a first step, replace the existing bike racks with a design that provides adequate support for bicycles. The hub-and-spoke design is widely used and favoured by cyclists and facilitates snow removal. The bike racks should as a minimum replace the existing capacity. Additional bike parking should be introduced outside every building, in a minimal initial number such as five to ten spaces.

2. Introduce bike parking inside new structured parking facilities. Using one weather-protected parking space for bike parking as a starting point will further encourage bike use. Create indoor bike parking in buildings where there is available space. Clearly defined areas designated for bicycle parking can provide shelter from harsh weather, as well as increased security of parked bicycles.

3. Assuming that bike use continues to expand, work with the City to plan for enhanced bike security on well-used bike routes to campus. These can take the form of painting travel lanes as “shared lanes” with a bicycle symbol, or if space permits, restriping existing roads to provide reserved lanes. In the case of road widening, work with the City to introduce bike lanes where feasible and indicated by demand.

4. As part of future developments, the University should consider providing secure in-building bicycle storage and changing/shower facilities to further encourage cycling. Showers for cyclists can be provided in athletic facilities.

5.8 Tele-commuting

Tele-commuting is often mentioned as a way to reduce parking demand. However, in a university context, collegiality is crucial and could be impeded by a high rate of telecommuting.

5.9 Concluding Remarks

Numerous recommendations are made throughout this section. Many of these recommendations encourage the use of alternative transportation modes, effectively constitute the beginning of a Travel Demand Management (TDM) plan for the University, reflecting the need to minimize growth in automobile traffic.

A final recommendation is for the need for change to be effectively communicated to students, faculty and staff. To remain fiscally responsible, and to be able to continue to direct funds to programs, the University and the campus community must become active participants in change. This need and the TDM plan should be communicated through campus media – for example, articles in the campus newspaper, posters across campus, and the University website. The University may also wish to consider hiring a Travel Demand Management Coordinator, to further develop and manage these programs.
6 sustainability
6 SUSTAINABILITY

6.1 Definition

In 1987, the World Conference on Environment and Development defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987). Since then, sustainability has been understood as the need for all development to take place in an environmentally, socially and economically responsible fashion — over the long term, rather than the short term.

This chapter will focus on the environmental side of campus development although it is understood that social and financial sustainability are of equal importance.

This chapter is not intended as a comprehensive Sustainability Plan or a complete inventory of possible initiatives. It is intended to frame the Campus Plan in the broader context of sustainability and suggest processes to implement follow-up initiatives.

6.2 Purpose

As a major community leader, employer, and educator, Memorial’s influence ranges from the community to the national scale. In light of this impact, it is clear that the transformation of the campus into a catalyst for environmental sustainability should be an integral part of Memorial’s mission. Increasingly, students, faculty and staff have strong views about the health of the environment, and have expressed their opinion about the use of pesticides, the sourcing of food on campus, the origin of clothing sold in the bookstore and the preservation of the natural environment around campuses. Universities themselves are increasingly realizing that environmental initiatives not only result in a healthier environment in the long term, but can have an effect on the bottom line within a relatively short term.

A sustainable campus can:

- Enhance the reputation of the institution and serve as a recruiting tool for faculty, staff and students;
- Provide opportunities for research and information sharing;
- Help fulfil Canada’s commitment to reduce greenhouse gas emissions;
- Contribute to a healthier campus and local environment;
- Lead initiatives in the Region and Province and pioneer the use of new technologies and practices in Newfoundland and Labrador.

Sustainability impacts virtually every aspect of campus growth and operations, sustainability principles have permeated the entire Campus Plan. This section provides a set of strategies to begin adopting a comprehensive sustainability strategy on campus, with some illustrations. Following the adoption of the Campus Plan, the preparation of a comprehensive sustainability strategy should be considered. The Strategy should be built on a consultation strategy leading to detailed principles, goals, targets, actions and an implementation plan against which progress can be measured.

6.3 Sustainability in Universities

A worldwide movement exists to promote sustainability in universities. In 1990, a diverse group of university presidents and chancellors signed the Talloires Declaration in Talloires, France. Since then, the declaration has been signed by over 300 university leaders in over 40 countries. The University Leaders for a Sustainable Future promotes the declaration and acts as a repository of information for best practices in this domain.

Please note that the emphasis placed on campus planning and operations in the remainder of this chapter is not intended to diminish the importance of incorporating sustainability in the curriculum.
The Talloires Declaration

*Universities have a major role in the education, research, policy formation and information exchange necessary to make these goals possible. Thus, university leaders must initiate and support mobilization of internal and external resources so that their institutions respond to this urgent challenge.*

**We, therefore, agree to take the following actions:**

1. Increase Awareness of Environmentally Sustainable Development
2. Create an Institutional Culture of Sustainability
3. Educate for Environmentally Responsible Citizenship
4. Foster Environmental Literacy for All
5. Practice Institutional Ecology
6. Involve All Stakeholders
7. Collaborate for Interdisciplinary Approaches
8. Enhance Capacity of Primary and Secondary Schools
9. Broaden Service and Outreach Nationally and Internationally
10. Maintain the Movement

Memorial already has many green campus areas that can be enhanced and extended.

*(Memorial)*
6.4 A Comprehensive Approach

For the implementation of sustainable guidelines to be effective, a comprehensive, systematic and strategic approach needs to be pursued. This means that over time, every process and activity on campus is reviewed for its environmental impact, taking into account social and economic implications, as well as potential cost savings. The following components are suggested as part of this approach.

6.4.1 Involving the Community

As discussed above, sustainability is not just about the environment, but considers financial and social sustainability as well. In the Newfoundland context, this distinction is crucial and the ramifications of each decision should be considered carefully. For example, while an aggressive paper recycling program is certain to save trees and energy, job losses may result in the local logging and pulp and paper industries while bales of used paper must be trucked off-island over long distances.

Memorial-led initiatives can benefit the environment, the University Community and the Community at large, while creating long-term economic opportunities.

6.4.2 A Bottom-Up Approach

A more sustainable campus should not only be the responsibility of champions at the senior level of the administration. With a ‘bottom up’ approach, sustainability becomes everyone’s business instead of change being imposed from the top. Workshops are conducted in every department to ensure that each employee is made aware of the importance of sustainability and empowered to contribute solutions and implement sustainable practices on the job. To date, only one university in Sweden has undergone the Natural Step process, although the process has been applied to various municipalities in Canada, for example Halifax.

The ‘Bottom-Up’ approach should be complemented with a ‘Top-Down’ approach whereby senior management empowers the organization to change – for example through the creation of a sustainability committee that is charged with gathering data and establishing targets, and that reports directly to the President.

6.4.3 Lifecycle Costing

An important step in the implementation of sustainability is the consideration of lifecycle costs - a concept that Memorial is already applying to the evaluation of energy retrofits in its EPC (Energy Performance Contract) program: the added cost of acquisition, maintenance, replacement and operation over the lifetime of an object. The relevance of lifecycle costing to sustainability stems from the role of energy in the operation of buildings, machinery and vehicles. Since a premium is often attached to energy efficiency, it is important to consider lifecycle costs and coordinate capital and operational budgets. In parallel, discussions can be held with funding organizations and governments to explain the benefit of lifecycle costing, especially as part of fundraising efforts for new buildings. In addition to lifecycle costing, external costs and benefits should be recognized as much as possible. This means that costs and benefits not normally accounted for, either environmental or financial, are taken into account in decision-making.

6.4.4 Sustainability and Incentive Systems

The implementation of the most thoughtful policies will only succeed with a solid process in place to ensure that job descriptions and incentives clearly specify the need for sustainable practices. Too often, employees are primarily rewarded for keeping costs down and vendors retained on the basis of price. In addition, budgets should be revised to accommodate lifecycle costing and changes in labour requirements. For example, as drought-tolerant grasses and ground covers limit the need for lawn mowing and irrigation, the effective costs or savings of these changes should be calculated for the budgeting process.

6.4.5 Sustainability in the Curriculum

By weaving sustainability into its curriculum, Memorial can establish itself as a leader in environmental education and research, in addition to sparking new ideas on how to constantly improve its own practices. Because sustainability has social, environmental and economic dimensions, every discipline presents opportunities to include sustainability in its curriculum. Students can be provided with opportunities to work on long-term study projects that involve sustainability, and research programs can be established to further advance the state of knowledge in environmental science and education, with opportunities for partnerships with internal and external entities involved in the day-to-day implementation of sustainability.

The Sustainability program can also constitute a source of on-campus employment for students, for example in recycling, composting, manual grounds maintenance and training others in sustainability practices. Finally, a sustainable campus provides opportunities for outreach programs such as summer camps and community outreach.
Enviro-facts

The average Canadian is responsible for the release of 6 tons of greenhouse gases per year.
6.4.6 A Proactive Approach
Because of the relatively recent awareness and emphasis on sustainability and the small size of the Newfoundland and even Canadian market, some products and services available elsewhere may not be available or cost more. Examples include organic produce, renewable power, ‘green’ construction materials or the recycling of electronics. A proactive approach in collaboration should be pursued with allied institutions such as colleges, school boards, the Health Care Corporation, government agencies and private firms to encourage the growth of a market for sustainable products, services and practices in St. John’s, a prime example being joint management of transportation through a Transportation Management Association, as discussed in Chapter 5 - Transportation.

6.4.7 A Supportive Environment
Asking staff to take on extra responsibilities is a difficult task. Therefore, it is suggested that the University consider the establishment of a Sustainability Coordinator position on a part or full-time basis, leading eventually to the creation of a small Sustainability Office.

The Sustainability Coordinator is responsible for coordinating the participation of departments and administrative units: by facilitating workshops and providing encouragement, education and resources. The Coordinator could also act as a consultant to assist departments in their efforts, liaise with faculty members interested in implementing sustainability in the curriculum or conducting research in the field. The coordinator can suggest alternatives to current practices and help identify alternative practices, suppliers and products.

The Coordinator can also facilitate partnerships with suppliers and other public and private institutions in the region to pool purchasing power and coordinate requirements.

Some of the savings resulting from the implementation of recommendations, such as improved energy efficiency, should be earmarked as funding for the Sustainability Coordinator position.

The Coordinator position can also be split with a part-time teaching position. In this case, the Coordinator is an even more favourable position to implement Sustainability in the Curriculum.

6.4.8 Monitoring Systems
Monitoring systems are needed to track progress over time against pre-established targets, and to identify areas in which further progress is needed. Over time, partnerships can be established with compatible institutions to agree on a common measuring system to allow benchmarking. Each year, a report should be produced to publicize the progress made at Memorial, inspire other organizations and encourage further efforts. Senior management, or an ad-hoc committee composed of various university stakeholders, should be accountable for progress.

6.4.9 Towards Measuring Memorial’s Environmental Impact
Not only energy consumption from heating and power and water consumption should be collected over time, but also energy from commuting as well as overall emissions to evaluate Memorial’s environmental impact. Meaningful statistics should be used to demonstrate that energy savings achieved through technology can be greatly enhanced through behavioural efforts – encouraging transit and carpooling, turning off the lights or using occupant sensors, using the stairs instead of taking the elevator, turning off computers, etc.

6.4.10 The Mount Allison Example
Mount Allison has been conducting a detailed Environmental Audit for four years. The document contains facts on the relevance of various indicators, the University’s absolute and year-to-year comparative performance, as well as objectives and recommendations for implementation. The clarity of the document makes it an attractive and compelling read. The document covers the following themes:

- Dining Services
- Water Use
- New Buildings and Renovations
- Energy Use
- Air Emissions
- Hazardous Waste
- Solid Waste
- Paper Consumption
- Transportation
- Grounds Keeping
- Risk Prevention
- Procurement
- Academic Opportunities
- Stewardship
Members of the Memorial Community who park on campus make close to an estimated 710,000 car trips to the campus every year, consuming over 800,000 litres of gasoline and resulting in 2,000 tons of Greenhouse Gas (GHG) emissions.

A significant proportion of energy used at Memorial is used for heating buildings. When the future cost of heating and cooling is factored into the design of each new building, high-efficiency solutions can be pursued.

Transportation to and from the campus typically represents about 10% of the energy used in university activities.
6.5 Campus Sustainability Initiatives

The following section provides an overview of areas where sustainable practices should be incorporated into the design and operation of the campus and its functions.

6.5.1 Buildings

Through their construction, maintenance and operation, buildings have a significant impact on the environment. Buildings consume about 38% of total Canadian secondary energy use, produce about 30% of total Canadian greenhouse gas emissions and use 40% of raw materials.

General

- The most sustainable building is obviously the one that is not built. Using space efficiently and allocating underused space in a timely manner are obvious ways to delay the construction of a new building.

- New development should follow LEED principles, and ultimately should aim for certification. LEED certification distinguishes building projects that have demonstrated a commitment to sustainability by meeting higher performance standards in environmental responsibility and energy efficiency. LEED buildings, when looked at in terms of lifecycle costing, are cheaper to construct, maintain and operate than conventional buildings.

Energy and Water Systems

Memorial’s EPC Program (Energy Performance Contract) is a comprehensive initiative to identify and implement energy savings opportunities. The program should continue to be supported and opportunities identified to supplement its outcomes with behavioural changes and projects ranked based on emissions in addition to cost savings to prioritize otherwise equivalent projects.

For new buildings, the LEED program provides an excellent framework to design buildings that minimize energy consumption in their construction and operation.
Mount Allison University
Environmental Audit
2005

Enviro-facts

Buildings consume about 38% of total Canadian secondary energy use, produce about 30% of total Canadian greenhouse gas emissions and use 40% of raw materials.
The following list presents initiatives that may be proposed as means to attain LEED or as retrofit to existing buildings.

- New buildings should be designed so as to encourage the use of staircases instead of elevators. Users tend to favour staircase use when they are clearly visible, accessible, and feature abundant glazing.
- Energy efficient boilers, HVAC systems and an emphasis on reducing the size of plants through innovative mechanical and construction technology (natural cooling, heat recovery, passive solar design, etc.). Memorial is already considered a leader in energy efficiency and is planning further improvements. This should continue, and new buildings brought to the highest standards from the onset to minimize the need for retrofits.
- Planted roofs as insulation.
- Building floorplates that maximize daylighting to reduce lighting requirements.
- Deciduous trees surrounding buildings to reduce cooling loads in the summer without blocking sun access in the winter.
- Efficient lighting equipment.
- Energy efficient outdoor light fixtures, downcast to minimize light pollution, in conjunction with a fine-tuned timing system to ensure that lights are only on when it is dark.
- Room and task light switches, occupancy sensors and photocells as energy efficient occupant controls.
- The campus’s location in a valley aligned with prevailing winds provides an opportunity to produce power from wind on campus. In addition, the purchase of electricity from renewable sources should be considered, including off-site wind power and methane from landfills. If such sources are not yet available, Partners should be identified to pioneer such efforts, leading to a potential opportunity for economic development outside of St. John’s.

Water

Water may seem plentiful in Newfoundland, but clean water requires energy to produce and transport, while wastewater must be treated at great expense when it is not simply conveyed to the Ocean without treatment. Hot water requires energy to produce. Some opportunities include:

- Reduce or eliminate the reliance on potable water in cooling systems.
- Vegetated roofs to mitigate stormwater runoff.
- Innovative wastewater treatment, water reduction and sustainable irrigation strategies including the use of water efficient or greywater plumbing fixtures.
- Runoff reduction through permeable surfaces, green roofs and filtration swales or ponds.
- Low-flow faucets and showerheads in existing and new buildings;
- Low-flow and dual-flush toilets in existing and new buildings;
- An effective process to report and repair leaks as they occur;
- Selection of plants that require less watering;
- Water-saving watering practices;
- Rainwater collection for plant watering.
Materials

- Energy costs associated with transportation should be reduced by promoting selection of locally manufactured or fabricated products and materials.

- Materials salvaged from demolition should be used in new building design, avoiding the waste and pollution of material extraction and production.

- If there are no salvageable materials available from an existing development site, they should be purchased directly from building demolition sales, from salvage contractors and used materials dealers. Reused materials can be used both in new buildings and in public amenity areas, for example as outdoor paving. Material reuse is more sustainable than the use of recycled materials as reused components do not require significant reprocessing.

- Many new and established construction products made with reprocessed waste materials are available for use on new projects. Construction materials containing post-consumer waste or recovered materials have the greatest recycling merit and should be used where feasible.

Quality of Life

- A high degree of indoor environmental quality should be achieved through design techniques including daylighting and the use of low-emission finishes formulated to low or zero volatile organic compounds (VOC) standards.

- Building flexibility should be maximized to satisfy the varied demands of current and future users and residents. Raised access flooring, modular partitions, a consistent structural grid and non-centralized HVAC systems all contribute to building flexibility.
• Natural ventilation systems should be considered as an alternative means to air conditioning through the promotion of passive convection cooling and ventilation. Passive systems can minimize or eliminate mechanical system usage for heating, cooling and ventilating buildings during prolonged periods in the year.

### 6.5.2 Green Roofs and Roof Gardens

Even a casual analysis of an aerial photograph of the campus shows large grey areas of building rooftops, streets and parking areas surrounded by the green of the tree canopy on surrounding streets. Hard and dark surfaces are not only unattractive, but they tend to result in runoff (see Runoff).

#### Planted Roof Runoff

- In a storm, all water that falls on a hard surface in the downtown is either directed to the storm or sanitary sewer. In either case, expensive pipes must be laid and maintained and the runoff must be processed. Often, the runoff water collects pollutants which often flow into watercourses untreated.

- A better alternative is to capture water on site through on-site infiltration or evapotranspiration. With on-site infiltration water is allowed to infiltrate slowly into the ground, a bio-swale can be constructed to filter the water before it seeps into the ground. Evapotranspiration is when, over time, water evaporates from the ground and is consumed by vegetation, the combined rate and quantity constitutes evapotranspiration.

#### Green Roofs vs. Roof Gardens

- It is important to distinguish green roofs from roof gardens as the former can achieve the same or even greater environmental benefits with lower construction and maintenance costs.

#### Green Roofs

- Green roofs refer to planted roofs. They may not be accessible to the public. Their purpose is to provide a visual amenity to occupants of surrounding buildings and to provide environmental services as described below. Plantings may consist of a single species and/or species that require little care.

### Roof Gardens

- Roof Gardens are designed as an amenity for the occupants of the building. While their environmental benefits generally do not exceed those of green roofs, they are more expensive to build and maintain as they generally require a greater variety of species, wider walkways and sitting areas.

#### Advantages

- **Thermal Insulation** – planted roofs work hard even in the winter months by providing extra insulation. In general, temperature variations are greatly reduced on planted roofs. Over a full year, heat gain is reduced by 95% and heat loss by 26% (Source: Soprema – NRC study).

- **Reduction of Runoff** – rainwater is captured and returned to the atmosphere. Some excess may be evacuated through pipes as on a conventional roof, but the overall amount is reduced. In an NRC study, runoff volume was found to be reduced by 54% (Source: Soprema).

- **Air quality improvements** – plants absorb carbon dioxide and emit oxygen. They also filter pollutants. 1 m² of unmowed grass on a roof absorbs up to 2 kg of windborne dust each year (minimum area of 2000 m²). 1.5 m² of unmowed grass produces enough oxygen for one single person needs for one year (Source: Soprema).

- **Improved longevity of the roof membrane** – the membrane is shielded from ultraviolet rays and the elements. Manufacturers of planted roof systems routinely offer warranties on their membranes.

- **Sound Insulation** – planted roofs also reduce noise penetration. 10 cm of growing medium reduces the noise by 15-20 dB (Source: Soprema).

- **Visual Amenity** – for occupants of surrounding buildings, a green roof offers visual relief.
6.5.3 Open Space

Though located in a park, the Memorial Campus is substantially impervious due to the total area occupied by buildings, roads, parking lots and other asphalted areas. This means that much of the rainfall is sent to the Ocean instead of seeping naturally through the ground.

There is significant scope to improve the environmental quality of Memorial’s open spaces: by the selection of plant species that require less maintenance, and by integrating native species. Additional details can be found in Chapter 4 - Open Space.

- Landscaping should be sized and located to allow plants to consume stormwater or building greywater, the use of potable water to irrigate landscaping is discouraged.

- Native plant materials should be used wherever possible as they require less maintenance, watering and fertilization.

- Existing significant trees, tree stands, and vegetation should be protected and incorporated into site design and landscaping. Provisions should be made to protect such trees from construction if development occurs in close proximity.

- Landscape design should incorporate a wide range of strategies to minimize water consumption, e.g. native species, use of mulches and compost, alternatives to grass and rainwater or greywater collection systems.

- The width of all planting beds should be at least 2.5 metres wide (except on sidewalks) to enable plant material to be massed to create a healthy and sustainable landscape and reduce irrigation dependency.

- Impervious areas directly connected to the storm drain system are the greatest contributor to the storm water management system. Breaks in such areas, by means of landscaping or other permeable surfaces should be provided to allow runoff absorption into the soil and avoidance or minimization of discharge into the storm drain system.

- The distribution of outdoor lighting should be controlled according to outdoor lighting design recommendations of the Royal Astronomical Society of Canada to minimize light pollution and maintain a dark night sky. Well-designed lighting networks that incorporate full cut-off fixtures are also more energy-efficient.

- Paved areas, such as surface parking, should be minimized wherever possible in order to maximize permeable surfaces that absorb and biodegrade certain toxins. This also reduces the volume of runoff into the storm drainage system.
Gravel paths cannot be used everywhere because they are challenging to the disabled, but they promote rapid infiltration into the ground which prevents runoff and keeps the path dry. (Memorial)

Enviro-tip

As a general rule, try to maximize on-site infiltration of rainwater to minimize the need to convey it to the Ocean.
• Streets, driveways and parking areas should be as small as possible within allowable standards. This challenges the status quo – do streets really need to be this wide, can adjacent developments share a common parking area, can a driveway be permeable?

• Parking areas should drain into vegetative or grassy swales that are incorporated into large common landscaped areas within a project or perimeter landscaping.

• Bio-swales should be created next to parking lots and walkways to collect stormwater runoff to minimize the dependency on stormwater sewers. Bio-swales should be planted with salt-tolerant shrubs and grasses to filter water before it percolates into the ground. They should be graded to direct water away from paved areas.

• Drainage basins should be located throughout parking lots to collect stormwater. These basins should be planted with native plant materials that thrive in wet conditions.

• A well-drained snow storage area should be provided in a location that enables melting snow to leach into drainage courses and storm drain inlets to prevent toxic materials from being washed into streams.

6.5.4 Parking and Transportation
A significant amount of energy is consumed by campus users commuting to and from the campus. Transportation-related energy use should be acknowledged, and a program adopted to encourage alternatives to establish reduction targets. Managing access to the campus is strongly related to the supply of parking. The encouragement of other modes of transportation can eliminate the need for new parking lots, thus resulting in the following benefits:

• Reduced paving of open space or need to construct a concrete parking garage;
• Reduced heat island effect in the summer defined as the localized increase in temperature due to absorption of solar energy in flat paving surfaces;
• Increased opportunity to plant trees that capture carbon dioxide and enhance the appearance of the campus;
• Reduced use of asphalt;
• Reduced power use for lighting;
• Reduced use of salt and melters as paved surfaces as a ratio of campus users are reduced;
• Reduced plowing.

Conversely, the University can encourage alternative modes of transportation by restricting parking supply.

In general, the following are some initiatives that can reduce emissions and energy consumption in the area of transportation:

• Transportation: the inclusion of private transportation to and from the campus in the university’s energy consumption picture to encourage alternatives, such as walking, transit, carpooling and telecommuting.

• Proactively encourage video-conferencing as an alternative to air travel.

Additional information on transportation alternatives can be found in Chapter 5 – Transportation.
Enviro-tip

Adopt the UPASS and encourage improvements to the transit system so that all members of the Memorial community including faculty and staff are encouraged to take transit.
6.5.5 Procurement

Procurement covers the sourcing of all products and services on campus. By actively managing its procurement policies, Memorial can obtain products and services that can result in a cleaner environment not only in the St. John’s region but also where these products are produced. The following are some principles that should be followed in the selection of products and services. Please note that they can at times appear to contradict one another: The net benefit should therefore be determined:

- Repair and reuse before purchasing. Also explore exchange and barter, or shared use with other users - for example in the case of specialized machinery.
- Select products and services that are produced locally, employ local people and help perpetuate local culture and practices. An important example is the sourcing of local and seasonal food on campus, minimizing the reliance on imported processed food should be dramatically reduced. Universities across North America have struck agreements with local farmers or worked with conventional food services corporations to ensure that a stable supply of healthy, seasonal and locally produced food is provided to the University.
- When products from developing countries must be purchased, choose products that have been produced with improved social practices (e.g. fair trade coffee, sweatshop-free clothing).
- Determine the lifecycle costs of options and opt for durable goods.
- Consider modular products that are easily repaired and products that are supplied with maintenance contracts. For example, copiers and carpeting can increasingly be bought as a service: the vendor only replaces defective parts (tiles in the case of carpeting) which are then reprocessed.
- Select renewable materials instead of man-made alternatives where possible.
- Consider the economic impacts on the Newfoundland and Labrador economy and the viability of its communities when making a purchasing decision.

6.5.6 Processes

The challenges inherent to achieving a green building include shifting operational costs onto capital costs, dealing with new technologies, finding expertise. These challenges can be tackled by the Administration in an orderly and organized fashion. Changing behaviour by users, trying to influence changes in millions of daily actions, is a different challenge, which can be helped with the right mix of supportive technology and information. Although the following initiatives may appear simplistic, they can help support the use of technology and help create a “culture of conservation and sustainability”:

- Lower thermostats in the winter and educate users with the reason for doing so. Temperature can be as low as 19 degrees. In the summer, thermostats can be raised as high as 26 degrees. Where no air conditioning is available, consider mechanical systems to circulate the air to avoid the installation of new HVAC systems.
- Minimize the use of chemicals that have impacts on the local environment and human health, for example Volatile Organic Compounds (VOCs).
- Explore economizing processes, such as duplexers in printers that allow double-sided printing, or the use of a printer tray that contains scrap paper.
- Consider master switches in all residence rooms that allow turning off all lights and selected outlets from one switch.
- Select plants that require less watering, fertilizing and pest control. Review mowing schedules and times.
- Discourage idling on campus through signage and training of parking enforcement personnel.

Enviro-tip

As much as possible, purchase locally produced food to support local producers and minimize transport-related emissions. Other universities have successfully included such clauses in their contracts with food service providers.
• Train users to use the ‘sleep’ function on computers at night, on week-end and during holidays - or consider the use of technology to remotely put computers on stand-by when appropriate.

• Adopt new practices to minimize the use of machinery on campus. For example, leaves and grass should be raked when the volume is small and dry.

6.5.7 Getting Students to Participate
Other universities have adopted a series of measures to inform and educate the student body in minimizing their energy and water use. This task is a challenging one, since unlike faculty and staff, the student body turns over frequently. These initiatives and measures are typically championed collaboratively by Facilities Management, student organizations and other entities such as Residence Services:

• Encourage and support barter and ‘garage sales’ in residences to minimize disposal.

• Include information on sustainability in information sessions for new students - energy and water consumption, recycling, transit and carpooling.

• Support a group (which could report to the Sustainability Coordinator or Facilities Management in the interim) that would create information panels and displays on sustainability. For example, students at Penn State University calculated that the equivalent to a ton of coal was burned every day to supply their residence’s power needs., resulting in 3 tons of greenhouse gas emissions They suggested displaying a ton of coal in the hallway to each residence. At LaVerne University, signs in the laundry room explain that washing and drying a T-shirt uses 10 times as much energy as making it in the first place - and encourages students to line dry their clothes when possible.

6.5.8 Waste Reduction and Management
Ambitious recycling programs can be problematic in relatively isolated areas such as Newfoundland from whence waste materials would have to travel over long distances for lack of local processing capacity or a market for recycled goods. Memorial should consider:

• Collaborating with other large generators to support local processing;

• Supporting local pilot projects in processing, especially involving new technologies - for example opportunities to produce energy from waste;

• Exploring opportunities for on-campus composting and use (e.g. in grounds maintenance). It is possible to start small, for example with coffee grounds;

• Working with the City and Province to devise innovative strategies in recycling and waste management technologies;

• Favoured goods with minimal packaging. Working with local suppliers to reduce the amount of packaging used.

• Reducing the packaging used for food services on campus.

Enviro-tip
Reserve a printer tray that uses scrap paper for drafts. This is the type of simple initiative that anyone can do and that can have a significant impact.
APPENDIX A - ENGINEERING OVERVIEW

The following overview was prepared by Quadratiec Inc. as part of the preparation of the Campus Plan.

Introduction

The Memorial University Master Plan includes the expansion of many campus buildings and the construction of others. This plan continues the growth trend that Memorial has experienced since its inception. To date, this growth, to a large extent, has been supported by the existing infrastructure. However, these systems are now at the peak of their capacity in many respects. The following outlines our understanding of items that require a more detailed analysis prior to embracing the planned expansions.

Storm Run-Off

Storm run-off on the North Campus effectively flows North to Long Pond and from there to the Rennies River system. On the South Campus, run-off is south to municipal sewers in Elizabeth and Bonaventure Avenues, with eventual connection to the Rennies River System at the intersection of Empire Avenue and Portugal Cove Road.

Initial conceptual level discussions with the City of St. John’s suggests that the northern sub-system has sufficient capacity to sustain reasonable development on the North Campus. One noted exception is the need to upgrade a bridge in the area of the Rennies Mill and Empire Avenue, an issue the City now appears to be addressing.

The system serving the South Campus is likely at or near full capacity due to infrastructure constraints in the sewers beneath Elizabeth and Bonaventure Avenues. Should appreciable increases in run-off occur on the South Campus, this system will, according to the City, require improvement. Should the City proceed with the redevelopment of Elizabeth Avenue, these systems would probably require upgrading regardless of what other development takes place on Campus.

Development on campus need not result in increased run-off which is essentially a function of ground surface treatment and on site infrastructure. The principle of sustainable development suggests that future designs should attempt to achieve “zero impact” on site run-off. This is potentially achievable by balancing increases in “hard” surfaces with new or improved landscaped areas, and by constructing either building specific or centralized storm water retention facilities.

Sanitary Sewer System

Initial discussions with the City of St. John’s suggest ample capacity exists in the trunk sewer system feeding the North Campus to accommodate future development.

However the same assurance was not received for the infrastructure serving the older South Campus. Based on measurements performed by the City, it appears that sanitary flows in the Elizabeth Avenue system are unusually high during periods of high storm run-off suggesting the possibility of either failed underground infrastructure, either on or off campus, or one or more storm/sanitary interconnections on campus. It was suggested by the City that resolution of this problem would possibly free up sufficient capacity to accommodate expansion. For this reason, it is recommended that an interconnection study be undertaken by MUN.

It is further understood that consumption of domestic water which is basically unmetered, may be excessive due to outdated plumbing fixtures and the extensive and growing use of domestic water for cooling.

Both the elimination of interconnections, and a planned reduction in water consumption are sustainable approaches to future development which might possibly permit the establishment of “zero impact” target for sanitary sewer capacity.

Water

Water infrastructure, both for potable use and fire protection are globally adequate, barring any unforeseen fire protection needs for hazard building construction.
**Heating Plant**

Both south and north campuses as well as the Health Sciences Centre and the Janeway Child Health Centre, are serviced by the central heating plant located at the MUN Utilities Annex. The ability of this heating plant to handle additional growth is limited by its design and by constraints in the north campus high temperature water distribution system, and by the older low temperature distribution system serving the original south campus. Determining the precise extent of these limits requires a detailed analysis of heating system infrastructure.

A potentially larger issue is whether the expansion of this system into the future is consistent with either provincial or national energy and environmental policies. This appears an appropriate time to consider these broader issues, and to evaluate alternate energy approaches, especially all-electric.

While all-electric, geothermal, cogeneration, and other alternative approaches may be suitable considerations for future and even present campus construction, they lack the reliability necessary for the increasing hospital presence on campus. For this reason, any allocation of remaining heating plant capacity, should embrace the principle that the hospitals are the first priority.

**Cooling Plant**

The central cooling plant at the MUN Utilities presently serves the HSC and Janeway Hospitals only. Other air conditioned campus buildings have some form of local plant, including local chiller plants, ground loop heat pump systems, or either water or air-cooled direct refrigerant systems.

As mentioned previously, the growth of water-cooled air conditioning equipment is consuming large quantities of treated city water and unnecessarily using sanitary sewer capacity. Further, the continued use of local cooling plants adds appreciable personnel and maintenance costs. For these reasons, it is an appropriate time in MUN’s history to compare the cost of individual plants versus a central cooling plant on a “go forward” basis. Central plants can avail of centralized labour, and can minimize both maintenance and energy cost.

It is recommended that both the expansion of the existing Utilities Annex and a new central plant be considered. These investigations should consider alternative distribution means including existing and new tunnels, and variants of direct buried systems.

**Electrical Distribution**

Memorial Campus presently receives its electrical supply from two Newfoundland Power 66 kV incoming power lines. These lines originate in the Stamps Lane and Kings Bridge substations and run aerially to the site prior to switching to a below grade route in the vicinity of the CBC Building and the Arts and Culture Building. Two utility owned step down transformers (66 kV:12.5 kV) rated at 15 and 20 MVA service the campus. The secondary of these transformers is connected to a 12.5 kV distribution line-up which presently contains only one spare breaker space. It appears that the present infrastructure consisting of a multitude of underground high voltage cables is over 30 years old and has very little redundancy built in.

Our search of the past five years of electrical demands indicates that the peak recorded demand on the Campus is approximately 16.7 MVA (March 2003).

Expansion of the Campus will require a detailed analysis on the overall load growth on the incoming feeders. While the average daily load has not presently exceeded the rating of either main transformer, this will likely happen in the near future as new buildings are constructed and the residences are converted to electric heat.

Other issues of equal importance are the physical capacity of the Campus 12.5 kV distribution centre to handle more loads and the need for increased reliability on the existing 30 year old feeders. Additionally, any increase in transformer capacity will likely impact on the available fault current and arc-flash levels.

**Emergency Power**

With the exception of the North Campus Annex, emergency power generation throughout Campus is left to stand-alone units located in various buildings. In the Annex, there is a group of generators arranged to supply the Janeway and Health Sciences Centre and to provide some redundancy in case of failure of one unit.

The stand-alone units typically date back to the associated building construction time and load has been added when new extensions or buildings were erected nearby.

Development of the Campus should trigger an analysis of the emergency power distribution system and the potential for centralized or centralized pockets of emergency power generation. This will allow for planned maintenance and unscheduled failures without affecting the supply of emergency power.
## APPENDIX B - PARKING COUNTS

<table>
<thead>
<tr>
<th>Surface Parking</th>
<th>Existing</th>
<th>Removed</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Spaces</td>
<td>Number of Spaces</td>
<td>Number of Spaces</td>
<td>Number of Spaces</td>
</tr>
<tr>
<td>Parking Area</td>
<td>1 14</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>1A 57</td>
<td>25</td>
<td>1A 32</td>
</tr>
<tr>
<td></td>
<td>2 60</td>
<td>60</td>
<td>2 0</td>
</tr>
<tr>
<td></td>
<td>4 52</td>
<td>52</td>
<td>4 0</td>
</tr>
<tr>
<td></td>
<td>5 47</td>
<td>47</td>
<td>5 47</td>
</tr>
<tr>
<td></td>
<td>6 73</td>
<td>73</td>
<td>6 0</td>
</tr>
<tr>
<td></td>
<td>7 37</td>
<td>37</td>
<td>7 37</td>
</tr>
<tr>
<td></td>
<td>7A 20</td>
<td>20</td>
<td>7A 20</td>
</tr>
<tr>
<td></td>
<td>8 67</td>
<td>33</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>9 200</td>
<td>9</td>
<td>290</td>
</tr>
<tr>
<td></td>
<td>10 9</td>
<td>9</td>
<td>10 9</td>
</tr>
<tr>
<td></td>
<td>10A 9</td>
<td>9</td>
<td>10A 9</td>
</tr>
<tr>
<td></td>
<td>11 30</td>
<td>11 30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12 19</td>
<td>12 19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13 25</td>
<td>13 25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14 50</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>15 217</td>
<td>217</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>15A 6</td>
<td>6</td>
<td>15A 6</td>
</tr>
<tr>
<td></td>
<td>15B 214</td>
<td>214</td>
<td>195</td>
</tr>
<tr>
<td></td>
<td>16 156</td>
<td>156</td>
<td>structured parking [16]</td>
</tr>
<tr>
<td></td>
<td>16A 290</td>
<td>180</td>
<td>16A 110</td>
</tr>
<tr>
<td></td>
<td>17 77</td>
<td>77</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>18 110</td>
<td>110</td>
<td>structured parking [18]</td>
</tr>
<tr>
<td></td>
<td>19 84</td>
<td>84</td>
<td>19 84</td>
</tr>
<tr>
<td></td>
<td>20 20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>21 19</td>
<td>19</td>
<td>21 0</td>
</tr>
<tr>
<td></td>
<td>22 136</td>
<td>136</td>
<td>structured parking [22]</td>
</tr>
<tr>
<td></td>
<td>23 30</td>
<td>30</td>
<td>23 38</td>
</tr>
<tr>
<td></td>
<td>24 11</td>
<td>11</td>
<td>24 0</td>
</tr>
<tr>
<td></td>
<td>25 5</td>
<td>5</td>
<td>25 5</td>
</tr>
<tr>
<td></td>
<td>26 13</td>
<td>13</td>
<td>26 13</td>
</tr>
<tr>
<td></td>
<td>27 250</td>
<td>250</td>
<td>structured parking [27]</td>
</tr>
<tr>
<td></td>
<td>30 14</td>
<td>14</td>
<td>30 0</td>
</tr>
<tr>
<td></td>
<td>31 5</td>
<td>5</td>
<td>31 5</td>
</tr>
<tr>
<td></td>
<td>36 80</td>
<td>80</td>
<td>36 80</td>
</tr>
<tr>
<td></td>
<td>40 126</td>
<td>126</td>
<td>40 126</td>
</tr>
<tr>
<td></td>
<td>56A 20</td>
<td>20</td>
<td>56B 0</td>
</tr>
<tr>
<td></td>
<td>62 32</td>
<td>32</td>
<td>62 32</td>
</tr>
<tr>
<td>Subtotal</td>
<td>2642</td>
<td>1775</td>
<td>663</td>
</tr>
<tr>
<td>Structured Parking</td>
<td>16 96</td>
<td>16 96</td>
<td>16A 1 96</td>
</tr>
<tr>
<td></td>
<td>18 60</td>
<td>60</td>
<td>18 60</td>
</tr>
<tr>
<td></td>
<td>22 120</td>
<td>120</td>
<td>22 120</td>
</tr>
<tr>
<td></td>
<td>27 750</td>
<td>750</td>
<td>27 750</td>
</tr>
<tr>
<td></td>
<td>480</td>
<td>480</td>
<td>McPherson</td>
</tr>
<tr>
<td></td>
<td>61 112</td>
<td>112</td>
<td>61 112</td>
</tr>
<tr>
<td></td>
<td>61 112</td>
<td>112</td>
<td>-</td>
</tr>
<tr>
<td>Subtotal</td>
<td>224</td>
<td>0</td>
<td>1602</td>
</tr>
<tr>
<td>On-Street Parking</td>
<td>211</td>
<td>211</td>
<td>211</td>
</tr>
<tr>
<td>Subtotal</td>
<td>0</td>
<td>211</td>
<td>211</td>
</tr>
<tr>
<td>Total</td>
<td>2866</td>
<td>1775</td>
<td>2476</td>
</tr>
</tbody>
</table>
## APPENDIX C - BUILDING AREA

<table>
<thead>
<tr>
<th>Buildings</th>
<th>footprint (m²)</th>
<th>number of levels</th>
<th>floor area (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Parking garage</td>
<td>4600</td>
<td>4</td>
<td>18400</td>
</tr>
<tr>
<td>2 Recreation expansion</td>
<td>1400</td>
<td>2</td>
<td>2800</td>
</tr>
<tr>
<td>3 Health Sciences</td>
<td>3333</td>
<td>3</td>
<td>10000</td>
</tr>
<tr>
<td>4 Parking garage / University Admin.</td>
<td>5690</td>
<td>5</td>
<td>28450</td>
</tr>
<tr>
<td>5 Future academic</td>
<td>3900</td>
<td>4</td>
<td>15600</td>
</tr>
<tr>
<td>6 Future academic</td>
<td>3900</td>
<td>4</td>
<td>15600</td>
</tr>
<tr>
<td>7 Future academic</td>
<td>2480</td>
<td>4</td>
<td>9920</td>
</tr>
<tr>
<td>8 Library expansion</td>
<td>1890</td>
<td>4</td>
<td>7560</td>
</tr>
<tr>
<td>9-1. Admin. / Faculty Club</td>
<td>990</td>
<td>3</td>
<td>2970</td>
</tr>
<tr>
<td>9-2. Admin. / Faculty Club</td>
<td>975</td>
<td>3</td>
<td>2925</td>
</tr>
<tr>
<td>10-1. Science expansion</td>
<td>1150</td>
<td>2</td>
<td>2300</td>
</tr>
<tr>
<td>10-2. Science expansion</td>
<td>3190</td>
<td>4</td>
<td>12760</td>
</tr>
<tr>
<td>11 Pavilion</td>
<td>445</td>
<td>1</td>
<td>445</td>
</tr>
<tr>
<td>12 Mathematic Expansion</td>
<td>1315</td>
<td>3</td>
<td>3945</td>
</tr>
<tr>
<td>13 Music Expansion</td>
<td>1315</td>
<td>2</td>
<td>2630</td>
</tr>
<tr>
<td>14-1. Business Expansion</td>
<td>1330</td>
<td>3</td>
<td>3990</td>
</tr>
<tr>
<td>14-2. Business Expansion</td>
<td>1015</td>
<td>4</td>
<td>4060</td>
</tr>
<tr>
<td>15-1. Future Academic / Residence</td>
<td>2180</td>
<td>4</td>
<td>8720</td>
</tr>
<tr>
<td>15-2. Future Academic / Residence</td>
<td>2750</td>
<td>4</td>
<td>11000</td>
</tr>
<tr>
<td>16 St. John's College</td>
<td>720</td>
<td>3</td>
<td>2160</td>
</tr>
<tr>
<td>17 Residence / Academic Expansion</td>
<td>540</td>
<td>4</td>
<td>2160</td>
</tr>
<tr>
<td>18 Residence / Academic Expansion</td>
<td>680</td>
<td>4</td>
<td>2720</td>
</tr>
<tr>
<td>19-1. Residence</td>
<td>4350</td>
<td>5</td>
<td>21750</td>
</tr>
<tr>
<td>19-2. Residence</td>
<td>515</td>
<td>3</td>
<td>1545</td>
</tr>
<tr>
<td>20 Residence</td>
<td>2230</td>
<td>4</td>
<td>8920</td>
</tr>
<tr>
<td>21 Dinning / Common Room</td>
<td>780</td>
<td>2</td>
<td>1560</td>
</tr>
<tr>
<td>22 Residence Entrance</td>
<td>210</td>
<td>2</td>
<td>420</td>
</tr>
<tr>
<td>23 Residence Entrance</td>
<td>210</td>
<td>2</td>
<td>420</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>54083</strong></td>
<td></td>
<td><strong>205730</strong></td>
</tr>
</tbody>
</table>