Comprehensive Facilities Master Plan
Design Guidelines

September 16th, 2003

Submitted by:

Phillip Markwood Architects, Inc.
Columbus, Ohio

in association with:

Michael Dennis & Associates
Boston, Massachusetts

and

LANDARCH
Pataskala, Ohio
Table of Contents

A. Preface ............................................................... 4
   1. The planning Process ........................................... 5
   2. Aesthetics ......................................................... 8
B. Urban Guidelines .................................................. 9
   1. Outdoor Spaces .................................................. 10
      1.1. Quadrangle ................................................... 10
      1.2. Courtyards .................................................... 10
         1.2a Phase-1 Court ............................................. 11
         1.2b Entry Court ................................................. 11
         1.2c General Courts ........................................... 11
      1.3 Pedestrian Spaces .......................................... 12
      1.4 Ravine ........................................................ 12
   2. Primary Visual Elements ...................................... 13
   3. Pedestrian Routes .............................................. 14
      3.1 Primary Pedestrian Routes ............................... 14
      3.2 Secondary Pedestrian Routes ............................ 14
   4. Vehicular Circulation .......................................... 15
      4.1 Primary Vehicular Routes ................................. 15
      4.2 Service/Emergency Routes ............................... 15
      4.3 Parking ........................................................ 16
      4.4 Bicycle Circulation ........................................ 16
      4.5 Accessible Routes ......................................... 16
   5. Building Issues ................................................ 17
      5.1 Building Locations ......................................... 17
      5.2 Building Spacing .......................................... 17
      5.3 Height Restrictions ....................................... 17
      5.4 Build-To Lines ............................................. 18
      5.5 Setback Lines .............................................. 18
      5.6 Flexible Building Lines ................................ 18
C. Architectural Guidelines ....................................... 21
   1. Building Typology ............................................. 21
   2. Building Massing ............................................. 21
   3. Building Character ........................................... 21
4. Articulation of Facades

4.1 Base, Middle, Top
4.2 Front vs. Rear or Side
4.3 Articulation of Building Perimeter
4.4 Entrance Characteristics
4.5 Opaque versus Transparent
4.6 Window Openings
4.7 Use of Large Glazed Areas

5. Exterior Materials

5.1 Building Facades
   5.1a Brick
   5.1b Stone
5.2 Roofs

6. Service Areas

D. Landscape Guidelines

1. Preface
2. Paved Surfaces
3. Storm Drainage
4. Site Furniture
5. Signage & Graphics
6. Fountains
7. Fencing
8. Lawn & Recreational Turf
9. Athletic Fields
10. Irrigation Systems
11. Preparation & Planting
12. Planting
13. Plant Materials
14. Plant Materials Maintenance
15. Maintenance Problems
16. Chemical Application
17. Pruning
18. Ivy
E. Master Plant Selection List
1. Shade Trees
2. Ornamental Trees
3. Evergreen Trees
4. Shrubs (Deciduous)
5. Shrubs (Evergreen)
6. Ground Covers and Vines
7. Perennials
8. Ferns and Ornamental Grasses

F. Other Recommendations
1. Utilities
2. Soils
3. Design Review Process
4. Visual Connection to Existing Facility
5. Site Elements

G. Appendix
1. Site Utility Drawings
   1.1 Electric and Telephone
   1.2 Storm Sewer
   1.3 Water and Sewer
2. Geotechnical Soils Report
3. Campus Master Plan
A. PREFACE

The purpose of this document is to guide the development of a new campus for Belmont Technical College. As such, its intent is to achieve the following stated goals:

- To create a campus with its own unique character: one that stands out from the surrounding built environment, and distinctively says “Belmont Technical College”
- To bring together the disparate portions of the campus at one location.
- To support and define the public spaces of the campus
- To achieve a varied but cohesive character
- To celebrate the heritage of the Ohio valley
- To emphasize quality
- To create exterior spaces that are as important as interior spaces
- To create a welcoming, safe and secure environment
- To celebrate technology, but blend with tradition

1. The Planning Process

It should always be remembered that planning is not an end all to campus facility issues and problems, but simply a means to make intelligent decisions about the future of an institution. This comprehensive campus plan should be reviewed on a regular basis and changes made to incorporate the changing values and needs of the institution. It is hoped that this plan will serve as a foundation from which a new campus can be constructed and serve as a guide for architects and planners who are engaged to articulate our ideas into the formation of our campus.

Daily decisions about the use of space and the allocation of space should be an administrative function that uses the current comprehensive plan as a guide. One administrator should be given the responsibility of overseeing the development of campus facilities and should be a member or ex-officio member on all campus planning teams. This person will be responsible for interacting with OBR officials, architects and contractors during the planning, construction and post-occupancy stages of a project. This person would also be an intermediary between the administration and the facilities planning team. Currently, this role is the responsibility of the Vice-President of Administrative Services. As the campus grows in size and stature, this role should ultimately be filled by a licensed architect, campus planner or engineer whose sole responsibility is to manage and maintain the college’s facilities.

A facilities planning team, made up of faculty, staff, and administrators, should meet regularly (twice a year) and whenever business is forthcoming. The purpose of the team would be to provide input into facilities proposals generated by the administration and act as a system of checks and balances. The team would also be responsible for reviewing the comprehensive facilities plan and making recommendations to the administration and Board of Trustees for any changes to the plan.

When projects are large (major renovation of existing space or the construction of an addition or new building), a Facilities Project Team will be assembled by the supervising administrator consisting of members of the Leadership Team, Facilities Team and those parties that will be directly involved in the use of the new space including faculty, staff (at least one member from the maintenance department), administrators and students. The purpose of these teams will be to establish programmatic guidelines for the design, provide input into the design process, and ultimately to make a recommendation to the Leadership Team concerning the acceptance of a specific design scenario. The Facilities Project Team will then meet occasionally during the construction process to supply technical expertise to the design team and contractors concerning details, change orders, and addenda to the contract.
2. Aesthetics

The new campus should be designed to create its own unique architectural identity. There are many ways in which a college campus can achieve a unique identity. For example, the use of a specific historic or modern style can be used to achieve unification between various structures like the Georgian campus at the University of Georgia or the Roman Revival campus at the University of Virginia. Styles may vary, but building can be limited to a small pallet of materials and colors, thus limiting the variation and ensuring campus unity like the use of terra cotta roof tiles at the University of Kansas or the use of limestone for all exterior walls at Kansas State. Most successful campuses have focal points which have become symbols of their campuses like the Quad at Harvard, or the Carillon at Iowa State. Belmont Technical College needs an architectural identity. It needs a symbol that will become synonymous with the institution for years to come.

While it is important that the college be unified as an institution, it must also realize that individual programs and college functions need to have distinct, recognizable images in order to facilitate circulation and subconscious understanding of place. One of the current problems with the existing campus is the inability of the architecture to define its contents. New students can’t find their way around and many departments don’t exist from a “physical” standpoint. Just as the campus image is used as a marketing tool, so can a department’s facilities. Each department should have a “home”. In some cases, this may be an individual building and in other cases, multiple departments may share a building, but within that building, territory should be defined architecturally and each department should be provided with modern, up-dated equipment.

The college must realize that its facilities are one of its greatest marketing tools. The image of the college campus as a leafy Arcadia has been ingrained in the American psyche since the establishment of the early colonial colleges based on European monastic traditions. From tree-lined sidewalks between buildings to outdoor sculpture and fountains, Belmont Technical College has historically skimped on these accessories. Sidewalks, planting, human scale exterior lighting, benches, trash receptacles, art work, fountains, etc. should all be incorporated into the master plan for the exterior of the campus. Most successful college campuses recognize that students use the exterior area as much as the interior. This holds true on commuter campuses as well as the traditional boarding schools. The campus should be designed to incorporate a variety of outdoor seating and recreational areas to provide as many choices for the student as possible. Remember, the space between each of the college buildings is as important as the buildings themselves.

The campus site overlooks a lake owned by the Joint Vocational School and the master plan incorporates views of the lake into the design. In the future, the college should consider pursuing acquisition of the lake and surrounding land. The lake could prove to be a uniquely identifiable feature of a new campus.

Quality should be established as the number one priority. An examination of current facilities of departments offering the same services as those proposed should be undertaken to establish the benchmark for current standards and every effort should be made to exceed those standards at this institution. An investment in quality is never regretted. By shifting the emphasis toward quality and timelessness, rather than quantity, we can be assured that the space we build today will be useful and appropriate in years to come. Benchmark exceeding facilities will be a powerful marketing tool that can be used to recruit new students, call attention to the institution, and assist each department in the pursuit of grant funding.
1. Building Preservation Technology Center
   - Existing Area: 12,070 s.f.
   - Proposed Area: 45,110 s.f.
   - Proposed Footprint: 22,555 s.f.
   - Stories: 2
   - Parking Spaces: 123
   - Parking Area: 33,480 s.f.
   - Total Footprint: 56,035 s.f.

2. Multi-Craft Manufacturing/Fabrication Technology Center
   - Existing Area: 12,070 s.f.
   - Proposed Area: 4,800 s.f.
   - Proposed Footprint: 22,400 s.f.
   - Stories: 1
   - Parking Spaces: 75
   - Parking Area: 21,720 s.f.
   - Total Footprint: 44,120 s.f.

3. Indoor Air Quality & Environmental Comfort Technology Center
   - Existing Area: 4,800 s.f.
   - Proposed Area: 26,875 s.f.
   - Proposed Footprint: 26,875 s.f.
   - Stories: 1
   - Parking Spaces: 75
   - Parking Area: 21,720 s.f.
   - Total Footprint: 48,595 s.f.
<table>
<thead>
<tr>
<th>BUILDING PROGRAM</th>
<th>Existing Area</th>
<th>Proposed Area</th>
<th>Proposed Footprint</th>
<th>Stories</th>
<th>Parking Spaces</th>
<th>Parking Area</th>
<th>Total Footprint</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Building Preservation Technology Center</td>
<td>12,070 s.f.</td>
<td>45,110 s.f.</td>
<td>22,555 s.f.</td>
<td>2</td>
<td>123</td>
<td>33,480 s.f.</td>
<td>56,035 s.f.</td>
</tr>
<tr>
<td>2. Multi-Craft Manufacturing/Fabrication Technology Center</td>
<td>12,070</td>
<td>22,400</td>
<td>22,400</td>
<td>1</td>
<td>75</td>
<td>21,720</td>
<td>44,120</td>
</tr>
<tr>
<td>3. Indoor Air Quality &amp; Environmental Comfort Technology Center</td>
<td>4,800</td>
<td>26,875</td>
<td>26,875</td>
<td>1</td>
<td>75</td>
<td>21,720</td>
<td>48,595</td>
</tr>
<tr>
<td>4. Public Safety Building</td>
<td>0</td>
<td>22,417</td>
<td>13,941</td>
<td>2</td>
<td>87</td>
<td>23,760</td>
<td>37,701</td>
</tr>
<tr>
<td>5. Community Health Building</td>
<td>0</td>
<td>38,295</td>
<td>12,765</td>
<td>3</td>
<td>112</td>
<td>30,240</td>
<td>43,005</td>
</tr>
<tr>
<td>6. Learning Resource Center</td>
<td>5,849</td>
<td>40,024</td>
<td>20,012</td>
<td>2</td>
<td>133</td>
<td>31,320</td>
<td>41,980</td>
</tr>
<tr>
<td>7. Computer &amp; Telecommunications Center</td>
<td>0</td>
<td>31,980</td>
<td>10,660</td>
<td>3</td>
<td>114</td>
<td>31,320</td>
<td>41,980</td>
</tr>
<tr>
<td>8. Administration Building</td>
<td>9,579</td>
<td>31,080</td>
<td>10,360</td>
<td>3</td>
<td>74</td>
<td>20,520</td>
<td>30,880</td>
</tr>
<tr>
<td>9. Student Union</td>
<td>17,854</td>
<td>72,623</td>
<td>49,594</td>
<td>1-2</td>
<td>231</td>
<td>65,640</td>
<td>115,234</td>
</tr>
<tr>
<td>10. Business Technology Center</td>
<td>0</td>
<td>29,625</td>
<td>9,875</td>
<td>3</td>
<td>122</td>
<td>33,480</td>
<td>43,355</td>
</tr>
<tr>
<td>11. General Classroom Building</td>
<td>60,487</td>
<td>35,100</td>
<td>11,700</td>
<td>3</td>
<td>130</td>
<td>35,640</td>
<td>47,340</td>
</tr>
<tr>
<td>12. Engineering Building</td>
<td>0</td>
<td>21,840</td>
<td>7,280</td>
<td>3</td>
<td>8</td>
<td>21,600</td>
<td>28,880</td>
</tr>
<tr>
<td>13. Community &amp; Continuing Education Center</td>
<td>0</td>
<td>56,940</td>
<td>18,980</td>
<td>3</td>
<td>136</td>
<td>36,720</td>
<td>55,700</td>
</tr>
<tr>
<td>14. Physical Education Center</td>
<td>0</td>
<td>51,930</td>
<td>42,136</td>
<td>2</td>
<td>195</td>
<td>52,920</td>
<td>95,056</td>
</tr>
<tr>
<td>15. Maintenance &amp; Long-Term Storage Center</td>
<td>2,782</td>
<td>21,098</td>
<td>21,098</td>
<td>1</td>
<td>30</td>
<td>8,640</td>
<td>29,738</td>
</tr>
<tr>
<td>16. Dormitories</td>
<td>0</td>
<td>74,400</td>
<td>24,800</td>
<td>3</td>
<td>110</td>
<td>30,240</td>
<td>55,040</td>
</tr>
<tr>
<td>17. Parking Garage</td>
<td>0</td>
<td>518,400</td>
<td>129,600</td>
<td>4</td>
<td>1,655</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **Outdoor Spaces**

- **Public Benefits:** To be a community requires density and proximity; it requires urbanity. Campus design is urban design, and urban design is the design and management of the public realm rather than the private realm of individual buildings. Precise control of public space allows for flexibility and change in individual buildings, and therefore it should be the principal instrument of physical planning.

- **Description:** The outdoor spaces make connections, provide continuity, define place, and compliment or enhance the architectural form of the campus. The outdoor spaces of the campus are public rooms and along with the streets and other linear corridors they provide the spatial structure of the campus and organize the buildings of the college into a greater whole. Landscape and architecture coexist in a reciprocal and complementary relationship, each commenting on the other.

1.1 **Quadrangle:**

- **Public Benefits:** As an outdoor public room, the quadrangle creates memorable images, as well as the possibility of leisure activities, ceremonial use and performs a vital civic role. The quadrangle is the primary formal space on campus.

- **Description:** The quadrangle is a large public formal space reinforced by the surrounding classroom buildings, plantings, furniture and the peripheral path systems. The character of the facades fronting the quadrangle should reflect the formality of the space. Oriented longitudinally along the north-south axis of the campus, the main quadrangle has a clear boundary established by formal tree lined pedestrian walkways and the perimeter classroom buildings. The basic east-west dimension of the quadrangle is 235ft. between the classroom buildings. Buildings should align on the quadrangle with sufficient continuity of façade surface to provide adequate spatial definition. In order to ensure this, “build-to” lines are established on the plan, and must be respected. The Learning Resource Building establishes the north terminus of the quadrangle. The importance of this building to the college is signified by it’s location at the terminus of this formal space. The south axis of the quadrangle, framed by L-shaped buildings, opens to the extended landscape of the park beyond.
Building Height: Buildings should be no less than two stories, and no more than three stories in height. Adjacent buildings should acknowledge the height of their neighboring structures. Building heights and entries should be coordinated across the quadrangle to reinforce axial relationships. Slender towers and picturesque elements may break the height limit, but should be located to reinforce the primary visual axis and pedestrian routes. The site of the quadrangle slopes downward from the north to the south, so buildings at the north end of the quad which are two stories and buildings toward the south which are three stories should maintain similar cornice lines/roof lines, etc.

Circulation and Access: Pedestrian access to the quadrangle is provided by walks which occur between the perimeter buildings. The pedestrian walks serve as capillaries of the quadrangle and they should be an extension of the urban edges of the quad perimeter. Primary pedestrian walks should have well defined edges and provide visually interesting linear view corridors. The main entrances of the buildings should be clearly visible and distinguishable from the quadrangle. The building entrances should have a clear relationship to the quadrangle and be reinforced by landscape, benches, paving, etc. Coordination of entries across the quad will help to preserve the formality of the space. In order to preserve the formal nature of the quadrangle, primary circulation should be around the perimeter with selective pathways which correspond to visual landmarks crossing the space.

Pedestrian Environment: The quadrangle is an exclusively pedestrian space with rigid urban edges. A colonnade of trees, plantings and the classroom buildings that frame the quadrangle clearly describe the boundary and provide a series of spatial layers that serve to articulate the pedestrian relationship of the buildings to the landscape.

1.2 Courtyards:

Public Benefits: Courtyards are more intimate spaces than the quadrangle and can take on a variety of characters from formal to informal. Seating and lighting should be an integral part of the composition whenever possible to encourage individual or small group studying and to reinforce the pedestrian scale.

Description: The Courtyards are open public spaces created by a grouping of buildings and are limited in size and legible in form. Courts should have a legible relationship to the circulation system of the surrounding building and/or open spaces.
1.2a Phase-1 Court:

- **Description:** The formal court located at the north end of the campus is defined by the “build-to” lines of its perimeter buildings and has a basic dimension of 130ft x 212ft. The east sidewalk of the court aligns with the east sidewalk of the quadrangle. This court is an exclusively pedestrian space. The perimeter of the court will be further established and reinforced by an architectural colonnade that will also serve to more physically and visually integrate the differing scales of the court perimeter buildings. The colonnade will reinforce the pedestrian scale and define a ground level layering of space for people and activity.

- **Building Height:** Buildings should be no more than two stories in height. Adjacent buildings should acknowledge the height of their neighboring structures whenever possible. The architectural colonnade should maintain a consistent height. The building entrances should be clearly visible and recognizable and as such can be reinforced in the colonnade.

- **Circulation and Access:** The primary circulation of the pedestrian court occurs along the clearly defined rigid urban edge, which is reinforced by the architectural colonnade. Secondary, informal circulation and access should be made available to the predominating central lawn space.

- **Pedestrian Environment:** The court is an exclusively pedestrian space with rigid urban edges defined by an architectural colonnade and the perimeter buildings that clearly describe the boundary.

1.2b Entry Court:

- **Description:** The entry court is located on the northeast of the campus and will be the primary vehicular access point of the campus. This court must establish itself from nearby surroundings and as such be clearly recognizable as a primary entrance. It will serve as the arrival point for the entire campus and will introduce the campus environment to arriving persons. For this reason the formality and symmetrical emphasis on the entry drive and pedestrian corridor axis must be maintained. The center of the court should contain a focal point.

- **Building Height:** One and two story buildings should supplement the landscape in defining the edges of the entry court and focus attention on the center of the entry court.
- **Circulation and Access:** The vehicular circulation of the entry court travels along a tree lined boulevard terminated by a centrally located iconic landmark/sculpture. This central icon serves as a terminus for the vehicular entry axis as well as the pedestrian promenade beyond which serves as its continuation. It also provides a hinge around which vehicular traffic is diverted to peripheral parking. Directional campus signage of a pedestrian scale should be clearly visible from the vehicular routes and should express the transitional design embodied throughout the campus. A sense of arrival is established at the entry court by the campus identification sign. Drop-off and pick-up areas should be provided for pedestrians.

- **Pedestrian Environment:** The entry court while primarily a vehicular domain does align with a pedestrian corridor clearly defined by the “build-to” lines and a tree-lined walkway and as such provides a visual connection to the phase-1 court. Waiting areas with benches should be provided near the end of the pedestrian corridor as well as near the theater building.

### 1.2c General Courts:

- **Description:** General courts refer to the relatively enclosed private, semi-private or public open space within a building or created by a group of buildings. The character and use of the general courts are directly related to the functional uses that surround them.

- **Pedestrian Environment:** Seating and lighting should be an integral part of the composition whenever possible to encourage individual or small group studying and to reinforce the pedestrian scale.
1.3 Pedestrian Spaces:

- **Public Benefits:** Pedestrian spaces act to promote a community through social gatherings as well as individual and small group studying.

- **Description:** The spaces between buildings, the primary and secondary circulation as well as the layered open spaces of the courtyards and the quadrangle act to integrate the campus by providing a fabric which knits individual elements together. The pedestrian spaces are a major factor in the establishment of the campus identity.

- **Features:** Pedestrian spaces should have a clearly described boundary and provide a series of spatial layers that serve to articulate the pedestrian relationship of the buildings to the landscape. Pedestrian spaces should have a varied, but cohesive quality established through the sequencing of framed views and linear relationships.

- **Building Height:** Buildings should be no more than three stories in height. Adjacent buildings should acknowledge the height of their neighboring structures and environment. Slender towers and picturesque elements may break the height limit, but should be located to reinforce the primary visual axis and pedestrian routes.

- **Circulation and Access:** Circulation must be of a width and character which are compatible with the pedestrian scale. Contact between vehicular and pedestrian circulation should be limited to only ADA access points, and crossings. The pedestrian circulation system is the main circulation system within the campus. Vehicular and service routes will intersect with the pedestrian routes, but must be secondary.

- **Pedestrian Environment:** The main entrances of the buildings should be clearly visible and recognizable from the primary pedestrian routes. Seating, pedestrian lighting, building entrances, and bicycle parking should be integrated into the pedestrian ways. Pedestrian spaces should have a legible relationship to the circulation system of the surrounding buildings and/or open spaces.

1.4 Ravine:

- **Public Benefits:** The ravine preserves and enhances an existing natural setting to encourage a relaxed and contemplative space for informal social gatherings and activities.

- **Description:** The ravine area differentiates itself from the courtyards and quadrangle by its large size and irregular edges. The romantic, picturesque and natural setting of the ravine area should be preserved. The picturesque qualities of the ravine area can be reinforced through informally placed canopy trees used to create areas of sun and shade and to frame and screen views. Open lawns will accommodate a variety of activities in these spaces. A small lake should be developed as a focal point for the ravine.
• **Features:** Located at the northeast corner of the ravine, an outdoor amphitheater can be cut into the naturally occurring contours of the site. Materials such as stone or concrete should be joined with the landscape to provide amphitheater seating, while trees and landscape elements embrace the stage area providing a backdrop which gently filters and provides glimpses of the picturesque ravine and lake area to the south and west. A pavilion located near the south west edge of the lake provides a shaded retreat for quiet study, picnics or for feeding ducks. An overlook area at the east edge of the ravine acts as the terminus of a cross axis of the quadrangle and provides sweeping panoramic views of the picturesque ravine and the student housing along its western edge.

• **Building Height:** Buildings appropriate to the ravine setting are single story pavilions placed informally with framed views that either establish a visual connection with the campus as destination landmarks or are informally screened by groupings of varied species trees to create an atmosphere of a more secluded retreat. Pavilions should be small in scale and limited to a few carefully placed objects.

• **Circulation and Access:** Informal paths through the ravine area may provide access from the dormitories to central campus. Informal circulation paths must be of a width and character which are compatible with the pedestrian scale and sympathetic to the natural setting of the ravine.

• **Pedestrian Environment:** Seating and pedestrian scale lighting should be provided along the informal circulation system of the ravine in such a manner that they do not interfere with or overwhelm the existing natural setting.

2. **Primary Visual Elements**

• **Description:** Where appropriate, visually significant landmark buildings should provide a terminus to view corridors. Examples of this are the Learning Resource center at the closed end of the quadrangle and the view of the Building Preservation Technology building as one approaches from the quadrangle or from the west.

• **Building Height:** Slender towers and picturesque elements may break the height limit of the primary spaces, but should be located to reinforce the primary visual axis and pedestrian routes. These elements must be limited in mass to prevent them from dominating the general height limitations of the space. These elements should be reviewed on a case-by-case basis to determine their appropriateness in terms of height, width and character.

• **Pedestrian Environment:** The main entrances of the buildings should be clearly visible and recognizable from the primary pedestrian routes.

3. **Pedestrian Routes**

3.1 **Primary Pedestrian Routes:**

• **Public Benefits:** The most successful pedestrian ways are both connectors and places in their own right and further serve to reinforce the campus identity.

• **Description:** Primary pedestrian routes should have well defined edges and provide visually interesting linear view corridors. The interconnected series of walks and streets must be of width and character which are compatible with the pedestrian scale.
• **Building Height:** A consistent “street” wall should be created through the alignment of building facades and corresponding parallel layers of landscaping. Buildings should be no more than three stories in height. Adjacent buildings should acknowledge the height of their neighboring structures. Slender towers and picturesque elements may break the height limit, but should be located to reinforce the primary visual axis, pedestrian routes and special occurrences such as entries, etc.

• **Circulation and Access:** Routes on the campus should function as both circulation routes from one destination to another and as linear spaces that relate to the buildings fronting onto them.

• **Pedestrian Environment:** Major pedestrian ways should be lined by trees planted in regular rows, and as closely spaced as recommended for the species in order to form a spatial canopy. The main entrances of the buildings should be clearly visible and recognizable from the primary pedestrian routes. Seating, pedestrian lighting, building entrances, and bicycle parking should be integrated into the pedestrian ways.

3.2 Secondary Pedestrian Routes:

• **Public Benefits:** Secondary pedestrian routes provide for functional connections between primary routes.

• **Description:** Informal pedestrian routes connect through buildings and courts to the major pedestrian routes to make a rich experience that is at once varied and united.

• **Building Height:** Buildings or landscape should help frame and define the pedestrian scale of paths.

• **Circulation and Access:** Secondary pedestrian routes may be regular or picturesque, and may be composed of single or multiple species of trees to be determined by the character of adjacent surroundings.

• **Pedestrian Environment:** Seating, pedestrian lighting and building entrances should be integrated into the pedestrian ways. Landmark features, slender towers and picturesque elements should be located to frame destination points and building entrances.

4. Vehicular Circulation

4.1 Primary Vehicular Routes:

• **Description:** Primary vehicular routes shall be located as close as is practical to the campus perimeter. Separating the vehicular routes from the campus core will make the central campus environment as pedestrian friendly as possible.

• **Circulation and Access:** Vehicular routes should be clear and simple and of an appropriate scale that meshes with the pedestrian environment of the campus. Routes on the east of the campus will provide access to parking from Hammond Road and to service areas for those buildings on the east half of the campus. Access between campus parking and Hammond Road shall be as direct as possible and allow for the stacking of cars leaving campus.

• **Pedestrian Environment:** Pedestrian activities shall be removed as much as possible from the vehicular circulation. Crosswalks and other intersections shall be clearly identified to insure the safety of pedestrians.
4.2 Service/Emergency Routes:

- **Description:** These routes will efficiently and safely provide for all service and maintenance operations, while being visually screened from primary views. Primary pedestrian routes must also be of the appropriate width to permit unfettered emergency access to campus buildings and facilities while maintaining a pedestrian scale and character.

- **Circulation and Access:** Maximize flexibility of vehicular movement with sufficient pavement and additional heavy duty concrete where necessary to support larger vehicle loads. Service routes will provide access to the “back” of buildings, which is the facade that does not front primary or secondary pedestrian spaces or routes. Light all entries and service bays to enhance security.

- **Pedestrian Environment:** Pedestrian activities in the service areas are limited; however, the service routes should be of a width and character which are compatible with the pedestrian scale. Provide visual screening with walls that are integral with the architecture and/or plantings that are consistent with the overall landscape treatment. Care should be taken to ensure clear views at walkway intersections and other connections where pedestrians and vehicles come together.

4.3 Parking:

- **Description:** In order to maintain an exclusively pedestrian campus core, parking should be held to the perimeter of the site. Future expansion and growth can be accommodated by either the introduction of structured parking at the site perimeter, or by the acquisition of additional acreage adjacent to the campus to be used for supplementary surface parking.

- **Circulation and Access:** Contact between vehicular and pedestrian circulation should be limited to only ADA access points, and crossings.

- **Pedestrian Environment:** Pedestrian activities in this area are limited; however the parking areas should be of a character which is compatible with the pedestrian scale. Provide plantings that are consistent with the overall landscape treatment. Pedestrian scale lighting should be provided at all parking areas to enhance security.

4.4 Bicycle Circulation:

- **Description:** In order to maintain an exclusively pedestrian campus core, bicycle parking should be held to the perimeter of the core campus areas.

- **Circulation and Access:** Contact between bicycle and pedestrian circulation should be minimized such that the bicycle traffic does not interfere with the pedestrian routes. Bicycle parking should be provided at the perimeter of the core campus with direct access to primary pedestrian routes, should be integrated into the landscape and pedestrian environment so that it does not interfere with the primary pedestrian circulation and visual axis. Care should be taken so that bicycle parking does not terminate a view corridor or become a visual focal point.
4.5 Accessible Routes:

- **Description:** Accessible routes must be made to all campus buildings. Accessible routes for vehicular access must be held to the perimeter of the core campus areas, such as the Quadrangle and the Phase-1 Courtyard.

- **Circulation and Access:** Service vehicle access and accessible vehicular access to the campus buildings at the west edge of the quadrangle should be controlled by means of a key card and gate to ensure that contact between pedestrians and vehicles is limited.

5. Building Issues

5.1 Building Locations:

- **Description:** In order to define outdoor space, certain buildings need to be precisely located along “build-to” lines relating to adjoining streets, outdoor spaces, and nearby buildings. Buildings should align on the streets, courts and quadrangle of the campus with sufficient continuity of facade surface to provide adequate spatial definition. In order to ensure this, “build-to” lines are established on the plan, and must be respected.

- **Circulation and Access:** Primary entries should be coordinated with other building entries and pedestrian routes to provide efficient circulation and access without creating unnecessary pathways between entries. Service entries should be at the perimeter of the core campus areas and provide access to the rear or end of buildings whenever possible.

- **Pedestrian Environment:** The main entrances of the buildings should be clearly visible and recognizable from the primary pedestrian routes.

5.2 Building Spacing:

- **Description:** The relationship between heights of buildings and size of open space should be of a width and character which are compatible with the pedestrian scale. Seating, pedestrian lighting, and bicycle racks should be integrated into these spaces in such a manner as to reinforce the linear sequence in a manner that does not impair the primary visual axis.

- **Circulation and Access:** Pedestrian circulation and access to centrally located open spaces occurs through the spaces between buildings, and as such these spaces should act to reinforce the urban character.

- **Pedestrian Environment:** The spacing of buildings must be of a width and character which are compatible with the urban, pedestrian scale.

5.3 Height Restrictions:

- **Description:** Buildings which cannot conform to the height requirements should be the exception and not the rule. Buildings which are exceptions should be carefully placed to work with the overall campus fabric. These exceptions can be used to symbolize importance as in the case of the Learning Resource building at the north end of the quadrangle. Other exceptions may need to be located outside of the main fabric of the campus, such as the Fire Fighting facility.

- **Building Height:** Buildings should be no less than two stories, and no more than three stories in height. Adjacent buildings should acknowledge the height of their neighboring structures. Slender towers and picturesque elements may break the height limit, but should be located to reinforce the primary visual axis and pedestrian routes.
• **Pedestrian Environment**: The relationship between the height of buildings and size of open spaces must maintain a width and character which are compatible with the pedestrian scale.

5.4 **Build-To Lines**:

• **Description**: In order to define outdoor space, certain buildings need to be precisely located along build-to lines relating to adjoining streets, outdoor spaces, and nearby buildings. Buildings should align on the streets, courts and quadrangle of the campus with sufficient continuity of façade surface to provide adequate spatial definition. In order to ensure this, “build-to” lines are established on the plan, and must be respected. In order to ensure sufficient continuity of façade surface and to define outdoor space; projections and recesses from the “build-to” line should be created to signify entrances, acknowledge adjoining streets, outdoor spaces, and nearby buildings, and to establish visual focal points corresponding to primary and secondary visual axis. Projections and recesses from established “build-to” lines should maintain a width and character which are compatible with the pedestrian scale and which do not confuse the definition of the “build-to” line. These projections and recesses should be reviewed on a case-by-case basis to ensure compatibility with adjacent buildings and a coordinated definition of the public space.

5.5 **Setback Lines**:

• **Benefits**: A consistent setback of the buildings along Hammond Road will serve to create a definable edge to the campus. The definable edge will also serve to accent the main campus entry by allowing it to be the only major thoroughfare to punctuate the edge. Where buildings do not sit on the setback line, but are further back from the road, the landscape design can reinforce this edge.

• **Description**: Campus buildings adjacent to main access roads to the campus site shall maintain a distance as required by local code. Consideration should also be given to the fact that the existing main access roads to the campus could be widened in the future to accommodate the increased vehicular flow to the campus. Care should be taken in the planning of setback lines to ensure that if the main road is widened that an appropriate setback is still achievable.

5.6 **Flexible Building Lines**:

• **Description**: The flexible building lines allow for the introduction of building courtyards and flexibility in setbacks.

• **Pedestrian Environment**: Building courtyards should have a legible relationship to the circulation system of the surrounding building and/or open spaces. Seating, lighting and landscaping should be an integral part of the composition to encourage individual or small group studying.
C. Architectural Guidelines

1. Building Typology

- **Description:** Architectural type is far more important than the architectural style. Block buildings and courtyard buildings offer an endless array of typological variants and are the appropriate urban building types. Block buildings define public spaces of the campus by aligning on the streets, courts, and quadrangle, and as such, compliment and reinforce the landscape plan. Courtyard buildings use external and/or internal courtyards to organize and define urban pedestrian spaces.

2. Building Massing

- **Description:** Building massing should relate to the urban pedestrian scale and maintain a consistency among the various buildings.

- **Building Height:** Buildings should be no more than three stories in height. Adjacent buildings should acknowledge the height of their neighboring structures. Slender towers and picturesque elements may break the height limit, but should be located to reinforce the primary visual axis and pedestrian routes. A slender element may be defined as being smaller in width or circumference in proportion to its height.

- **Roof Profiles:** Buildings should use a combination of sloped and flat roofs. Broad building masses will require some flat roof areas, but high slope components and accent pieces should be incorporated to reinforce a traditional architectural character.

- **Form Modulation:** Modulation of the massing can be used in order to emphasize or acknowledge special conditions such as entries, and to create gathering space such as outdoor dining courts, etc. Form modulation should be used with restraint in order to preserve the established build-to lines and reinforce the definition of primary exterior spaces.

- **Pedestrian Environment:** The relationship between the height of buildings and the size of the open space must maintain a width and character which are compatible with the pedestrian scale. Minor courts and other small spaces must be sized to accommodate and facilitate their intended use.

3. Building Character

- **Description:** Each building on campus should have its own unique identity, but it should also contribute to the community by adhering to common architectural and urban conventions.

- **Language:** The architectural vocabulary should be primarily traditional, yet celebrate technology through the discreet articulation of structural elements and rigorous detailing of the connection of dissimilar materials.

- **Material Palette:** Primary exterior materials should be a clay brick blend with limestone and architectural precast concrete accents. Structural elements and other steel and aluminum details can be used to accent the building and its components. Use of glass should be limited to punched openings and special conditions and not used in large scale on facades. Window and door frames should generally use a synthetic colored finish that is coordinated throughout the campus. Exceptions should be reviewed on a case-by-case basis.
4. **Articulation of Facades**

4.1 **Base, Middle, Top:**

- *Description:* Buildings should have a clearly legible base, middle, and top. The base is especially important as it reinforces the pedestrian scale of the building and defines a ground level layer of space for people and activity. The ground floors of buildings should be articulate and distinct, and, where feasible, the interior spaces should be organized as extensions of the public space outside.

4.2 **Front vs. Rear or Side:**

- *Description:* In order to define outdoor space, certain buildings need to be precisely located along “build-to” lines relating to adjoining streets, outdoor spaces, and nearby buildings. Buildings should align on the streets, courts and quadrangle of the campus with sufficient continuity of façade surface to provide adequate spatial definition. In order to ensure this, “build-to” lines are established on the plan, and must be respected. The main entrances of the buildings should be clearly visible and recognizable from the primary pedestrian routes.

- *Front:* The front façade of the building is the façade that determines the formal boundary of adjacent open spaces and primary pedestrian routes and visual axis. The front façade should be of masonry construction comprised of brick of a blended color palette and complementary limestone or architectural pre-cast concrete accent elements. The brick used should be subject to a case by case review of each building as it relates to its neighboring structures and to the campus material palette.

- *Rear:* Building services should be located at the rear of buildings whenever possible. The rear façade is that façade which does not front primary pedestrian routes and/or formally established open spaces. Whenever student work areas occur at the rear façade, such as welding areas, they may potentially use a more economical material palette, but in doing so should maintain the urban pedestrian scale of the campus and display continuity with adjacent façades. These exceptions should be reviewed on a case by case basis. Service and work areas should be visually screened with walls that are integral with the architecture and/or plantings that are consistent with the overall landscape treatment.

- *Side:* The side façade of buildings should act to reinforce the urban character. The side façade should be of masonry construction comprised of brick of a blended color palette and complementary limestone or architectural pre-cast concrete elements.
4.3 Articulation of Building Perimeter:

- **Description:** In order to define outdoor space, certain buildings need to be precisely located along “build-to” lines relating to adjoining streets, outdoor spaces, and nearby buildings. Buildings should align on the streets, courts and quadrangle of the campus with sufficient continuity of façade surface to provide adequate spatial definition. While “build-to” lines are established to ensure sufficient continuity of façade surface for definition of outdoor space; projections and recesses from the “build-to” line should be created to signify entrances, establish visual focal points and acknowledge adjoining streets, outdoor spaces, and nearby buildings. Projections and recesses from established “build-to” lines should maintain a width and character which are compatible with the scale of the facade and maintain the clear definition of the build-to lines.

4.4 Entrance Characteristics:

- **Description:** Primary entrances should be clearly visible and recognizable from the primary pedestrian routes. Secondary entries or exits may be less noticeable and uncelebrated.

- **Building Height:** Slender towers, picturesque elements, or other modulations of the building form should be located to reinforce the location and identification of building entrances.

4.5 Opaque versus Transparent:

- **Description:** Functionally, the majority of campus facilities will require relatively opaque facades. These should be interrupted by punched openings whenever possible. Some areas may be suitable to large glazed areas and can be treated as special conditions.

4.6 Window Openings:

- **Description:** Punched openings, not horizontal, should be combined for larger glazed areas. The size and rhythm of window openings must correspond to the urban scale while serving to strengthen the unity of the building to the landscape, adjacent open spaces and pedestrian routes. Adjacent buildings should acknowledge the fenestration of their neighboring structures. Buildings with components requiring large expanses of glazing should also utilize punched openings in other sections of the building to reinforce the campus fabric.

4.7 Use of Large Glazed Areas:

- **Description:** Punched openings could be combined for larger glazed areas. The size and rhythm of window openings must correspond to the urban scale and serve to strengthen the unity of the building to the landscape and adjacent open spaces and pedestrian routes. Large glazed areas should be treated as special conditions and not as general building facades. As such, the scale of the glazed area must be carefully measured against the rest of the facade.
5. Exterior Materials

5.1 Building Facades:

5.1a Brick:

- **Description:** The exterior skin of buildings should generally be masonry construction. Clay brick should be a blended mix rather than a single color. In order to reinforce the campus fabric and community, adjacent buildings should acknowledge the material palette of their neighboring structures.

- **Color:** A campus blend of brick should be selected in phase 1 and used as a primary material for all buildings. Brick should be of a traditional red blend using colors common to historic locally produced brick.

5.1b Stone:

- **Description:** Stone should be used as a complementary material to the blended brick. The use of stone accents will contribute to the campus image in several ways. The timeless quality of natural stone will help to support the desired traditional institutional feel. Because of these traditional associations, stone accents can be used in various ways to transition between traditional and modern detailing. Stone can be used to formalize or accent primary entries as well as other special portions of the buildings. Stone accents or banding can also be an excellent tool for differentiating between the base, middle, and top of a building.

- **Material Palette:** Stone accents should either be a natural buff limestone or, for economic reasons, architectural pre-cast concrete that matches the texture and color of natural limestone elements. Stone textures can vary, but primarily a smooth surface should be used.

5.2 Roofs:

- **Description:** Roofing material for sloped portions should be either standing seam metal or slate. Adjacent buildings should acknowledge the material palette of their neighboring structures.

- **Colors:** Colors should be in a neutral range. Gray or natural metal colors and gray slates can provide a compatible palette.

- **Visibility:** Screen lower flat roof buildings to avoid views from other taller buildings. Mechanical equipment located on roofs must be screened from view from adjacent buildings and pedestrian pathways.

- **Access:** Mechanical units located on rooftops must also be easily accessible for maintenance. Access to rooftop mechanical units should be provided from inside the building via roof scuttles. If necessary, any exterior access ladders must be located at back of building areas and should be secured.
6. Service Areas

- **Description:** Service routes should efficiently and safely provide for all service and maintenance operations. Service should be visually screened from primary views. These areas should be separate from public/student pedestrian traffic whenever possible.

- **Circulation and Access:** Maximize flexibility of vehicular movement with sufficient pavement and additional heavy duty concrete where necessary to support larger vehicle loads. Service functions are located at the “back” or “sides” of buildings. Light all entries and service bays to enhance security.

- **Pedestrian Environment:** Pedestrian activities in this area are extremely limited; however service routes should be of a width and character which are compatible with the urban scale. Provide visual screening with walls that are integral with the architecture and/or plantings that are consistent with the overall landscape treatment.
LANDSCAPE GUIDELINES
D. LANDSCAPE GUIDELINES

1. Preface

- The condition of a campus often influences impressions and attitudes. The grounds sometimes make a first impression that may determine enrollment of students and employment of faculty and staff. As influential as they can be, properly designed and maintained grounds and interior plantings are not necessarily prime areas of concern to administrators. This attitude is changing as more emphasis is being given to the physical condition of the grounds, as well as campus aesthetics.

- Unlike most areas of maintenance, grounds are subjected to unpredictable variables. The grounds manager contends with problems of nature and living things, quite unlike a controlled interior environment. Generally, the purpose of grounds maintenance is to provide services that maintain, in an acceptable manner, the exterior portion of the campus, excluding buildings. The mission may be expanded to include maintenance of interior plantings and environments.

2. Paved Surfaces

- The types of paved surfaces range from loose gravel to fine hand-laid quarry tile or exposed aggregate concrete surfaces. Each material requires its own method of maintenance, but there are some common practices for each.

- Before any material is selected, consideration must be given to its intended use, type of traffic, cost to install, cost to maintain, life expectancy, aesthetic conditions, availability of materials, and weather and seasonal factors.

- The most common problem of paved surfaces is the lack of drainage. This is particularly true in climates that expose surfaces to continued freeze-thaw cycles. A soft subbase caused by wet, poorly drained conditions results in movement, pumping, and other problems. The importance of good drainage cannot be overemphasized.

- Problems with concrete pavements can be attributed to specific causes. As with paved surfaces, drainage is important. However, concrete can be of poor quality for several reasons. First are placement problems. Overworking of surfaces or retempering is common and particularly critical in cold climates. When being poured, concrete can easily begin to harden before the finishers have time to work it.

- Improper mix of proportions of materials continues to be a problem. Strength and surface spall problems are directly related to misuse of water, as is the retention of water for proper curing. Concrete that is not immediately sealed or properly protected for curing will have surface and strength problems. Poor selection of aggregate and lack of air entrainment will also cause a variety of failure situations.

- Budgets for construction projects are sometimes inadequate and many details are reduced in design. Problems result from reductions in design strengths, or sections of pavements. Surface courses may be omitted, or a less effective surface is installed, with later resurfacing intended. Often breakdown occurs earlier than “scheduled”, and money is not available for improvement or repair.
3. Storm Drainage

- Storm drainage problems are frequently caused by undersized lines and backups. Lines that were adequate at one time become inadequate as more hard surfaces are installed, increasing the speed of runoff. Since the greatest cost of installing storm sewers is for labor, catch basins, and manholes, always demand oversizing of the pipe. To increase size or add more lines later is expensive, considering site restoration costs.
- Total cleaning and inspection of storm sewer inlets and manholes is frequently overlooked until backups or failures occur. This activity should be included in a preventive maintenance schedule. Storm drainage systems should be thoroughly reviewed to make certain they are designed to handle water disposal quickly, particularly in spaces of high pedestrian traffic.

4. Site Furniture

- Site furniture selection is critical and should be standardized to reflect the character of the campus (see proposed selections).
- A frequently overlooked problem on many campuses is the lack of adequate refuse containers. Even if there are enough containers, sometimes they are inappropriate for a college or university campus.
- This may be true of other outdoor furniture as well. Benches, light poles, and planter boxes should harmonize with their surroundings. The disruption of an otherwise pleasant atmosphere occurs if site furnishings are improper. Selection of a standard is wise and should be followed.

5. Signage & Graphics

- The most significant item that can visually clutter a campus is the proliferation of nonstandardized signage and exterior graphics. Strong institutional rules should regulate all types of signage: visual graphics, posters, traffic control signage, and informational and directional signage. These regulations should stipulate a standard to be followed and place the responsibility and authority for enforcement on one specific division or person.
- Bulletin boards and kiosks should be located strategically throughout the campus, and only these should be allowed for posting. Old posters, residue tape, and glue can easily make a campus look shabby.
- Building identification and directional and informational signage should all follow a set standard using harmonious colors, locations, sign shapes, and alphabet types. These standards establish an important continuity throughout the campus.
- Allowing graffiti to accumulate only encourages more. Materials are available to remove all types of paint and marking materials from various surfaces. As soon as improperly placed posters, signage, and graffiti are discovered, they should be removed. All staff personnel should be trained to participate in this effort.
6. Fountains

- Fountains are difficult to maintain. The expenditure of dollars and work hours required to keep them in running condition is, at times, questionable. The installation of water features should be considered with this in mind.

- Ongoing maintenance costs of fountains are usually higher than other installations because of student-related activities. Therefore, the location and design can significantly affect maintenance costs.

- The complexity of design and mechanical systems will make a considerable difference in maintenance demands. Varying water movement, lighting, and special spray nozzles contributes to increased cost. Regular treatment in warm climates or during the summer is necessary to control algae growth. Occasional emptying is required for cleaning and to remove objects.

- Water attractions are pleasant and usually improve aesthetics. Care must be taken in design to be certain maintenance is possible within realistic budgetary restrictions. A fountain in the lake of the ravine could be used to provide aeration for fish. In all cases, fountains increase costs.

7. Fencing

- Fencing on a campus is sometimes needed to direct traffic. In many cases, fencing can be replaced by plants, or pavements can be redesigned to provide proper traffic flow. Extensive use of fencing should be avoided, if possible. Too much fencing may obstruct a view or diminish the aesthetic continuity of space.

- The fencing material should be as pleasing and unobtrusive as possible but still do its intended job. A dark plastic coating on chain-link fencing helps it recede visually, or a simple pedestrian fence of heavy timber post and chain creates a park-like atmosphere.

- Avoid temporary-looking fences whenever possible. They usually become permanent and detract from the campus setting. If a temporary fence is constructed using a drive post and wire, ribbon or brightly colored tape must be fastened to the wire to make it more visible. Serious accidents can occur with unmarked wire.

- Fencing is another of the many items on campus that, if not maintained, will create a less-than-satisfactory appearance.

8. Lawns & Recreational Turf

- The Campus Administration must be aware of Principles of Turf Management.

- First, no lawn is stable. It is either improving or declining in quality. Even when a lawn appears to be in good condition, hidden problems may be beginning.

- Second, with proper moisture and fertilization, a lawn will be established, weeds will be crowded out, and grasses will grow abundantly. This does not preclude invasion by fungi and insects.
• Third, grass will not continue to grow in dense shade. Beware of all the miracle advertisements. There are varieties of grasses that tolerate varying degrees of shade, but none can tolerate shade caused by dense trees. Some of the problems of the dry soil and shade combination are caused by trees absorbing much of the water.

• Beware also of growth regulators—they are not for every lawn. There are a number of restricted use growth regulators available on the market, and each is effective for different turf situations. Cost factors must be considered to determine the economic feasibility of growth regulator usage. Also, the physiological effects to the turf may cause problems in certain areas.

• Non-irrigated lawns usually experience a dormant period from mid to late summer if rainfall falls below levels necessary to sustain growth. This is normal, and the brown-blue grass will turn green with sufficient water.

9. Athletic Fields

• Quality turf that is required of some athletic fields will require more maintenance.

• Irrigation, good drainage, fertilization, aeration, overseeding, top dressing, and chemical application all are necessary to maintain or increase the turf’s durability.

• Many volumes of literature and university courses detail athletic field installation and maintenance. Of course, no maintenance program exists that assures safe playable turf on overused fields. If such a demand exists for athletic turf, additional areas should be created so that playing fields are not used to the point where the turf is always in a state of decline.

10. Irrigation Systems

• Irrigation systems, once deemed frivolous and undependable, have become a viable mainstay for turf and plant maintenance in today’s grounds care industry. It not only provides a “cheap insurance policy” for new plant and turf installation, it also serves as a potential source of labor and dollar savings over an extended period of time. Hand watering with hoses and sprinklers is often an inefficient use of water as well as labor intensive (depending on the quality of your work force). Conversely, and irrigation watering source that controls water usage through specific precipitation rates and precise watering times is more effective.

• Water use is typically minimized through the use of an “automatic controller” and a rain sensor. These simple devices allow the system to turn itself on and off at a certain time of day and control the length of time each area is watered. In periods of sufficient precipitation, the rain sensor will shut the system down until the moisture level is low enough to warrant additional watering. In expansive commercial jobs, irrigation is often managed through a computer. This allows for the control of a system from a central location. Manufacturer-specific programs compute precise watering times and schedules based on regional climate, geography, soil compaction, slope conditions, and specific landscape features to optimize the use of water. In addition, with a change in software, the system controller can also automatically operate fountains, gates, lighting, and security systems.
A well or sewer charge meter can yield additional cost savings. A sewage charge meter monitors water used by the irrigation system. This water is not subject to sewage fees (frequently comprising up to 85 percent of the water bill). A typical system will often pay for itself in a few years through the savings on sewage charges. As water management in some communities has become an important issue (sometimes requiring water restriction), a well will provide a usable source during drought conditions and is acceptable in most communities during restriction periods. It too is exempt from sewage fees.

System selection will depend on:

a. Mechanism desired
b. Mode/method of operation
c. Specific application
d. Sized of project
e. Water source/water pressure
f. Climate

Properly designed and installed irrigation systems require little maintenance. Seasonal watering time periods may be needed to react to severe deviations from regional weather norms and winterization/restart will be required in cold climate areas. Proper operation and an appropriate schedule of watering times will control problems from fungus and thatch when combined with a good spraying and aeration program.

Irrigation systems will benefit any landscape setting and become an asset to physical plant. Once a system is in, it only needs occasional maintenance and in colder climates winterization. Watering amounts are critical. How much water depends on what soil type and turf variety exists and the seasonal changes of the evapotranspiration rate (defined as moisture taken from the soil by plants and air). Several problems occurring with irrigation are increased fungus growth, thatch accumulation, and soil compaction. A good spraying and aeration program will keep these problems in check. Fungus diseases can also be reduced by timing waterings to minimize the length of time during a twenty-four-hour period that the turf is wet.

11. Preparation & Planting

Proper preparation for a new lawn assures the desired end result. In new construction, the site is usually in poor condition for the establishment of turf. All kinds of problems have to be corrected. Sheets of plywood are hidden just below the surface, large concrete chunks are imbedded in the soil, buried plaster or lime causes unknown alkalinity problems.

Consult a turf specialist or agronomist for seed selection in any given location. As a result of research on turf grass varieties, new selections regularly come on the market. Selection of a combination of grasses suitable for a specific use must be made individually.

Many factors determine selection and include use of the lawn, mowing heights, available water and fertility rates, insect and fungus resistance, shade percentage and intensity, soil factors, and drainage. No common seed mixture is perfect, and no two turf consultants will prescribe the same solution.
• It is recommended that a high percentage of a variety of perennial rye grass seed be used on most campus areas. There are many very good new introductions of perennial rye grass seed mixes on the market. Perennial rye grasses tend to be tougher, require less fertilizer and water, but still are nearly indistinguishable from the older blue grass lawns.

• During the grading process, the most important problem is drainage. No turf area should slope less than 1 percent—a bare minimum. Pockets of undrained turf will result in a multitude of problems.

• Areas compacted by heavy equipment should be loosened or turf establishment will be difficult until the soil loosens naturally, which can take several years. The entire site should be tilled and evenly shaped. It is not necessary to pulverize the soil completely and it is even better if small lumps creating voids of up to one inch remain.

• A fertilizer chosen for the specific soil condition should be applied and worked into the surface. Soil analysis is helpful, but an experienced turf manager will know the requirements of a seven site based on other lawns in the area.

• Several methods of seeding can be used depending on the site. In small areas seed might be distributed by hand-carried rotary seeders. For larger spaces, a slicing seeder or drill might be used, and large areas or steep slopes may require hydra seeding. The latter method can incorporate fertilizer, seed, and mulch in one operation.

• Mulch is of utmost importance in the seeding process. It provides protection from erosion, retains moisture, and shades the seed bed. Without mulch, the chances of establishing a lawn are greatly reduced.

12. Planting

• There are several steps in the planting procedure that frequently cause problems. Preparation of the hole is important. In clay soils, the plant will drown if the hole is too deep and the plant cannot drain properly. If the soil is heavy clay and in a low area or confined (as in a parking lot with curbs), a drainage system must be installed. Trees planted in heavy soils with poor drainage die from too much water rather than from a lack of it. When the hole is dug, it should be no deeper than the depth of the ball to plant at the original level. This keeps the plant from settling out of plumb or to a level that will not drain. The hole should be wider than the ball and backfilled with top soil combined with generous amounts of soil conditioner (peat moss, sand or chips).

• The volume of branches and top must be reduced enough to compensate for root loss in digging. The person handling the plant should not lift the plant by the top, which would break or loosen the ball, and the planted tree must be staked properly. Staking reduces losses due to wind, people, and other physical problems. If staked and mulched properly, the base of the tree will also be protected from mower damage. The twine or cord used in securing the ball must be completely loosened and cut away from the trunk. If not, the tree will be girdled and die. This is particularly true when nondegradable twine is used.

• Methods of planting should follow the standards set by the American Association of Nurserymen. Their standards also provide guidance for quality and size when purchasing plant material.
Landscape Master Plan

Legend
- Shade Tree
- Ornamental Tree
- Evergreen
• Note: See Suggested List of Plant Materials. This list is to be used for assistance in plant selection and can be revised as needed.

13. Plant Materials

• Maintenance problems of plant materials—trees, shrubs, ground covers, and vines—are directly related to the initial selection of the specific plant. If improperly chosen, a plant will be a problem in various ways throughout its life. Many factors must be considered to ensure the proper plant is chosen for a specific location.

• The one problem commonly overlooked is space. Many times the plant selected will grow considerably larger than the space allows. This causes continual pruning, and finally, replacement. A common error of designers is to use several plants—causing overcrowding—where one will do the job.

• Poor selection may require continuous treatment to condition the soil acidity, or a plant may be chosen that will not withstand wet conditions or areas of poor drainage. Selecting plants that are not hardy enough for a geographical zone or exposing certain plants to sun, snow, or strong winds can be disastrous to certain species.

• Soil conditions determine many future maintenance problems. Selection of plants to withstand the various conditions is critical. In urban settings, more and more plants are harmed by air pollutants, and this fairly new problem must be considered.

• The person selecting plants for use on campus should be aware of these common problems. Occasionally, a landscape architect or other designer who practices in a different environment and has no firsthand knowledge of special conditions affecting plants on a specific project is selected to create a planting for a given site. The designer will probably use plant lists for the zone intended, but local conditions may be entirely different. Therefore, consultants must be completely familiar with the area and its problems.

14. Plant Materials Maintenance

• All plants require maintenance in varying degrees. There are no plants entirely free of problems. Problems must be dealt with individually since there are thousands of cultivated plants, each with its own requirements.

• Maintenance common to all plants includes watering, fertilization, chemical treatment for proliferation of pests and diseases, pruning, and eventual removal.

• Determining proper moisture level for the numerous varieties of plants is difficult. Most plants should be thoroughly soaked and allowed to drain to the point of being dry before being watered again. Most plants will drown if overwatered, but drought conditions can also be damaging. Proper balance can only be reached by learning the peculiarities of individual plants.
Most plants used in cultivated conditions require fertilization. Intensity of fertilization varies according to individual plant requirements. Turf grass plants that are irrigated on well-drained soils require fertilization several times each year, but a good shade tree in natural conditions requires fertilization on a limited basis. Related to fertilization is the introduction of various trace elements lacking or trapped in the soil. This again relates to improper plant selection. For example, chlorosis (abnormally yellow color) in several varieties of trees is common, and must be treated. Chlorosis results from a lack of iron in a plant. Iron is either not present in the soil or is not available to the plant because of some other soil condition. One of the most common causes is alkalinity and iron-deficiency combination. The same plants located properly will not develop chlorosis.

The various chemical treatment procedures are so numerous that only descriptions of common operations are presented.

**Target Pest:** The insect or other organism must be identified before proper treatment can be selected. Identification includes timing, resistance, and life cycles.

**Toxicity:** Pesticide application will become a subject of public concern if not properly monitored. Levels of toxicity are indicated by an LD₅₀ value. This is the amount of pesticide that is lethal to 50 percent of a test population in a single does. It is registered in milligrams per kilogram of body weight and is shown both as dermal and oral indicators. This rating does not indicate hazard, rather the killing ability of a chemical. A chemical can be highly toxic but have little hazard potential because of the way it is used (or misused) and the way it is formulated. The lower the number, the higher the risk factor due to less volume of material required to be lethal. LD₅₀ is not the only way of determining toxicity, but it is a good indicator.

**Phytotoxicity:** This describes the effects a selected chemical will have on various, non-targeted plants. Incorrect selection and application methods will result in damage to other plants. An example is 2,4-D injury to shrubs and trees when applied improperly to lawns for broad-leaf weeds.

**Compatibility:** Certain chemicals can be combined to resolve combinations of problems. There are many chemicals that should not be mixed or will not mix for many reasons. Awareness of this condition will avoid many problems.

Other factors to consider when selecting a specific chemical are its effectiveness, residual behavior, method of application, and employees’ capabilities to handle application problems.

Shop rules for safety and procedural methods must be established. Reference publications are available suggesting methods of transportation and storage of chemicals, types of protective devices and clothing, and calibration. Information is also available about other use factors of equipment, personal hygiene, and—with today’s emphasis on environmental protection—methods of disposal. College and university agencies, such as agriculture schools and health services, state extension services, and manufacturers, are all sources of safety procedures.

The problem of safety due to exposure to agricultural chemicals, and the hazards of absorption into the body, cannot be overemphasized. Health testing procedures are available for use in protecting employees and, in turn, the institution. Chemical absorption can result in absenteeism and serious health problems. A good system of detection can benefit employees, and possibly avoid future legal entanglements if hazards are discovered and treated properly.
15. Maintenance Problems

- As stated earlier, a profusion of disease and insect problems exists in lawns. As the density of a lawn increases, so do problems. The selection of grass for disease resistance is important, and a program of seasonal treatment should be established to cope with standard problems.

- One of the common problems of good lawns is the accumulation of thatch. Grass clippings and other miscellaneous particles that build up on the soil surface do not decompose rapidly. This causes a roof effect and reduces the chances of air and water reaching the roots of the grass plants. It also creates an environment conducive to insect and fungus disease growth.

- If this layer of thatch gets too thick, it must be removed or a poor turf will result. Chemical dethatchers have been introduced but none have proven successful. Mechanical removal is the only answer, and the lawn must “start over”. Aeration and slicing will reduce thatch and extend the time between renovations. Annual aeration of heavy-use areas will reduce compaction and allow moisture to permeate the surface.

- Mowing schedules and heights must be regulated. In campus situations, particularly where budgets and human resources are limited, mowing often falls behind schedule. Heavy windrows of clippings can create fungus problems. Delayed mowing will also injure the grass plant by allowing the leaf to be cut severely into the “white” area. The optimum is to cut more often and remove less grass per cutting. As summer passes, the cutting height should be raised to allow more leaf surface to remain. Short cutting heights are harmful to turf health and sometimes cause the plants to die. This also depends on grass variety. Some varieties withstand short cutting better than others.

- If properly graded and drained, most lawns can become acceptable if management establishes a systematic program of chemical treatment, fertilization, and irrigation. Each area of the country requires specific programs. If followed, the lawn quality will improve.

16. Chemical Application

- A chemical applicator’s license or registration is required by most states for at least one person responsible for chemical application.

- Current federal regulations require employers who transport, store, and apply hazardous chemical to have a Hazard Communication Standard Program. This involves obtaining Material Safety Data Sheets (MSDS) from manufacturer for each hazardous chemical on hand. The MSDS must be made available to the employee, and he or she must be trained on how to safely handle each hazardous chemical. For more information regarding the Hazard Communication Standard, contact your local or regional Occupational Safety and Health Administration Office.

17. Pruning

- One of the most misunderstood maintenance procedures is pruning, which should not be confused with shearing. The quickest way to ruin plants and the original intent of a plant selection is to allow them to be sheared into round balls or flat-topped cones, unless a formal garden is intended. The use of the hedge clippers can injure plants and ruin the plants’ intended purpose.
Pruning should be done to remove dead or damaged branches, retain original plant shape, control the size of the plant, or for renewal purposes. Trained personnel should perform this function at specific times of the year as needed by the type of plant. On larger campuses, or where labor is a problem, pruning can be done almost any time. Some sacrifices must be made—such as loss of flower or fruit the following season.

Disease control is an important reason for pruning. Some infected plants or groups of plants can be spared the spread of disease if infected branches are removed and destroyed. In some cases, the pruning equipment must be sterilized after each cut to keep from carrying the infection from plant to plant. Dipping tools in alcohol is effective.

18. Ivy

The maintenance problems associated with ivy-covered walls involve potential damage to masonry and wood moldings.

The two most common ivy plants covering the walls of many buildings are either the deciduous plant, Parthenocissus Tricuspidata, commonly called Boston Ivy, or the vine that does not lose its leaves, Hedera Helix, English Ivy. Each has its advantages and disadvantages.

Boston Ivy grows rapidly, sometimes as much as ten feet a year. When it loses its leaves each fall, like most deciduous plants it displays fall colors of bright orange, red, and crimson. Boston ivy climbs readily on nearly any surface by using adhesive discs at the tips of its tendrils. These tendrils do not seek cracks or crevices but adhere to the surface. The vine should not be allowed to grow unrestrained behind and between moldings, joints, or on wood surfaces.

English Ivy, a dark green-leaved vine, is a much slower growing plant, and in some conditions, not nearly as hardy as Boston Ivy. In certain locations, it will freeze back to the ground and must be removed. In the proper location it is an excellent plant as a ground or wall cover. Some smoother surfaces do not have enough texture to support English Ivy.

Both vines provide shading of walls and insulation against bright sunshine. Ivy’s value as insulation has not been determined but is significant.

The added aesthetic value probably outweighs the negative attitudes, costs to control growth, and potential damage.
MASTER PLANT SELECTION LIST
### Preface

Plans selected for this master plant selection list were chosen on the basis that they are relatively easy to maintain and that they typically thrive in this climate.

1. **Shade Trees (Deciduous)**

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acer rubrum 'Autumn Flame'</td>
<td>Red Maple</td>
</tr>
<tr>
<td>Acer saccharum 'Commemoration'</td>
<td>Sugar Maple</td>
</tr>
<tr>
<td>Aesculus carnea 'Briotii'</td>
<td>Ruby Red Horsechestnut</td>
</tr>
<tr>
<td>Betula nigra 'Heritage'</td>
<td>Heritage River Birch</td>
</tr>
<tr>
<td>Celtis occidentalis</td>
<td>Hackberry</td>
</tr>
<tr>
<td>Celtis occidentalis</td>
<td>Hackberry</td>
</tr>
<tr>
<td>Fagus sylvatica 'Tricolor'</td>
<td>Tricolor European Beech</td>
</tr>
<tr>
<td>Fraxinus americana 'Autumn Applause'</td>
<td>Autumn Applause White Ash</td>
</tr>
<tr>
<td>Fraxinus americana 'Autumn Purple'</td>
<td>Autumn Purple White Ash</td>
</tr>
<tr>
<td>Fraxinus pennsylvanica 'Cimmaron'</td>
<td>Cimmaron Green Ash</td>
</tr>
<tr>
<td>Fraxinus pennsylvanica 'Marshall'</td>
<td>Marshall Seedless Green Ash</td>
</tr>
<tr>
<td>Fraxinus pennsylvanica 'Patmore'</td>
<td>Patmore Green Ash</td>
</tr>
<tr>
<td>Fraxinus pennsylvanica 'Summit'</td>
<td>Summit Green Ash</td>
</tr>
<tr>
<td>Ginkgo biloba</td>
<td>Maidenhair Tree (males only)</td>
</tr>
<tr>
<td>Gleditsia triacanthos inermis 'Imperial'</td>
<td>Thornless Honey Locust</td>
</tr>
<tr>
<td>Gymnocladus dioicus</td>
<td>Kentucky Coffee Tree</td>
</tr>
<tr>
<td>Liquidambar styraciflua</td>
<td>American Sweet Gum</td>
</tr>
<tr>
<td>Liriodendron tulipifera</td>
<td>Tulip Tree</td>
</tr>
<tr>
<td>Nyssa sylvatica</td>
<td>Black Tupelo</td>
</tr>
<tr>
<td>Platanus acerifolia 'Bloodgood'</td>
<td>Bloodgood Plaintree</td>
</tr>
<tr>
<td>Quercus</td>
<td>Oak</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>acutissima</td>
<td>Sawtooth Oak</td>
</tr>
<tr>
<td>alba</td>
<td>White Oak</td>
</tr>
<tr>
<td>Bicolor</td>
<td>Swamp White Oak</td>
</tr>
<tr>
<td>coccinea</td>
<td>Scarlet Oak</td>
</tr>
<tr>
<td>imbricaria</td>
<td>Shingle Oak</td>
</tr>
<tr>
<td>macrocarpa</td>
<td>Bur Oak</td>
</tr>
<tr>
<td>palustris</td>
<td>Pin Oak</td>
</tr>
<tr>
<td>robur</td>
<td>English Oak</td>
</tr>
<tr>
<td>rubra</td>
<td>Red Oak</td>
</tr>
<tr>
<td>shumardi</td>
<td>Shumard Red Oak</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Salix</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tilia cordata</td>
<td></td>
</tr>
<tr>
<td>‘Greenspire’</td>
<td>Greenspiro Linden</td>
</tr>
</tbody>
</table>

| Zelkova serrata      |                            |
| ‘Green Vase’         | Green Vase Zelkova         |
| ‘Village Green’      | Village Green Zelkova      |

2. **Ornamental Trees (Deciduous)**

<table>
<thead>
<tr>
<th>Acer ginnala</th>
<th>Flame Amur Maple</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Flame’</td>
<td></td>
</tr>
<tr>
<td>Acer griseum</td>
<td>Paper Bark Maple</td>
</tr>
<tr>
<td>Acer palmatum</td>
<td>Japanese Maple (Select varieties)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amelanchier canadensis</th>
<th>Shadblow Serviceberry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amelanchier grandiflora ‘Autumn Brilliance’</td>
<td>Autumn Brilliance Serviceberry</td>
</tr>
</tbody>
</table>

| Cercis canadensis     | Redbud                     |

| Chionanthus virginicus| White Fringe Tree          |

| Cornus                | Dogwood                    |
|                       | Chinese Dogwood            |
| florida (Pink & White Flowering) | Cornscion Cherry Dogwood |
| kousa chinensis       |                            |
| mas                   |                            |

| Crataecus             | Hawthorne                  |
|                       | Washington Hawthorne       |
| phaenopyrum           | Ohio Pioneer Hawthrone     |
| punctata ‘Ohio Pioneer’ | Winterking Hawthrone   |
| viridis ‘Winterking’  |                            |

| Koelreuteria paniculato| Golden Raintree            |

| Magnolia              |                            |
| Ann                   | Ann Magnolia               |
| Jane                  | Jane Magnolia              |
| ‘Leonard Messel’      | Messel Star Magnolia       |
| ‘Loebneri Merrill’    | Dr. Merrill Star Magnolia  |
| saulangeana           | Saucer Magnolia            |
| stellata ‘Royal Star’ | Royal Star Magnolia        |
| virginiana            | Sweetbay Magnolia          |

| Malus                 | Crabapple                  |
|                       | Many varieties – select for disease resistance. |

<p>| Metasequoia glyptostroboides | Dawn Redwood |</p>
<table>
<thead>
<tr>
<th>Plant</th>
<th>Variety</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prunus</td>
<td>cerasifera (Select varieties)</td>
<td>Flowering Plum</td>
</tr>
<tr>
<td></td>
<td>cistena (Select varieties)</td>
<td>Flowering Cherry</td>
</tr>
<tr>
<td>Pyrus</td>
<td>calleryana ‘Aristocrat’</td>
<td>Pear</td>
</tr>
<tr>
<td></td>
<td>calleryana ‘Bradford’</td>
<td>Aristocrat Callery Pear</td>
</tr>
<tr>
<td></td>
<td>calleryana ‘Chanticleer’</td>
<td>Bradford Callery Pear</td>
</tr>
<tr>
<td></td>
<td>calleryana ‘Cleveland Select’</td>
<td>Chanticleer Callery Pear</td>
</tr>
<tr>
<td></td>
<td>calleryana ‘Bradford’</td>
<td>Bradford Callery Pear</td>
</tr>
<tr>
<td></td>
<td>calleryana ‘Chanticleer’</td>
<td>Chanticleer Callery Pear</td>
</tr>
<tr>
<td></td>
<td>calleryana ‘Cleveland Select’</td>
<td>Cleveland Callery Pear</td>
</tr>
</tbody>
</table>

3. **Evergreen Trees**

| Abies         | balsamea phanerolepis         | Canaan Fir                   |
|               | concolor                      | White Fir                    |
|               | fraseri                       | Fraser Fir                   |
| Ilex opaca    | cultivars (male & female)    | American Holly               |
| Picea         | abies                         | Spruce                       |
|               | glauca                        | Norway Spruce                |
|               | ‘Densata’                     | White Spruce                 |
|               | omorika                       | Black Hills White Spruce     |
|               | pungens                       | Serbian Spruce               |
|               | pungens glauca                | Colorado Spruce              |
|               | glauca ‘Densata’              | Blue Colorado Spruce         |
| Pinus         | flexilis                      | Pine                         |
|               | mugo                          | Limber Pine                  |
|               | nigra                         | Mugo Pine                    |
|               | resinosa                      | Austrian Pine                |
|               | strobus                       | Red Pine                     |
|               | sylvestris                    | Eastern White Pine           |
|               |                               | Scots Pine                   |
| Pseudotsuga   | menziesii                     | Douglas Fir                  |
| Thuja         | occidentalis ‘Nigra’          | Arborvitae                   |
|               | occidentalis ‘Pyramidalis’    | Dark Green American Arborvitae|
|               | occidentalis ‘Smaragd’        | Pyramidal Arborvitae         |
|               |                               | Emerald Green Arborvitae     |
| Tsuga         | canadensis                    | Canada Hemlock               |

4. **Shrubs (Deciduous)**

<p>| Aesculus      | parviflora                    | Bottlebrush Buckeye          |
| Aronia        | arbutifolia ‘Brillianissima’  | Red Chokeberry               |
| Berberis      | mentorensis                   | Mentor Barberry              |
|               | thunbergii ‘Rose Glow’        | Rose Glow Barberry           |
| Buddleia      | davidii                       | Butterfly Bush              |</p>
<table>
<thead>
<tr>
<th>Commons Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpinus betulus ‘Fastigiata’</td>
<td>Upright European Hornbear</td>
</tr>
<tr>
<td>Caryopteris ‘Bluebeard’</td>
<td>Bluebeard</td>
</tr>
<tr>
<td>Chaenomeles superba ‘Jet Trail’</td>
<td>Jet Trail Dwarf Flowering Quince</td>
</tr>
<tr>
<td>Chaenomeles superba ‘Texas Scarlet’</td>
<td>Texas Scarlet Flowering Quince</td>
</tr>
<tr>
<td>Clethra (Varieties)</td>
<td>Summersweet</td>
</tr>
<tr>
<td>Cornus alba ‘Argenteo-Marginato’</td>
<td>Dogwood</td>
</tr>
<tr>
<td>Cornus alba siberica</td>
<td>Cream Edge Tatarion Dogwood</td>
</tr>
<tr>
<td>Cotinos coggygria ‘Velvet Cloak’</td>
<td>Velbet Cloak Smoketree</td>
</tr>
<tr>
<td>Cotoneaster apiculata (Varieties)</td>
<td>Cotoneaster</td>
</tr>
<tr>
<td>Cotoneaster dammeri ‘Coral Beauty’</td>
<td>Cranberry Cotoneaster</td>
</tr>
<tr>
<td>Cotoneaster</td>
<td>Coral Beauty Cotoneaster</td>
</tr>
<tr>
<td>Euonymus alatus ‘Compacta’</td>
<td>Dwarf Winged Euonymus</td>
</tr>
<tr>
<td>Forsythia ‘Lynwood Gold’</td>
<td>Lynwood Gold Forsythia</td>
</tr>
<tr>
<td>Hamamelis vernalis</td>
<td>Vernal Witchhazel</td>
</tr>
<tr>
<td>Hydrangea arborescens ‘Annabelle’</td>
<td>Annabelle Hydrangea</td>
</tr>
<tr>
<td>Hydrangea inacrophylla ‘Nikko Blue’</td>
<td>Nikko Blue Hydrangea</td>
</tr>
<tr>
<td>Hydrangea quercifolia</td>
<td>Oak Leaf Hydrangea</td>
</tr>
<tr>
<td>Ilex verticillata (male &amp; female)</td>
<td>Winterberry Holly</td>
</tr>
<tr>
<td>Ligustrum obtusifowum regelianum</td>
<td>Regel Privet</td>
</tr>
<tr>
<td>Malus sargentii</td>
<td>Sargent Crabapple</td>
</tr>
<tr>
<td>Potentilla fruticosa (cultivars)</td>
<td>Unquefoil</td>
</tr>
<tr>
<td>Rhus aromatica</td>
<td>Gro-Low Fragrant Sumac</td>
</tr>
<tr>
<td>Ribes alpinum</td>
<td>Alpine Currant</td>
</tr>
<tr>
<td>Spiraea bumalda ‘Anthony Waterer’</td>
<td>Anthony Waterer Spirea</td>
</tr>
<tr>
<td>Spiraea bumalda ‘Gold Flame’</td>
<td>Gold Flame Spirea</td>
</tr>
<tr>
<td>Spiraea bumalda ‘Gold Mound’</td>
<td>Gold Mound Spirea</td>
</tr>
<tr>
<td>Spiraea japonica ‘Little Princess’</td>
<td>Little Princess Spirea</td>
</tr>
<tr>
<td>Spiraea japonica ‘Shirobana’</td>
<td>Shirobana Spirea</td>
</tr>
<tr>
<td>Spiraea nipponica ‘Snow Mound’</td>
<td>Snow Mound Spirea</td>
</tr>
<tr>
<td>Spiraea vanhouttei</td>
<td>Vanhoutte Spirea</td>
</tr>
<tr>
<td>Syringa patula ‘Miss Kim’</td>
<td>Miss Kim Lilac</td>
</tr>
<tr>
<td>Viburnum (This is the most important group of deciduous shrubs with some 15 to 20 varieties.)</td>
<td>Weigela</td>
</tr>
<tr>
<td>Weigela florida (Varieties)</td>
<td>Weigela</td>
</tr>
</tbody>
</table>
5. **Shrubs (Evergreen)**

Azalea – Gable & Kurume Hybrids

**Buxus**  
‘Green Mountain’  
‘Green Velvet’  
microphylla koreana wintergreen

**Ilex**  
crenata ‘Green Lustre’  
glabra ‘Shamrock’  
meserveae ‘China Boy’  
meserveae ‘China Girl’

**Juniper**  
chinensis ‘Sea Green’  
chinensis ‘Saybrook Gold’  
conerta ‘Blue Pacific’  
horizontalis ‘Blue Chip’  
horizontalis ‘Wiltonii’

**NOTE – Use Juniper sparingly and only in full sun.**

**Mahonia aquifolia ‘Compacta’**

**Pinus mugo**

**Rhododendron**  
catawbiense cultivars  
PJM hybrids

**Taxus**  
cuspidata ‘Capitata’  
media ‘Browns’  
media ‘Chadwick’  
media Densiformis  
media ‘Everlow’  
media ‘Hicks’  
media ‘Ward’

**Arborvitae**  
bobazam  
techny

**Viburnum**  
rhytidophylloides ‘Allegheny’

**6. Ground Covers & Vines**

**Aegopodium podagraria**  
*Ajuga reptans ‘Bronze Beauty’*  
*Ampelopsis brevipedunculata elegans*  
*Clematis Hybrids**

**Euonymys fortunei colorotus**  
*Hedera helix ‘Thorndale’*  
*Liriope ‘Big Blue’*  
Pachysandra terminalis  
*Parthenocissus tricuspidata*  
Goutweed  
Bronze Beauty Carpet Bugle  
Porcelain Vine  
Purple Leaf Winter Creeper  
Thorndale English Ivy  
Big Blue Lilyturf  
Japanese Pachysandra  
Boston Ivy
7. Perennials

Perennials are highly desirable but care must be taken to use as mass plantings. “Perennial Gardens” become very labor intensive, but used properly, are very effective and economical. Following are suggest plants for mass use.

- Astor (Dwarf varieties)
- Astilbe
- Chrysanthemum
- Coreopsis
- Dilentra
- Echinacea
- Hemerocallis selections (excellent mass) Day Lillies
- Hosta (many good varieties for partial shade)
- Lianandula
- Phlox
- Rudbeckia Goldsturm
- Sedum
- Yucca

8. Ferns & Ornamental Grasses

Many grasses are available but should be used sparingly and usually enmasse. Unless carefully chosen and located, grasses can be objectionable, however, groups or masses can be very effective.
OTHER RECOMMENDATIONS
F. OTHER RECOMMENDATIONS

1. Utilities

- Construction of all utilities will need to anticipate the development of the complete campus. This will result in additional construction costs beyond actual building construction costs. The primary reason for this is that utility lines and services will need to be sized and routed to anticipate future construction. Anticipated basic sizes and suggested routes are shown on the drawings included in the appendix.

2. Soils

- Due to the nature of the soils of the reclaimed site, special care will need to be taken to plan for foundations of new construction. Depending on the method selected, preparations may need to be made for more than one building at a time. If dynamic compaction of the soil is utilized, pads for adjacent buildings should be compacted simultaneously to prevent damage from vibration to existing structures. All buildings to be constructed will require a specific evaluation of the conditions at that site for bearing capacity and design recommendations. A general soils report for the site is included in the appendix.

3. Design Review Process

- In order to achieve the established goals, the establishment of a design review process will be crucial. The college should establish a clear process of design review and approval. This process should not only include the ability to monitor the design process, but should also monitor the construction process. Care should also be taken in the selection of architects in order to insure that design interests are similar to the campus guidelines.

- We recommend that a committee be established to bridge from the final master plan to the establishment of a Design Review Committee. The purpose of the committee will be to carry on the work begun by the Facilities Master Plan Committee and lay the remaining ground work for the establishment of the Design Review Committee.

4. Visual Connection To Existing Facility

- As long as the existing campus facility is in use, some method should be undertaken of relating the two portions of the campus to the visitor. Since the image of the existing facility is the same as the neighboring vocational school, it is an image that the college wishes to distance itself from. This eliminates the ability of the new campus to match the existing facility in terms of design, style or color. Since the new facilities will be different in appearance from the existing campus, some other form of connection must be established. This can take on several forms.

- The simplest way to relate the two portions of the campus is to develop matching signage that can be used to identify each location from the road. The new signage should be designed to work with the palette of materials for the new campus buildings. Blended brick and limestone can be combined with identification graphics either placed in or on the limestone. The graphics can also be of other materials on a limestone background with a brick and limestone base.

- Creating gateways of a similar construction as that described for signage is another way to reinforce the relationship. Gateways would need to be placed at the main entrance to each section of the campus, and potentially at secondary entrances. These could be of a reduced scale or scope but still relate to the
• Planting matching tree lines and landscaping at each campus location can also reinforce this connection. Using trees with a particular shape and character, or a combination of more than one type, can create a consistent image along the road at both locations.

• Ideally, a combination of all three of these methods will provide the strongest connection between the two locations as seen from the road.

• If the original facility is to be used with the new campus over a long period of time, another method of connection might be desired. If the property can be obtained, or if the work can be performed within the context of the lease, a revision to the main parking lot could help to visually connect the two sections of the campus. This would serve to make one aware of the new campus from the main entry of the original facility. If the space created by the courtyard of the original facility is extended out into the parking area by the removal of pavement and the use of landscaping, a visual swath of space can be linked from the original building to the new quadrangle. With the selective trimming and removal of trees at the edge of the parking area, this vista can be opened up and framed to focus the view.

5. Site Elements:

• Campus signage, informational kiosks and directional signage should be located throughout the campus to clearly describe building and site amenity locations. The character of this signage should relate to the building signage which may include etched limestone or brick.

• Site lighting should be compatible with the pedestrian scale and should have a legible relationship to the circulation system, the surrounding buildings and open spaces. The character of the site lighting should be of a transitional nature that is a blend of traditional and technical styles.

• Site furniture should be located near the intersections of pedestrian and vehicular routes, along the perimeter of clearly defined outdoor spaces and at locations throughout the entire campus where student gatherings and outdoor studying is likely to occur. The placement and organization of sit furniture should have a legible relationship to the circulation system, the surrounding buildings and open spaces. The character of the site furniture should be of a transitional nature that is a blend of traditional and technical styles.
Visual Connection to Existing Facility
### 1.1 Electric and Telephone

#### BUILDING PROGRAM

<table>
<thead>
<tr>
<th>Proposed Area</th>
<th>Electrical Power Normal</th>
<th>Estimated Loads Emergency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Building Preservation Technology Center</td>
<td>45,110 s.f.</td>
<td>50 kva</td>
</tr>
<tr>
<td>2. Multi-Craft Manufacturing/Manufacturing Technology Center</td>
<td>22,400</td>
<td>225</td>
</tr>
<tr>
<td>3. Indoor Air Quality &amp; Environmental Control Technology Center</td>
<td>26,875</td>
<td>250</td>
</tr>
<tr>
<td>4. Public Safety Building</td>
<td>22,417</td>
<td>225</td>
</tr>
<tr>
<td>5. Community Health Building</td>
<td>38,295</td>
<td>500</td>
</tr>
<tr>
<td>6. Learning Resource Center</td>
<td>40,024</td>
<td>500</td>
</tr>
<tr>
<td>7. Computer &amp; Telecommunications Center</td>
<td>31,980</td>
<td>500</td>
</tr>
<tr>
<td>8. Administration Building</td>
<td>31,080</td>
<td>400</td>
</tr>
<tr>
<td>9. Student Union</td>
<td>72,623</td>
<td>850</td>
</tr>
<tr>
<td>10. Business Technology Center</td>
<td>29,625</td>
<td>450</td>
</tr>
<tr>
<td>11. General Classroom Building</td>
<td>35,100</td>
<td>500</td>
</tr>
<tr>
<td>12. Engineering Building</td>
<td>21,840</td>
<td>300</td>
</tr>
<tr>
<td>13. Community &amp; Continuing Education Center</td>
<td>56,940</td>
<td>500</td>
</tr>
<tr>
<td>14. Physical Education Center</td>
<td>51,930</td>
<td>500</td>
</tr>
<tr>
<td>15. Maintenance &amp; Long-Term Storage Center</td>
<td>21,098</td>
<td>175</td>
</tr>
<tr>
<td>16. Dormitories</td>
<td>74,400</td>
<td>600</td>
</tr>
<tr>
<td>17. Parking Garage</td>
<td>518,400</td>
<td>225</td>
</tr>
</tbody>
</table>

#### ELECTRICAL LEGEND

- Primary Switchgear (4 circuit) and Primary Metering Cubicle
- Loop Feed Pad Mounted Switchgear Normally Open - 4 circuit
- Loop Feed Pad Mounted Transformer 8’x8’ Pad
- Electrical Manhole - 6’x8’x6’ Deep
- Tele/Com Manhole - 6’x8’x6’ Deep
- Emergency Power Generator 5’x10’ Pad

**Notes:**
1) Power feeder ducts - six 5” conduits encased in concrete
2) Tele/Com ducts- four 4” conduits encased in concrete
3) Primary underground feeder cables 50mcm copper

15 kv. initial feeder load to be less than 300 amperes per circuit.
1.2 Storm Sewer

LEGEND

- Storm Sewer
- Manhole
- Catch Basin/Curb Inlet
- Headwall
1.3 Water and Sewer

LEGEND

- Sanitary Sewers
- Water Line
- Manhole
- Fire Hydrant
- Meter Pit
BELMONT TECHNICAL COLLEGE

Comprehensive Facilities Master Plan Design Guidelines

Campus Master Plan

[Diagram showing various buildings and facilities, including:
- Fire Fighting Structure
- Student Union
- Physical Education Center
- Learning Resource Center
- Student Apartments
- Business Technology Complex
- Community Health Pavilion
- Day Care Center
- Computer & Telecom. Engineering
- Community & Continuing Ed.
- Parking Garage
- Amphitheater
- Quadrangle
- Ravine]