

## 2. Standards & Guidelines Review

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### **INTRODUCTION**

Section 2 - Standards and Guidelines Review includes the following major subsections:

- Major Issues and Factors, which provides a background discussion on the issues related to the development and application of utilization and space guidelines and standards
- Review Summary, which briefly summarizes the utilization and space standards and guidelines in BC and other jurisdictions
- Overall Utilization Within BC and Comparison with Other Jurisdictions, which summarizes the actual utilization achieved at BC institutions and compares these with institutions in other jurisdictions
- Instructional Space Utilization, which summarizes instruments used to capture utilization in BC and other jurisdictions, analyzes actual utilization at BC institutions to see if trends exist, and then develops and recommends utilization standards
- Unit Area Standards, including:
  - Instructional Station Space, which summarizes the standards and guidelines for instructional space in various jurisdictions, provides “best practices” examples of instructional space within BC institutions, and recommends standards for instructional stations and instructional support space
  - Ancillary Support Space, which summarizes the standards and guidelines for office, library, lounge, reading and study, cafeteria/food services, and remaining space in BC and other jurisdictions and, based on an analysis of support space in BC institutions, develops standards for ancillary support spaces
- Net to Gross Ratios, which summarizes available information on net to gross ratios for institutions in other jurisdictions and BC, and recommends net to gross ratio standards for specific building types

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### MAJOR ISSUES AND FACTORS

A number of issues and factors that may have an impact on both the development and application of utilization and space guidelines for post-secondary institutions were identified from a review of the utilization and space standards and guidelines of other jurisdictions. These issues and factors are included here, with particular attention given to those that, given the provincial context, have a significant impact on BC institutions. They are intended to provide greater perspective into the issues surrounding space and utilization guidelines.

The issues and factors include:

1. Purpose of Space Standards and Guidelines
2. Level of Detail and Specificity
3. Accuracy and Adequacy of Base Data
4. Relevancy of Guidelines to Old/Renovated Buildings
5. Variations in Program Delivery Methods and Scheduling
6. Shift in the Profile of a "Typical" Student
7. Bridging Activity/Provision of Space for Non-Base Funded Students
8. Policy of Decentralizing Services
9. Geographical Characteristics
10. Impact of Technology

#### 1. Purpose of Space Standards and Guidelines

There are two reasons for developing space guidelines and standards:

- A. The first is to establish a preliminary project size for new capital developments. In this context, an input (Full Time Equivalent – FTEs, student headcount, Annual Student Contact Hours – ASCHs) is multiplied by a factor based on assumptions about station size and utilization to arrive at an estimate of project size. Station size tells us how much space is necessary per unit, utilization tells us how many stations are required.

More specific information on appropriate areas for specific student stations as well as support space enables planners and designers to develop statements of requirements for particular program areas.

- B. The second reason for developing guidelines and standards is to establish a baseline to measure the utilization of currently used facilities. In this case, the measure indicates the effectiveness with which an institution is able to use its physical resources to deliver its educational programs and services. This measure may be used to identify or support the need for new construction.

#### 2. Level of Detail and Specificity

Guidelines and standards can extend from the macro level of annual student contact hour per student station or per square

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metre down to the number of square metres of space required for an office. The level of detail and specificity of the standards must be consistent with their intended purpose.

Each of BC's institutions is unique, with a different mix of programs and activities. Because of this, generalized overall standards, which may assume that one-size-fits-all, often overlook critical institutional differences. As a result, standards should be tailored, at the very least, to relevant categories of campuses.

However, while standards are typically understood to be fixed and inflexible, allowing little or no room to respond to the specific circumstances of a particular case or situation, the tremendous variety of institutions within the BC college, institute and university college system entails that standards must be understood as starting points only. The standards are able to account for the gross variations provided by the campus categories only. It is recognized that due to its set of unique and specific circumstances, a campus may legitimately fall above or below the set standard for its category.

In addition, standards should not attempt to be design criteria, imposing a single standard at a micro level. Standards should allow variations in design to better support the delivery of instructional programs.

## 3. Accuracy and Adequacy of Base Data

For this report, information was provided by the colleges, university colleges and institutes of BC, the Ministry of Advanced Education, Training and Technology, and from other jurisdictions. Information includes Facilities Inventory System (FIS) data, student workload information and existing standards and guidelines.

The quality and completeness of FIS space inventory information varies among BC institutions and there is no assurance that each institution has applied definitions uniformly. While the use in BC of the *Post Secondary Education Facilities Inventory and Classification Manual* has provided a great deal more consistency in inventory information, inconsistencies still exist. For example, offices may or may not be identified as used by faculty or administration.

Analysis of ancillary space types is only possible if the function of each space is provided, e.g., whether an office belongs to Financial Aid, Student Association or Security.

**It is recommended that either an audit of inventory information be completed by a single party or that an instructional session be conducted to train those staff from each institution who will be assembling inventory**

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**information to ensure the consistent application of definitions when assembling inventory information.**

**It is also recommended that a list of relevant functional units be developed as part of the FIS and that space be allocated to these categories where appropriate to assist in the analysis of all ancillary support space.**

Definitions of FTE and student contact hours may differ from one jurisdiction to another. The use of FTE as a measure of workload for classrooms and laboratories is problematic in the college system as various programs have different numbers of student contact hours that attach to an FTE. The range within BC varies from approximately 500 student contact hours to over 1,500 student contact hours. The problem is compounded when a comparison is made of FTEs in BC to those in other jurisdictions.

Utilization guidelines in other jurisdictions are often based on the principle of "point in time" collection, usually just after the beginning of the semester, when the maximum number of students are competing for space. In academic programs this usually is taken in early September. While it is true that "point in time" collection provides a relevant indicator of facility need, not all institutions may experience their peak load at the same time or experience the same difference in peak to valley. Due to the variety of program types in BC and the difficulty in developing a peak load measure that can equitably be applied to all institutions, BC has moved from capturing utilization during the period of peak stable enrollment to capturing utilization throughout the year. Utilization guidelines which measure peak utilization thus need to be revised if they are going to apply to what is, in essence, average yearly utilization.

Every attempt has been made to ensure that, where comparisons are made, they are logical and accurate. Where possible, FTEs have been translated into student contact hours, which provide a more consistent indication of workload. However, the number of student contact hours embedded in the FTEs in another jurisdiction is not always available or necessarily comparable in every case.

#### 4. Relevance of Standards to Old/Renovated Buildings

Space standards are often derived primarily for constructing new facilities, particularly with respect to expectations on achieving net to gross ratios. However, most institutions are faced with aging facilities that do not meet current standards with respect to environmental conditions, building code, access for those with disabilities and technology/information systems infrastructure.

Renovating these buildings typically results in lost or wasted net usable space as, for example, classrooms or offices may be

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forced to fit within a structural or exterior window grid. Classroom and laboratory/shop station size guidelines, and net to gross guidelines will need to reflect the unique requirements of renovating existing space.

## 5. Variations in Program Delivery and Scheduling

It is important that differences in the way programs are delivered and the variations in the needs of students taking the programs are explored in the development of space standards.

Significant variations exist in the way programs are delivered at institutions within BC. For example, program length may vary from 4 to 8 weeks (for apprenticeship programs) to as long as one year for some vocational programs. Other programs include work term experience, with in-class instruction also scheduled periodically. These program variations tend to result in decreased utilization.

- The typical day for vocational programs is approximately 6 hours. As a result, running two program streams consecutively through the day entails starting the initial stream at 7:00 am, with the second stream ending at 7:00 to 8:00 pm. While it is possible to run two streams consecutively, typically only a single stream is offered. Consequently, the specialized teaching laboratories or shops required for these programs are underutilized.
- Course-based programs, such as academic and ESL programs, have shorter scheduled “periods”, allowing more scheduling flexibility than the vocational programs. However, as students may have timetabling gaps, additional study and lounge space may be required to accommodate these students while they wait for their next class.
- While vocational programs may run year-round, the traditional academic program timetable follows the universities’ calendar, with two main semesters beginning in September and January respectively, followed by spring and summer sessions. These sessions usually attract fewer students as students traditionally work through the summer to help pay for their extended programs of four or more years. Thus, it is difficult for university transfer programs to achieve consistently high year-round utilization.
- University college and other large campuses may have enough students in lower level courses to mount larger sections (assuming collective agreements allow this) that can make use of more space efficient lecture/ classroom space. This may be followed in upper level courses by more emphasis on seminar-type instruction which may be less space efficient than typical classrooms.

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While program information should be factored into a consideration of utilization, information about program mix is not currently available by campus for BC institutions. **It is recommended that information about program mix by campus should be developed and used to analyze utilization. This will result in a better understanding of the implications of program mix on utilization.**

### 6. Shift in the Profile of a “Typical” Student

There has been a system-wide trend towards an increasing number of mature adult students and part time students, who are often entering or returning to post-secondary education at an older age for career advancement or skills development. These students affect facility needs in terms of:

- more flexible timetabling of courses
- larger, more adaptable student stations
- extended access to library and study facilities
- more sophisticated student services
- on-campus child day care services
- additional parking

### 7. Bridging Activity: Provision of Space for Non-Base Funded Students

The percentage of program activity that is outside the Province’s base funding system has increased and is captured by the Key Performance Indicator (KPI) utilization measure. This activity may be funded through the federal government, industry sources, or by continuing education or international education initiatives. Due to the increasing demand for and opportunity provided by non-funded programs, increasingly projects may involve private funding, joint ownership or lease-back arrangements as institutions take a more entrepreneurial stance.

It is difficult to address the space needs of such programs through common standards and, therefore, these program requirements should be addressed on a case-by-case basis. However, this space should be included within the FIS, as specially designated space.

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### 8. Policy of Decentralizing Services

BC has maintained a policy of delivering post-secondary education and training using, at least in part, a decentralized model. This has enabled the delivery of programs in many small communities throughout BC through the development of a number of very small campuses. For example, Northwest Community College with approximately 1,300 FTE delivers its programs to 9 separate communities, with an average of approximately 144 FTE at each campus.

Two important aspects of smaller campuses need to be considered:

- Smaller institutions do not have the critical mass to deliver a number of sections in the same course, which is a strategy to achieve higher utilization. In addition, there may not be sufficient demand to fill courses completely.
- Smaller institutions do not have the student enrollment to generate required minimum space for general support facilities such as athletic/recreation space or performing arts space or, even, library, cafeteria and student lounge/study space. Minimum guidelines must be set for those space types which campuses must have, regardless of size. In addition, minimum campus size guidelines must be established for those services which require a critical campus mass.

### 9. Geographical Characteristics

The varied geography of BC, which ranges from concentrations of people in the Lower Mainland, the Okanagan and southern Vancouver Island to villages and towns separated by miles of wilderness, has led to the development of colleges, university colleges and institutions which are each tailored to fit their unique local context. Recommended guidelines should recognize these differences by providing utilization and space guidelines that vary depending on the size and the location of each campus. Factors that may influence the space and utilization of a campus include:

- the relative remoteness of a campus. In some rural campuses, a significant portion of the student population commutes by car from other towns and villages. It is not reasonable to expect full utilization of night time-slots at these campuses as students may be reluctant to attend at night, due to the lengthy drive under the adverse winter driving conditions of early darkness, sub-zero temperatures and slippery or snow-covered roads.
- The climatic conditions of a campus. For example, campuses in the Lower Mainland and southern Vancouver Island may be able to function with lower net to gross ratios by providing a significant portion of

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circulation between functions external to the building. Both VCC's King Edward Campus and Malaspina's Nanaimo Campus have lower than typical net to gross ratios due to the use of external walkways that connect buildings or parts of the same building.

- The presence of a significant Aboriginal student population. The need for dedicated student services space and particular sensitivity to aboriginal issues in planning and design may be appropriate and will add to space requirements.

## 10. Impact of Technology

Technology can have a significant impact on the space required for the delivery of instruction and for ancillary support spaces. Impacts include:

- need for larger student station work surfaces in classrooms generally to accommodate laptop computers and in video-conferencing classrooms to accommodate microphones and other electronic paraphernalia
- storage adjacent to classrooms for multimedia equipment
- office and workspace for technicians charged with the monitoring and support of computer and video-conferencing facilities
- requirement for additional faculty office and support space to accommodate computers and printers.

However, trends toward miniaturization of technology should be monitored. For example, in the future flat-screen monitors may replace CRTs and will require less desktop space, possibly allowing smaller computer workstations.

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### REVIEW SUMMARY

RPG conducted a brief literature review and contacted other jurisdictions via telephone and e-mail to understand levels of actual utilization and space guidelines and standards used. The results of the investigations are summarized in the table below and the narrative that follows.

**Table 1 – Summary Of Standards From Canadian/US Sources**

Jurisdiction	Type		Available Space Standards			Utilization	
	College	University	Instruct.	Support Space	Net to Gross	Instruct.	Whole College
<u>Canada</u>							
1. Alberta	✓	✓	✓		✓	✓	
2. Alberta (RMC/MGT)			✓	✓	✓	✓	
3. British Columbia	✓		✓			✓	
4. Ontario – COU		✓	✓	✓			
5. Ontario – Colleges	✓					✓	✓
6. Saskatchewan							
<u>U.S.</u>							
7. California	✓		✓			✓	
8. Minnesota		✓	✓			✓	
9. Washington	✓		✓	✓		✓	✓
10. Georgia		✓				✓	

### **CANADA**

#### **1. Alberta**

The Alberta government developed standards in the early 1970s which included a combination of global space allocations (m<sup>2</sup>/FTE standards for each of five types of institutions) and detailed methodologies for sizing each component of an institution. The detailed methodology developed space allocations for specific components based on “per student FTE” allotments. For example, 0.7 net m<sup>2</sup>/ student FTE was provided for student services. These standards and guidelines were expanded in 1984 and updated in 1989.

In 1994, a review of the standards was conducted to recommend changes. The resulting standards have not been officially adopted. (See 2. Alberta (RMC/MGT) below.)

In order to understand the capability of its current infrastructure in the face of rapidly expanding enrolments, Alberta commissioned a study in 1998 to calculate the number of Full Load Equivalent (FLE) students each institution would be able to accommodate, given specific assumptions around the utilization of instructional space. The study calculated a range of capability for each campus and compared these with the number of FLEs currently delivered. Two institutions had an actual FLE count that was higher than the higher end of the range, ten were below the lower

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end of the range and eight were within the range. Urban institutions generally had higher utilization than their rural counterparts.

In the same study, institutions were asked to identify “pressure points” which limited their ability to accommodate additional students. Included in the list were:

- aging buildings
- lack of technically equipped classrooms
- lack of computer labs
- lack of equipped study space
- office space restrictions
- student services
- food services
- parking
- student housing
- general lab space
- classrooms of the wrong size
- limited library space
- limited recreational space
- elevators

Of note is that office space restrictions, limited library space and aging buildings were identified as the three leading pressure points.

### 2. Alberta (RMC/MGT Study)

A review and update of the existing Alberta “Fenske” formula space guidelines and standards was conducted in 1994. Recommendations included removal of campus gross area guidelines as they fail to recognize the diversity of the institutions; increasing classroom utilization targets from 30 hours to 36 hours per week, based on a 15 hour day, Monday to Friday; maintaining station utilization at 70%; maintaining lab utilization at 30 hours per week; and increasing lab station utilization from 70% to 85%.

Additional recommendations for instructional space included increasing average classroom student station sizes to the university standard of 1.7 m<sup>2</sup> and the development and application of 5 lab station types following the model developed by the Council of Ontario Universities (COU) to better correspond to the specific space requirements of the programs. Lab and shop size standards ranged from 4.1 m<sup>2</sup> to 11.0 m<sup>2</sup> per student station, including lab support and service space, depending on the type.

The report also recommended standards for ancillary support space, including faculty and administrative offices, library/learning resources centre, auditorium, athletic services

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and food services.

### 3. British Columbia

British Columbia utilized the “Thorstenson” formulas to prepare *Instructional Facilities Utilization* (IFUS) until 1997. The IFUS reports captured room-by-room utilization at peak stable enrolment using a 52-hour base week. Some flexibility was built-in to enable institutions to adjust the utilization “window” to the day- and night-time periods which captured the greatest utilization.

In addition, four standards for classroom and lecture theatre student stations (depending on capacity of room) and standards for 13 specific types of instructional lab/shop student stations have been developed. The list of lab/shop station types is not comprehensive and, in at least one instance, is somewhat dated.

In 1998, the Ministry simplified the method required to document utilization, adopting the “Key Performance Indicator” (KPI) method. With KPI, all on-campus instructional activity is captured and compared to the notional (not actual) number of student stations available. The result is expressed as Annual Student Contact Hours per Student Station (ASCHs/ST ST).

In addition, BC institutions have assembled inventory information based on the National Center for Education Statistics (NCES) *Post Secondary Education Facilities Inventory and Classification Manual*.

Of note is the use by BC universities of Ontario’s Council of Ontario Universities (COU) guidelines as a general guideline for determining overall formula allocations as well as individual faculty allocations.

### 4. Ontario Universities – Council of Ontario Universities (COU)

Initiated in 1972 and culminating in 1987 with *Building Blocks 7 – Final Report of the Task Force to Review COU Space Standards*, the Council of Ontario Universities (COU) has developed instruments to classify and inventory university-oriented space, and to prepare space entitlements based on input measures.

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COU space guidelines are derived from input measures as follows:

Space Type	Input measure
Classroom Facilities .....	Student FTE
Instructional Laboratory .....	Weekly Student Contact Hours
Research Lab Space	FTE Faculty plus other research appointments
Academic Offices and Support	FTE Faculty plus FTE Non-Academic Staff Office Support as % of above
Library Facilities/Study Space	
Collection .....	Collection Size
Study Space .....	Student FTE
Support .....	% of Collection and Study Space
Athletic/Recreation Space .....	Student FTE plus threshold allowance based on total student FTE ranges
Student Services, including Food Services, .....	Student FTE
Bookstore/Merchandizing Facilities, Audio-Visual/ Television Facilities, Central Services, Health Service Facilities, Student Activity Space, Assembly and Exhibition Facilities	
Maintenance Space .....	% of Net Assignable Space
Administrative Office and Related .....	FTE Non-Academic Staff plus Office Support as % of above

### 5. Ontario – Colleges

There are currently no space guidelines for the community college system. However, individuals with the government anticipate the development of a system similar to the “Building Blocks” model used in the Council of Ontario Universities (COU) system (see above).

The community colleges themselves have developed a utilization report which measures institutional activity per institution, expressed as Gross Area per Student. Colleges are characterized according to their urban/rural context and whether utilization has historically been low, medium or high.

### 6. Saskatchewan

Saskatchewan recently conducted a series of studies to review space guidelines and the funding structure for its universities. As a result, Saskatchewan universities will adopt the COU space standards and guidelines.

No standards are currently used for colleges in Saskatchewan. It is anticipated that standards based on the COU standards will be developed in the near future.

### Other Canadian Jurisdictions

Colleges in Manitoba and the Maritime provinces are not required to provide utilization data. Guidelines and standards are not used for the planning of college facilities.

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### UNITED STATES

#### 7. California

California is a recognized US leader in the development and analysis of space and utilization standards and guidelines. The state has developed standards and guidelines for classroom and laboratory/shop utilization (based on weekly student contact hours), classroom and laboratory/shop student station sizes (see *Appendix B – Lab/Shop Space Standards – Other Jurisdictions*), and faculty office sizes. Its utilization standards for instructional space are among the highest with a 70-hour base week and 85% station occupancy rate for laboratory/shop stations.

There is some concern that the utilization standards and guidelines, which stem from the early 1990's, may be somewhat dated and should undergo a review. It was indicated that one possible direction for future guidelines and standards might be an instrument like that developed by the California State University. This utilization measure, based on the more global Assignable Square Feet per student FTE, allows campuses greater flexibility and is more adaptable to new approaches in instructional delivery.

#### 8. Georgia

A novel method of predicting space needs has been developed for the University System of Georgia, based on department by department benchmarking with comparable and "best-practices" institutions. The benchmark institutions are used to identify a range of Assignable Square Footage per Faculty benchmarks for departments and with which the Georgia institution departments are compared. Based on these comparisons, space projections are proposed which allow departments to match comparable "best practices" institutions.

#### 9. Minnesota

The Minnesota Facilities Model (MFM) provides guidelines which indicate space requirements as well as providing a tool to assess the use of facilities. Used by the University of Minnesota, MFM has four components:

- a space inventory
- qualitative evaluation of existing space
- identification of program inputs
- application of space standards and allowances.

Inventories are based on the Department of Health, Education and Welfare's *Higher Education Facilities Inventory and Classification Manual* which is similar to the system used in BC. The facilities evaluation includes a physical condition rating as well as a functional rating. Inputs used to generate space requirements include faculty, administrative staff, Weekly

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Student Contact Hours, equivalent volumes, student FTEs, employee headcount, total classroom/lab stations, Student Full Year Equivalents (FYE). Allowances are provided for Recreational/Athletic facilities. About 170 instructional station standards are provided, including a breakdown of the area for the station itself and for support space. Almost all of these apply only to the university context. See page B.2, *Appendix B – Lab/Shop Space Standards – Other Jurisdictions*.

### 10. Washington

Washington State uses a Capital Analysis Model (CAM) method to evaluate the quantitative adequacy of on-campus facilities of community and technical colleges. The model uses future enrolment and space per FTE factors to set probable level of future space requirements. When compared to available space, the model supports decisions about the amounts and types of space that should be added to meet future enrolment demands. In addition, age of structure and quality of space are considered.

CAM does not include space factors for vocational instructional space, due to the wide range of space-per-student-station for various occupational training labs and shops.

CAM includes classroom station standards for general labs, science and computer labs and basic skills labs, classroom and academic lab utilization standards, as well as formula-based allocations and allowances for art, music, drama, auditorium, library/LRC, physical education, faculty offices, administration/student services, student centre and related, stores/maintenance and child care. An example which shows the application of the CAM is provided in *Appendix C – Washington CAM Method*.

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### OVERALL UTILIZATION WITHIN BC AND COMPARISON WITH OTHER JURISDICTIONS

Using a variety of utilization measurements, this section provides a comparison of the utilization achieved at BC institutions with that of institutions in other jurisdictions, where comparable information is available. The jurisdictions include:

- Alberta
- Ontario
- Washington State

An undertaking of this nature is somewhat limited given the very small number of jurisdictions that have developed utilization summaries. Where it exists, utilization information has been developed for the particular needs and interests of the home jurisdiction. Thus, definitions for FTE and Student Contact Hours differ from jurisdiction to jurisdiction, and what is captured by one may not be captured by another.

As a result, this material needs to be viewed broadly, as a general indication of where things stand, and not one which can be scrutinized too closely.

Table 2, below, outlines the information available from each jurisdiction and from which the following comparisons have been developed. A complete table of information, showing the measures and outcomes for each institution in the comparison jurisdictions can be found in *Appendix D – Utilization Information from BC and Other Jurisdictions*.

**Table 2 – Summary Of Available Information To Measure Unit Areas and Overall Utilization**

Jurisdiction	Gross Area <sup>1</sup>	Instructional Areas, incl. Support <sup>2</sup>	No. of Student Stations	Student FTEs/ FLEs <sup>3</sup>	Student Contact Hours <sup>4</sup>
Alberta	✓	✓	✓	✓	✓
British Columbia	-	✓	✓	✓	✓
Ontario	✓	-	-	✓	✓
Washington	✓	-	-	✓	-

Notes:

1. While Gross Area for British Columbia institutions was not available, Gross Area for BC has been derived as follows: total inventory information, minus non-program space such as child care facilities (if not part of-Early Childcare Education program) and residential space, is multiplied by an 8% factor to account for the internal partition and external wall areas which are not captured by the inventory.
2. Instructional support space includes associated storage, preparation rooms, etc.
3. Student FTEs/FLEs information is as follows:
  - Alberta FLEs includes credit (or funded) activity only;
  - British Columbia FTEs for 1997/98 are actual FTEs from "The History of FTE's", October 1999 and include funded activity only;
  - Ontario FTEs for 1998/99 include funded programs only;
  - Washington State FTEs for 1997/98 are from "1999-2001 Capital Budget Request and 1999 – 2000 Capital Program" document and include both funded and contract activity.
4. Student Contact Hours information is as follows:
  - Alberta SCHs are for 1997/98 and include credit activity only;
  - British Columbia SCHs are from "Key Performance Indicators" report and are for 1997/98. They include funded and non-funded activity;
  - Ontario SCHs were provided by the Ontario Ministry and are for 1998/99. They include funded activity only.

### **Comparison of British Columbia With Other Jurisdictions**

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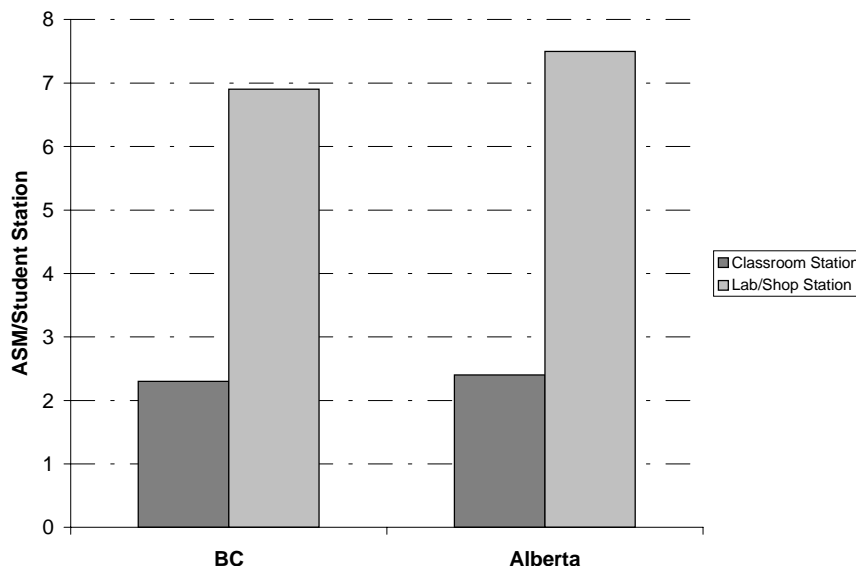
Table 3 and the graphs that follow summarize unit area and utilization information from each jurisdiction, providing overall totals.

Table 3 – Summary Of Unit Areas and Overall Utilization

Jurisdiction	Classroom Area per Station (m <sup>2</sup> )	Laboratory/Shop Area per Station (m <sup>2</sup> )	ASCHs/ST ST	Gross Area/FTE or FLE (m <sup>2</sup> )	Gross Area/ASCH (m <sup>2</sup> )
Alberta	2.4	7.5	519	22.1	0.031
British Columbia	2.3	6.9	731	11.7	0.015
Ontario	-	-	-	10.2	0.014
Washington	-	-	-	9.2	-

Note that classroom and laboratory/shop areas include support space such as storage, preparation and balance rooms. In addition, BC institutions have agreed to increase their utilization per student station from between 10 and 20% by 2002/03 which will lower the Gross Area per ASCH from 0.014 m<sup>2</sup> per ASCH to 0.013.

Graph 1 – Comparison Of Classroom And Laboratory/Shop Station Unit Areas



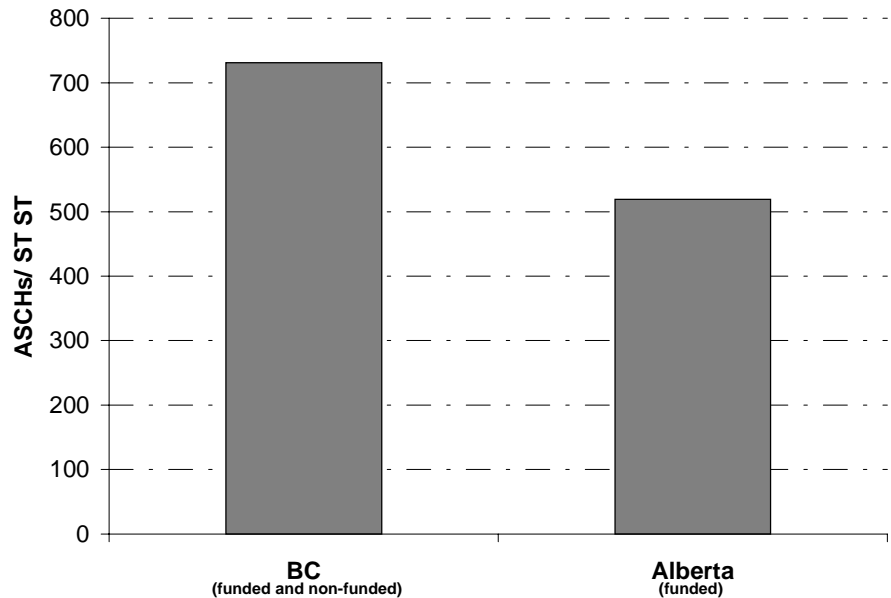
On average, BC has a slightly smaller unit area than Alberta for classroom student stations and associated support space. Laboratory and shop stations are on average over 8% smaller, assuming the mix of stations to be about equal. Note that this is an average and that variations in shop and lab ratios may be a significant factor.

Note: Not all information for BC institutions is available at this time. Information on station numbers has not been included for BCIT and Malaspina.

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Graph 2 – Comparison Of Annual Student Contact Hours Per Student Station

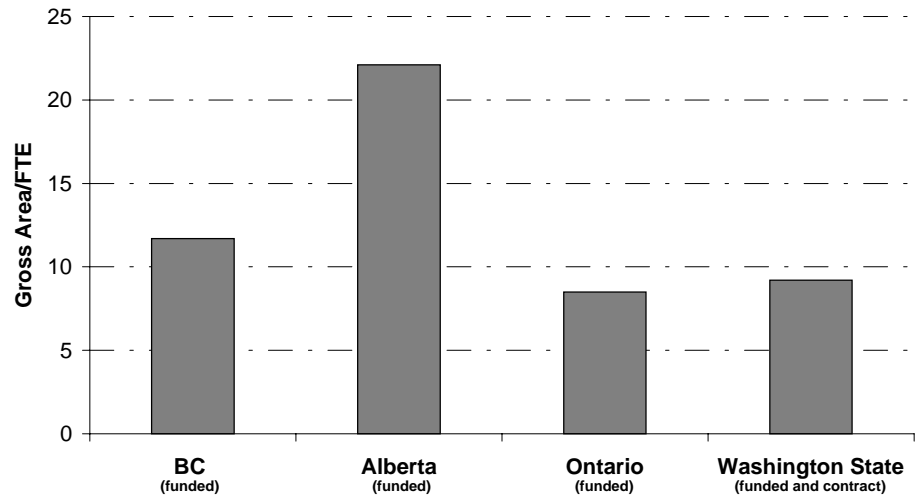


Graph 2 indicates that the British Columbia system has significantly higher utilization than the Alberta system in terms of Annual Student Contact Hours per student station. Note that while BC utilization includes funded and non-funded activity, Alberta includes credit activity only. However, the difference in utilization of almost 40% should more than account for the exclusion of non-funded activity as, for most jurisdictions, it comprises a small proportion of total activity. Confirmation of this assumption should be pursued.

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Graph 3 – Comparison Of Gross Area Per FTE



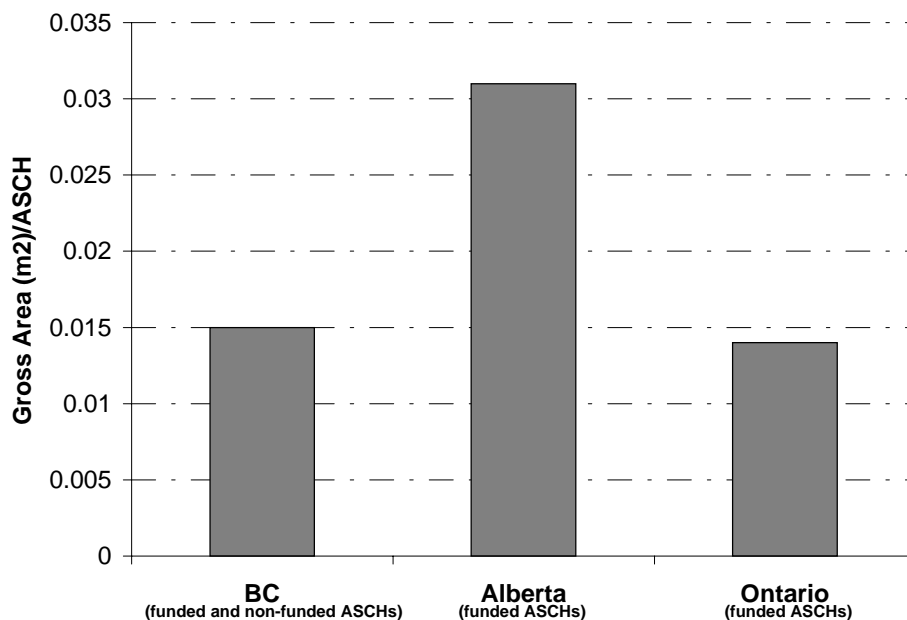
Graph 3, above, illustrates the gross area required to deliver each student FTE. Note that the gross area for BC institutions has been calculated (FIS x 1.08) and that FTEs for Alberta, Ontario and BC include funded FTEs only but that FTEs for Washington State include contract FTEs as well as funded FTEs. As a result, Washington State may indicate a lower comparable gross area per FTE.

Graph 3 indicates that institutions in BC use slightly more space than institutions in both Ontario and Washington State to deliver each student FTE but that the BC institutions use significantly less space per student FTE than institutions in Alberta.

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Graph 4 – Comparison Of Area Per Annual Student Contact Hour



Graph 4, above, illustrates the gross area required to deliver each Annual Student Contact Hour. Note that ASCHs figures for Alberta and Ontario include funded (or credit) activities only and that Alberta's figure may not account for all lab/seminar time. BC includes both funded and non-funded activity. Alberta and Ontario were not able to indicate how much more activity as non-credit or non-funded is provided.

Institutions in Alberta uses substantially more space to deliver each student contact hour than those in both Ontario and BC. BC institutions appear to use slightly more space per student contact hour than those in Ontario.

**Overall institutions in BC appear to have utilization rates that are comparable to those in both Ontario and Washington State and, according to these indicators, higher than that achieved by those in Alberta. BC's utilization rates have been achieved in the context of a policy of providing services to a large number of smaller communities.** As the next section illustrates, utilization at campuses in smaller communities is generally lower than utilization of campuses situated in regional or urban centres.

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### **INSTRUCTIONAL SPACE UTILIZATION**

#### **INTRODUCTION**

This section includes the following:

- this Introduction, which provides some background into the definitions and terms used in discussions of utilization
- a Review of Existing Standards, which provides a summary of utilization standards used in other jurisdictions and in BC.
- an Analysis of BC Utilization, which determines trends which may be of assistance in the development of utilization standards for BC institutions.
- Development of an Annual Student Contact Hours Per Student Station Standard, which develops and recommends ASCHs/ST ST utilization standards for various campus types.

The terms typically used in the development of utilization standards and guidelines and the measurement of the actual utilization of instructional space are as follows:

- Reporting Week, which is the week established to collect utilization information, which typically is a few weeks after the beginning of the fall term at the time of peak stable load
- Base Week, which is the number of hours in the Reporting Week that instructional space is expected to be utilized.
- Average Weekly Room Utilization, which is the number of hours in the Base Week that an instructional room can be expected to be in use (if a standard) or is actually in use (if actual utilization is measured). Average Weekly Room Utilization may also be expressed as a percentage of the Base Week.
- Average Station Occupancy, which is the percentage of actual or expected student station occupancy when rooms are used
- Weekly Student Contact Hours or Station Utilization, which is the number of hours per week a student station can be expected to be used (if a standard) or is actually in use (if actual utilization is measured).

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The following equation indicates the relationship between Average Weekly Room Utilization, Average Station Occupancy and Weekly Student Contact Hours.

$$\begin{array}{l} \text{Average Weekly} \\ \text{Room Utilization} \end{array} \times \begin{array}{l} \text{Average} \\ \text{Station Occupancy} \end{array} = \begin{array}{l} \text{Weekly Student} \\ \text{Contact Hours} \end{array}$$

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**REVIEW OF EXISTING UTILIZATION STANDARDS** Table 4 summarizes the utilization standards for instructional space for various jurisdictions in North America.

**Table 4 – Comparison Of Instructional Space Utilization Standards And Guidelines**

	CLASSROOMS					SHOPS / LABORATORIES			
	Base Week (hrs/wk)	Average Weekly Room Utilization (hrs/wk)	Average Weekly Room Utilization (%)	Average Station Occupancy (%)	Weekly Student Hours	Average Weekly Room Utilization (hrs/wk)	Average Weekly Room Utilization (%)	Average Station Occupancy (%)	Weekly Student Hours
<u>Canada</u>									
Alberta	45	30	67%	70%	21.0	20	44%	80%	16
Alberta - RMC/MGT	45	36	80%	70%	25.2	24	53%	80%	19.2
BC	52	35.8	69%	80%	28.6	30	58%	80%	24
Ontario Universities	45	30	67%	62%	18.6	18	40%	75%	13.5
Ontario Colleges <sup>1</sup>	70	37.5	54%	80%	30.0	30 - 37.5	43% - 54%	n/a	12.9-20.25
<u>U.S.</u>									
California	70	42	60%	71.4%	30.0	25	36%	80%	20
Colorado <sup>1</sup>	45	30	67%	67%	20.1	20-30	44% - 67%	80%	8.8 - 20.1
Minnesota	45	30	67%	60%	18.0	20	44%	80%	16
Oregon <sup>1</sup>	45	33	73%	60%	19.8	22	49%	80%	17.6
Utah <sup>1</sup>	45	33.75	75%	67%	22.6	24	53%	80%	19.2
Washington									
Up to 1000 FTE	45	33.75	75%	70%	23.6	27	60%	80%	21.6
Above 1000 FTE	45	36	80%	71%	25.6	27	60%	80%	21.6

Notes:

<sup>1</sup> From Alberta Advanced Education and Career Development "Facilities Accommodation Capability Study", p. 6

While use of the Thorstenson formula, as shown for BC in Table 4, has been discontinued, the following review describes how the Thorstenson formula, and, in fact, how all such utilization standards generally, are used:

The Average Weekly Room Utilization (AWRU) was based on a Base Week of 52 hours. 40 of the Base Week hours were daytime hours for which an Average Weekly Room Utilization standard of 70% was assumed (for classrooms); 12 of the hours were evening hours, for which an Average Weekly Room Utilization standard of 65% was used (for classrooms).

The result is a Weekly Student Hour Standard of 28.6 hours, as shown in the following equation:

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$AWRU = 40 \text{ daytime hours} \times 70\% + 12 \text{ evening hours} \times 65\% = 35.8 \text{ hours (or 69\% of Base Week)}$

The standard for Weekly Student Contact Hours (WSCHs) is calculated by multiplying the standard/guideline for Average Weekly Room Utilization (AWRU) by the standard/guideline for Average Station Occupancy (ASO).

In the case of BC classrooms, this was:

$WSCHs = 35.8 \text{ hours (AWRU)} \times 80\% \text{ (ASO)} = 28.6 \text{ hours/week}$

Table 4 indicates that while most jurisdictions use a 45-hour base week, some jurisdictions use a base week with an extended number of hours. For example, BC previously used a 52-hour base week, and California currently uses a 70-hour base, assuming availability of classrooms from 800 to 2200, Monday through Friday.

Average Weekly Room Utilization standards/guidelines for classrooms vary from 30 to 42 hours, with an average of 34 hours per week. BC used a 35.8-hour per week standard, just slightly higher than the average.

Classroom Average Station Occupancy standards/guidelines vary from 62% (Ontario Universities) to 80% (Ontario and BC Colleges) with the average around 68%. In the mid-90's expectations for Average Station Occupancy in BC had risen to 90%, significantly higher than the average.

In general, Average Weekly Room Utilization standards/guidelines for shops and laboratories tend to be lower than for classrooms, but with higher expectations for Average Station Occupancy. Standards for Average Weekly Room Utilization range from a low of 18 hours per week (Ontario Universities) to a high of 37.5 hours per week (Ontario Colleges), with an average of about 24 hours. BC had an Average Weekly Room Utilization standard of 30 hours which is significantly higher than the average.

All jurisdictions have shop and laboratory Average Station Occupancy standards or guidelines of 80% for colleges.

There are increased opportunities for intensive scheduling of classrooms and some laboratory spaces in larger institutions. In recognition of this, Washington State has implemented a stepped utilization standard for classrooms and selected labs which takes effect at the 1,000 FTE threshold.

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### **Annual Student Contact Hours per Student Station**

As noted above, BC has discontinued use of the Thorstenson formula and now uses the more global Key Performance Indicator (KPI) which measures utilization as Annual Student Contact Hours per Student Station (ASCHs/ST ST). BC is leading other jurisdictions in the adoption of this instrument and as a result, straightforward comparisons with other jurisdictions are not available.

The KPI or ASCHs/ST ST instrument has the advantage of capturing all utilization within a week—including very early morning and weekend use—and all utilization within a year, including the summer months. In addition, the instrument provides institutions with greater flexibility in how they will structure, schedule and deliver programs as they are not required to focus their activity in the Reporting Week in an attempt to meet utilization expectations.

However, this instrument is not as useful as a planning tool from which the facilities needed to support a program can be derived, as programs may have peaks in demand that will need to be accommodated. Planning will require an analysis of peak section demand.

The KPI or ASCHs/ST ST instrument originally was used to report the actual utilization of each institution. It has since been used to develop campus utilization targets for BC institutions to the year 2002/03, as each institution has agreed with the Ministry on a year-by-year percentage increase of 2, 3 or 4 percent for a period of five years, beginning in 1997/98. As a result, utilization at BC institutions will be increasing by approximately 14% in that period.

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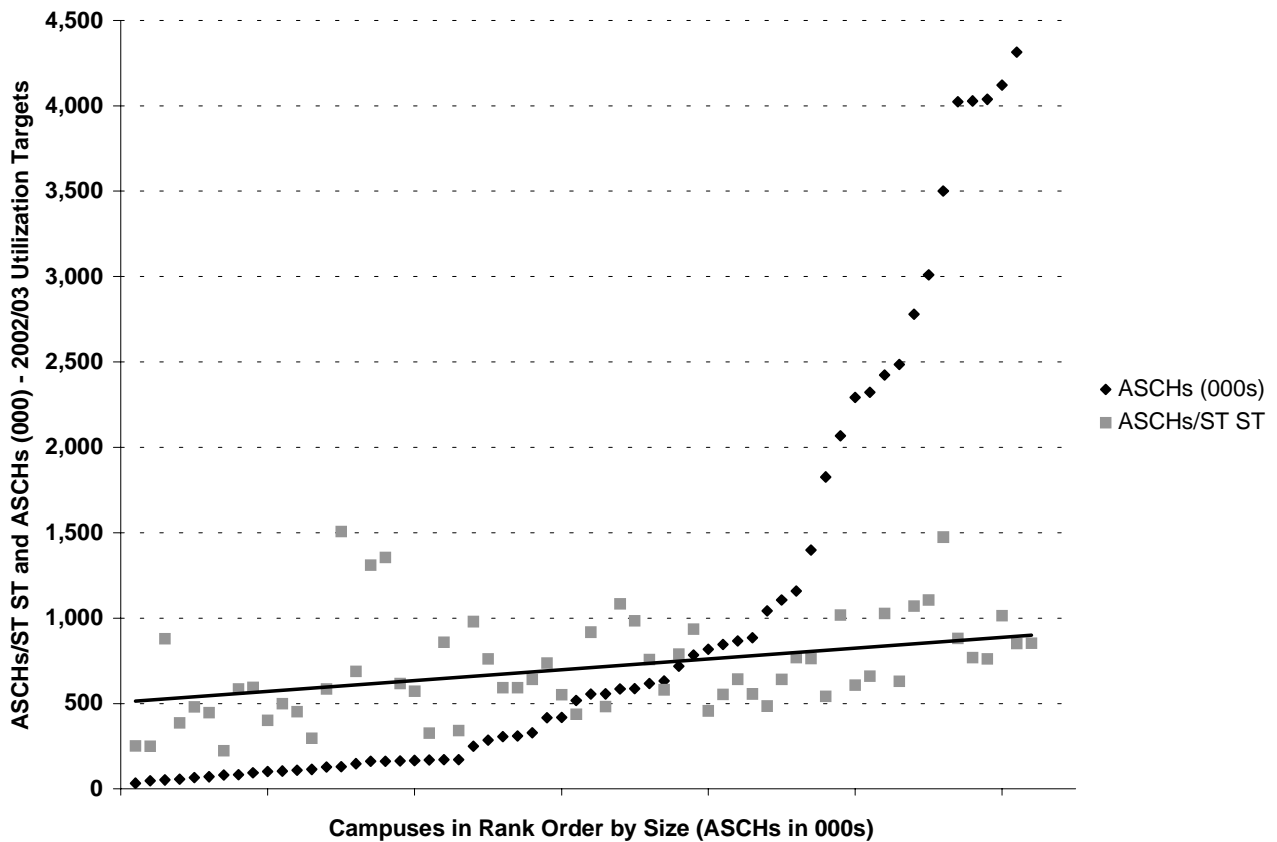
**ANALYSIS OF BC UTILIZATION**

In an endeavour to develop utilization standards which are based on the ASCHs/ST ST instrument that can be applied to BC institutions, brief analyses were conducted of the effect of campus size, geography and climate, and ratio of classroom to laboratory/shop stations on utilization.

**Campus Size**

Graph 5 indicates the basic relationship between campus size in terms of total Annual Student Contact Hours (ASCHs) and utilization. The data for 62 of BC's campuses are presented in rank order of campus size, in terms of target Annual Student Contact Hours in 2003. Complete utilization information for each campus is included for reference as *Appendix E – BC Campuses by 2003 ASCH Target Size*. Note that the number of Annual Student Contract Hours for BCIT's Burnaby campus, which would otherwise be the last black diamond, has a value of over 9 million ASCHs and is not shown.

**Graph 5 – Comparison Of Utilization And Institution Size**



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The trendline in Graph 5 indicates a definite increase in utilization as campus size, measured in terms of ASCHs, increases, rising from a low of approximately 500 ASCHs/ST ST for the smaller campuses to approximately 900 ASCHs/ST ST for the campuses which have high total ASCHs. The total actual range is approximately 250 ASCHs to 1,500 ASCHs. The likely causes of the lower utilization at smaller campuses are discussed in the previous section, *Major Issues and Factors*, Topic 8. "Policy of Decentralizing Services".

**It is recommended that campus size be factored into utilization standards, with lower utilization expected of small campuses.**

**Small campuses are defined as those with less than 250,000 ASCHs, mid-sized campuses as those with between 250,000 and 1,250,000 ASCHs and large campuses as those with over 1,250,000 ASCHs.**

### Urban and Non-Urban Context

BC campuses are located in a varied geography and climatic context that has an impact on utilization. For example, many non-urban campuses have smaller student catchment populations. Students attending non-urban campuses may have to commute long distances to attend courses, particularly in the evening, when they may face the hazardous driving conditions of sub-zero temperatures, freezing rain, and snow. Similarly, with shorter summer/fair weather periods in some areas of BC, there may be less demand for summer programs as potential students become focussed on other pursuits and opportunities.

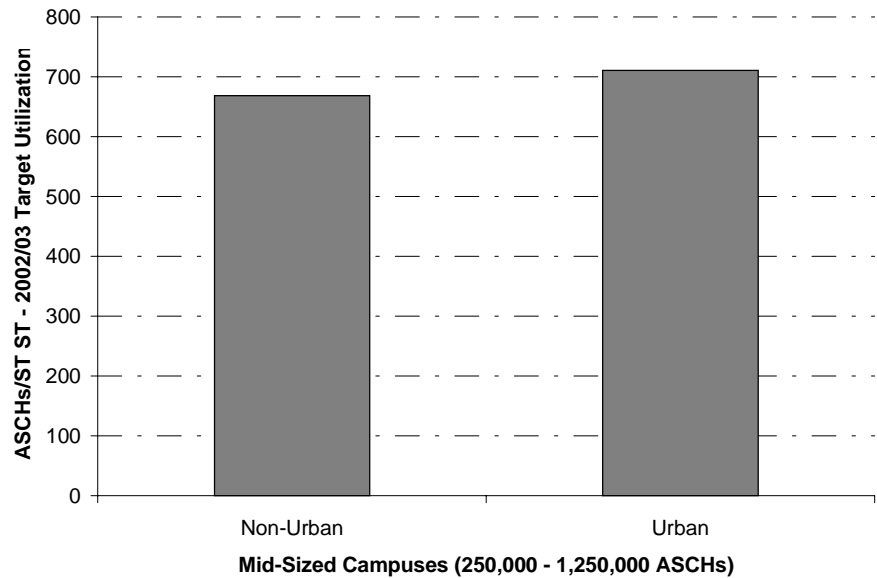
Graph 6 considers the impact that geography and climate have on utilization, in terms of the relative urban and non-urban context of the campus. The average utilization of campuses in terms of ASCHs/ST ST is compared for mid-sized campuses which have between 250,000 and 1,250,000 ASCHs. Small campuses of less than 250,000 ASCHs are not included because of the small number of urban campuses in this group. Large campuses are also not included as it is assumed large campuses generally are located in urban areas.

The distribution of campuses according to these categories can be found in *Appendix F – BC Campuses by Size and Context*.

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**Graph 6 – Comparison Of Campus Utilization Considering Urban And Non-Urban Context**



Graph 6 shows that mid-sized non-urban campuses have a slightly lower (6%) average utilization than their urban mid-sized counterparts.

**It is recommended that the urban and non-urban context be factored into utilization standards, with slightly lower utilization expected of non-urban campuses.**

### Program Mix

While it is generally agreed that program mix has an impact on utilization of instructional spaces, data on programs by campus (rather than institution) were not available for this study, and so an analysis of the influence of program mix on utilization was not conducted.

**It is recommended that data on program mix by campus be developed so that an analysis can be conducted on the impact of program type on utilization.**

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### **Ratios of Classroom Stations to Laboratory/Shop Stations**

A brief analysis was conducted to determine whether the ratio of classroom stations to laboratory stations affects overall utilization. Based on the utilization standards and guidelines summarized in Table 4, a positive correlation between higher utilization and a greater proportion of classroom to lab stations would be expected as the utilization standards and guidelines of classroom stations is generally higher than those for laboratory and shop stations.

However, our analysis did not indicate a clear trend in utilization when campuses were grouped and compared according to ratios of laboratory/shop stations as total student stations. This may be due to the high utilization that science laboratories and computer labs receive.

**It is recommended that the relative proportions of laboratory/shop stations to classroom stations should not be factored into utilization standards.**

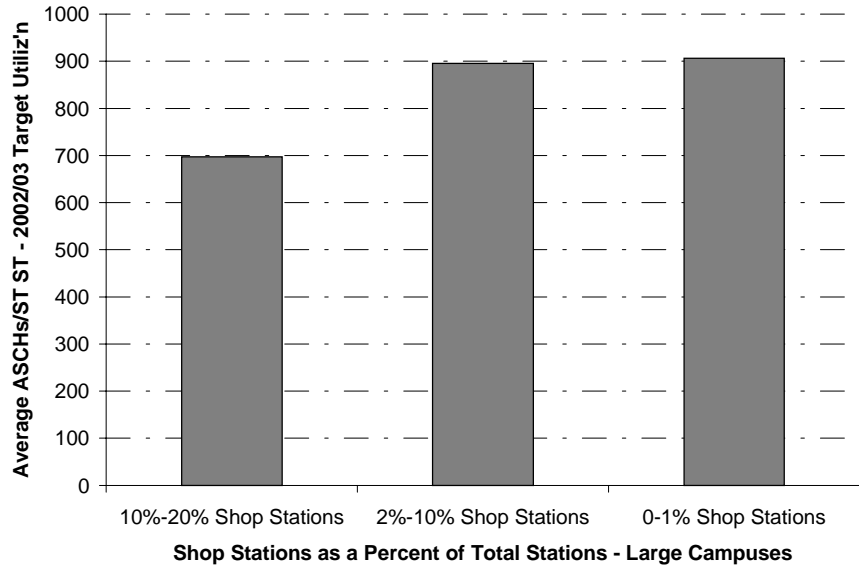
### **Ratios of Classroom/Laboratory Stations to Shop/Teaching Kitchen Stations**

A second analysis was conducted to determine whether a correlation exists between the proportion of shop and teaching kitchen stations and overall utilization. As Graphs 7 and 8 indicate, for large and mid-sized campuses respectively, the proportion of shop stations has a strong impact on utilization, with a 30% difference between the average utilization at large campuses with 10% to 20% shop stations and large campuses with 0 to 1% shop stations. There is a similar difference in utilization shown in Graph 8 between the mid-sized campuses with over 20% shop stations and mid-sized campuses with 0 to 1% shop stations.

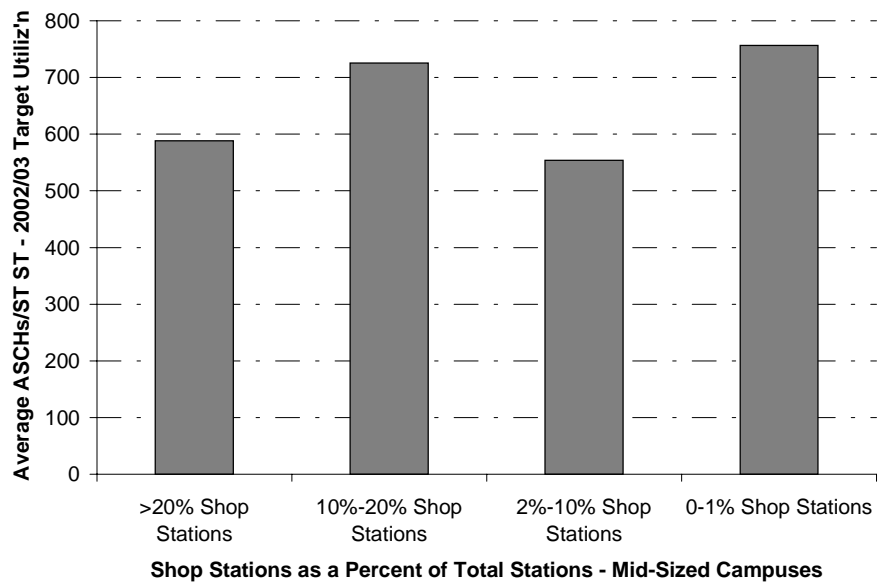
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**Graph 7 – Comparison Of Campus Utilization At Large Campuses Considering Proportion Of Shop Stations**



**Graph 8 – Comparison Of Campus Utilization At Mid-Sized Campuses Considering Proportion Of Shop Stations**



It is noteworthy that shop stations appear to have a greater impact on utilization than would be expected. This may be because the utilization of classrooms also is affected by the way shop-based programs are delivered. Classroom space and shop

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space may both be scheduled for use by the same program stream and thus decrease the average utilization of classrooms.

**It is recommended that the relative proportions of shop and teaching kitchens to classroom and laboratory stations should be factored into campus utilization standards.**

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### **DEVELOPMENT OF AN ANNUAL STUDENT CONTACT HOURS PER STUDENT STATION STANDARD**

In the previous section, the analyses indicated that the following criteria have an impact on utilization and should be taken into account when developing utilization standards for instructional space:

- campus size
- urban versus non-urban context
- the proportion of shops and teaching kitchen stations to classroom stations

Working from those basic principles, this section develops ASCHs/ST ST standards for various campus types.

It may be helpful to resurrect the previously used BC Thorstenson formula guideline to assess any proposed standard based on an ASCHs/ST ST instrument, as the Thorstenson formula is reasonably familiar to most individuals who have been involved in the college, institute and university college system. For classroom stations, the Thorstenson standards call for a utilization of 28.6 WSCHs/ST ST, as noted in 4. Assuming that institutions operate for 46 weeks per year, this is equal to approximately 1,300 ASCHs per classroom student station.

For laboratories and shop stations, the old BC Thorstenson standard is 24 WSCHs/ST ST, the highest of all jurisdictions. Annualized, again by multiplying by 46 weeks, this is equal to 1,100 ASCHs per laboratories and shop stations.

However, the Thorstenson standards were intended to set utilization during peak stable enrolment and so need to be adjusted to provide a standard of utilization that can be applied through an entire year. Assuming a factor of approximately 75% to compensate for this averaging of utilization, the resulting basic rates are approximately 1,000 ASCHs/ST ST for classroom stations and 825 ASCHs/ST ST for shop/laboratory stations.

As the previous section indicated, there is no strong trend indicating that laboratory stations have an actual lower utilization and so **it is recommended the lower rate of 825 ASCHs/ST ST only be applied to shop and teaching kitchen stations**, the presence of which has a negative impact on utilization.

The differences in actual utilization found in campus size should be reflected in the development of three utilization standards for the three campus size groupings. However, the mid-sized campuses should be further divided into urban and non-urban campuses, with slightly lower standards of utilization required for non-urban campuses than their urban counterparts.

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Campuses which are unique because of their location, or program mix should generally be treated as exceptions to these recommended standards.

The base annualized Thorstenson formula standards have been adjusted according to the actual utilization achieved by campuses in the categories listed above. The result is similar to the average 2002/03 target utilization for each category. **The recommended standards are as follows:**

- **Large campuses are 100% of the annualized Thorstenson formula rates, i.e., at 1,000 ASCHs/ST ST for classroom and lab stations and at 825 ASCHs/ST ST for shop/teaching kitchen stations**
- **Urban mid-sized campuses should be set at 80% of the annualized Thorstenson formula rates (800 and 650 ASCHs/ST ST respectively)**
- **Non-urban mid-sized campuses should be set at 75% of the annualized Thorstenson formula rates (750 and 620 respectively)**
- **small campuses should be set at 65% of the basic rates (650 and 540 ASCHs/ST ST respectively)**

Table 5 compares average actual utilization, the annualized Thorstenson formula rates and the standards recommended above.

**Table 5 – Comparison Of Actual Utilization, Annualized Thorstenson And Recommended Standards**

Campus Category	Actual Utilization (2002/03 Target) Mixed Classroom/ Laboratory/Shop (ASCHs/ST ST)	Thorstenson Formula Guideline (Annualized)		Recommended Standards	
		Classroom Stations (ASCHs/ST ST)	Laboratory/Shop Stations (ASCHs/ST ST)	Classroom/ Laboratory Stations (ASCHs/ST ST)	Shop/Teaching Kitchen Stations (ASCHs/ST ST)
Large Campuses	838 (averaged)	1,000	825	1,000	825
Mid-Sized Urban	700 (averaged)	1,000	825	800	650
Mid-Sized Non-Urban	668 (averaged)	1,000	825	750	620
Small Campuses	555 (averaged)	1,000	825	650	540

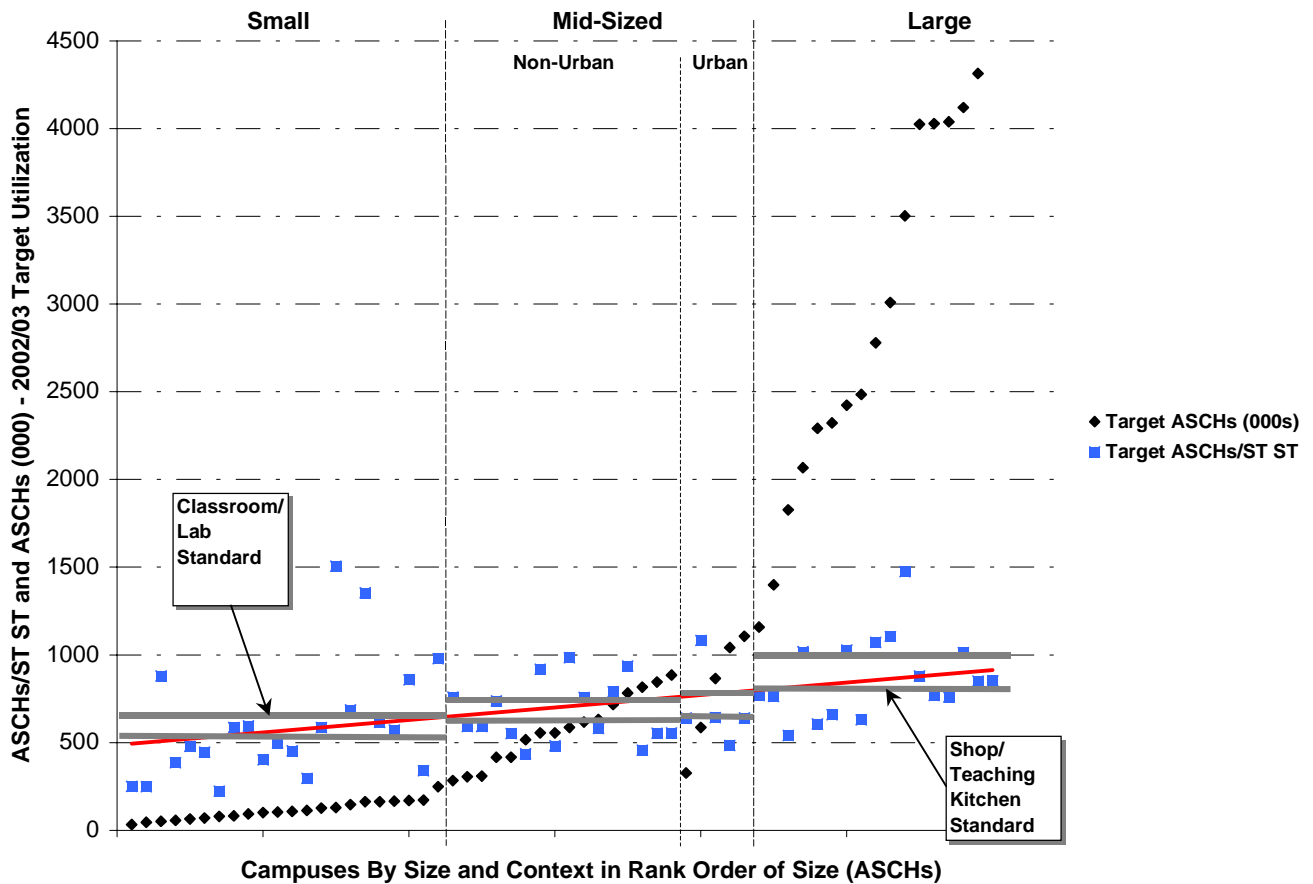
As Table 5 indicates, the recommended standards take into account the utilization trends indicated by actual utilization, whereas the Thorstenson formula guideline does not. The Actual Utilization (2002/03 Target) which is a mixture of classroom, laboratory and shop utilization falls, in all campus categories, between the Recommended Standard for classroom/laboratory stations and the Recommended Standard for shop/teaching kitchen stations.

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Graph 9, below, indicates visually how the recommended standards compare to Actual Utilization. The upper grey bar is the Classroom/Laboratory Standard, the lower grey bar is the Shop/Teaching Kitchen Standard.

**Graph 9 – Comparison Of Actual Utilization and Recommended Utilization Standards by Campus Type**



Graph 9 indicates that, while approximately 35% of large campuses surpass the higher recommended standard for classroom/laboratory stations, the majority of this group are very close to the standard. If the campus with the high utilization (1,500 ASCHs/ST ST) is not counted, the remainder are on average less than 5% above the higher recommended standard. On the other hand, campuses which are below the standard have, on average, room for an approximately 35% growth potential before the standard is reached. On balance, for large campuses, the system could accommodate between 10% and 14% more growth than the 2002/03 Utilization Targets.

25% of mid-sized urban campus, and approximately 40% of mid-sized non-urban and small campuses have achieved a rate of

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utilization that surpasses the higher recommended standards for classroom/laboratory stations.

### Calculation of Utilization Standards for Specific Campuses

**It is recommended that the application of the different utilization standards for classroom/laboratory stations and shop/teaching kitchens should be based on the proportions of stations of each type at a campus.**

For example, if a large campus has 80% classroom/laboratory stations and 20% shop stations, the campus utilization target standard would be as follows:

1,000 ASCHs per station X 80% classroom/lab stations = 800 ASCHs/ST ST

plus

825 ASCHs per station X 20% shop/teaching kitchen stations = 165 ASCHs/ST ST

equals an overall utilization target standard of

965 ASCHs/ST ST

The recommended standards, based on ASCHs/ST ST, are unique in the world of post-secondary institutions. As BC is leading the way in this endeavour, there is no precedent in another jurisdiction that BC can use as a basis for the development of its own standard.

The standards are based largely on the information prepared by each institution through its facilities inventory system. Improvements in the consistency and application of definitions of spaces can be expected in the future and this will have an impact on how each campus compares to the recommended standards.

**It is recommended that the standards be evaluated in the future to ensure levels of utilization are reasonable and that the instrument proves workable.**

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### **UNIT AREA STANDARDS AND GUIDELINES**

#### **INSTRUCTIONAL STATIONS**

##### **Introduction**

This section includes the following:

- Review Of Existing Instructional Space Standards And Guidelines, which summarizes the standards and guidelines for instructional space used in various jurisdictions
- Best Practices Examples, which summarizes the contributed and evaluated examples of effective instructional spaces in BC institutions

##### **Review of Existing Instructional Space Standards and Guidelines**

This section reviews existing student station space standards and guidelines from various jurisdictions. There are generally three types of space standards and guidelines:

1. standards and guidelines for specific station types, which provide per student station areas only and which do not include space for associated support functions
2. standards and guidelines for specific station types, which include both student station area and an allocation of space for associated support functions, e.g., storage, lab preparation, etc.
3. more generalized standards and guidelines which are averages of the amount of space required per station for all stations of a large category, e.g., academic laboratories, vocational shops, etc., or broad groupings of these along with associated support functions

The first type is useful to determine the theoretical student capacity of a room, achieved by applying the guideline as a divisor to the area of the classroom, laboratory or shop. The second and particularly the third, more generalized guidelines are, however, very useful in the preliminary calculation of space needs when planning a facility.

##### **Classroom Stations**

Table 6, on the next page, compares classroom student station standards and guidelines in various North American jurisdictions. Except for BC, the standards and guidelines include some provision for support space.

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**Table 6 – Classroom Student Station Size Standards And Guidelines By Jurisdiction**

Jurisdiction	Student Station Area (m <sup>2</sup> )
<u>Canada</u>	
Alberta	
Colleges (Non-Technical)	1.4
Technical Institutes	1.6
Agriculture Colleges	1.6
Alberta (RMC/MGT)	1.7
British Columbia <sup>1</sup>	
Classrooms up to 56 m <sup>2</sup>	2.3
Classrooms from 57 m <sup>2</sup> to 93 m <sup>2</sup>	1.8
Classrooms larger than 94 m <sup>2</sup>	1.3
Ontario (COU only)	1.4
<u>United States</u>	
California	1.4
Minnesota	1.5
Washington State	2.1

The relatively small classroom station size in some jurisdictions can only be achieved by providing a substantial proportion of classroom seating in larger classrooms. While this may be possible in universities and large colleges by using large section sizes (particularly for lower level courses), smaller colleges may not have the student numbers to mount the large sections that can make use of larger, more space efficient classrooms.

Of note is the trend in some jurisdictions to provide larger classroom station standards: Washington State has increased average classroom size from 1.86 m<sup>2</sup> to 2.09 m<sup>2</sup> (the odd sizes reflect the conversion from Imperial to metric measurement) to account for flexibility in room use (e.g., use of small-groups) and to reflect increased space requirements of high-tech classrooms equipped for multimedia presentations or interactive video.

The RMC/MGT study for Alberta AECD also recommended increasing the college and technical institute classroom station space standard from 1.4 and 1.6, respectively, to 1.7. In that study, the following rationale for the need to increase station size was provided (emphasis added):

- “a general trend towards the use of tables and chairs in all classrooms of less than 60-80 seats. Although *most prevalent in the community colleges* it is also occurring at the universities;
- the need to accommodate handicapped students;
- the need to accommodate additional student equipment such as personal computers
- the need to accommodate flexible furniture arrangements;
- the need to accommodate exam writing.”

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BC has developed three classroom student station size standards based on room size, as shown in Table 6, above. The standards include a station size of 2.3 m<sup>2</sup> for rooms of up to 56 m<sup>2</sup> (i.e., up to 24 student stations), 1.8 m<sup>2</sup> for rooms between 57 and 93 m<sup>2</sup> (i.e., between 32 and 51 student stations), and 1.3 m<sup>2</sup> for classrooms and lecture theatres larger than 94 m<sup>2</sup> (i.e., 72 student stations and over). The average of these three station size standards is 1.8 m<sup>2</sup>. Unlike standards and guidelines in other jurisdictions, BC's student station space standards do not include support space. Interestingly, the stepped approach to student station size adopted by the BC standards means that classrooms of 56 to 57 m<sup>2</sup> may accommodate anywhere between 25 and 31 students and that classrooms of 93 to 94 m<sup>2</sup> may accommodate anywhere between 52 and 71 students.

The broad range of campus sizes in BC, with the largest campus almost 300 times the size of the smallest in terms of annual student contact hours, results in each having a unique mix of classroom types and sizes. In this context, a single, generalized classroom standard cannot be fairly applied to all campuses.

### Shop/Laboratory Stations

As in classroom student station space standards and guidelines, jurisdictions have applied the three approaches to laboratory and shop station size standards and guidelines which include:

1. student station space standards and guidelines for specific laboratories and shops;
2. standards and guidelines per station for specific laboratories and shops, including support space;
3. generalized standards and guidelines which cover broad categories of laboratories or shops and which include support space.

The advantages and disadvantages listed above also apply to laboratory and shop student station space standards and guidelines.

Table 7 summarizes the generalized laboratory and shop space standards and guidelines other jurisdictions have developed. Note that all standards and guidelines include support space.

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**Table 7 – Laboratory And Shop Student Station Space Guidelines**

Jurisdiction	Average Student Station Area (m <sup>2</sup> )
<u>Canada</u>	
Alberta	
Colleges (Non-Technical)	6.5
Technical Institutes	9.3
Agriculture Colleges	9.3
Trades	9.3
Fine and Performing Arts	Specifically Programmed
Ontario (COU)	
Group W <sup>1</sup>	10.8
Group X <sup>2</sup>	8.1
Group Y <sup>3</sup>	3.75
Group Z <sup>4</sup>	4.05
<u>United States</u>	
Florida – Community Colleges	
Academic	5.1
Occupational	8.7
Washington State	
Science Lab	5.6
Basic Skills/Developmental	2.6
Vocational Labs/Shops	Specifically Programmed

Notes:

1. Includes Agriculture, Veterinary Medicine, Engineering, Metallurgy
2. Includes Fine and Applied Arts, Biochemistry, Biology, Fisheries, Wildlife Management, Zoology, Architecture, Health Professions except Nursing
3. Includes Education, Geography, Psychology.
4. Includes Humanities, Administrative Studies, Economics, Law, Political Science, Sociology, Nursing, Computer Science, Mathematics.

The RMC/MGT study conducted for Alberta's AECD recommended the adoption of a COU-type system, involving a small number of similarly sized laboratory/shop groupings, to take into account differences in program mixes at institutions in Alberta, including community colleges.

Washington State purposely has not developed standards for vocational labs and shops, "because of the wide range of space-per-student-station for various occupational training labs and shops."

BC, along with some other jurisdictions, has adopted student station space standards and guidelines that provide per station areas for specific laboratory and shop types. The number of laboratory and shop station types can be quite large. For example, the University of Minnesota has developed space standards for about 170 student station types, including separate standard areas for workstations and for support space. California, which includes support space in the station space standard, has 46 lab and shop standards with a total of 13 different station sizes. Both the Minnesota and California standards have been included for reference as *Appendix B – Lab/Shop Space Standards – Other Jurisdictions*.

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BC has developed standards for 15 types of laboratories and shops, as shown in Table 8, below. Note that the Unit Area does not include support space.

**Table 8 – BC Shop And Lab Student Station Space Standards**

Student Station Type	Unit Area (m <sup>2</sup> )
<u>Laboratories</u>	
Micro-computer Instruction	3.7
Micro-computer Access to Terminals	2.3
Science Labs	4.6
Dental Assisting Labs	6.9
Draughting Lab	8.6
Language Lab	3.5
Nursing Lab	6.4
Typing Lab	3.7
Accounting Lab	3.7
<u>Shops</u>	
Autobody Shop	20.4
Auto-mechanics Shop	20.4
Heavy Duty Mechanics Shop	33.0
Carpentry Shop	13.9
Intro. Electricity Shop	11.3
Welding Shop	5.6

### Summary

For the fair application of BC's utilization standards, it is necessary to develop specific student station space standards that can be applied to rooms to derive a number of student stations which is consistent throughout the system.

**As a result, it is recommended that student station space standards continue to generally reflect the actual capacities of instructional rooms. This requires the provision of a number of different area per station standards for different room sizes, in the case of classrooms, and the development of standards for the more common laboratories and shops, that can be applied uniformly to all institutions.**

With a standard of this type, calculation of the area required to deliver a program conducted for planning purposes must proceed through a "bottom up" process of calculating required numbers of rooms of each type and capacity and adding a factor for support space. Though more complex, this ensures that planning can and will account for the variety of campus types and sizes in BC. For example, a campus comprised of lecture theatres and large classrooms will have significantly less area per student station than one comprised entirely of small classrooms.

A disadvantage of this type of standard is that support space is not subject to the application of uniform standards. As a result,

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functions, which are best, located within a lab or shop may be located in support space in order to provide more space per student station within the instructional space. **It is recommended that standards for classroom, laboratory and shop support space be developed to provide uniformity between campuses and to facilitate future planning endeavours.**

**For unique laboratories and shops, areas for student stations should be developed by design professionals working in concert with institutional staff and Ministry officials. Student station areas and utilization for these spaces should be based on actual room capacity.**

### Best Practices Examples

To assist in the development of student station space standards, institutions in BC were canvassed for classrooms, laboratories and shops that were acknowledged by faculty and staff to be superior examples of a space type. In addition, tours were conducted of the University College of the Cariboo (Kamloops), Malaspina University College (Nanaimo), Kwantlen University College (Surrey and Langley), Capilano College (Lynmour) and BCIT (Burnaby) to evaluate and document instructional space. Table 9 summarizes the results of these surveys and tours. Best Practices examples that were documented more fully in the tours of the campuses are identified by italicized text and are included for reference in *Appendix G – Best Practices Examples*. Considerations for best practices included sightlines, workstation space, support for the range of information-technology (where applicable), entry/egress, space efficiency, and utilization over time.

A recommended station size standard and support space rate are included, based, where possible, on the best practices example. Where best practices were not available, the recommended standards are based on available industry standards.

Instructional support space rates, which include the space necessary to support the activities within an instructional area, have been developed from a review of inventory information and plans, and are included as a percentage of student station area.

Note that examples of upper level labs were not available within the BC college, university college and institute system, as the move to degree-granting status at university colleges is relatively new. There are no examples of labs which are built purposely to support upper level science courses.

**Table 9 – Best Practices Summary Of Classrooms, Laboratories And Shops**

Space Type	Capacity	Area/ ST ST	College	Campus	Building	Room No.	Comment
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<b>CLASSROOMS</b>							
<b><u>Seminar/Small Classroom:</u></b>							Up to 24 Students
	20	2.70	OUC	KLO		122	
	23	2.34	OUC	N. Kelowna	SCI	249	
<i>Best Practices</i>	24	2.50	UCC	Kamloops	TT	149	<i>See Appendix G.1</i>
<b>Recommended Standard:</b>		<b>2.50</b>					
<b>Support Space Rate:</b>		<b>5%</b>					
<b><u>Mid – Sized Classroom:</u></b>							25 to 60 students
	39	2.06	OUC	N. Kelowna	SCI	247	
	40	1.70	Langara		"B"	Various	Accommodates 5' x 2' tables; provides good instructor to student relationship
<i>Best Practices</i>	40	1.93	CPC	Lynmour	Cedar	231	<i>See Appendix G.2</i>
<b>Recommended Standard:</b>		<b>1.95</b>					
<b>Support Space Rate:</b>		<b>5%</b>					
<b><u>Mid-Sized Tiered Classroom:</u></b>							25 to 60 students
	54	1.79	OUC	N. Kelowna	SCI	134	
<i>Best Practices</i>	42	1.65	MUC	Nanaimo	356	315	<i>See Appendix G.3</i>
<b>Recommended Standard:</b>		<b>1.65</b>					
<b>Support Space Rate:</b>		<b>5%</b>					
<b><u>Large Classroom:</u></b>							Over 60 students
<b>Recommended Standard:</b>		<b>1.50</b>					Assumes tablet arm chairs
<b>Support Space Rate:</b>		<b>5%</b>					
<b><u>Lecture Theatre:</u></b>							
	86	1.59	SLK	Castlegar	K	10	Excellent sightlines, ample work surface
	90	0.93 – 1.11	Langara		"A"	112a/b	Good acoustics and visibility
	155	1.44	UCFV	Abbotsford	B	101	
<i>Best Practices</i>	148	1.71	CPC	Lynmour	Cedar	148	<i>See Appendix G.4</i>
<b>Recommended Standard:</b>		<b>1.80</b>					Assumes fixed table
<b>Support Space Rate:</b>		<b>15%</b>					
<b><u>Videoconferencing Room:</u></b>							
	36	2.04	UCFV	Abbotsford	G	159	Accommodates TVs, cameras
<i>Best Practices</i>	27	2.29	UCC	Kamloops	Old Main	1472	<i>See Appendix G.5</i>
<b>Recommended Standard:</b>		<b>2.50</b>					
<b>Support Space Rate:</b>		<b>15%</b>					
<b>LABORATORIES</b>							
<b><u>Computer/Language/Business:</u></b>							
Computer Lab	36	3.17	Langara		"A"	340	Good use of space allowing privacy and good communication with instructor
	20	3.83	CPC	Lynmour	Cedar	232	Back-to-back desk arrangement allows instructor to assist students
	24	3.84	Langara		"A"	140	Contract training lab; large room of better quality with large work surfaces
	20	4.29	UCC	Kamloops	Old Main	1355	Part of a computer lab complex
Drop-in Computer	40	2.46	Langara		"B"	015/019	Maximum number of students for room w/o being crowded; good layout for attention to front of room

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Space Type	Capacity	Area/ ST ST	College	Campus	Building	Room No.	Comment
Language Lab	24	2.93	UCFV	Abbotsford	D	221	Ample space between stations
Keyboarding Lab	36	3.05	UCFV	Abbotsford	D	223	Good sightlines
	36	3.59	CPC	Lynmour	Fir	212	
<i>Best Practices – Drop in Lab</i>	15	2.40	UCC	Kamloops	Old Main	1329	See Appendix G.6
<i>Best Practices – Instructional Lab</i>	36	3.41	CPC	Lynmour	Fir	213	See Appendix G.7
<b>Recommended Standard:</b>		<b>3.40</b>					
<b>Support Space Rate:</b>		<b>10%</b>					
<b>CAD/GIS/Drafting/Multimedia:</b>							
	20	5.26	UCFV	Abbotsford	D	104	Multimedia lab
	18	6.27	VCC	City Centre		721	Comfortable working environment
<b>Recommended Standard:</b>		<b>6.00</b>					
<b>Support Space Rate:</b>		<b>15%</b>					
<b>Dry Science Lab – Lower Level</b>							
	40	2.73	Langara		"A"	228/ 229	Geography: Large workstations and storage address special course needs
	20	3.47	OUC	N. Kelowna	SCI	124	Geology
<i>Best Practices</i>	36	2.77	Kwantlen	Langley		1310	See Appendix G.8.
<b>Recommended Standard:</b>		<b>3.00</b>					
<b>Support Space Rate:</b>		<b>10%</b>					
<b>Dry Science Lab – Upper Level</b>							
	20	4.00	OUC	N. Kelowna	SCI	242	Physics
<i>Best Practices</i>	28	4.64	Kwantlen	Surrey	E	106	See Appendix G.9.
<b>Recommended Standard:</b>		<b>4.60</b>					
<b>Support Space Rate:</b>		<b>10%</b>					
<b>Wet Science Lab – Lower Level</b>							
	24	4.61	OUC	N. Kelowna	SCI	119	Lower Division Biology
	24	4.10	OUC	N. Kelowna	SCI	131	Anatomy/Physiology
	20	5.58	OUC	N. Kelowna	SCI	231	Chemistry
<i>Best Practices</i>	20	4.92	CPC	Lynmour	Fir	306	See Appendix G.10.
<b>Recommended Standard:</b>		<b>5.00</b>					
<b>Support Space Rate:</b>		<b>50%</b>					
<b>Wet Science Lab – Upper Level</b>							
<b>Recommended Standard:</b>		<b>6.00</b>					
<b>Support Space Rate:</b>		<b>50%</b>					
<b>Electronics Lab</b>							
<i>Best Practices</i>	20	8.8	UCC	Kamloops	TT	282	See Appendix G.11.
<b>Recommended Standard:</b>		<b>8.5</b>					
<b>Support Space Rate:</b>		<b>50%</b>					
<b>Nursing/Community Care Lab</b>							
<i>Best Practices</i>	12	6.67	Kwantlen	Surrey	D	240	See Appendix G.12.
<b>Recommended Standard:</b>		<b>7.00</b>					
<b>Support Space Rate:</b>		<b>30%</b>					
<b>Fine Arts Studio – Painting/Drawing</b>							
Foundation Studio	20	5.3	UCFV	Abbotsford		D113	Very flexible, allows different

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Space Type	Capacity	Area/ ST ST	College	Campus	Building	Room No.	Comment
2-D studio	20	3.82	UCFV	Abbotsford		D115	activities to occur simultaneously Very flexible, allows different activities to occur simultaneously
<i>Best Practices</i>	25	5.02	Capilano	Lynmour	SA	103	See Appendix G.13.
<b>Recommended Standard:</b>		<b>5.00</b>					
<b>Support Space Rate:</b>		<b>30%</b>					
<b>SHOPS</b>							
<b><u>Carpentry/Building Technologies</u></b>							
<i>Best Practices</i>	16	14.50	UCC	Kamloops	TT	230	See Appendix G.14.
<b>Recommended Standard:</b>		<b>15.00</b>					
<b>Support Space Rate:</b>		<b>10%</b>					
<b><u>Electrical Lab</u></b>							
<i>Best Practices</i>	16	14.62	BCIT	Burnaby	SE01	124	See Appendix G.15.
<b>Recommended Standard:</b>		<b>15.00</b>					
<b>Support Space Rate:</b>		<b>55%</b>					
<b><u>Welding</u></b>							
	20	12.50	Kwantlen	Langley	East Wing	1900	Shop supports self-paced program
<i>Best Practices</i>	48	9.90	UCC	Kamloops	TT	272	See Appendix G.16.
<b>Recommended Standard:</b>		<b>10.00</b>					
<b>Support Space Rate:</b>		<b>25%</b>					
<b><u>Machine Tools/Millwright</u></b>							
<i>Best Practices</i>	64	21.00	BCIT	Burnaby	NW06	100	See Appendix G.17.
<b>Recommended Standard:</b>		<b>21.00</b>					
<b>Support Space Rate:</b>		<b>30%</b>					
<b><u>Automotive Mechanics</u></b>							
	20	21.90	UCC	Kamloops	TT	212	Good shared use of tool crib, parts- room, flexibility ensured with large open space
<i>Best Practices</i>	18	23.80	Kwantlen	Langley	East Wing	1800	See Appendix G.18.
<b>Recommended Standard:</b>		<b>22.00</b>					
<b>Support Space Rate:</b>		<b>15%</b>					
<b><u>Heavy Duty/Commercial Transport/Diesel</u></b>							
	36	22.90	MUC	Nanaimo	AS	N/A	As currently planned
<i>Best Practices</i>	36	21.00	UCC	Kamloops	TT	204/208	See Appendix G.19.
<b>Recommended Standard:</b>		<b>23.00</b>					
<b>Support Space Rate:</b>		<b>15%</b>					
<b><u>Fine Arts Studio – Sculpture</u></b>							
	12	8.8	UCFV	Abbotsford	D	105	Very flexible, allows different activities to occur simultaneously
<i>Best Practices</i>	15/25	6.36/8.0	Capilano	Lynmour	SA	100/101	See Appendix G.20.
<b>Recommended Standard:</b>		<b>7.50</b>					
<b>Support Space Rate:</b>		<b>35%</b>					

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### **ANCILLARY SUPPORT SPACE**

This section includes the following:

- a Review Summary, which summarizes the results of a literature review of standards and guidelines that have been developed in other jurisdictions
- Analysis of Ancillary Support Space, which documents trends that may be of assistance in the development of space standards for BC institutions and recommends space standards.

### **Review Summary**

A preliminary review of inventory information indicates that instructional space comprises only 30% to 50% of a college's overall area. The remaining spaces, what are here termed ancillary support spaces, are critical to the administration and delivery of the instructional activities.

Generally, ancillary support space may include the following:

- faculty offices
- administration
- student services, including counseling, financial aid, etc.
- library and audio-visual services
- cafeteria and food services
- bookstore
- student and staff lounges
- athletic and recreation space
- assembly space
- child care facilities
- building services and storage space

Guidelines and standards have been developed by a limited number of jurisdictions for these ancillary support areas. The standards and guidelines are summarized in Table 10 to provide an indication of the type of functions that are generally accounted for as well as the input measure for deriving the area of each function. Most use full-time equivalent students as the input, a measure that is not defined consistently by different jurisdictions and, as a result, is difficult to normalize across jurisdictions.

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**Table 10 – Institutional Ancillary Support Space Generators In Various Jurisdictions**

	Art	Music	Drama	Faculty Offices	Admin. Offices	Library/Learning Resource Centre	Athletic/ Recreation	Auditorium/ Assembly	Student Centre & Related	Flexibility Factor	Stores/ Maintenance	Child Care
<u>Canada</u>												
Alberta - Colleges and Universities	na	na	na	13.0 m <sup>2</sup> / instructor @ 15:1 student FTE to instructor rate	13.0 m <sup>2</sup> / administrator OR 1.0 m <sup>2</sup> per student FTE for combined Faculty/ Administrat'n	1.25 m <sup>2</sup> / student FTE	1.00 m <sup>2</sup> / student FTE	0.2 m <sup>2</sup> / student FTE	1.1 m <sup>2</sup> / student FTE	15% of Net Assignable	Included in Net to Gross Ratio of 1.54	May be included in Student Services
Ontario - COU - Universities	na	na	na	13.0 m <sup>2</sup> /FTE faculty + 15% and 30% support	13.0 m <sup>2</sup> /FTE staff and 30% support	Stack (equiv. Vols) + Study (0.5 m <sup>2</sup> /student FTE) + Support ( 25%)	0.9 m <sup>2</sup> / student + 2,000 m2 (less than 4,000 FTE)/ 1,000 m2 (4,000 - 8,000 FTE)	See Student Centre and Relted	2.0 m <sup>2</sup> / student FTE	na	1.5% of Net Assignable Area	na
<u>United States</u>												
Minnesota - Universities	na	na	na	13.9 m <sup>2</sup> / adjusted head count	13.9 m <sup>2</sup> / adjusted head count	Stack (equiv. Vols) + Study (.72 m <sup>2</sup> /student FTE) + Support (20 %)	Allowance 3790 m <sup>2</sup> (1,000 FTE) 6317 m <sup>2</sup> (5,000 students) + 0.8 m <sup>2</sup> Headcount factor	na	0.8 m <sup>2</sup> / FYE student + .01 m <sup>2</sup> /StSt + .01 m <sup>2</sup> / headcount employees	na	na	na
Washington State - Community Colleges	0.46 m <sup>2</sup> (1st 500) 0.18 m <sup>2</sup> (over 500)	0.28 m <sup>2</sup> (1st 500) 0.14 m <sup>2</sup> (over 500)	139 m <sup>2</sup> Allowance	.55 m <sup>2</sup> / student FTE except vocational @ 0.7 m <sup>2</sup> /FTE	.83 m <sup>2</sup> / student FTE (1st 1000) then 0.48 m <sup>2</sup> / Student FTE	Various rates for Acad/Voc/Basic Skills for 1st 1000 FTE, decreased rates above 1000 FTE	2.4 m <sup>2</sup> / FTE student (1st 500) then .93 m <sup>2</sup> /FTE	372 m <sup>2</sup> Allowance	1.2 m <sup>2</sup> / student FTE (1st 1000) then 0.74 m <sup>2</sup> / Student FTE	na	.65 m <sup>2</sup> / student FTE (1st 1000) then 0.37 m <sup>2</sup> / Student FTE	0.26 m <sup>2</sup> / student FTE

**Analysis of Ancillary Support Space**

This section analyzes actual use of ancillary support space in BC institutions and compares these, where relevant, to those in other jurisdictions to develop standards and guidelines for BC institutions.

Analyses have been conducted for the following space types:

- Offices
- Library/Study and Lounge Space
- Cafeteria and Food Services
- Additional Campus Activity

Office Space

Separate analyses of administrative, faculty and student services office space at BC institutions are not possible as these space types are not consistently identified in institutional FIS data as belonging to one of these groups. As a result, this analysis must focus on office space in general.

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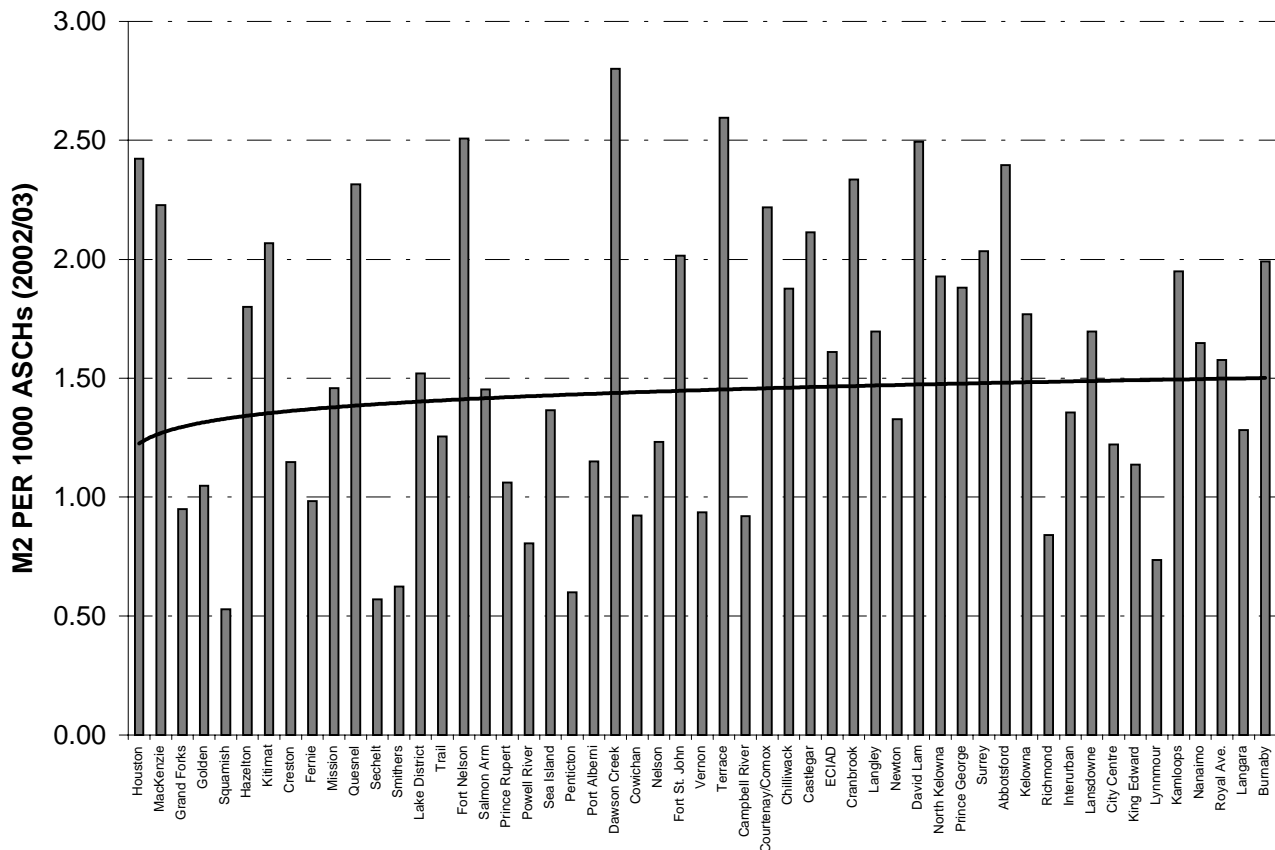
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It is recommended that consistent methods of categorizing office space be developed that indicate the function each office serves, i.e., use by faculty, administrative staff, student services staff, student association, etc., and, in the case of faculty offices, to which program the office belongs. This will enable a more detailed analysis of office space utilization in the future.

Graph 10 shows the relation between the amount of total office space and Annual Student Contact Hours (ASCH) for the year 2002/03 for each campus in BC. Campuses are listed in rank, order by size in terms of ASCHs. The trendline indicates that smaller campuses have slightly less office space per ASCH than the larger campuses although rates, particularly for small campuses, are variable, ranging from as high as 0.025 net m<sup>2</sup>/ASCH to a low of 0.0005, one-tenth of the high figure.

The trendline begins at approximately 1.3 net m<sup>2</sup> per 1,000 ASCHs and rises steadily increases to 1.5 net m<sup>2</sup> per 1,000 ASCHs.

Graph 10 - Comparison Of Office Space At BC Institutions



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Both Alberta and Washington State have office space guidelines which are based on area per student FTE. Alberta's is 1.0 net m<sup>2</sup> per FTE when administration and office space are combined. Assuming a range of 600 to 700 ASCHs per FTE, Alberta's office allocation can be translated to equal 1.4 to 1.7 net m<sup>2</sup> per 1,000 ASCHs. The RMC/MGT study recommended increasing the per office allocation of space by 1.0 m<sup>2</sup> to account for the use of computers in offices which translates into an approximately 7% increase in office allocation guidelines. This would increase the range from 1.5 to 1.8 net m<sup>2</sup> per 1,000 ASCHs.

Washington State's office space guidelines are more difficult to apply. The guideline for faculty offices is .55 net m<sup>2</sup> per student FTE except for vocational programs, which are 0.7 net m<sup>2</sup> per student FTE. Space guidelines for administrative offices are .83 net m<sup>2</sup> per student FTE for the first 1,000 FTEs, then decreasing to 0.48 net m<sup>2</sup> per student FTE for the remaining FTEs. This adds up to a range of between 1.03 and 1.53 net m<sup>2</sup> per student FTE which is somewhat higher than Alberta's standard although it could never approach the higher end. Translated to our ASCH measure, this is equal to between 1.6 and 2.5 net m<sup>2</sup> per 1,000 ASCHs.

**It is recommended that, for administration, student support, and faculty office space, an overall net office space allocation of 1.6 net m<sup>2</sup> per 1,000 ASCHs be applied to the first 250,000 ASCHs and that a rate of 1.8 net m<sup>2</sup> per 1,000 ASCHs (or base of 400 m<sup>2</sup>) apply to remaining ASCHs.**

Within these allocations, institutions should be able to define how offices are best allocated. For example, in some programs it may be beneficial to accommodate faculty in an open office environment. Others may require private offices.

Included in the above recommendation are student services space such as registration, counselling, and financial aide. Current FIS data does not adequately or consistently identify student services space. As a result, an analysis of student service space alone could not be conducted on existing facilities.

A number of factors may have an impact on student service space needs, including program mix. Campuses with large proportions of students in academic and English as a second language programs may require more space for student admissions, counseling, registrar's office, etc. Further analysis needs to be done to confirm and quantify this.

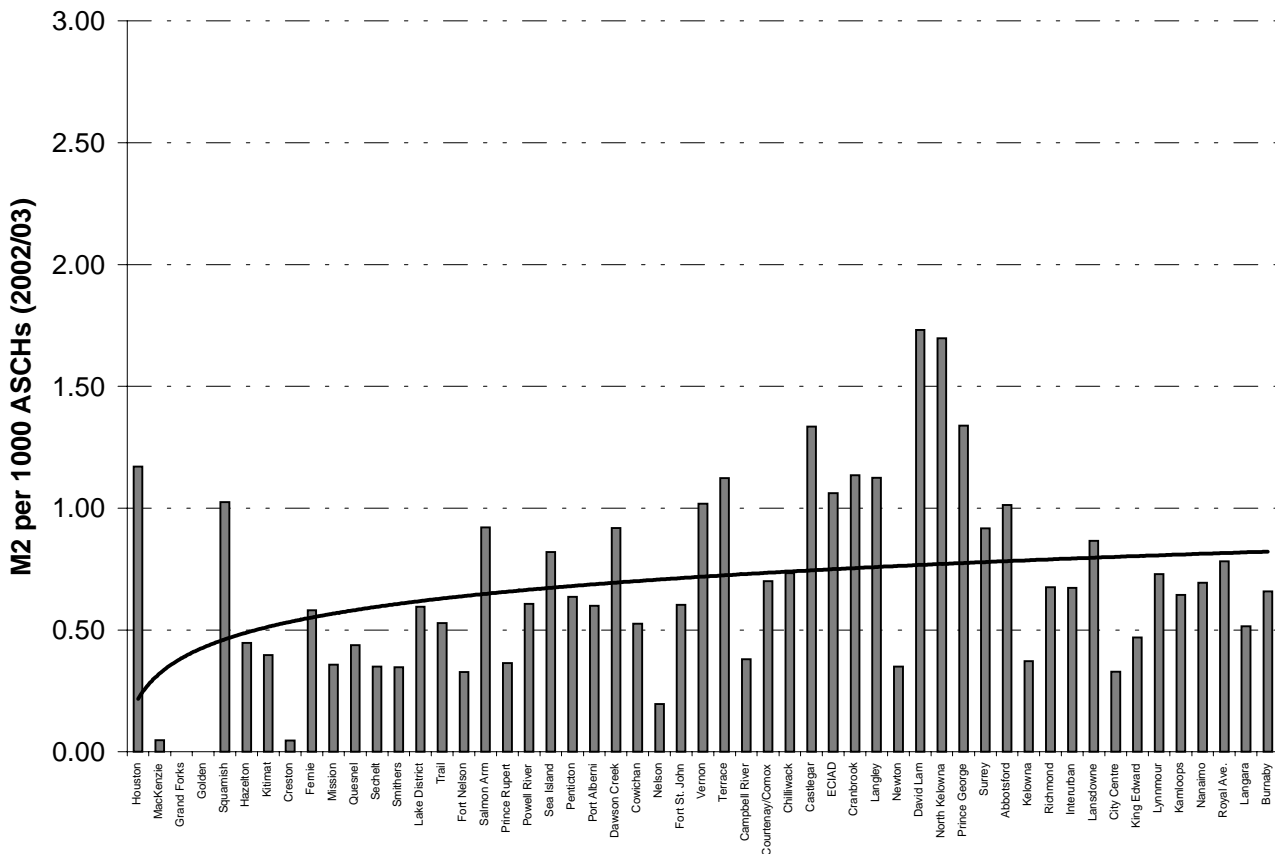
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Library/Study and Lounge Space

Graphs 11, 12 and 13 illustrate the relation between Annual Student Contact Hours (ASCH) for the year 2002/03 for each campus in BC in rank order of size, and respectively, the amount of library space, lounge space and combined library and lounge space, with the result expressed as m<sup>2</sup> per 1,000 ASCHs.

Graph 11 – Comparison Of Library/Av Space At BC Campuses



Graph 11 indicates that, in general, the proportion of library and AV space per ASCH increases as the size of an institution increases. This is in part because some small campuses do not have libraries or study space at all, but is also due to a general trend that can be perceived, with the majority of small campuses below the 0.5 net m<sup>2</sup> per 1,000 ASCHs range.

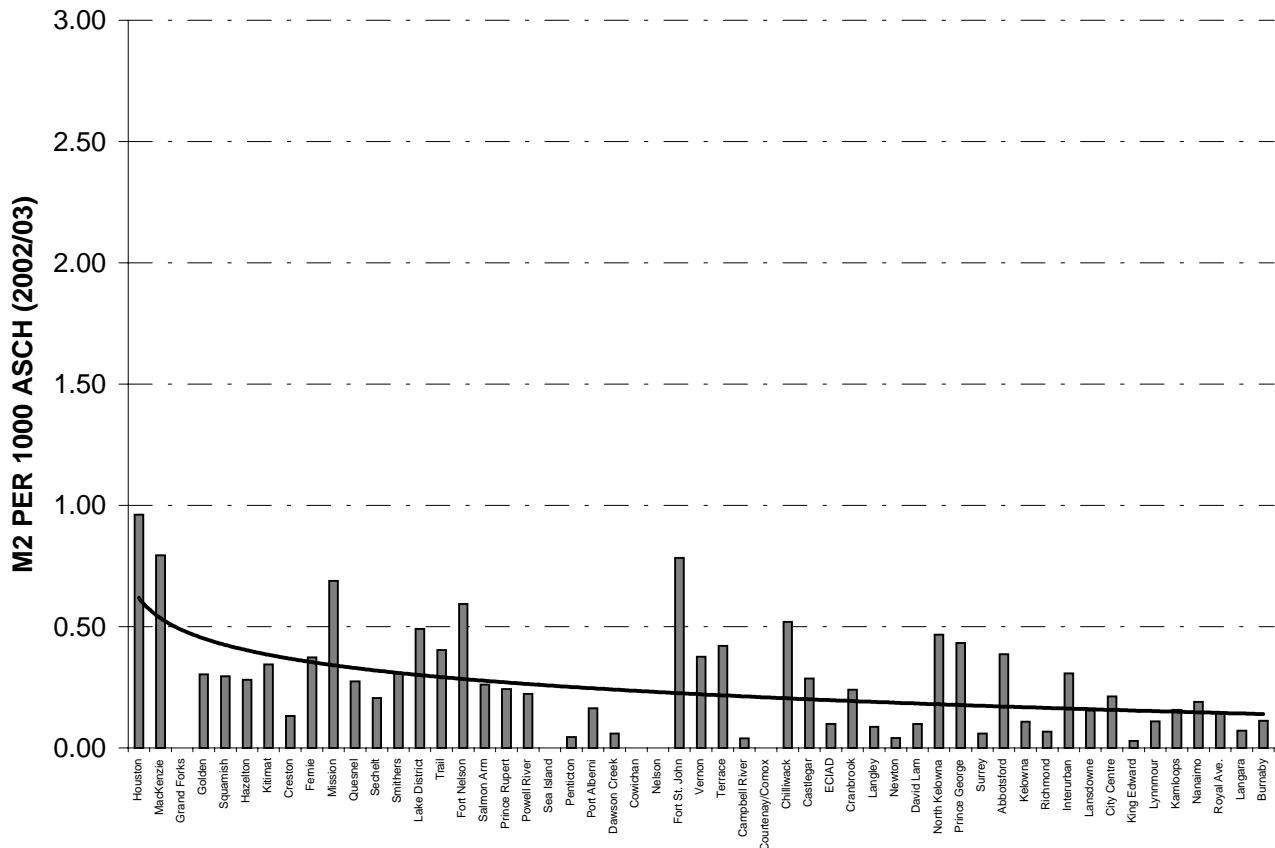
Alberta has a library/learning resource centre space allocation of 1.25 net m<sup>2</sup> per FTE. Again, assuming a range of 600 to 700 ASCHs per FTE, this translates to between 1.8 and 2.0 net m<sup>2</sup> per 1,000 ASCHs, which is substantially more area per ASCH than provided by BC institutions. Only North Kelowna and David Lam campuses approach this allocation.

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All library space guidelines in other jurisdictions are based on stack numbers, which enables some libraries to grow more than others due to growth in collection size alone. Collection growth may be the result of poor policies on weeding collections and, as a result, is not a recommended approach.

Graph 12 - Comparison Of Lounge And Reading/Study Space At BC Campuses



Graph 12 illustrates the amount of lounge and reading/study space that is provided at BC campuses. The ratios may include area for staff lounge space as these areas, in some cases, could not be extracted from the data.

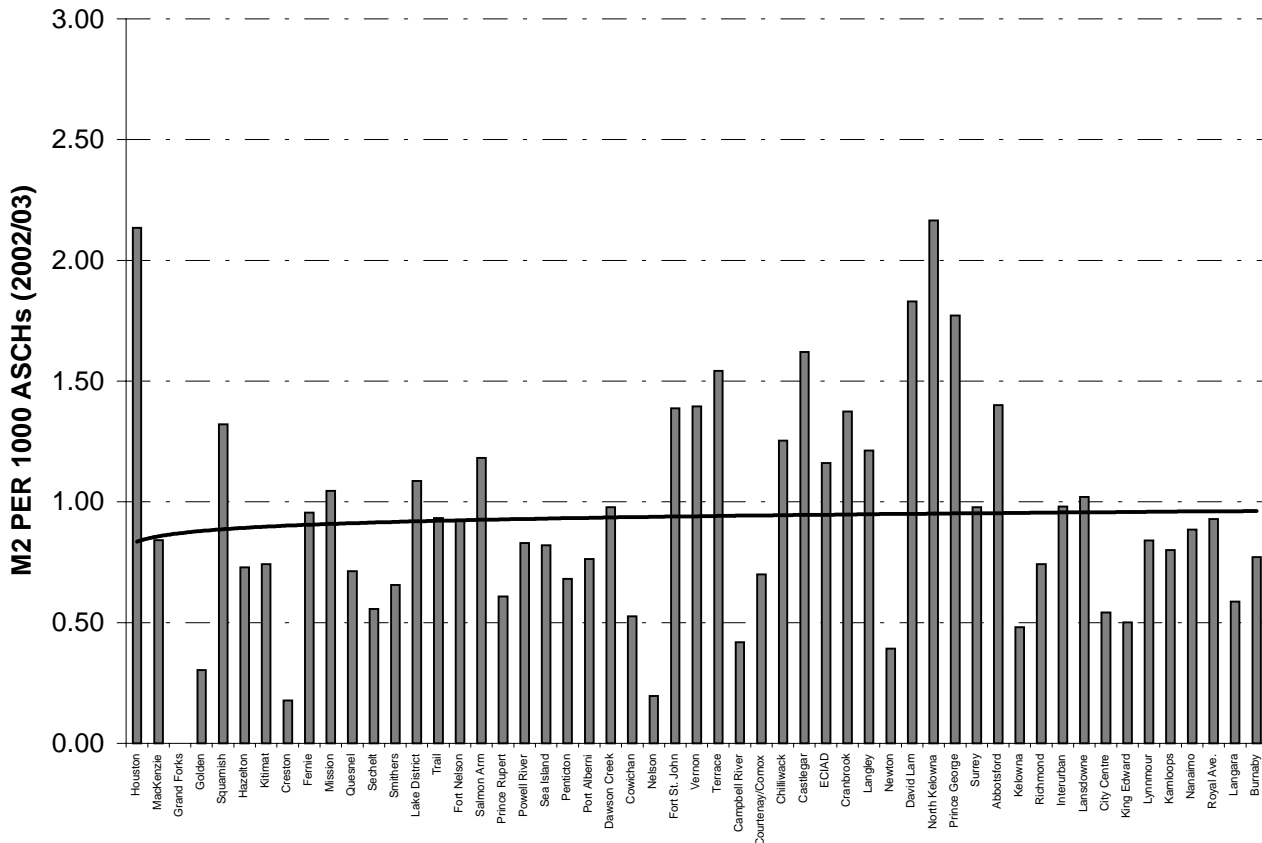
In general, the trendline indicates that the larger the campus, measured in the 2002/02 projected ASCHs, the less space that is provided per ASCH for lounge and study/reading space. Small campuses tend to provide more lounge and reading/study space (approximately 1.0 net m<sup>2</sup> per 1,000 ASCHs) than library space, whereas large campuses tend to provide substantially more library space than lounge and reading/study space (which bottoms out at approximately 0.15 net m<sup>2</sup> per 1,000 ASCHs).

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Graph 13 illustrates the result when library/AV, lounge and reading/study space are combined. It shows a strikingly flat trendline from the very smallest campuses to the largest.

Graph 13 – Comparison Of Combined Library/AV, Lounge And Reading/Study Space At BC Campuses



The consistency of the allocation of space per student for library, AV, lounge and reading/study across the complete spectrum of campuses in BC may be explained by the consistent need to provide seats for students when they are not in class.

The overall average of library, AV, lounge and reading/study space that is provided by campuses in BC is approximately 1.0 net m<sup>2</sup> per 1,000 ASCHs. This is only one-half of the area provided by Alberta for libraries and learning resource centres alone, using our derived calculations of between 1.8 and 2.0 net m<sup>2</sup> per 1,000 ASCHs.

In our best practices survey, the library at CNC's Prince George campus was recognized to be an effectively utilized space. Including AV space, the Prince George library delivers effective service at a rate of 1.3 net m<sup>2</sup> per 1,000 ASCHs. As a relatively

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new facility, it likely is not operating at capacity, and so, adding a 15% growth factor, we can assume it will continue to deliver effective services at a rate of 1.1 net m<sup>2</sup> per 1,000 ASCHs. Assuming an additional 0.25 net m<sup>2</sup> per 1,000 ASCHs for lounge and study space (Prince George's existing figure is 0.43, at the high end), the overall allocation for library/AV, lounge and reading/study space is equal to 1.35 net m<sup>2</sup> per 1,000 ASCHs.

**It is recommended that the standard for library/AV, lounge and reading/study space be combined. The rate of 1.35 net m<sup>2</sup> per 1,000 ASCHs should be generally applied to campuses, with institutions given the discretion to allocate resources to each function.**

Another factor which may have an impact on the requirements for lounge and library space is program mix, particularly for academic and English as a second language programs. It is recommended that information about program mix at campuses should be developed and used to analyze the use of library, study and lounge space. The importance of informal study and meeting space for students in academic and professional programs has been widely documented.

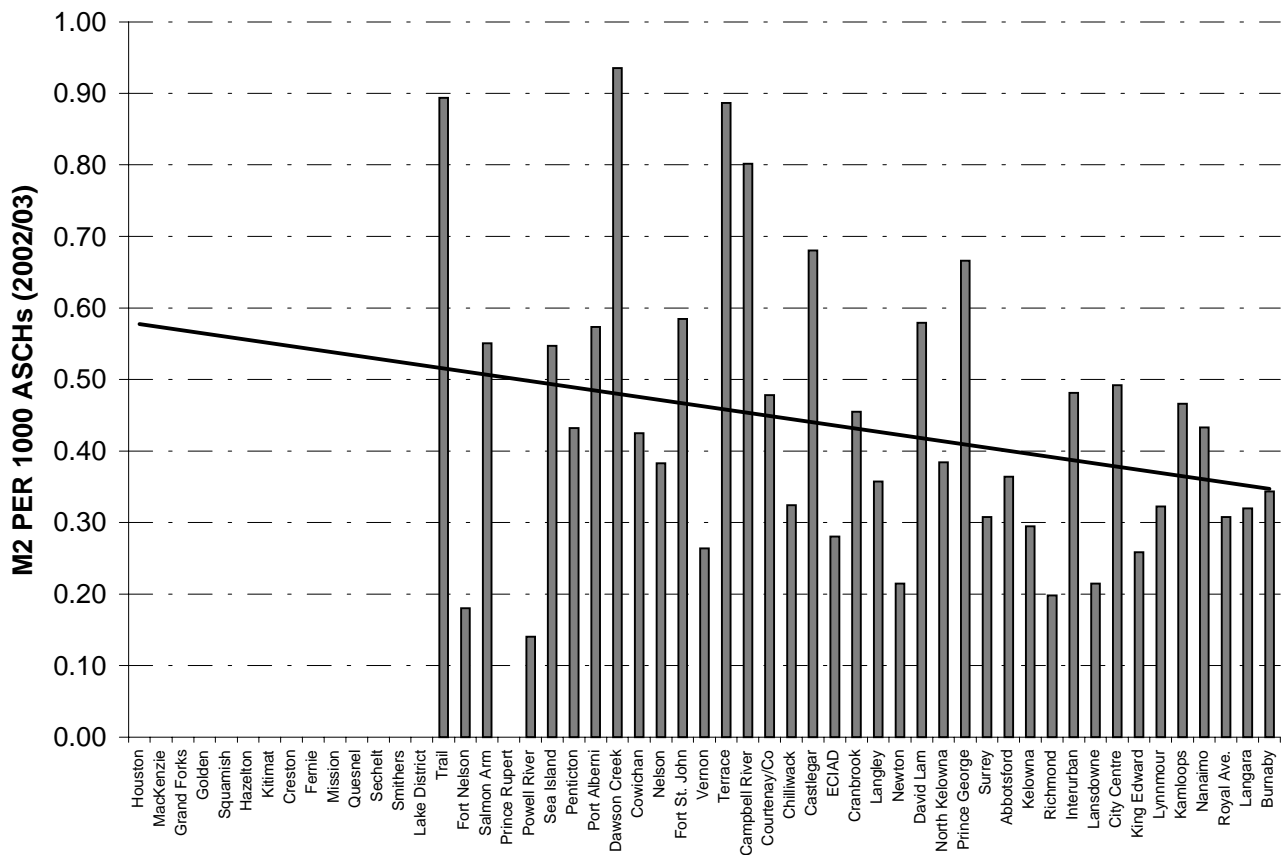
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Cafeteria and Food Services

Graph 14 indicates the relationship between cafeteria and food services area and campus size expressed in terms of as ASCHs for BC campuses. It excludes space for teaching kitchens but includes space for production kitchens and kitchen support areas.

Graph 14 – Comparison Of Cafeteria And Food Services Space At BC Campuses



The trendline indicates that the larger the campus in terms of ASCHs the less space per ASCH that is provided for cafeteria and food services. As well, campuses below a size of approximately 200,000 ASCHs generally do not have food services or cafeterias.

The range of space provided is quite large, ranging from 0.20 net m<sup>2</sup> per 1,000 ASCH at the low end, to a high of 0.9. The majority of campuses, however, are centred on the 0.3 to 0.4 net m<sup>2</sup> per 1,000 ASCHs range.

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Alberta used a space guideline of 0.4 net m<sup>2</sup> per student FTE for calculating cafeteria space. The guideline is based on the assumption of 2.70 m<sup>2</sup>/meal served, three 40 minute shifts and expectation that one-third of students will eat at the cafeteria. This guideline, translated into ASCHs by using a range of 600 to 700 ASCHs per FTE, is equal to 0.57 to 0.67 net m<sup>2</sup> per 1,000 ASCHs which, again, is well above the typical area for cafeteria at BC institutions. There are, however, a small number of institutions that approach the Alberta allocation.

The cafeteria at the Kelowna campus has been identified as a best practices space. However, it was largely based on the teaching kitchen program areas. It is advisable to identify a preferred practices cafeteria area for comparative purposes.

**It is recommended that a standard of 0.5 net m<sup>2</sup> per 1,000 ASCHs, slightly below that of Alberta, be used for cafeteria and food services for campuses larger than 200,000 ASCHs.**

A number of other factors may have an impact on food service needs, including the number or proportion of residential students, geography, the presence of teaching kitchens and available commercial space in close proximity to the campus. These factors should be considered when applying the above standards.

### Additional Campus Activity

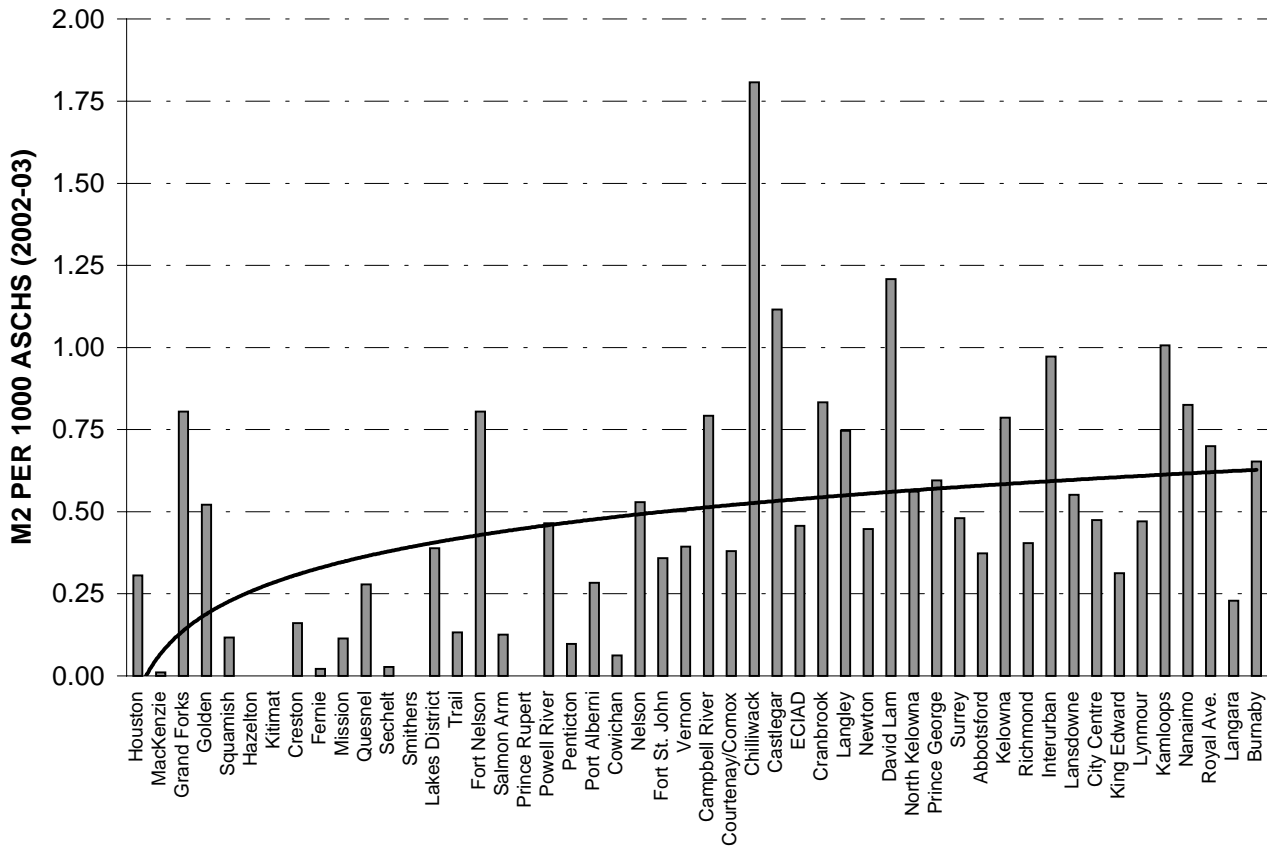
Space for the remaining functions that are typical of most campuses has been analyzed as additional campus activity. Included in this category are meeting and conference rooms, theatres, health facilities, maintenance and building support, and data and computing facilities. Excluded from the analysis are spaces that tend to be unique to a given campus or which lend themselves to a case-by-case consideration, such as bookstores and other merchandizing space, residential facilities, athletics and recreation space, and child care facilities.

Graph 15 indicates the relationship between space for this additional activity and campus size expressed in terms of area per 1,000 ASCHs for BC campuses.

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Graph 15 – Comparison Of Space For Additional Activities At BC Campuses



In general, the trendline indicates that the larger the campus the greater the amount of additional support space per 1,000 ASCHs that is provided. Small campuses may have a complete absence of additional activity space. The relatively high ratio of space per 1,000 ASCHs for some campuses may reflect the provision of a theatre (e.g., Chilliwack Campus) or support space designed to accommodate more than current student numbers (e.g., David Lam Campus).

**It is recommended that a standard of 0.25 net m<sup>2</sup> per 1,000 ASCHs be used for a campus' first 250,000 ASCHs, and that a standard of 0.65 m<sup>2</sup> per 1,000 ASCHs apply to remaining ASCHs. This is an interim standard only and should be confirmed when more comprehensive FIS data is available.**

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### NET TO GROSS RATIOS

While a great deal of attention has been given to the development of standards and guidelines for instructional space in many jurisdictions – which may comprise as little as 30% of a campus or building's physical plant – very little attention has been given by these jurisdictions to net to gross ratios, which may comprise over half of a building's overall area.

This section summarizes the information that is available on net to gross ratios in BC and other jurisdictions. Terms used in the analysis of net to gross ratios include:

- Net Assignable Area, the area used to accommodate a specific function or occupant. Examples of net assignable areas include offices, classrooms, laboratories, storage rooms, etc. Measurements are taken from inside wall to inside wall. Net assignable area does not include mechanical, electrical, structural and other building systems areas, washrooms, or circulation areas.

All numbered space code categories in the Facilities Inventory System (FIS) fall within Net Assignable Area, except 435 (Building Services Area in Library Complex), 530 (Building Services Area in Gymnasium) and 655 (Building Services Area in Food Services Area). These two space code categories are Non-Assignable Area as defined below.

- Non-Assignable Area, the area used to accommodate mechanical, electrical and other building systems, janitorial closets, washrooms, and circulation areas. Examples of non-assignable areas include mechanical rooms, corridors, lobbies, etc. At times the distinction between net assignable and non-assignable space may be difficult to determine. For example, a large mall type space is used both for general circulation (non-assignable) and as lounge space (net assignable).

Non-assignable Area is categorized as 435 (Building Services Area in Library Complex), 530 (Building Services Area in Gymnasium) 655 (Building Services Area in Food Services area) and ZZZ space in the FIS.

- Usable Area, as used by the FIS, is the result of adding net assignable and non-assignable areas.
- Gross Area is the total area of a building including exterior walls, structural members, and internal partitions. It typically applies only to roofed, heated space, which is surrounded by exterior walls. Gross area is the result of adding usable area and structural area.

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- Net to Gross Ratios are calculated by dividing the Gross Area by the building's Net Assignable Area.

Although the space that the net to gross ratio identifies is often construed as "design" space, adequate circulation, washrooms and mechanical rooms are necessary and are, in many cases, driven by the relevant building codes, to ensure that a building functions properly and is safe for occupants. Buildings with large corridors or significant mechanical areas will have larger net to gross ratios. Again, large corridors may be multifunctional, and, when this is the case, should not be understood as purely non-assignable area.

### Other Jurisdictions

For comparison, information from other jurisdictions is included. This information should be viewed cautiously, as net to gross ratios may be calculated slightly differently. In addition, climate and geography may have an impact on circulation and mechanical space requirements.

The Alberta Fenske formula provides an assignable area to gross area ratio of approximately 1.54 for campuses as a whole. However, this includes maintenance and stores space.

Published articles have indicated that for five science teaching facilities at U.S. colleges and community colleges, the ratio of net area to gross area varies from 1.51 to 1.70, with the average ratio around 1.62. Sciences facilities have some of the highest net to gross ratios

California State University provides direction for a portion of the net to gross factor through its standards for corridor widths, which are as follows:

- Corridors with offices on each side: 1,829 mm (6 ft)
- Corridors with offices on one side and instructional rooms on the other: 2,438 mm (8 ft)
- Corridors with instructional rooms on each side: 3,048 mm (10 ft)

### British Columbia

BC has made a significant investment into a Facilities Information System (FIS). As a result, **it is recommended that, where possible, data from this system and the methodology of this system should be used to calculate net to gross ratios.**

Table 11 provides a comparison of select buildings organized according to building type. The Gross Area for these buildings is compared to Total Usable Area and Total Assignable Area, based on the FIS data. The recommended net to gross standards are included.

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It is important to note that because the net to gross ratio standards have been derived from FIS data, they likely differ from the ratios commonly used in the design industry as individual spaces may be categorized as net space or may be included in the net to gross ratio mark-up.

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Table 11 – Comparison Of Gross Area, Total Usable (FIS Total) and Total Assignable For Selected Buildings

Building	Gross Area (m <sup>2</sup> )	Total Usable: FIS Total (m <sup>2</sup> )	Ratio to Gross Area	Total Assignable: FIS - ZZZ (m <sup>2</sup> )	Ratio to Gross Area
<u>Classroom/Lab Buildings</u>					
Capilano Classroom Building	4,316	4,000	1.08	2,876	1.50
Camosun College General Purpose Bldg *	1,904	1,763	1.08	1,335	1.43
Malaspina Education/Social Sciences	4,310	3,960	1.09	2,668	1.62
UCC Arts and Education Building *	5,543	5,132	1.08	3,546	1.56
OUC North Kelowna, Arts Building	6,589	5,805	1.14	3,934	1.67
OUC North Kelowna, Sciences Building	6,358	5,856	1.09	3,967	1.60
Totals	29,020	26,516	1.09	18,325	1.58
<b>Recommended Guideline: 1.50 - 1.60</b>					
<u>Shops</u>					
UCC Trades and Technology Building **	10,236	9,252	1.11	6,859	1.49
<b>Recommended Guideline: 1.40 - 1.45</b>					
<u>Administrative/Student Services Buildings</u>					
Capilano Student Service Building	10,704	10,117	1.06	7,089	1.51
OUC North Kelowna	3,953	3,817	1.04	2,862	1.38
<b>Recommended Guideline: 1.40 - 1.50</b>					
<u>Library Buildings</u>					
Capilano Library Building *	7,943	7,355	1.08	5,319	1.49
UCFV Library Building *	4,479	4,148	1.08	3,007	1.49
OUC North Kelowna	3,553	3,332	1.07	2,827	1.26
<b>Recommended Guideline: 1.45 - 1.50</b>					

Notes:

\* Gross Area has been calculated by multiplying Total Usable by 1.08.

\*\* Building includes office and classrooms as well as shop space.

In Table 11, Total Usable is equal to Total Assignable Area plus Non-Assignable Area. Total Assignable Area includes all space that can be allocated to a specific function or occupant, except janitorial and public hygiene functions. Non-Assignable Area, categorized as ZZZ space in the FIS, includes circulation space (corridors, lobbies, staircases, etc.), building systems space (mechanical and electrical rooms, etc.) and public hygiene space (public washrooms, janitorial closets, etc.). The remaining area of the building, after Total Assignable Area and Non-Assignable Area are removed is equal to the structural area of the building and the area of all interior partitions.

A range for net to gross ratios has been provided for specific building types in Table 11. A number of factors can influence the net to gross ratio, including:

- the type of space. For example, an open office environment will result in a lower net to gross ratio than that achieved by the accommodating the same functions in enclosed offices. This is due to two factors. First, the

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partitions between offices in the second instance will be included in the net to gross ratio. Second, and more importantly, the aisles between workstations in the open office scheme will be included in the Net Assignable Area. In the enclosed office scheme they will be included as Building Service space and not as Net Assignable Area. As a result, though the gross areas of the two schemes may be very similar, the net to gross ratio will be significantly higher for the enclosed office scheme.

- climate and geography, which may allow access by external corridors and differences in the sizing of mechanical rooms.
- siting constraints. For example, the site may dictate the shape of a building or the building may be required to serve as a major campus pedestrian conduit.
- the number and type of occupants of a facility. For example, wheelchair access considerations serve to increase net to gross ratios as ramping or areas of refuge may be required. Again, numbers of occupants drive the requirement for public washrooms.

Improvements in the way FIS data is collected and reported will result in a better understanding of net to gross ratios within the BC college, institute and university college system. Possible improvements to the FIS data include developing a gross area for each building, ensuring that FIS data can be easily extracted by building, and that the building services categories (435, 530, 655 and ZZZ) are allocated only to building services functions and exclude storage and those portions of corridors and lobbies which serve functions besides circulation.