University of Toronto Library

Project Planning Report
for
Long-Term, High-Density
Library Storage Facility
at Downsview Campus

Prepared by:
Library Storage Project Committee
January 19, 2004

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I. Committee Membership

Carole Moore (Chair), Chief Librarian, University of Toronto Libraries
Alfred Cheng, Director, Finance and Administration, University of Toronto Libraries
Prof. Ken Bartlett, Chair of the Advisory Committee on the Library System
Junior Milczarek, Undergraduate Student Representative
Prof. Ron Venter, Vice-Provost, Space and Facilities Planning
Julian Binks, Manager, Project Planning, Capital Projects Office
William Yasui, Senior Facilities Planner, Campus and Facilities Planning

II. Terms of Reference

The Project Committee was chaired by Carole Moore, Chief Librarian, University of Toronto, and was charged with the following terms of reference:

1. Identify the short- and long-term storage requirements (extending over a twenty-year period) for the storage of library material, primarily books, of the University of Toronto Library system. Identify the frequency of use of this facility.
2. Assess the suitability of locating the storage facility at the Downsview, University of Toronto at Mississauga (UTM) and University of Toronto at Scarborough (UTSC) Campuses.
3. Investigate the suitability of locating an interim storage facility in the Borden Building, Canadiana Gallery, and possibly, 89 Chestnut Street.
4. Identify space programs for the interim and long-term facilities.
5. Identify any secondary effects.
6. Identify all equipment, moveable and fixed furnishings necessary to the project, and the estimated costs for equipment and furnishings.
7. Identify all resource implications and the sources of funding. Include a preliminary estimate of capital costs, financing and cash flow costs, and all projected increases to the annual costs of the University.
8. Include a detailed funding plan for the capital and operating costs.
9. Establish an implementation schedule for the interim and long-term plan that is proposed.
10. Report as soon as possible.

III. Background Information

In 1999/2000, the *Advisory Committee on Library Space* reviewed the inventory of space in University of Toronto libraries, defined short-term and long-term library space issues, and projected collection requirements to the year 2020. Two sub-groups were charged with investigating *Current Collection Space (Sciences, Humanities and Social Sciences)* and *Alternate Collection Storage*.

At that time, the *Advisory Committee* revealed that the University's libraries had an estimated overall utilization of collection space capacity of between 90 and 100 percent. This utilization rate did not compare favourably with the maximum workable capacity recommended for public access library stacks at 75 to 80 percent of total capacity. With a five-year average (taken from 1995 to 1999) net increase in collection size of 180,552 volumes per year, the *Advisory Committee* projected a need for an alternate long-term collection storage space for lesser-used materials within five to seven years. Any significant changes to the planning model's assumptions could exasperate the seriousness of the problem.

The *Advisory Committee on Library Space* presented several interim and long-term strategies to deal with the collection storage needs of the University's libraries. These strategies formed the bases for the *Terms of References* for this current Project Committee.

When the Project Committee first convened, the annual acquisition rate of the library's collection was approximately 226,000 volumes per year and the need for some type of high-density, long-term storage facility was immediate. The twenty-year planning horizon now had a projected minimum storage requirement of 4.5 million volumes of primarily print (i.e. monographs, bound journals) collection material.

The Project Committee reviewed and evaluated a number of interim and long-term storage options in order to prepare the optimal response to the problem.

IV. Planning Considerations and Recommended Plan

High Density Racking Options

A. Open Access Shelving

In a typical, patron-accessible library stack, the single-sided, shelving units are usually three-feet wide, 10- to 12-wide and having seven shelves. On average, each shelf can hold a maximum of 22 volumes (more if books are small, less if they are large). Theoretically, each shelving unit could hold 154 volumes (typically in accessible stacks shelves should hold 75 to 80% of their maximum capacity). The library collection in accessible stacks is usually shelved by subject matter and by author (alphabetically) to facilitate browsing and locating specific volumes by library users. However, this is the least cost-effective approach for the storage of low-use volumes that will not be accessed by the public. For planning and comparison purposes, a library collection of one million volumes would require a total stack area of 5,900 net assignable square metres (nasm) based on *Council of Ontario* (COU) space allocation factors.

B. Moveable Compact Storage

In open access stacks, a significant portion of the floor area is required to provide circulation space not only between opposing shelving units (to gain direct access to books on shelves) but also to get to and go between stack areas. A method to increase the density of collection volumes within any given floor area is to use moveable compact storage units. These units are relatively long double-sided, storage units that are mounted are mounted on tracks that allow a number of shelving ranges to move laterally; this way a single aisle can be created where needed within a block of shelving ranges (fixed single-sided ranges are located at the end to act as stops). As with open access stacks, collections are often still arranged by subject and by author.

Two basis types of moveable compact shelving are found in libraries: mechanically-assisted, manually operated units (that can accommodate up ranges up to 30 feet long); and, motorized units (that can double the range length but are usually 36 feet long). With the elimination of nearly all of the stack aisles, a one million volume collection that are accommodated in a manually-operated system would require a floor area of about 3,400 nasm – a significant decrease from open access stacks. Motorized systems would require even less floor space. However, these systems are considerably more expensive (especially motorized units), require significant time to move units to gain stack access, and require considerable live floor loading capacities.

C. High Density Racking Systems

A number of academic research universities in North America have adopted high-density storage systems that are very similar to those found in commercial or industrial enterprises. These approaches typically use industrial racking systems with shelves that are deeper (and often wider) than those in library units, and are 25 feet, or more, in height. As well, instead of volumes being individually placed on shelves, volumes of the same size are grouped together and placed in enclosed boxes or open trays.

In this approach, not only are the volumes encoded (usually with a scannable UPC bar code) but also each box/tray, shelf and rack. With suitable hardware and software to identify, store, locate and retrieve individual items, the collection can be stored without concern as to subject matter or author. When grouped by size and boxes or trays are placed on end into shelves (with usually two boxes or trays end-to-end on a 36-inch deep shelf), the available 'storage' volume of the rack can be optimized.

Three types of approaches to filing, retrieval and refilling of specific volumes have been employed by high-density storage facilities. The most technologically-involved and costly method is to use an automated or robotic system. This approach has the advantage of relatively quick turn-around time in retrieving and delivering volumes to the end-user, and the end user can often make queries and requests directly from a computer workstation. However, if the system goes down for any reason, stored volumes cannot be readily (if at all) be retrieved or filed as the system is usually designed for equipment maintenance purposes only.

A more popular approach is to use a mechanized order picking system. A fork lift type wheeled device is operated by a staff member to access boxes or trays from the racks. The operator then brings the box or tray back to a processing centre for copying and or delivery; some units have photocopy or scanning equipment on the lift. This approach is relatively costly (especially if redundant lift are required in case of emergencies) from an initial capitalization and on-going operating cost standpoint, and requires that staff are properly trained in the safe and efficient used of motorized equipment.

The Project Committee considered the simplest approach to be the best. This system uses the same racking units but retrieval and filing is done manually and directly by staff by the use of interconnected, elevated walkways. Stairs are used by staff to move between levels (usually two above the floor level) and a dumb waiter is used to move book carts. On each level, small portable step units are needed by staff to reach the upper shelves. With this approach, the facility's staff will not be required to be trained in the use of any motorized equipment. Based on some racking models, it is estimated that one million volumes can be accommodated in a floor footprint of 990 nasm.

Library administration has recommended that any long-term storage facility be designed to accommodate print material. Selected material will be sorted by size and placed in one of four sizes of open cardboard trays. It is anticipated that the majority of the collection will be readily accommodated in trays that are nominally 9-inches wide by 18-inches deep (trays are stored on end on shelves) with a clear shelf height of approximately 12 inches. Actual tray size and shelf spacing will evolve as the collection grows, but for planning purposes, the above dimensions have been used in defining the requirements of this project.

Interim Storage Options

A. Existing Library Space

The Chief Librarian has been involved with on-going discussion with academic and administrative departments and units that are currently located in the John P. Robarts Library Building and the Gerstein Science Information Centre to re-locate them elsewhere on the St. George Campus. However, these moves are highly dependent on locating suitable and acceptable space and completing renovations within a very short period of time. It was considered impractical to rely on this possibility and the Project Committee did not deem this as a viable approach. In the long term, the space assigned to non-library users when released will assist the UTL in rationalizing existing functions and services, and accommodating new initiatives; the amount of space for growing the collection would be minimal.

B. Canadiana Gallery, Bahen Centre and 255 McCaul Street

Several locations on the St. George Campus were investigated; unassigned space in the Canadian Gallery, the unfinished sixth floor of the Bahen Centre for Information Technology, and the vacant warehouse building (formerly owned by the Board of Education) at 255 McCaul Street. Each location was closely examined as to the maximum number of shelving units (included existing surplus library units, and used and/or used commercial units) that could be accommodated, the total number of volumes that could be held on these units, and the estimated cost to undertake (not including the costs associated with processing and moving the collection). The table below summarizes the Project Committee's findings

Interim Location	Total Volumes	Cost Estimate	Cost per Vol.
Canadiana Gallery	150,920	$80,850	$0.54
Bahen Centre (Sixth Floor)	529,760	$331,800	$0.63
255 McCaul Street	708,400	$417,900	$0.59

After considerable discussion, the Project Committee decided that could not recommend the implementation of any of these interim storage solutions. Although the Canadiana Gallery is currently available, the amount of surplus library shelving units will not be sufficient and some non-standard commercial units will need to be purchased. The Canadiana Gallery does not have an elevator that will require extensive manual labour in the moving and setting up of shelving units, the relocation of the collection, and the retrieval and refilling of any circulation material. The commercial units that will need to be purchased for this option cannot be re-used in the long-term facility and will have to either be put into storage or sold.

Both the Bahen Centre and 255 McCaul Street locations could accommodate a significant number of volumes. However, both these locations are under consideration for other long-term uses and a significant amount of capital investment would be required to implement them. Although the horizontal pans of the commercial shelving units could be re-used in the long-term facility, the structural upright components cannot and will need to be either sold or put into storage.

In all three scenarios, the capital investments are large enough (especially for the Bahen and 255 McCaul options) to have a significant impact on the ability to implement the long-term solution. As well, the library will need to make a significant commitment of its human resources (operating budget) to relocate the low-use collection to an interim location for a relatively short period of time before the collection has to be moved again to the long-term facility.

C. Other Locations

Additional locations; such as, 89 Chestnut Street and the lower portion of the Bahen Centre's underground parking garage, were considered but none were found to provide suitable storage space for the low-use collection.

Long-Term Options

A. Scope of Investigation

The Project Committee considered all possible locations for a long-term facility not only on the St. George Campus but also the UTM, UTSC and Downsview Campuses. As well, the Committee considered the possibility of purchasing a commercial property within the Greater Toronto Area.

B. UTM and UTSC Campuses

The University of Toronto at Mississauga and at Scarborough Campuses were both offered the opportunity to accommodate the proposed library storage facility and both campuses declined. Both campuses have aggressive capital development plans and felt that they could not readily accommodate the addition of the proposed storage facility. As well, the Committee agreed that neither campus is centrally located for the entire University of Toronto library system. The Project Committee did not pursue any further analyses of these campuses.

More detailed investigations were undertaken for the St. George and Downsview Campuses as both of these are centrally located, and the availability and cost to purchase commercial property was also looked into more detail.

C. St. George Campus

The St. George Campus has very limited amount of development sites for any sizable building structure (especially for the building form envisioned for a long-term storage facility). However, the current City of Toronto By-Laws does permit the construction of a significant addition onto the west elevation of the Robarts Library Building. A 23-metre high (from street grade) structure that is 48-metres wide and 28-metres deep is permitted along the west elevation (Huron Street) of the existing library building. This addition has to be centred down Glen Morris Street and must incorporate the existing loading dock facility.

It was determined that a structure with two 30-foot high floor levels could be constructed and high-density storage racking could be readily accommodated. Depending on the possible configuration of the racking (difficult to determine without a more detailed assessment of the building form and size allowable on the site), anywhere from 2.5 to 3 million volumes could be stored. Although this option provided the best situation for the library to service its clients and minimized the amount of processing-administration space (as this facility could take advantage of existing Robarts staff and operations), and at a total project cost similar to the preferred option, the disadvantages made this option a second choice (at best).

The primary disadvantage is that this option does not provide an addition large enough to accommodate 4.5 to 5 million volumes. Because of the difficulty in undertaking the construction of an addition onto the Robarts Library and the need to minimize disruption while doing so, the entire available building envelope will need to be built in a single phase, not in stages as the collection grows over time. This will mean that either the unused space be left vacant or suitable temporary uses (that can be readily moved out in stages) will need to be found. As well, this location will require a more concerted effort to facilitate its passage through not only the University's capital project process but also through the City of Toronto's various agencies. This will require more time to implement and it is expect that this option would require nearly twice as much time to complete as the recommended approach.

Another consideration for the St. George was the construction of an underground facility as part of the development plans for the Varsity Stadium lands. An underground facility could not readily be built with the clear ceiling height needed for the proposed racking system. Therefore, a significantly larger building footprint would be needed (using up a significant portion of the available site). As with the addition to the Robarts Library, an underground facility would be required to be constructed to its full 20-year capacity size; phased development would not be practical. Also, a plan for the Varsity site has yet to be finalized and the development of this project could not begin until this occurred. If it does proceed without a finalized master plan for this site, any future development may be considerably constrained.

D. Purchase of Suitable Property

The Project Committee considered the acquisition of an appropriate warehouse building within the Greater Toronto Area. Based on information available from the University's Real Estate Division, there is a possibility that a suitably sized warehouse (not likely one with a 31 foot clear ceiling height) for a low height racking system could be found for about the same capital investment as building a purpose-built structure on University lands. However, the cost to renovate an industrial warehouse unit with an appropriate preservation environment for print material could be extensive making this the most expensive solution for long-term storage. As well, unless a property with a warehouse that could be readily expanded is located, then a large enough building for the 20-year collection size would have to find other tenants for unused space who can be readily moved out in stages.

E. Downsview Campus (Recommended Plan)

The Downsview Campus was viewed as a strong candidate for the long-term storage facility because it is centrally located to the St. George, UTM and UTSC Campuses, has a construction site large enough to accommodate the proposed structure, and can be readily be accessed by vehicles off of Dufferin Street.. This location would allow the construction of a structure that is ideally dimensioned to contain the recommended racking system and would readily allow its phased development. As well, the processing-administration facility can be ideally situated in relation to the initial and future storage modules. More details about the site and proposed building are described in later sections of this report.

This is the Project Committee's preferred site for a permanent high-density storage facility and recommends that an initial phase consisting of the full processing-administration facility and two storage modules (of one million volume capacity each) be built as soon as possible. It's estimated that subsequent storage modules would follow in approximately four-year intervals. Because this option permits a phased development, the initial capital expenditure would be the least of all of the considered options. Each subsequent storage module can be phased to closely coincide with projected needs and would be reasonably cost effective to implement.

Although there are other developments proposed for the Downsview Campus, there are sufficient lands available to accommodate them as well as the proposed high-density storage facility for the University of Toronto Library.

As well as considering new construction at Downsview, the Project Committee explored the possibility of a joint venture with the University of Toronto Press (UTP) that occupy a structure at the entrance to the Downsview Campus. The Committee also considered the suitability of the UTP complex if it became available. The Committee concluded that a shared arrangement with any expansion onto UTP's complex would be operationally difficult (different access and environmental needs) and that the existing UTP site proffered very limited expansion capability due to its proximity to the nearby river bank of the West Branch of the Don River. The existing structure itself could not be easily moved into if it became available because the storage environment for a press operation is quite different from the one needed to properly preserve library material; extensive renovations would be required and a detailed investigation would be needed to determine if a suitable racking system could be accommodated within the building's infrastructure.

V. Space Program

A. Storage Modules

A complicated space program for each of the storage modules is not required. The basis of the design criteria for each module is to provide the minimum structure to envelop the long-term storage collection in an environment that is appropriate for the preservation of library material.

Each module is programmed to accommodate approximately one million volumes (of predominantly print material) within a building environment of 12-20˚C (+/- 2˚C) and 40% RH (+/- 10%). The maintenance of a constant environment is crucial in the preservation of print material. Volumes will be sorted and stored by size in cardboard trays (four sizes but nominally sized at 9-inces wide by 16-inces deep for planning purposes) that will be placed end-to-end on 36-inch deep shelves. Racking runs will consist of two 36-deep units placed back-to-back (i.e. four trays deep) and are 27 feet in height (three levels with one at grade and two above that are accessed by catwalks). Based on shelves that are eight-feet long, 64-foot long racking runs are suggested.

In order to accommodate one million volumes, approximately 13.75 double-sided racking runs will be needed with seven runs down each side of an eight-foot wide centre aisle. Access to each racking run will be along four-foot aisles. Nominally, the entire racking system in each module would be 74 feet deep by 144 feet wide by 27 feet high for a total net assignable floor area of 10,656 square feet or 990 square metres. As the racking system will be fully self-contained (including dumb waiter and stairs), only sufficient clear ceiling height will be needed to accommodate not only the rack structure but also the roof structure, lights and HVAC system. For planning purposes, each module is expected to be 11,544 gross square feet (or 1,000 gross square metres) in size. Each storage module will have its own facility (at grade for ease of maintenance) for mechanical and electrical equipment located adjacent to it. A simple structure of approximately 100 gsm in size has been estimated.

It should be noted that the actual racking system selected and subsequently the size of the storage module will still need to be investigated during the design development process. The continued involvement of the Project Committee and especially A. Cheng (UTL Administration), J. Binks (Capital Projects Office) and W. Yasui (Campus & Facilities Planning) is crucial during this time. These individuals will need to not only prepare detailed performance specifications for the racking system and the surrounding building but also closely review any proposals put forward by consultants and/or contractors during the design and construction phases.

B. Administration-Processing Facility

Although the UTL has not finalized all of the operational aspects of a remote long-term, high-density storage facility, a preliminary space program for a central administration-processing facility was developed from similar operations at other academic research libraries' storage facilities.

The administration-processing facility is expected to contain:

Room/Function	Unit Area (sm)	No.Rooms	Total Area (sm)
Vehicle (Van) Bay	27.87	1	27.87
Shipping/Receiving Area	18.58	1	18.58
Main Processing Area			
- Processing Lines	35.00	4	140.00
- Retrieval Area	23.23	1	23.23
- Refile Area	23.23	1	23.23
- Electronic Document Delivery	23.23	1	23.23
Tray Assembly & Storage Room	19.39	1	19.39
Administration Area			
- Manager's Office	15.00	1	15.00
- Front Office/Reception	23.23	1	23.23
- Office Support	11.15	1	11.15
- Staff Room (with kitchenette)	18.58	1	18.58
- Reading/Meeting Room	23.23	1	23.23
- Server Room	4.65	1	4.65

Total Net Assignable Area (NASM)	**370.37**
Gross-up Factor - Mechanical-Electrical Rooms - Circulation Space - Wall Space - Washrooms & Custodial Space - Telecommunications Closet	1.35
Total Facility Gross Area (GSM)	**500.00**

Normally capital projects would prepare detailed room specification sheets that describe each discrete room or space within the building. Because the operation of this facility has yet to be finalized, room specifications sheets have not been prepared. However, it is recommended that these sheets be prepared for the administration-processing facility during the design development phase of the project. As with the design of the storage modules, the continued involvement of the Project Committee and especially A. Cheng (UTL Administration), J. Binks (Capital Projects Office) and W. Yasui (Campus & Facilities Planning) is crucial during this time.

C. Phased Project Development

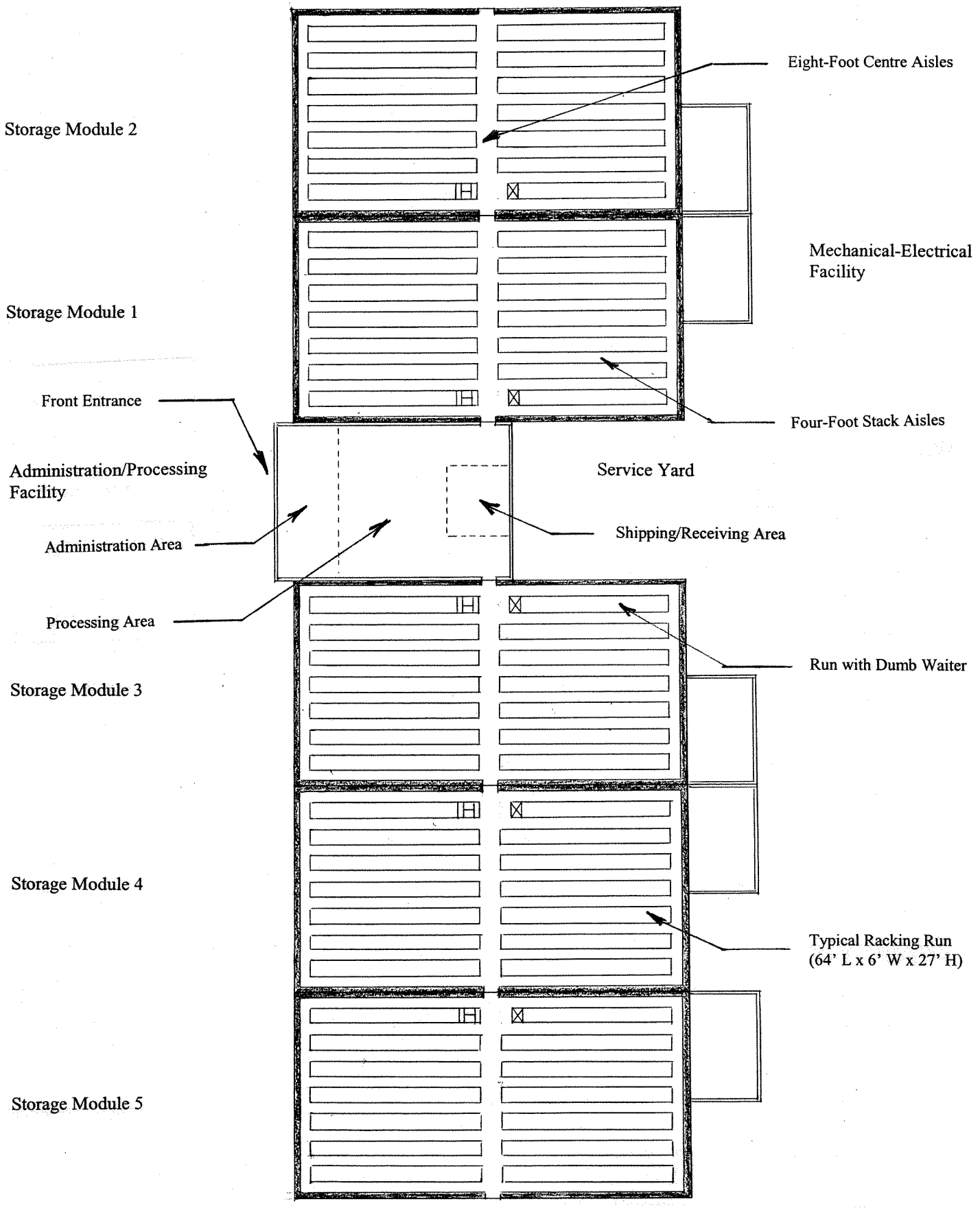
The Project Committee recommends that the first phase of the construction project include the full administration-processing facility and two of the storage modules. This phase of construction would be approximately 2,700 gross square metres in size (two modules at 1,000 gsm each, two mechanical-electrical units at 100 gsm each, and the administration-processing facility at 500 gsm). This initial phase would then be followed by three phases that would each add one storage module and mechanical-electrical unit (total of 1,100 gsm each).

VI. Functional Plan

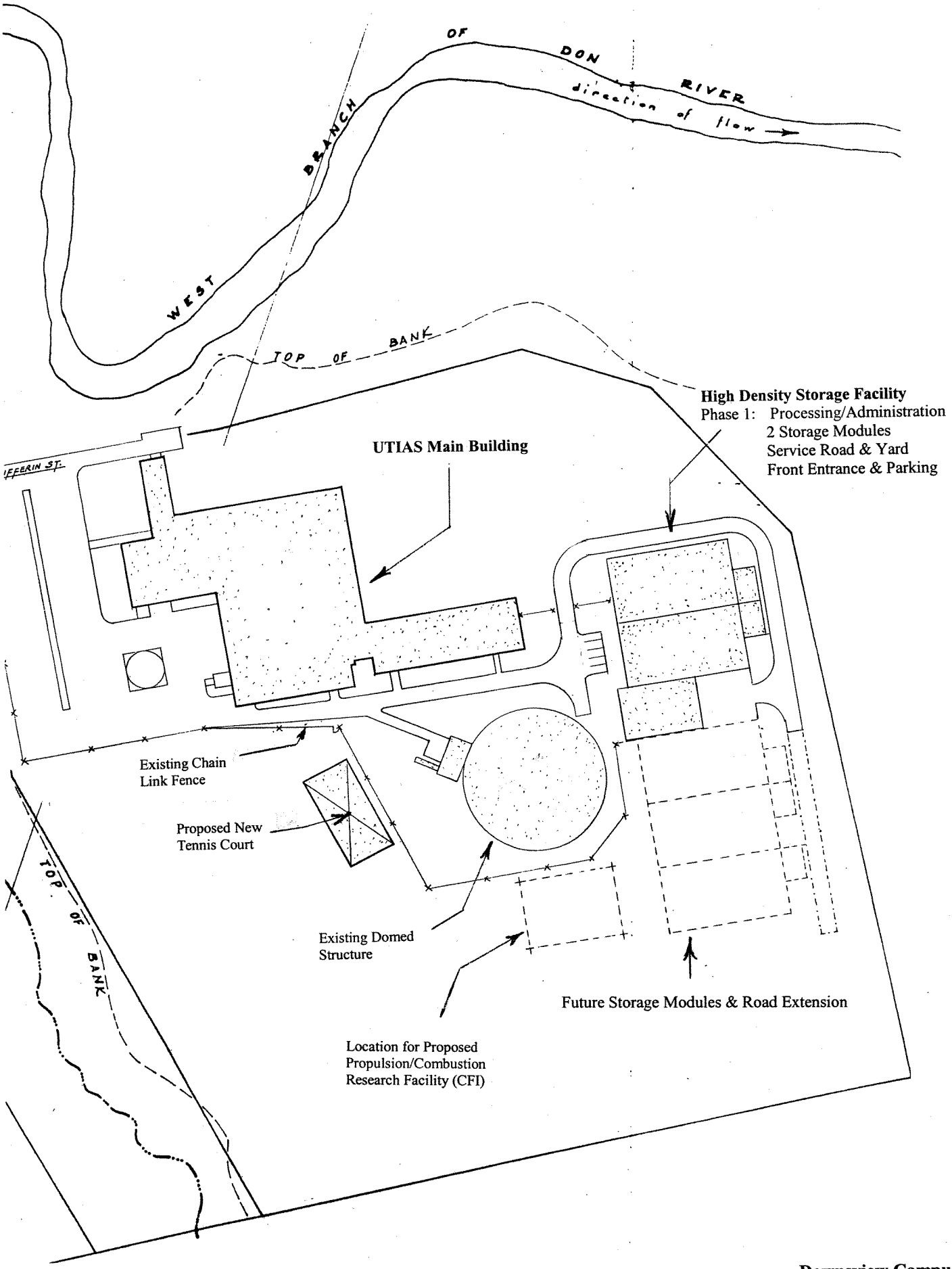
Without a definitive operational plan nor a selected racking system, it is difficult to prepare a detailed functional plan for this project. However, in order to provide some planning guidelines and cost estimates for the proposed scheme, a preliminary arrangement of the project's building components has been prepared and presented in the accompanying illustration.

It is proposed that the centre aisles be aligned with each other and with the access point(s) of the main processing area. The first two storage modules should be constructed to the north of the administration-processing facility with subsequent storage modules constructed (in a line) to the south. When the entire complex is completed, the administration-processing facility is roughly in the middle of the storage modules. This location ensures that reasonable travel distances by staff accessing the collection can be achieved without the need to employ any motorized devices.

A more detailed analysis of the facility's work flow will need to be undertaken before the functional arrangement for the administration-processing facility can be prepared. However, for planning purposes, it was assumed that the administration area and shipping-receiving/vehicle bay could be located beside each other at the front (west side) of the facility and the main processing area to the rear. Regardless of the layout, work flow within the administration-processing facility and traffic flow between it and the storage modules must be optimized. The mechanical-electrical units for each storage module should be located on the same side as the shipping-receiving area to optimize the amount of vehicular roads needed to service the facility.



High Density Storage Facility
Proposed Component Layout (at completion)



Downsview Campus
Site Plan

A preliminary site plan was prepared to ensure that the proposed long-term, high density storage facility could be accommodated on the Downsview Campus (see accompanying illustration). It should be noted that the size of building's footprint and the location of the access road is shown in what the Project Committee felt was the 'worst-case scenario'. The Committee recognized that it was possible to reduce the dimensions of the racking systems' footprint by changing the length of shelves and that the length of the access road could be reduced by moving the shipping-receiving area (and mechanical-electrical units) to the front of the complex.

As with the preceding phases of this project, the Project Committee will need to be closely involved during this phase to ensure that a functional design can be achieved by the consultant. The consultants should rely on the specific input from A. Cheng (UTL Administration), J. Binks (Capital Projects Office) and W. Yasui (Campus & Facilities Planning

VII. Environmental Impact

The University of Toronto is strongly committed to the development and maintenance of exemplary strategies that are aimed at enhancing not only the campus but also the global environment. This commitment is set out in the University's *Environmental Protection Policy*, dated 7 March 1994 and is reproduced in Appendix A.

This policy has had, and will continue to have, important impact on construction projects that range from siting policy to material selection. The University does not under-estimate the difficulties in making the most effective environmental choices nor can the budget implications of such choices be ignored. On campus, buildings represent the single most important element that affects the environment; they give it a recognizable form and are major consumers of natural resources in their construction and operation. Building design professionals have an inherent responsibility to foster good environmental practices as do building users and university administrators.

In order to encourage building designs that meet the University's environmental policy, an environmental section has been incorporated into the University's *Design Standards Manual*. This section obligates the design team to adhere to a set of environmental design principles:

- When making decisions about designs, processes and products that influence resource use (e.g., energy, water, materials) and other environmental impacts (e.g., indoor air quality, lighting, waste management), alternative choices, including innovative but proven alternatives, be considered;
- When making decisions about life cycle costs to consider those which also offer environmental benefits; and,
- To assess environmental impact broadly – recognizing that impacts in one area must be assessed in relation to others so that the "system" can be effective.

VIII. Special Considerations

A. Standards of Construction and Quality

The storage facility is a permanent, long-term building and must be designed in such a way and of such materials that this life will be achieved. It should be located and designed to avoid or resist 100 year floods, earthquakes, hurricanes etc.

Conceptually, it consists of a single-storey administration - processing module connected to a complex of high density storage modules having nominal capacity of one million volumes each. This volume

requirement translates into storage modules of approximately 74 feet deep by 144 feet wide in interior dimensions with at least 31 feet clear height inside. The precise interior dimensions will depend on the final configuration of racking chosen and the modules exterior structure will depend on construction method.

The storage racking will be arranged in three tiers, each nine feet high, for a total system height of 27 feet. Each of the two upper tiers has an open catwalk for access by personnel to the shelves on these levels. In order to accommodate one million volumes, approximately 91,000 boxes (nominally 9-inches wide x 18-inches deep) will need to be accommodated on shelves. Boxes are not stacked, but may be housed two deep on 36-inch deep shelves. With some allowance for the width of vertical supports, this translates to 36,400 linear feet of 36-inch deep shelving.

It is proposed to build out two of the one million-volume modules plus the administration - processing area in the first phase of this project. Subsequent phases will likely consist of additional one million volume storage modules.

The building will need to be secure, well lit, with multi-level sprinkler protection, and HVAC systems capable of maintaining a 12-20˚ C (+/- 2˚C) and 40% RH (+/- 10%) year round for 95% of the year in the Toronto climate. Each module will have its own HVAC system. A more detailed investigation into fire protection systems still needs to be undertaken to ensure that a suitable system is selected.

B. Landscape Requirements

The Downsview Campus currently has an inner security fence to protect unauthorized access to its facilities as well as an older fence around the perimeter of the property. The high-density storage facility will need to ensure that its construction and operation will not compromise the security of the campus' current or future operations.

As well, an access road extends to the edge of the proposed location for this new building. This road will need to be extended to the facility's shipping and receiving area, and to provide service access to the facility's mechanical-electrical units. A small vehicle parking area near the front entrance should also be incorporated in the site plan as the campus' existing parking is not conveniently located for this library operation.

The proposed site is an open field except for a small cluster of evergreens by the hazardous waste storage module that is located at the north end of the site. The design of the new facility and associated road access should either incorporate them in their current location or relocate them to a more appropriate location.

C. Accessibility and Personal Safety

This building is not intended for general faculty, student or public access; it will strictly be used for the secure, long-term storage of the library's low use material. Although this building will be designed and constructed to meet all applicable building regulations and the administration/processing facility will be accessible, it is accepted that the storage modules will only be accessible by able-bodied personnel. The height of shelves in the racking system will require the use of rolling ladder/work platforms and the depth of shelves will require staff who can readily and safely retrieve book trays. As well, the upper tiers of the storage facility's racking system will only have dumb waiters to move book carts to these levels and staff will access these upper levels by stairs. The selected racking system will ensure that library staff moving through it and accessing shelves will be able to do so in a safe manner.

D. Computing and Communications

Voice/data communications will need to be integrated with the University of Toronto Library's systems. However, this storage facility is a remote facility and data communications will be over Bell lines or via the internet. Telephone service will be provided. Within the facility, a local area network will be required to facilitate the identification and processing of incoming and outgoing material, and for the retrieval and refilling of circulation material.

E. Hazardous Waste Disposal

At the time of writing this report, the University's Environmental Health and Safety Department maintains a remote (portable) storage unit for hazardous waste. A second unit had been earlier removed and the existing unit is expected to be emptied of its contents and removed from the site before the start of construction of the library's storage facility.

F. Campus Planning Issues

The Downsview Campus does not have an approved development plan. However, the development of a new storage facility should take into the account the possibility of future initiatives of current or potential users of this campus. At this time, proposals for the currently vacant domed structure and a new Propulsion/Combustion Research Facility have been submitted for (CIF) funding.

IX. Resource Implications

A. Infrastructure Upgrades in the Sector

The prepared cost estimates assumed that the proposed site was not currently serviced and included an allowance of $250,000 for the provision of electrical, water and sanitary service connections. Upon approval to proceed with design, an initial task is to undertake a detailed examination of the Downsview Campus as it relates to available utilities and site conditions.

B. Secondary Effects

A budget estimate was not carried for this item. It was assumed that the scheduled emptying and removal of the hazardous materials unit on the site will proceed and that the project will not be required to cover this expense. No other secondary effects with this project can be envisioned.

C. Total Project Cost Estimate

Although there is a need to expedite this project, the Project Committee is committed to develop the design and construction of this facility in the conventional process for University capital projects. The Phase One building of 2,700 GSM (for two million volumes but fully serviced to allow for the expansion to five million volumes) is estimated to have a total project cost of $6,000,000 (in 2003 dollars). Each additional module of one million volume capacity is expected to have a total project cost of $2,200,000 (again in 2003 dollars). Estimates for the total project cost (TPC) of the initial phase and the additional storage modules are presented in Appendix B.

If approval to proceed is obtained, then a quantity surveyor will be retained (prior to the selection of design consultants) to prepare a more detailed construction cost estimate (based on room specification sheets, performance specifications, and site data) and the Capital Projects Office would also prepare a more detailed total project cost estimate (TPC).

X. Operating Costs

Four major types of operating costs are associated with this high-density storage facility and their estimates (in 2003 dollars) are summarized in Appendix C.

A. Initial Library Collection Relocation Costs

The Committee proposes that, in the first year of operation, one million volumes be relocated from the library's collection to the storage facility. The UTL Administration estimates that the cost to select and process one million volumes over the first year of operation after start-up will be $689,300 (in 2003 dollars). The majority of the costs will be labour at $559,300 for 12 individuals with the remaining $130,000 for transportation and supplies (primarily trays). This is a one-time operating cost that will be expended within the first year of operation and will not be an on-going budget concern (even with the construction of additional storage modules).

B. Capital Debt Repayment

The UTL currently does not have the necessary funds to capitalize the construction of the proposed Phase One facility with a TPC of $6,000,000 and subsequent modular additions of $2,200,000 each. Based on each construction phase being financed over an amortization period of 25 years at a rate of seven percent (7%), the Capital Projects Office estimated that the first facility phase will require annual payments of $504,800 (in 2003 dollars). Each additional phase will increase the amount of annual payment required to service and pay off this debt (projected to be $1,066,300 by the completion of the final phase). Payments will be reduced as each phase attains the end of its 25-year amortization period.

It should be noted that these estimates are for planning purposes as the actual cost to service and repay any mortgage will depend on lending rates at the time it is borrowed and the amount that will need to be borrowed.

C. Building Operating Costs

The Phase One building of 2,700 GSM is projected to have an annual operating cost of $108,000 (in 2003 dollars). Operating costs consist of direct costs such as maintenance, utility and operations, indirect costs (such as prevention and building maintenance supervision), and general services overhead (police, grounds, Facilities & Services administration). During the design of the facility, special attention will need to be given to ensure that the building's infrastructure and systems will operate not only efficiently and economically but also ensure the required environmental conditions are maintained.

Each subsequent modular addition will increase the annual operating cost of the facility. When all phases have been completed, it is estimated that this facility will have an annual building operating cost of $240,000 (in 2003 dollars).

Annual building operating costs will be borne by the University of Toronto Library.

D. Library Operating Costs

The UTL Administration undertook a preliminary model of what is involved in operating a remote, low-use, high-density storage facility at the Downsview Campus. This facility will be an independent or self-contained operation with a dedicated staff projected to consist of a full-time manager, two full-time and one part-time (0.5 FTE) staff members and one FTE student staff member for the warehouse and delivery component; another 1.5 FTE staff will be required for the inter-library loan/document delivery (ILL/DD) service. The on-going operation is not only expected to process new, incoming items to the facility but also to retrieve, copy scan, electronic or physical delivery, and re-file material already in the storage collection. The staffing complement was based on the need to process approximately 200,000 new

volumes annually, a circulation rate of 1.5 to 2.9% of the total collection, and a processing productivity of 320 to 350 items per staff member per day.

The UTL Administration estimates that the remote facility will have an annual operating cost of $376,800 (in 2003 dollars) with salaries and benefits representing the largest budget item at $282,000. The remainder of the operating costs includes transportation (to and from the storage facility to the University's three campuses), supplies, and equipment (leasing and maintenance of computers, scanners, photocopiers, fax machines, etc.).

XII. Funding Sources and Cash Flow Analysis

The University of Toronto Library will allocate from its own resources the funds ($689,300) needed for the processing and transfer of the initial one million volumes into the facility. The UTL will also commit to funding the annual building operating costs and its own operating costs (totalling $484,800 per annum for Phase One and increasing to $616,800 by the completion of Phase Four). The Project Committee requests that the University of Toronto carry the annual costs to service and repay the mortgage for Phase One (at $504,800) and the financing of subsequent project phases.

XIII. Project Schedule

There is an urgent need for the proposed long-term, high-density storage facility by the University of Toronto Library. If approval to proceed is obtained, the Project Committee in conjunction with Campus & Facilities Planning, the Capital Projects Office, and Facilities & Services will initiate all necessary investigations and will retain suitable consultants. Because the UTL are willing to forgo any interim measures to expedite the implementation of the long-term facility, Phase One of the facility will need to be completed by the beginning of the 2005 calendar year. Phases two, three and four (i.e. storage modules three, four and five) will then be projected to be needed by 2009, 2013 and 2017, respectively.

XIV. Recommendations

The Project Committee for the Library Storage Facility recommends:

1. THAT the Project Planning Report for the Library Storage Facility at the Downsview Campus be approved in principle.

2. THAT the proposed Library Storage facility be located on the Downsview Campus.

3. THAT the project scope identified in the Project Planning Report, to establish a of 2,700 gross square metres storage facility to house two million volumes with the appropriate shipping, receiving and processing areas to service the facility be approved at a cost of $6,000,000 with funding source as follows:

   (i) A mortgage in the amount of $6,000,000 to be amortized over a period of 25 years and to be repaid from the University of Toronto operating budget.

APPENDIX A:

Environmental Protection Policy
and
Environmental Checklist

University of Toronto Environmental Protection Policy

PREAMBLE

The University of Toronto is committed to being a positive and creative force in the protection and enhancement of the local and global environment, through its teaching, research and administrative operations. Recognizing that some of its activities, because of their scale and scope, have significant effects on the environment, the University as an institution, and all members of the university community, have the responsibility to society to act in ways consistent with the following principles and objectives:

FUNDAMENTAL PRINCIPLES

- Minimization of negative impacts on the environment
- Conservation and wise use of natural resources
- Respect for bio-diversity

SPECIFIC OBJECTIVES

In adopting these fundamental principles, the University will be guided by ethical attitudes towards natural spaces, and will take all reasonable steps to meet the following objectives:

- Minimize energy use, through efficient management and practice
- Minimize water use, through efficient management and practice
- Minimize waste generation through reduction, reuse and recycling
- Minimize polluting effluent and emissions into air, land and water
- Minimize noise and odour pollution
- Minimize and where possible eliminate use of chemicals, including outdoor salt, pesticides herbicides and cleaning agents
- Include bio-diversity and environmental concerns in planning and landscape decisions
- Meet and where possible exceed environmental standards, regulations and guidelines

IMPLEMENTATION

To implement this Environmental Protection Policy:

- An Environmental Protection Advisory Committee (EPAC) will be established consisting of administrative staff, academic staff and student groups, to be chaired by a member of the University's academic staff. The Committee will provide advice to the Assistant Vice-President, Operations and Services, on programs to meet the environmental protection objectives. Membership of the committee will be made known to the community to ensure that new and existing initiatives are brought forward for consideration. The meetings of EPAC will be open.
- Facilities and Services, through the Waste Management Department will facilitate the development, implementation and evaluation of environmental protection programs, and will liaise with the EPAC and all three campuses on the programs.
- In this role Facilities and Services will:
  - Regularly review university policies to ensure consistency with this policy;
  - Carry out appropriate environmental audits and pilot projects;
  - Undertake education and training programs to inform the University Community about this and how its members, both personally and collectively, can best meet the objectives set forth in it;
  - Inform all contractors, service operations and users of University facilities that they must comply with the requirements of the policy;
  - Annually issue a report concerning the University's impact on the environment, summarizing initiatives undertaken and identifying matters which require particular attention.

Approved by Business Board of the Governing Council on March 7, 1994.

Environmental Checklist for Users Committees (5/99)

1. General planning principles: Consideration of alternatives, Life cycle approach

2. Minimize Energy Use
   a) Thermal Energy: Heating, Cooling
   b) Lighting/Use of Natural Light
   c) Ventilation/Windows
   d) Machinery/Equipment
   e) Orientation of Building - effect on building energy needs
   f) Roof Design

3. Minimize Water Use (Maximize Reuse)
   a) Flushing
   b) Washing - hands and body
   c) Building Cleaning
   d) Drinking
   e) Experimental/Labs
   f) Equipment Cooling
   g) Outdoor Vegetation - choice and watering (see #4)

4. Utilization and Diversion of Rainwater
   a) Use of Roof Water
   b) Porous Pavements

5. Waste Management (offices, classrooms, food outlets, outdoors, construction/demolition)
   a) Reduction
   b) Reuse
   c) Recycling
   d) Treatment and Disposal - possible on campus

6. Effluent and Emissions (reduce, reuse, recycle, dispose)
   a) Indoor (Air Toxicity, Noise, Odours, Ventilation)
   b) Outdoor Air - laboratory emissions
   c) Water - Hazardous Wastes
   d) Land

7. Reduce Harmful Chemicals
   a) Outdoor Salts
   b) Pesticides/Herbicides
   c) Cleaning Agents

8. Outdoor Environment
   a) Encourage Bio-diversity (encourage and protection of species)
   b) Landscaping/Shading - effect on building energy needs in summer and winter
   c) Use of outdoor space (e.g. rest areas, roof gardens)

9. Monitoring and Metering of Use of Resources and Wastes
   a) Water
   b) Electricity
   c) Heat
   d) Wastes

10. Visibility of Environmental Concerns
    a) Pilot Projects
    b) Posters/Displays

11. Material Choice (Use of endangered/exotic materials, off-gassing)
    a) Building Fabric
    b) Fixtures and Furnishings

APPENDIX B:

Total Project Cost Estimates
for
Phase One & Phased Additions

Project Title: **Library Long Term storage facility.**
Phase 1, nominal 2M volume capacity.

TABLE 1: Total Project Cost Estimates

Column 1 will be completed with the Project Planning Report.
Column 1-5 will be included in the Project Implementation Report.

Items	Project Planning Report	Concept Design	Design Devel't	Drawings @ 90%	Tender	100% Complete
Design-Build contract	5,286,000					
Construction Contingency	inc					
Applicable GST	122,107					
Total Construction Costs, including taxes	**$5,408,107**					
Infrastructure Upgrades in Sector Note B	inc					
Secondary Effects	0					
Demolition	0					
Landscaping	0					
Permits & Insurance	inc					
Professional Fees	206,401					
Computing Infrastructure	20,462					
Telephone moves	2,046					
Audio/Visual	0					
Moving	0					
Staging	0					
Furnishings	55,155					
Equipment	55,155					
Security & access systems	20,462					
Signage: Interior & Exterior	7,162					
Signage: Donor Recognition	0					
Groundbreaking & Building opening	5,116					
Miscellaneous	4,092					
Project Contingency	115,842					
Finance Costs Note C	100,000					
Total Project Cost Estimate GST included	**$6,000,000**	**$0**	**$0**	**$0**	**$0**	**$0**

prepared 16 Dec 2003 jcb

Notes:

A Based on unit rates established by CMRR for a facility meeting the requirements.
Includes high density racking and site services. Gross area 2,700 GSM.
B Allowance for utility charges to provide electrical, water and sanitary service.
C Allowance.

Project Title: **Library Long Term storage facility.**
Phase 2 and on, nominal 1M volume capacity.

TABLE 1: Total Project Cost Estimates

Column 1 will be completed with the Project Planning Report.
Column 1-5 will be included in the Project Implementation Report.

Items	Project Planning Report	Concept Design	Design Devel't	Drawings @ 90%	Tender	100% Complete
Design-Build contract	1,993,940					
Construction Contingency	inc					
Applicable GST	46,060					
Total Construction Costs, including taxes	**$2,040,000**					
Infrastructure Upgrades in Sector	na					
Secondary Effects	0					
Demolition	0					
Landscaping	0					
Permits & Insurance	inc					
Professional Fees	78,294					
Computing Infrastructure	0					
Telephone moves	0					
Audio/Visual	0					
Moving	0					
Staging	0					
Furnishings	0					
Equipment	0					
Security & access systems	0					
Signage: Interior & Exterior	2,046					
Signage: Donor Recognition	0					
Groundbreaking & Building opening	0					
Miscellaneous	3,069					
Project Contingency	46,591					
Finance Costs Note C	30,000					
Total Project Cost Estimate GST included	**$2,200,000**	**$0**	**$0**	**$0**	**$0**	**$0**

prepared 16 Dec 2003 jcb

Notes:

A Based on unit rates established by CMRR for a facility meeting the requirements.
Includes high density racking . Gross area 1,100 GSM.

C Allowance.

APPENDIX C:

Operating Cost Estimates
(All Project Phases)

University of Toronto Library
High-Density, Long-Term Storage Facility: Operating Cost Estimates
Downsview Campus

Budget Item	Phase 1 (2005)	Phase 2 (2009)	Phase 3 (2013)	Phase 4 (2017)
Storage Capacity (volumes)	2,000,000	3,000,000	4,000,000	5,000,000
Building Size (GSM)	2,700	3,800	4,900	6,000
One Time Costs				
Collection Relocation	$689,300.00	$0.00	$0.00	$0.00
Annual Operating Costs				
Debt Repayment	$504,800.00	$690,300.00	$875,800.00	$1,066,300.00
Building Operating Costs	$108,000.00	$152,000.00	$196,000.00	$240,000.00
UTL Operating Costs	$376,800.00	$376,800.00	$376,800.00	$376,800.00
Total Operating Costs	$989,600.00	$1,219,100.00	$1,448,600.00	$1,683,100.00

Notes:

1. All cost amounts are shown in 2003 dollars (not adjusted for inflationary increases).
2. The 'one time cost' for initial collection relocation will be expended in the first year of operation.
3. Annual operating costs are assumed constant until the next project phase.
4. Debt financing costs assumed that each construction phase is amortized over 25 years
   This is preliminary estimate prepared by the Capital Projects Office that will require a more detailed examination.
5. Building operating costs are preliminary estimates that needs to be reconsidered when more design information is available.