

Engineering Strategies and Practice

University of Toronto
Faculty of Applied Science and Engineering
APS112 & APS113
Final Design Specification (FDS)

Project #	113	Date	Wednesday, April 3, 2014
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Executive Summary

Emmanuel College is a theological college that offers graduate level degrees. One of the rooms in the college, room 107, is cluttered with furniture, preventing it from not only hosting any proper classes or conferences, but also from being used as a work space. Thus, Emmanuel College's principal Mark G. Toulouse has contacted a design team from the University of Toronto to renovate the room so that it may be used in an effective manner. The project's gap is defined to be the room's lack of organization due to the excess furniture; the furniture prevents the client from using it for the purposes they desire. From this, the scope of the problem is to design a multi-functional room.

Stakeholders for this project include the visiting scholars and Victoria University. The stakeholders were developed by determining their significance to the project as well as their relation to Emmanuel College.

The functional basis of the design is to organize mass, in this case, the furniture. The primary function of the design is to create a multifunctional room comprising of both a common space and an office space. The most important objective for this project is that the room should be able to host all the activities outlined by the client [Appendix A]. The objectives were formulated and ranked on their relevance to the gap using the pairwise comparison method [Appendix B]. Ranking the objectives provided a criteria against which the success of the design could be measured. Finally, the constraints identified included compliance to the Building Code of Canada, as well as the National Energy Code of Canada.

The final design incorporates elements that satisfy all the objectives. The furniture was selected by comparing products to the functions, objectives and constraints and determining which ones would best meet them. Designing for sustainability also influenced the product choices; products that would best mitigate environmental issues arising from implementation were chosen.

The preliminary assessments were finalized after the design specifications were completed. The associated human factors are the physical, psychological, and team factors, developed with regards to both human proportions and psychological mindsets. The final cost is approximately \$15 745.98. This calculation includes the capital costs of implementation, the ongoing costs of operation, and the disposal costs. A social impact is the design will increase international cooperation in religious research; this was developed in regards to the visiting scholar's influence on religious endeavors. No standardized tests were applicable to the design and as a result, practical test plans were developed.

The Final Design Specifications will be presented to, and reviewed by, the client on April 18. The client feedback will be taken into consideration for the Final Presentation on April 22.

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1.0 Project Requirements

Emmanuel College is associated with the United Church of Canada and is one of the seven associated colleges with the Toronto School of Theology [1]. It hosts discussions and conferences with visiting scholars [2]. The scholars typically stay between a week and two years. During this period, the scholars are assigned a work space in room 107.

1.1 Problem Statement

Currently, Room 107 is cluttered with extraneous and mismatched furniture, causing the 71 m² room to only accommodate 9 work stations [3]. The extraneous furniture also makes the room unappealing with small and impractical workspaces, decreasing productivity of people [4]. In addition, there is no organization to the layout of the room; the workspaces are scattered throughout the room, and the furniture hinders mobility [Appendix C]. Due to this lack of organization, the room cannot be used for office space or common space, as per the client's wants [Appendix A]. As a result, the functional basis of the design is to organize the mass (furniture) in the room.

The client wishes to use the room as a multi-purpose space to host activities such as receptions, meetings, presentations, and privatized work [5]. As such, it is important that the design provides a space which can be used as a common area, reception space, conference room and office space. Finally, the design should remain in congruence with Emmanuel College's gothic architecture.

1.2 Identification of Stakeholders

The following table details those related to the project, their interests, and their influence on the design.

Stakeholder	Interest	Influence on Design
Victoria University [1]	Interested in raising money for their Imagination Unbound campaign. [6]	Need to consider the limited amount of money that is available from Victoria University as Victoria will be concerned with their own financial matters.

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Electrical Safety Authority	Protecting the people of Ontario from electrical dangers [7].	Need to adhere to the Ontario Electrical Safety Code [8].
Ontario Municipal Fire Prevention Officers Authority	Enforcing fire safety regulations in Toronto and educating the public on fire safety/prevention [9].	Fire protection regulations and standards must be met [10].
Visiting Scholars	Interested in teaching a semester course and furthering their research. [11]	The design should provide visitors with an ergonomically acceptable facility [Appendix D].
United Church of Canada	The United Church of Canada renowns itself for its respect for all people regardless of age, race, class, gender, orientation, or physical ability [12].	The design should uphold the dignity of all races, religions, gender, orientation, or physical ability.
Toronto School of Theology (TST)	The TST is a graduate school, and are interested in upholding their academic reputation.	The design should be a multi-purpose room with the latest technologies in order to show commitment to the TST's academic endeavors.

1.3 Functions

The following section describes what the design will do upon implementation. The functions were determined by the client meeting as well as the list of activities outlined by the client [Appendix C].

Functional Basis

The functional basis of the design is to organize mass (inclusive of furniture) within the room.

Primary Functions

The following functions define what the design will do:

- The design shall be a multifunctional room that will accommodate:
 - a common area.
 - privatized office spaces.

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Secondary Functions

The following functions enable/result from the primary functions:

- The design will:
 - accommodate staff meetings.
 - provide visiting researchers with larger office space.

Unintended Functions

The following functions are consequences of the primary and secondary functions:

- The design may be used for purposes other than those listed by the client [Appendix A]:
 - Storage for unused furniture, documents, etc.
 - Lecture-style classroom.

1.4 Objectives

The following table lists goals that the design should strive to meet as well as their criteria for evaluation ordered in terms of importance. The objectives were ranked by using a pairwise comparison table [Appendix B].

#	Objective	Goal	Metric
1	Functionality and flexibility: room should have a wide range of uses.	The room should be used for all activities indicated by the client [Appendix A].	How many activities from the client list the room facilitates [Appendix A].
2	Design should accommodate Emmanuel College's entire faculty	All 20 faculty members should fit in the room either standing or sitting.	Number of people that can fit in the room.
3	Minimizing money spent.	Cost below the estimated budget of \$40,000 [14] [Appendix E].	Cost of final design and implementation in CAD (Canadian Dollars).
4	Room should require little reorganization of furniture between different uses.	The room should need only two configurations to host all activities. One configuration corresponds to one furniture arrangement required to	The number of room configurations needed to host activities as specified by the client [Appendix A]

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		host one activity outlined by the client [Appendix A]	
5	Office space should meet the Ontario Health and Safety Guidelines (OHSG) concerning workstation ergonomics [15].	All measurements specified in the OHSG should be met in the design.	Dimensions of the cubicle and furniture in the room.
6	Noise from the common area should be minimized in the office space.	Maximum noise level of 35dB in the office space [16].	Amount of decibels heard in the office space, from the common space[17].

1.5 Constraints

For the design to work, it must meet all of the following constraints:

- Comply with the National Building Code of Canada as it relates to:
 - safety
 - health
 - accessibility
 - fire safety [18]
- Comply with the Ontario Electrical Safety Code for Buildings [19].
- One office space must be handicapped accessible [Appendix A]

1.6 Service Environment

The design is a room within Emmanuel College, located in Toronto.

Physical Environment

- Temperature: 19°C -24°C [20].
- Tiled hardwood floor.
- Nine individual office spaces, each with:
 - Desk
 - Chair
- Office furniture:
 - Bookshelves
 - Filing cabinets
 - Work area dividers

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- 71.18 square metres [Appendix F].

Living Things

- Faculty and students of Emmanuel College.
- Visiting Scholars.

Virtual Environment

- Wifi available.
- Cellphone reception available.

1.7 Client Ethics and Values

Emmanuel College is associated with the United Church of Canada, one of the largest Christian denominations in Canada [1]. They seek to provide an education based on theological inquiry, analysis, and inclusion [1]. Being a large theological college, their values include “excellence in teaching and research,” and both social and cultural diversity [21]. The gathering and transfer of knowledge will be increased by our design since it will provide useful space for research, study, and discussion. This will strengthen their values. Emmanuel College also currently seeks to strengthen its financial sustainability which was considered in the weighting of the objective to minimize cost [22].

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2.0 Detailed Design

The design consists of three components: a common space, an office space, and a storage closet (*Figure 2.0.1*).

The furniture brands were selected because they met the objectives better than the competing products did (*Figure 2.0.2*). The combination of cubicles and modular furniture accommodates both office space and common space (Primary Function). The modular furniture will allow for many different configurations, and will therefore allow the room to host all activities outlined by the client (in correspondence to the most important objective, #1). In addition, the furniture and cubicle dimensions and layouts were determined in collaboration with the client to ensure the college's entire faculty may be accommodated (in correspondence to second most important objective, #2). The construction of the closet wall, and any electrical wiring will be done by professional contractors, and thereby adhere to both the Building and Electrical Code of Ontario (Constraint #1). The cubicle entrances are large enough to be handicapped accessible (Constraint #2) [23].

Factors considered while choosing the furniture economically included selecting the lowest priced furniture; factors considered while designing for the environment included choosing products with the longest life span (relative to competing products).

Common Space:

- 4: 1.82 x 0.61 meter "Classic by Performance, EZ Link" foldable tables [24].
 - Two sets of two tables attached length-wise (creates two long tables).
 - Aligned parallel to north and south walls.
- 2: 1.52 x 0.61 meter "Classic by Performance, EZ Link" foldable tables.
 - Two tables attached lengthwise
 - Placed in between the two longer tables, aligned perpendicular to north and south walls.
- ~18 stackable "Cheemay CM2001N" chairs [25].
- 1: SMARTBoard 680 with UF65 projector [26].
- 1: "Down View Podium - DVP Series" podium [27].

Office Space:

- 4: 1.92 x 1.32 meter "Steelcase 9000 Workstations", 1.65 meters tall [28]. Each cubicle contains:
 - 2: 120V electrical outlets
 - 1: Torkel Swivel Chair [29].
 - 1: FORMAT work lamp by IKEA [29].

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- 2 cubicles to have 21.5" Apple iMac computers [30].

Storage Closet:

- Wall spanning parallel to south wall, 1.2m away to create a storage closet.
- 1: "Atlas" sliding double door [31].

Figure 2.0.1: A birds-eye-view of the design with furniture dimensions included.



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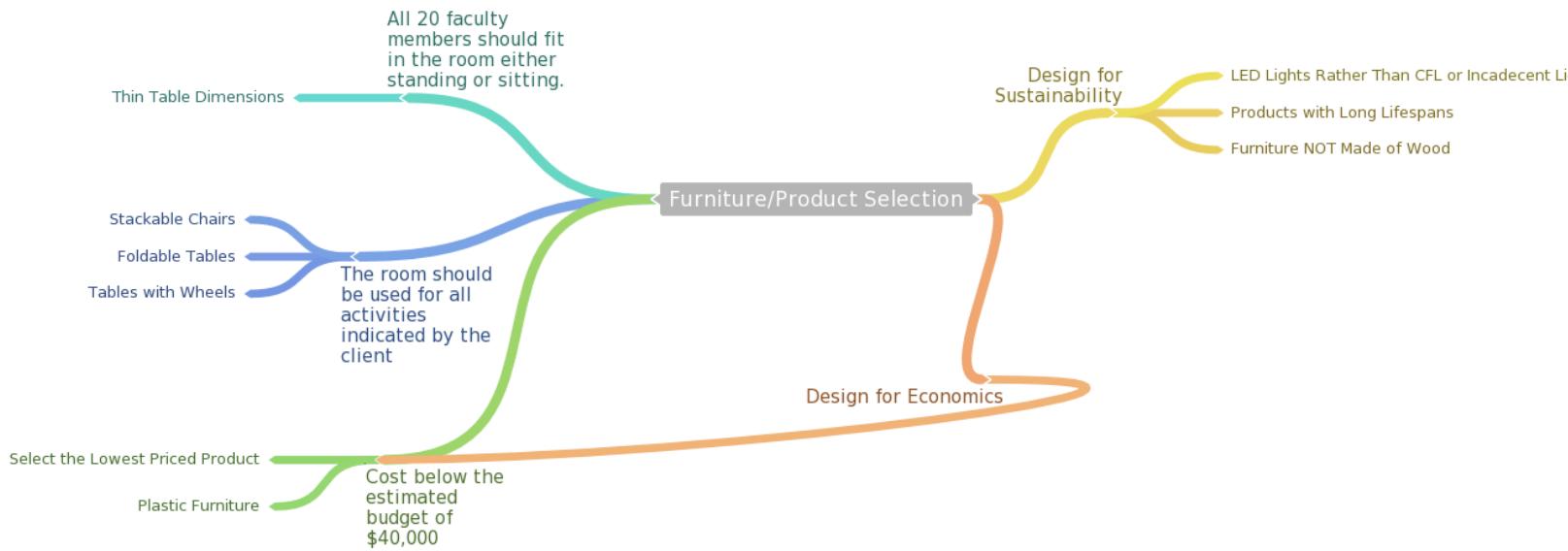


Figure 2.0.2: A diagram illustrating the decision making process involved in selecting the furniture/products. Products that had features at the end of the branches were favored over those that did not or had fewer.

2.1 Regulations, Standards, and Intellectual Property

Safety Regulations / Building Codes:

The following table lists applicable codes, the relevant subsections from each, and their impact on the design. Only codes and sections pertaining to municipal buildings were considered. No environmental regulations were relevant as all changes done will be in the building; implementing the design will not directly impact the environment.

Regulatory Code and Subsection(s)	Description
Ontario Regulation 213/07: Fire Code, Sections 2.1 to 2.8 regarding Fire Safety in Buildings [32].	Added furniture must be made of materials regulated by the fire code; likewise, the furniture's layout must abide by the code.
Ontario Regulation 333/12: Building	Changes to the room's scheme must maintain the

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Code, Part 3 regarding Fire Protection, Occupant Safety, and Accessibility [33].	room's accessibility, and fire and safety standards, as outlined by the building code.
Ontario Electrical Safety Code, as regulated by the Electrical Safety Authority [34].	Electrical installations must be approved by the Electrical Safety Authority before use.

Patented Technologies:

No patents pertain to the design.

2.2 Testing

There are no standardized tests that are applicable to the project's objectives. The only relevant tests are practical and logical and not industry standardized.

Objective	Test	How to Perform Test
<u>Functionality & Flexibility:</u> The room should have a wide range of uses; the room should be used for all activities indicated by the client.	Create scale diagrams of the different room layouts required for the different activities as listed by the client [Appendix A] in Google SketchUp.	Read through the list of activities, making a scale layout (or using an existing layout) for each in Google Sketchup. The layouts and their corresponding activities will be sent to the client, who will determine whether they are viable. If there are activities for which the design cannot accommodate, the design fails the test.
<u>Accommodate Entire Faculty:</u> All 20 faculty members should fit in the room either standing or sitting.	Compare amount of space taken by 20 average people to space in common area [15].	Using the dimensions of the room and the furniture, the respective surface areas will be calculated. The net area (room surface area subtract furniture surface area) should be above the average space needed for a human, multiplied by the number of people (20).
<u>Minimize Money Spent:</u> The cost should be below the	Calculate the total cost by summing up the cost of every	Take note of every necessary purchase and service needed

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estimated budget of \$40,000.	design component.	upon implementation. Find the market cost of every component and add them to get the total cost of implementation.
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2.3 - Market Issues

The client requires the design to be implemented in Room 107, and has not requested it to be marketed.

2.4 - Implementation requirements

This section lists all the actions and arrangements required by the client upon design implementation. Recommendations are made to guide the client in these actions.

Purchases

The following is the list of items the client will need to buy and where they should purchase them:

In-Stores

These products should be purchased in-store so the client can ask store staff technical questions and check equipment for faults:

- 2: Apple iMac 21.5" computers at the Apple Store in Eaton Centre, Toronto [35].
1. Atlas Sliding Door at any Rona store in Toronto [36].
2. EZ Link PLT2472 Conference Tables [37].
2. EZ Link PLT2460Conference Tables [37].
- 4: LEDARE Bulbs at IKEA North York [40].
- 4: FORMAT Lamps IKEA North York[41].
- 4: TORKEL Chairs IKEA North York[42].

Online

These products must be purchased online as they are unavailable in local retail stores:

- 1: SMARTBoard. Available at:

http://www.advanced-education.com/store/smart_sb680i4_smartboards.html

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1: Downview Podium. Available at:

<http://www.versatables.com/office/downview-podium/>

18: Cheemay stackable chairs. Available at:

http://www.alibaba.com/product-detail/Stackable-conference-chairs_1717557211.html

Removing Raised Space

On the north side of the room, there is a wooden raised platform (half a foot) that must be removed [Appendix G]. A general contractor will need to be hired to remove it. A contractor may be hired through the Yellow Pages website [43]. It is recommended the contractor has been affirmed by a certified official and that the contractor has at least three credible references [44].

Building Storage Space

To build the storage closet wall, a building permit needs to be acquired as this is an interior alteration [45]. The main documents the client needs to obtain the permit are listed below, but it is recommended to review all the documents on the official site for detailed information. These include:

- All accurate drawings prepared and verified by a qualified designer [45]
- Site plan [45]
- Architectural plans [45]
- Roof plan [45]
- Sections [45]
- Construction Details and Notes [45]
- Building's life safety [45]

Once the building permit is acquired, a building contractor may be hired. It is recommended the building contractor be hired through the Ontario Contractors Database as the database provides direct background checks on the contractors [46].

Relocation

During renovations, the office spaces currently in room 107 will need to be relocated. In addition, as the noise produced by the renovations and construction will be approximately 85 decibels (50 decibels above the maximum sound level appropriate for workspaces) adjacent offices will need to be relocated; similarly, events hosted in nearby classrooms will have to be moved [47] [48].

Electrical work

An electrician will need to be hired to install power outlets and to light the storage space [49]. The client can contact any electrician either through Homestars or Kijiji [50] [51]. However, the client must confirm that the electrician is licensed by checking their ESA/ECRA license number; only

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licensed electricians may appeal to the Electric Safety Authority for mandatory safety inspections [49]. It is recommended that the client requests a copy of the permit of the inspection [49]. It is also recommended that the client researches the contractor's proficiency before hiring.

2.5 - Life Cycle and Environmental Impact

This section details the potential environmental impacts in implementation, usage and disposal of the design and how design decisions regarding furniture, equipment and lighting decisions have minimised these impacts. Life cycle diagrams focusing on design implementation, usage and disposal are also included. The diagrams were developed in regards to design sustainability research done by the Center for Sustainable Systems, University of Michigan [52].

Implementation (*Figure 2.5.1*):

Problem	Mitigation
Wooden furniture manufacturing encourages unsustainable practises such as deforestation [53].	Use of wood has been avoided in the design by choosing aluminium and polyester cubicles, steel-based office chairs, and plastic-cum-steel stackable chairs.
Pollution from furniture transportation.	Implemented furniture from local furniture stores including IKEA, RONA and Home Depot.

Usage (*Figure 2.5.2*):

Problem	Mitigation
High power usage for bulbs used in lamps.	Use of LED bulbs which use up to 85% less energy and last 20 times longer than incandescent bulbs [54]

Disposal (*Figure 2.5.3*):

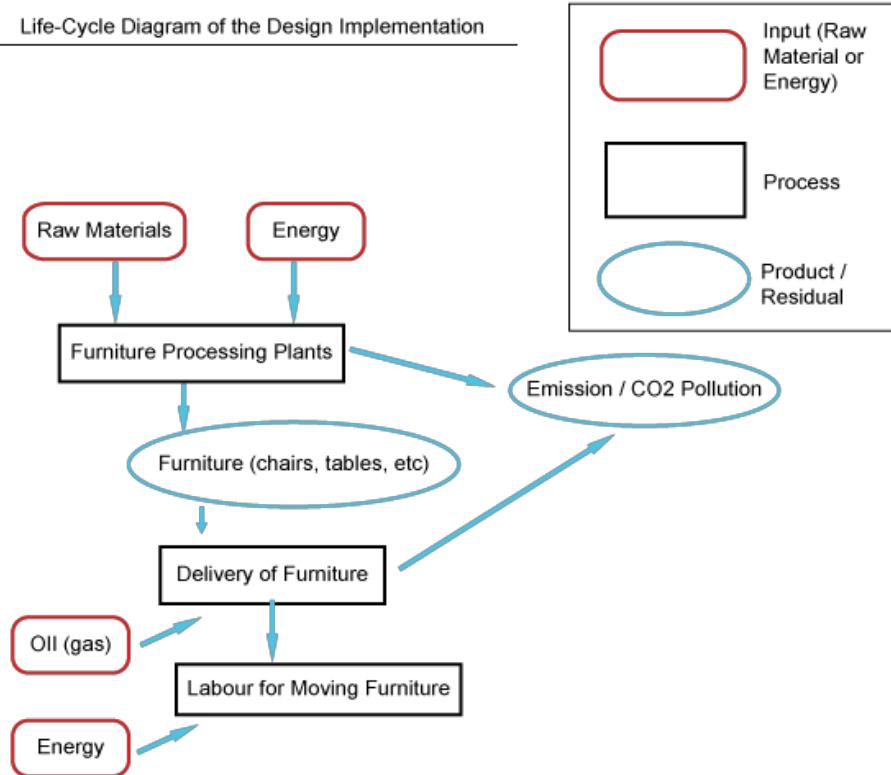
Problem	Mitigation
Average functional lifespan of computers: 2-5 years. When disposed in landfills, they release toxins [55].	The design uses 21.5-inch Apple iMacs which have one to two years better average lifespans than comparable Windows computers [56].

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Light bulbs, when disposed in landfills, release toxins [57].

Mercury-free LED bulbs are used in lamps [58].

Figure 2.5.1: Implementation



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Figure 2.5.2: Usage

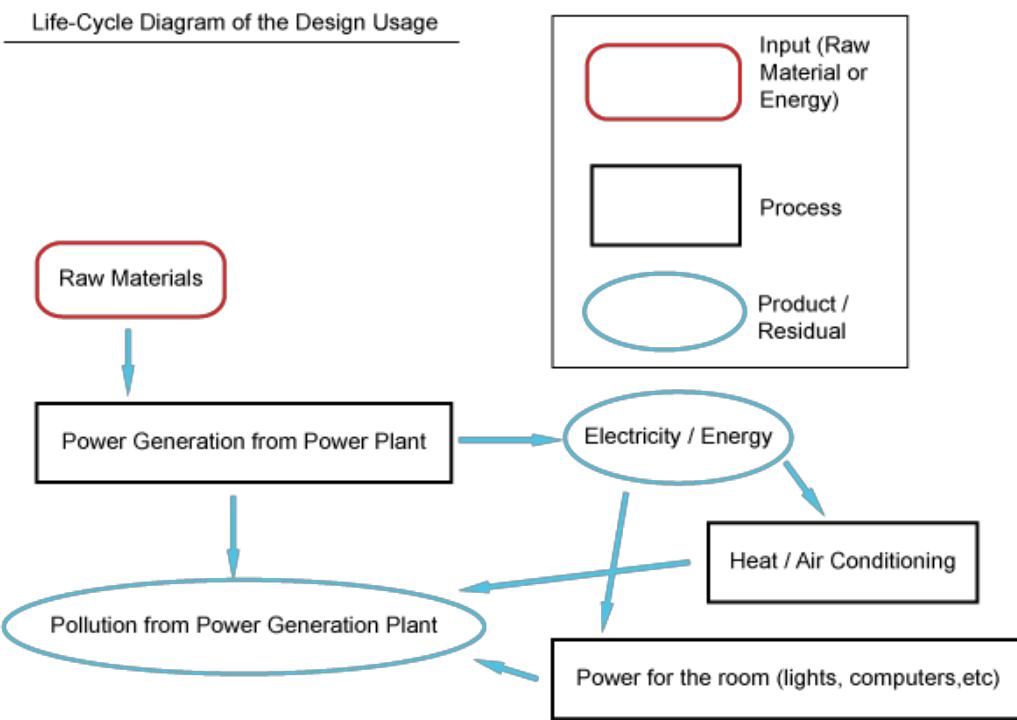
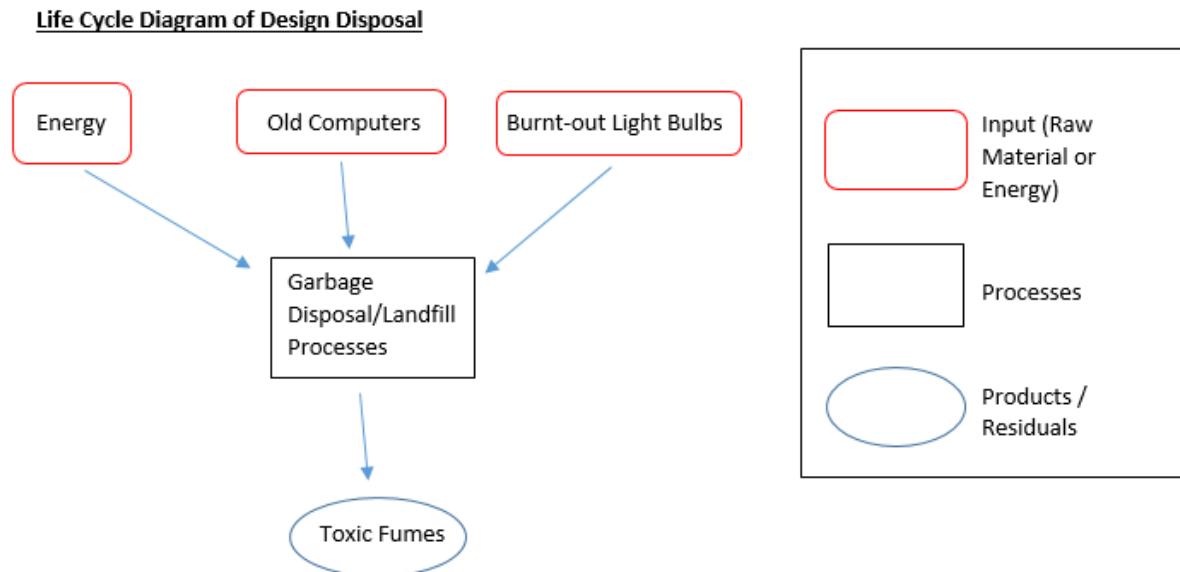


Figure 2.5.3: Disposal



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2.6 Human Factors

The proposed design addresses the physical, psychological and team human factors. The physical proportions of the body as well as the psychological mindset of the students were deliberated when selecting and arranging the furniture. Lastly considered was the use of teamwork to manage the design's use once implemented.

Physical:

The design considers the physical proportions of the human body; cubicles with dimensions of 1.92m x 1.32m and an opening of 0.6m between cubicles allowing easy access in and out of the cubicles. These dimensions also prevent any interference from furniture [59].

For privatization, the height of the cubicles are chosen to be 1.65m; the average sitting eye height is about 1.17m for females and 1.27m for males [60].

Psychological:

The cubicles are spacious enough that they address the psychological need to work in a clean and organized environment [61].

A podium close to the center of the audience gives the speaker the power and control for a productive presentation. The podium fulfills the psychological need of the speaker to be distinguished from the audience [62].

Team:

The teamwork factor is recognized by creating a system to make room reservations known and by appointing someone to organize and prepare the room to accommodate the reservation. The development of such a system will promote collaboration between faculty members.

2.7 Social Impact

The design will increase international cooperation in religious research. It will promote this impact by attracting international scholars by providing an ergonomically acceptable workspace. The design will also uphold general societal knowledge since it will increase the research being done in the world [63]. The improved workspaces will allow Emmanuel College to better host its visitors, and thus improve Emmanuel College's and, by extension, U of T's international reputations.

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2.8 Economics

This section details the economic costs (capital, operating, disposal and external) associated with the design. Careful consideration was made to choose items that had the lowest life-cycle costs.

Table 2.8.1: The table outlines the capital costs associated with the design.

Description	Capital Cost	Operational Cost	Disposal Cost	Quantity	Total Cost (before taxes)
Apple iMac 21.5" [30]	\$1349.00	Approximately \$30.00 - \$40.00 per month (dependent on electricity usage)	\$50.00	2	\$2700 + \$30-\$40 per month
OSP KISS 2-Person T-Shape Station [64]	\$ 2299.99	\$0	\$0	2	\$4599.98
FORMAT work lamp + LEDARE LED bulb [41][40]	\$29.99 + \$6.99	\$6.99 for bulb after approximately 25,000 hrs of usage + \$5.00-\$10.00 (dependent on electricity usage).	\$0	4	\$150.00 + \$5.00-10.00 per month
TORKEL swivel chair [42]	\$59.99	\$0	\$0	4	\$240.00
SMART Board 680 with UF65 projector [26]	\$4439.00 + shipping + installation [65]	\$267.00 for lamp replacement [66*]	\$0	1	Approx \$5000.00
Downview Podium - DVP Series Podium [38]	\$599.00 + shipping	\$0	\$0	1	Approx \$650.00

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"Atlas" Sliding Door [36]	\$214.00	\$0	\$0	1	\$214.00
Classic by Performance , EZ Link (PLT2472 + PLTPOST) Conference Table [67]	\$129.00 + \$69.00	\$0	\$0	4	\$792.00
Classic by Performance , EZ Link (PLT2460 + PLTPOST) Conference Table [67]	\$109.00 + \$69.00	\$0	\$0	2	\$356.00
Cheemay CM2001N Conference Chair [39]	\$58.00	\$0	\$0	18	\$1044.00
TOTALS	\$9 422.97	~\$70/month	\$50	N/A	\$15 745.98

Variable costs

The following are not fixed costs, they depend on extraneous factors:

- Electrical, structural, and fire and safety contractors' fees will depend on their respective hourly rates as well as the hours spent on the design.
 - The cost to build the storage closet wall will be dependent on the price the contractor sets.
- Electricity, heat, hydro and internet costs will depend on the utilities companies' charges in addition to the amount of each utility used.

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3.0 - Project Management Plan

The FDS will be emailed to the client on April 14, and a meeting to discuss the document will be arranged potentially for April 18. The client will be reminded of the Final Presentation on April 22 they are welcome to attend.

4.0 - Conclusion

The design specifications were determined by comparing different furniture brands and dimensions to the project's functions and objectives. The design assessments were finalized in detail from the preliminary assessments done in the Conceptual Design Specifications after the design specifications were completed. The next step will be to deliver the FDS to the client so they may implement the design.

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Appendix A

The following is the list of potential activities as outlined by the client.

Thoughts from the Ad-Hoc "New Centre" Committee

Title (for discussion purposes): Centre for Religion and Its Contexts

Purpose: To support faculty/student/visiting scholar projects that are in some way related to the identity of Emmanuel's "brand," which the committee understands to be its contextual approach to the study of religion in all its aspects (theology and belief, lived experience, and diversity of expressions – including primarily Christian expressions, but not excluding the consideration of these things as found in Islam, Judaism, Buddhism, or other religious understandings). The committee intends to include within the "contextual approach" of Emmanuel's brand such considerations as global, Canadian or local, urban or rural, and specific emphases on diversity and/or intercultural matters.

Examples of Potential Activities

- Monthly discussion of contemporary faculty research or other faculty conversations ("teaching theology" style conversations)
- Interaction and Discussion with Visiting Scholars to Emmanuel (Anne Duncan Gray or visiting scholars from China, Africa, or other regions of the world)
- Vetting AD student presentations for Conferences (like AAR), etc.
- Home for the new Emmanuel Reads program (monthly visiting presentations from scholars on new books)
- Hosting of Committees and their activities related to its work (change current "Centre of Asian Theology" to "Committee of Asian Theology" and host its work in the Centre; host the work of the developing "Committee on Chinese Christianity")
- Meeting space for our faculty to host Consultations, Working Groups, or Collaborations with TST/UT Faculty members in these areas (examples are Swee Hong's current consultation with St. Michael's faculty on music and theology, Judy's planned consultation with Ann Jervis and others on "time and eschatology in Paul", or Mark's work with Anver Emon and others on the Connaught Summer Institute, etc.)
- Hosting of meetings held to plan lecture events at Emmanuel, such as the recent Cousland Lecture or other such lectures
- Planning space for national or international conferences hosted by our faculty (when faculty host conferences in Toronto as was the case with Pam's IAPT, or Tom's Disability conferences)
- Hosting special meetings of students and/or faculty (not classes, but other meetings), such as Swee Hong's once per semester Music Forum, or Natalie's meetings with TFM fellows, or other such meetings

Renovation of Space (107)

- Flexibility important
- 30-35% (around the South Entrance to the room) devoted to small private study cubicles with desks, shelves, internet access, and perhaps small desktop computers to host visiting scholars, and perhaps emeritus faculty
- An effective and efficient copy machine for conference planning
- One common printer for the room (perhaps the copy machine doubles for this)
- 65-70% (around the North Entrance to the room) devoted to a flexible meeting space that enables a boardroom style (using collapsible tables and seating fifteen to twenty), as well as

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informal and comfortable circular or row seating styles (using comfortable collapsible chairs and seating anywhere from ten to twenty or thirty, depending on format used) – should include a closeted storage space for collapsed chairs and tables, thus allowing for a “standing and gathering” use of the space as well

- Other features of the meeting space would include a large television screen (perhaps two) on the walls, providing for the possibility of internet conferences or use of skype

Resources and Funds for Support of Centre Activity

- Create a portal calendar for reserving of the centre’s space for faculty-led consultations and meetings connected to the purposes of the centre
- No staffing to start, but using Kate Sedore’s office for coordination and scheduling, and Betsy Anderson’s office for coordination of anything related to events connected to the centre
- Reconfigure the Academic Initiatives Committee into the “Faculty Research Committee” and assigning it tasks of dealing with the annual grants (AI and EC Research Funds), and any requests related to funding of centre-related activities (from AI Intellectual Life funds or AI Bridging funds) or to funding from centre specific funds (see next bullet point)
- Establish an 80,000 centre program endowment that would yield 3,200 per year in annual centre funding

Appendix B

Table 5.2 - Pairwise comparison of objectives

	Functionality	Money	Faculty	Usages	Noise	Ergonomics	Score
Functionality	--	1	1	0	1	1	4
Money	0	--	1	0	1	1	3
Faculty	0	0	--	0	1	1	2
Usages	1	1	1	--	1	1	5
Noise	0	0	0	0	--	0	0
Ergonomics	0	0	0	0	1	--	1

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Ranked from most to least important:

1. Functionality and flexibility: the room should have a wide range of uses.
2. Require little reorganization of furniture between uses.
3. Minimizing the amount of money spent.
4. Accommodate Emmanuel College's entire faculty.

Appendix C

The pictures of the room give a visual depiction of the room's clutter and disorganization.



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Appendix D

The definition of an environment that promotes productivity is important to understand how to best design a room for optimal usage [13].

By a study done by Gensler, an international architecture firm, an environment that promotes productivity is defined to be one that [13]:

- Uses layered light [13]
- Ergonomically correct furniture that ensures [13]:
 - feet fall flat on floor
 - back is well supported
 - elbows are situated at 90 degrees
- Has inspirational decor [13]
 - Colourful, abstract artwork
 - Accent furniture

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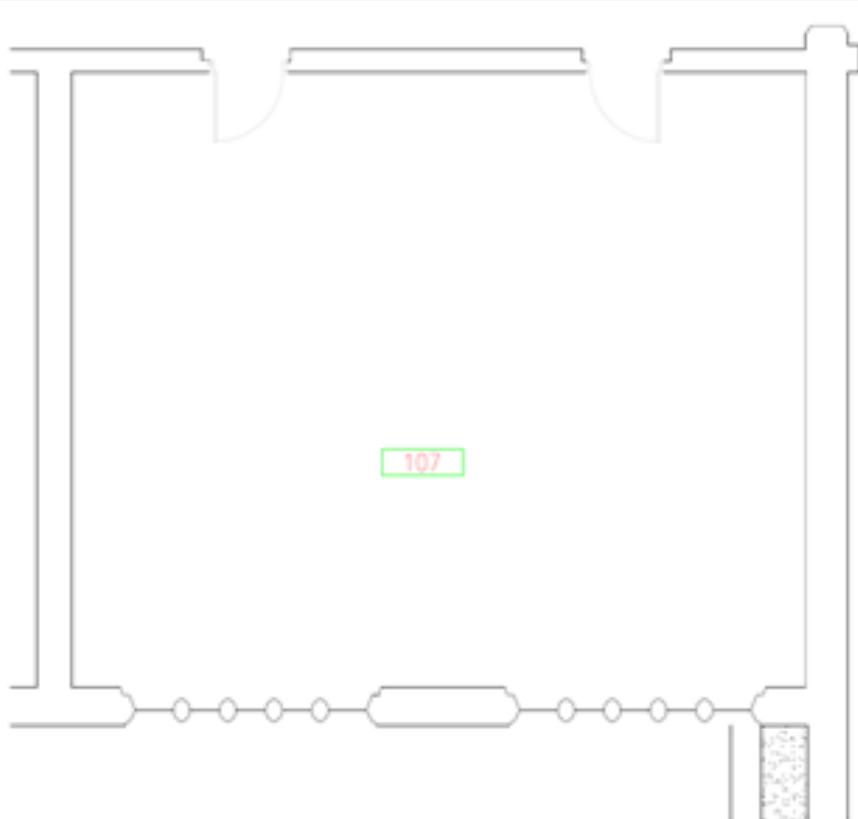
Appendix E

The client's budget must be respected for both a successful design as well as a successful client relationship.

The client has set a budget of \$40 000, but has access to additional funds of approximately \$20 000

Appendix F

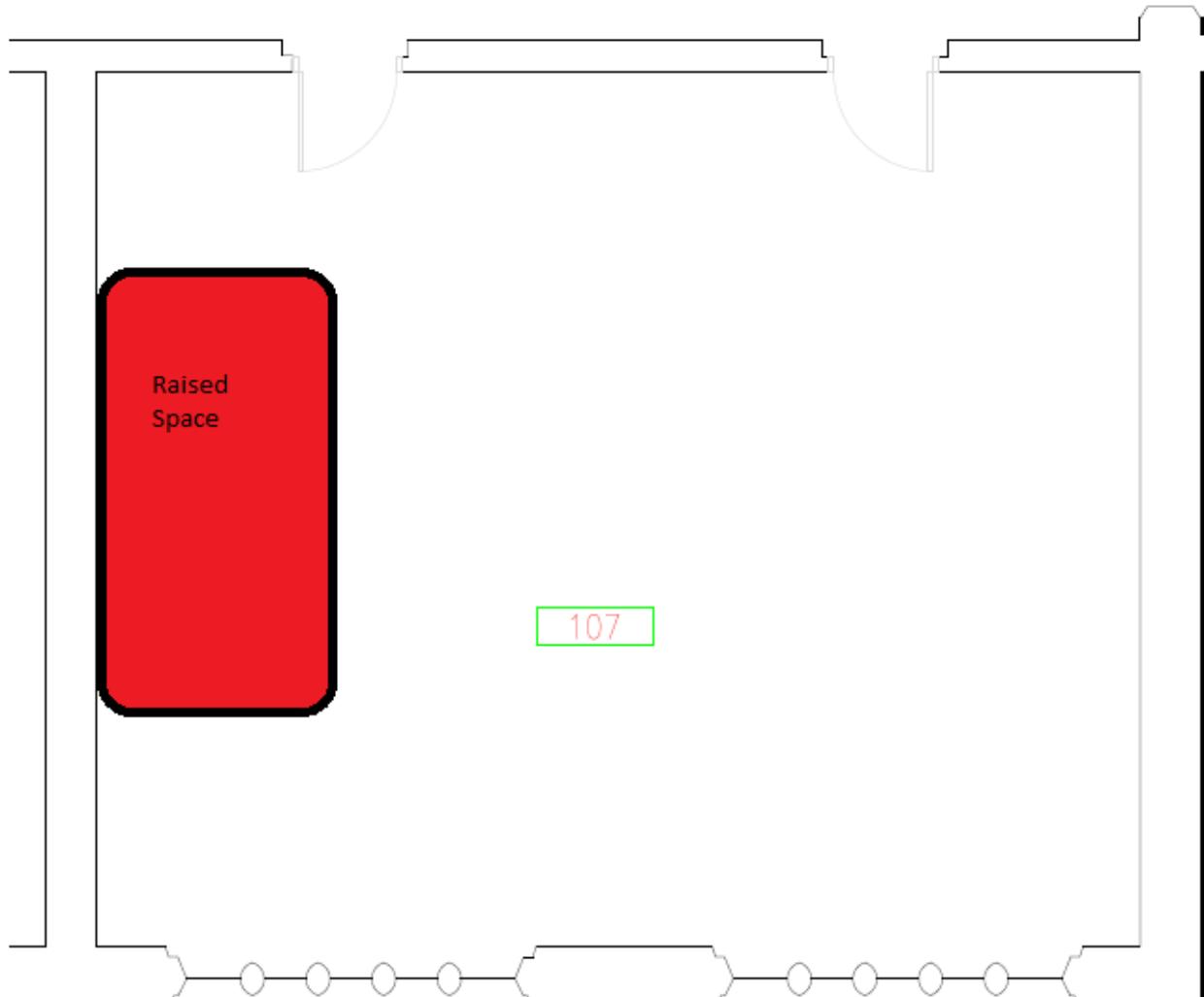
The following is the floorplan of Room 107. The room is 71.18 square metres.



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Appendix G

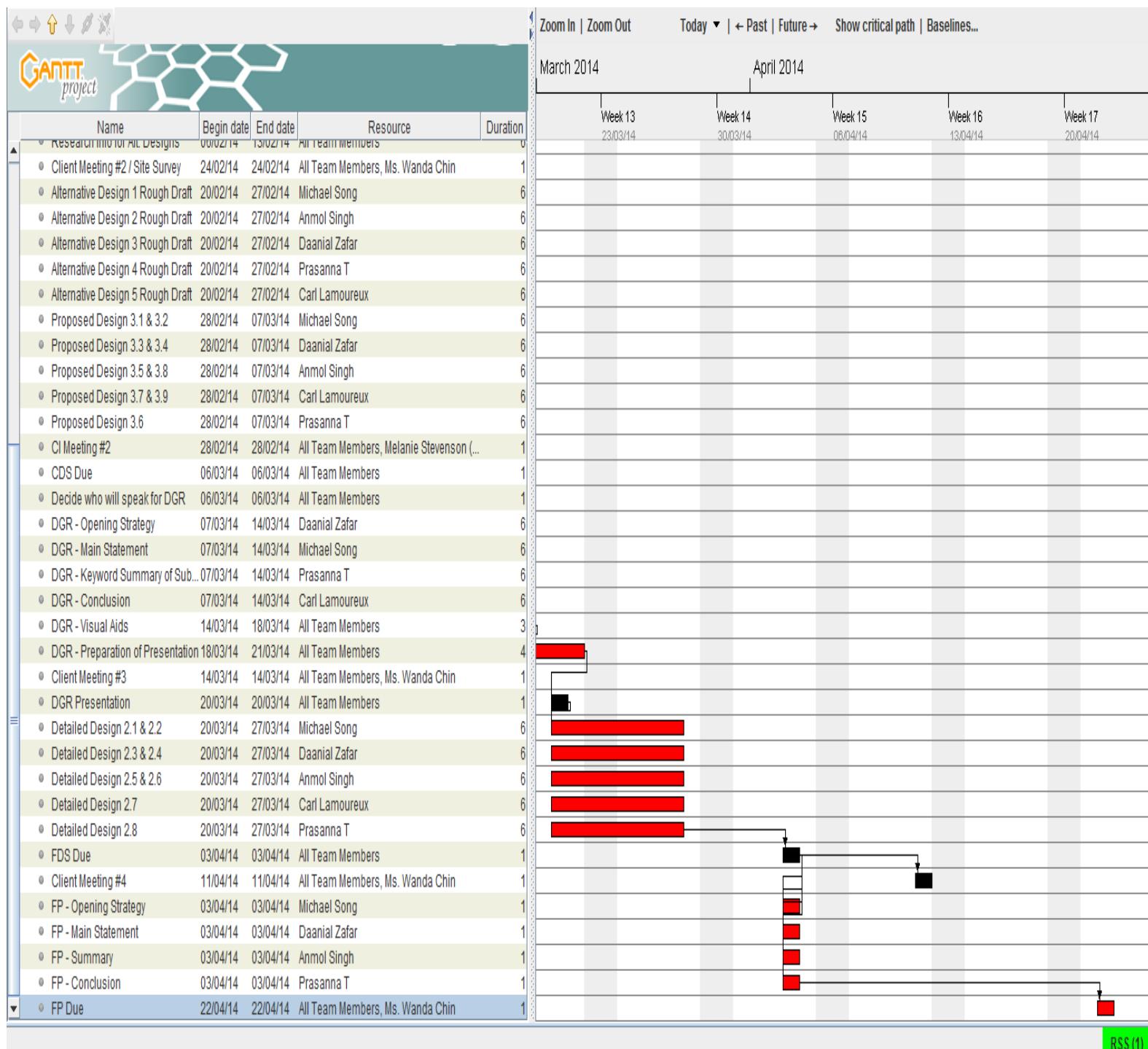
The following shows the raised space in Room 107. The space is six inches raised from the main floor.



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Appendix H: Gantt Chart

The Gantt Chart illustrates the project's deadlines and important dates. The critical path is indicated by the red blocks. The duration for completion for the corresponding task is shown as well as the team member responsible.



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