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July 20, 2010

VICE PROVOST CATHERINE KOSHLAND
VICE CHANCELLOR HARRY LEGRANDE

Dear Vice Provost Koshland and Vice Chancellor LeGrande:

I am pleased to submit the final report of the Active Learning Classrooms Working Group, charged by you last July to explore the potential for some UC Berkeley general assignment classrooms to be adapted for "active learning." After a review of experiences with active learning classrooms at other institutions and an investigation of the pedagogical leanings of faculty and students on the Berkeley campus, the working group formed a very favorable opinion of such an approach to teaching and of the practicability of converting some UCB classrooms.

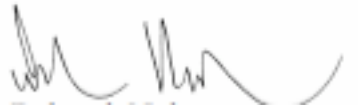
Specifically, the working group makes the following recommendations:

1) Build an active learning classroom in Moffitt that can seat 100+ students;
2) Improve one of the large lecture halls in Moffitt, maintaining a seating capacity of 80+;
3) Create an informal learning space in Moffitt near the classrooms;
4) Develop an incentive program for departments to create informal learning spaces in departmentally controlled areas;
5) Develop other ALCs on campus when possible and, when refitting any classrooms, use flexible furnishings that can accommodate group activities;
6) Offer instructional design support to faculty interested in adapting courses to active learning settings.

Implementing the recommendations will improve the teaching and learning environment on this campus, and will position UCB to attract innovative faculty members and creative students. Implementation will require a modest investment, and there are many opportunities to create the new classrooms cost-effectively, as with the Moffitt Renovation Project detailed in the report.

I have appreciated the opportunity to work on this meritorious project, and will happily provide any additional information or background you may need going forward.

Best regards,



Deborah Nolan
Professor, Statistics
Associate Dean, Mathematical and Physical Sciences

Attachment

Cc: Working Group
Core Group

# The Case for Active Learning Classrooms

## FINAL REPORT

of the

**Active Learning Classrooms Working Group**
**University of California, Berkeley**

**July 19, 2010**

# The Case for Active Learning Classrooms

**July 19, 2010**

## CONTENTS

## EXECUTIVE SUMMARY

The Active Learning Classrooms working group was convened to consider the question of what UC Berkeley classrooms should look like in the 21st century. More specifically, the working group was asked to examine the "active learning classroom" and whether or not the campus should invest in the development of such spaces. Active learning classrooms are designed to promote cooperative and problem-based learning in which instructors tend not to lecture but rather assist and direct students' cooperative learning activities. To address their charge, the working group reviewed the literature on active learning classrooms; assessed other universities' uses of active learning spaces; obtained information on campus classroom sizes, configurations, and usage; held focus groups and conducted interviews with 22 faculty, including Presidential Chair Fellows, Mellon Fellows, junior faculty, and faculty known for innovations in teaching; and met with undergraduates on the Student Advisory Council on Undergraduate Education.

The working group found that all of the faculty members interviewed were interested in more flexible classrooms that would allow increased group activities and instructor mobility. A small but significant number of faculty members were enthusiastic about teaching their entire courses in an active learning environment, and many others wished to use such classrooms for part of the semester, e.g., for special class sessions, discussion sections, office hours, and symposia. The experience at peer universities suggests that the level of faculty interest is likely to increase: after initial trial periods for new action learning spaces, demand for them grew. Additionally, nearly all UCB faculty members are very interested in creating informal learning spaces outside of the classroom where students and faculty can extend teaching and learning opportunities.

The working group was also asked to consider the specific question of how the general assignment classrooms in Moffitt Library might be upgraded. With the Moffitt renovation, there will be upgrades to the ventilation, lighting, and disabled access in the classroom area; thus, upgrading the classrooms might be efficiently folded into the renovation. The working group toured the Moffitt classroom space; reviewed usage statistics for these classrooms; met with university librarians to understand the full scope of the renovation; and met with architects to discuss possibilities for the classroom space. It was determined that a) the needed changes for disabled access and restroom facilities would reduce the available seating in the existing classrooms; b) the renovation offered a unique opportunity to create an active learning classroom seating about 100 students; and c) the cost to further improve the classrooms beyond lighting, ventilation, and access (approximately $2M) added only10% to the cost.

In light of these findings, the working group makes the following recommendations: 1) build an active learning classroom in Moffitt that can seat 100+ students; 2) improve one of the large lecture halls in Moffitt, maintaining a seating capacity of 80+; 3) create an informal learning space in Moffitt near the classrooms; 4) develop an incentive program for departments to create informal learning spaces in departmentally controlled areas; 5) develop other ALCs on campus when possible and, when refitting any classrooms, use flexible furnishings that can accommodate group activities; and 6) offer instructional design support to faculty interested in adapting courses to active learning settings.

## INTRODUCTION

The Active Learning Classrooms working group was convened in July of 2009 by Vice Provosts Koshland and Maslach and Vice Chancellor LeGrande. Deborah Nolan, then Acting Dean of Mathematical and Physical Sciences in L&S and Professor of Statistics, served as chair. The charge given the group follows:

> In recent meetings of the Moffitt Program Committee, which is overseeing the renovation of Moffitt Library, it has become apparent that now is a good time for the campus to rethink what we want our general assignment classrooms to look like in the 21st century. To what degree should we be investing in the development of "active learning" classrooms? If we agree that we need them, how should they be equipped? Should they be one size or many?

The charge letter in its entirety can be found in Appendix I. In addition, at its first meeting, the working group was asked to consider specifically whether or not the general assignment classrooms in Moffitt would be suitable for active learning classrooms.

The working group sought information about active learning classrooms and opinions from faculty and students by engaging in the following activities:

- Reviewed literature on active learning classrooms
- Assessed other universities' uses of active learning curriculum and spaces, including Stanford, University of Minnesota, MIT, University of Michigan, and UNC
- Toured the Koret Interactive Classrooms in the Haas School of Business and Berkeley Law School
- Interviewed Presidential Chair fellows and attended a meeting in which they discussed active learning approaches in their classrooms
- Held focus groups with faculty members from different disciplines teaching different sizes of classes
- Interviewed specially chosen faculty members who were primarily junior and had experience with active learning or problem-centered learning
- Interviewed students who were on the Student Advisory Council on Undergraduate Education regarding their experience with classroom space at UCB
- Met with LaVern Lazzereschi, in the Office of the Registrar, about classroom sizes and configurations most in need at UCB

In addition, to gain an understanding of the Moffitt classroom situation, the working group undertook the following:

- Toured the Moffitt classroom space and reviewed usage statistics for the classrooms
- Met with Beth Dupuis, Associate University Librarian for Educational Initiatives and Director, Doe/Moffitt Libraries, and Fred Yasaki, then Library Architect, to understand the full scope and goals of the Moffitt Library renovation
- Met multiple times with EHDD architects to discuss what could be done in the space in Moffitt and for what comparative costs

This report summarizes the findings of the working group; recommendations appear in the final section. The recommendations pertain to Moffitt renovations and an active learning classroom there, as well as to classrooms and informal learning spaces elsewhere; they also address support for curriculum development, an important issue uncovered in the faculty interviews. Briefly, the working group makes the following recommendations:

**1) Build an active learning classroom in Moffitt**—specifically, a flexible room that can either seat 108 students or be divided into two 54-seat classrooms—and, as demand increases, create additional such classrooms in other buildings (Barrows was identified as a possible next venue);
**2) Improve one of the large 80-seat lecture halls in Moffitt** so that it is less steep and has flexible seating that promotes student-student and instructor-student interaction,
**3) Create an informal learning space next to the Moffitt** classrooms where students can meet with faculty before and after class or gather to work in groups between classes;
**4) Develop an incentive program** to encourage creation of **informal learning spaces** in **departmental space;**
**5) Develop other ALCs on campus** when resources allow and, **when classrooms are renovated, use flexible furnishings** that can accommodate group activities and instructor mobility;
**6) Offer instructional design support to faculty** interested in adapting courses to active learning classrooms.

## ACTIVE LEARNING CLASSROOMS

Active learning is a process whereby students engage in higher-order thinking tasks such as analysis, synthesis, and evaluation. Cooperative learning, problem-based learning, and the use of case methods and simulations are some approaches that promote active learning. In an active learning curriculum, students are given the opportunity for a more interactive relationship with the subject matter of a course, and encouraged to generate rather than to receive knowledge. In an active learning environment, teachers typically do not lecture, but rather assist and direct the students' cooperative activities. Appendix A contains a summary of characteristics thought to be important in active learning spaces and, indeed, all learning spaces. This summary was used in meetings with students and faculty to elicit their opinions about classroom design. Additional information about active learning curricula and classroom design can be found in the References at the end of this report.

A few spaces at UCB have been redesigned to allow more "active" learning, but they are in departmental space. The Koret Interactive Classrooms in the Haas Business School and Berkeley Law School have movable chairs and tables instead of individual desktops so students can easily get together for small group discussions and activities, and they have a gentle rake (or a flat floor) and wide aisles so faculty can circulate among the students. While these rooms are primarily designed for delivering lectures, they do facilitate more interactive modes of instruction. The I School developed the CoLab (in 210 South Hall) as a flexible space with movable tables, chairs,

and white boards to support informal meetings, group work, and individual study. A nearby lounge area also supports individual and group work. Wireless networking is available. General assignment active learning classrooms have been created in many of our peer institutions, where they are known by terms as various as "collaborative facilities," "decision theaters," "technology-enhanced active learning spaces," "interactive environments," and "incubator classrooms." Regardless of the institution, each of these spaces is student-centered, flexible, and generally technology-assisted (see Appendix B for illustrations of some active learning spaces in use).

At the University of Minnesota, the active learning classrooms have no "front" and students sit at round tables in groups of eight or nine. Tables are equipped with audio, laptop hookups and a screen for sharing work with other group members. Multiple large screens are placed on the walls around the room for projection of instructor or student work for all to see, and all four walls have glass boards for students to use in problem-solving. The floor plan for the room is shown in Figure 1. These learning environments have been so successful that the university is in the process of building ten more active learning classrooms in their new Science Teaching and Student Service building slated to open fall of 2010.

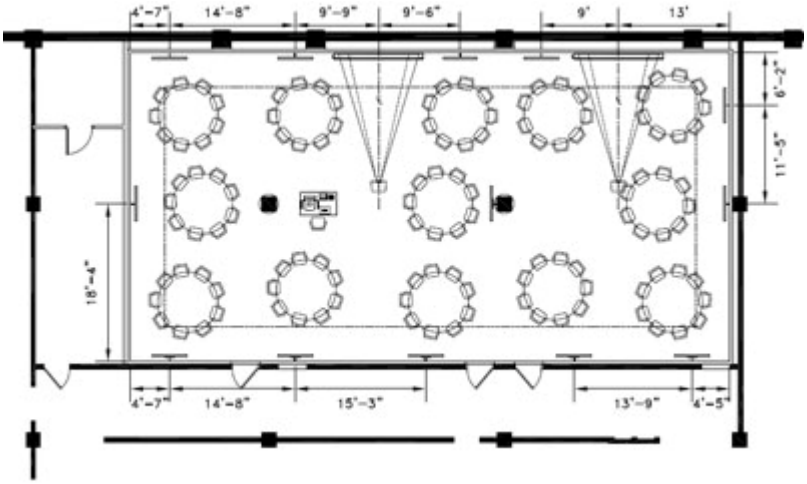



***Figure 1.*** *The active learning classrooms at the University of Minnesota have large round tables that seat nine students, switchable laptop-based technology, several flat-panel display/projection systems, a teaching station which allows the instructor to select and display table-specific information, and a glass marker board around the perimeter of the room. These rooms operate using student-provided laptops, and feature reconfigurable low-profile flooring with internal power and cable management (http://www.classroom.umn.edu/projects/alc.html)*

MIT, a well-known leader in the transformation of teaching and learning, identified active learning as a key ingredient to the success of its engineering programs. To support active learning methods, they redesigned physical spaces and partnered with like-minded institutions to build multi-media environments with wireless capabilities, video conferencing and opportunities for hands-on experiments. For example, they created TEAL, Technology-Enhanced Active Learning, to redesign freshman physics courses in the late 1990s by changing the traditional lecture format

to an approach called interactive engagement, and by designing new learning environments that facilitated peer instruction. Another initiative, iLabs, opened up the types and scope of experiments that students can access. Students use real instruments via remote online laboratories shared across the university or with worldwide institutions. In these and other projects, MIT made good on its commitment to change by modifying curriculum, course content, the sequence of classes taught, and teaching methods to encourage active learning rather than passive note-taking.

At Stanford University, the Wallenberg Hall Advanced Resource Classrooms are available to faculty who want to experiment with new ways of teaching and learning in their subject areas. The rooms are of different sizes, furniture is moveable, walls are covered in whiteboards, and technology is abundant. Wallenberg Hall's staff of teachers and technologists works cooperatively with faculty to create new learning activities and the tools to support them.

The University of Illinois at Chicago has undertaken a campus-wide project to renovate classroom spaces. In the process, they adopted new classroom design guidelines: "lower classroom capacity should not be viewed as lost seats, but as improved teacher/student ratios with greater flexibility in accommodating teaching and learning styles." Additionally, the university focused on informal learning spaces in "Project Oasis," and since 2003 they have made over 20 under-utilized campus areas into supportive learning environments by improved lighting, acoustics and infrastructure, and new ergonomic furniture.

The University of Arizona recently reorganized a number of units--University Teaching Center, the Office of Assessment, and the Learning Technology Center--into the Office of Instruction and Assessment. In this reconfiguration, essential services for instruction are united under one department that supports many aspects of active learning: instructional applications (learning management system) and multimedia support, instructional design, course curriculum design, assessment and evaluation, best teaching practices, TA support, new faculty orientations, e-learning such as second-life development, website and emerging technologies including podcasting and web-based learning objects, consulting, grant management, and outreach.

At San Jose State University, the Academic Success Center in Clark Hall recently upgraded over 3000 square feet, creating The Stage, a learning technology center, three "fishbowl" meeting rooms for student meetings and small group collaboration, and an incubator classroom that seats 50 students and includes technologies such as smart boards, tablet PCs, a document camera, student response system, video conferencing capabilities, and collaborative software (Tidebreak's ClassSpot,) to facilitate content management across multiple screens for teaching and learning.

North Carolina State University is one of more than 50 institutions that have adopted the Student-Centered Active learning Environment for Undergraduate Programs, or SCALE-UP, which increases opportunities for highly interactive, collaborative, guided-inquiry-based learning. In these learning spaces, students work in teams investigating and sharing work. Most lectures are class-wide discussions in which the majority of time is spent in hands-on activities, simulations, or answering questions and solving problems. Physical spaces are designed around ubiquitous technology, whiteboards and laptops are assigned to each round table, and students have the ability to project images and content to facilitate group interactions.

Clearly, "active learning" or "student-centered learning" is established and well-supported in most of our peer institutions, and they have been getting good press for their innovations. For example, a January 2009 ***New York Times*** article (Rimer, 2009) not only applauded the changes at MIT, but also acknowledged efforts at a number of other institutions. It is not unreasonable to worry that UCB's ability to recruit out-of-state and international undergraduates will be compromised unless its name starts showing up in articles such as that one.

## FEEDBACK FROM FACULTY AND STUDENTS

To solicit input from students and faculty about their teaching and learning style preferences, and their interest in active learning spaces, the working group interviewed a number of faculty members and students. Members of the group attended a meeting of the Presidential Chair Fellows during which they discussed active learning. This was followed by one-on-one interviews (Appendix D). The working group hosted two focus group lunches during the RRR period in December (Appendices E and F) and invited faculty members who were teaching various subjects in different-sized rooms to reflect on the options presented by the Minnesota classrooms. Additionally, early in the spring semester, 12 primarily junior faculty members, identified as innovative instructors, were interviewed one-on-one (Appendix G). To gain student input, members of the working group attended a meeting of the Student Advisory Council on Undergraduate Education, where they showed videos of Stanford's Wallenberg Center and the University of Minnesota's active learning classroom, and engaged the students in a conversation about their learning experiences at UCB (see Appendix C)

In our interviews and focus groups, we encountered both disciplinary and individual differences in teaching philosophies and styles. A number of faculty expressed concerns about the de-centering of the instructor that they see implied in the active learning model. Some have doubts about both the efficacy of the implied small group work and the practicability of it in Berkeley's competitive environment. Though not wholly committed to an active learning curriculum, many of the faculty said they would use active learning classrooms for part of a course, and for special class sessions, discussion sections, office hours, and symposia. Furthermore, while not always certain about the meaning of "active learning," **nearly all faculty members are interested in more flexible classrooms—moveable furniture, less raking—that would allow increased group activities and instructor mobility**.

The faculty interviewed one-on-one gave **endorsement for a new type of learning space in Moffitt, where they could try out new teaching and learning modes**. The main disagreement among them was the optimal size of the new space. The size issue is addressed later in this report in the section on the Moffitt classrooms. Though a number of faculty have already redesigned their curricula and need only an appropriate space in order to modify their teaching modes fully, **many faculty will require support in changing both their curricula and teaching approaches**. Though faculty views differ about the precise size and arrangement of an ideal room, it is clear that a Moffitt active learning classroom would offer opportunities to pilot new curricula and try out alternative furnishings, technology and other tools.

Faculty members in the focus groups were also in near unanimous agreement that **the campus needs more informal learning spaces**, both for students and faculty to meet, and for students to

work with each other. These spaces would be desirable in a number of locations, among them just outside classrooms to allow for informal student-faculty meetings immediately before or after class. Students also emphasized the need for more informal learning spaces.

Notwithstanding the differences noted above, the faculty members all agree on **the unsatisfactory state of a majority of general assignment classrooms on this campus**: lack of versatility (fixed seating, uncomfortable chairs with confining arms), dim lighting, and bad ventilation. Even the rooms that have been recently upgraded suffer from lack of maintenance, and insufficient cleaning. Some faculty opined that basic maintenance of classrooms may be more important than creating a few new state-of-the-art learning spaces. Details appear in appendices E, F, and G.

Additionally, some faculty use technology extensively, and others less so, but nearly all **think it is a pedagogical tool that should be ubiquitous in our classrooms**. Faculty would like more surfaces to write on in classrooms, but are almost evenly split on their whether they should be blackboards or whiteboards. Some prefer blackboards because they dislike the older whiteboards that get contaminated by incorrect markers and cannot be cleaned. It is likely they would be happy with 21st century glassboards that can be easily cleaned and written on by any type of marker. Some faculty prefer whiteboards because they are allergic to chalk (in some cases, their chalk allergy may be severe enough to trigger a university obligation to accommodate it as a disability). Educational Technology professionals prefer whiteboards because chalk dust clogs up electronic equipment and must be cleaned out at significant cost.

As mentioned above, the **students were unanimous in their desire for more informal learning spaces and in their preference for flexible classrooms**. Although very few students have had experience with active learning in courses at UCB, they are generally interested in it. Students share faculty members' frustrations with the state of most classrooms on campus; the classrooms they rate highly are generally the newer, more flexible variety that promote student-student and student-teacher interaction.

**Students want to bring their laptops to the classroom and use them**. Because information technology is ubiquitous in students' lives, they think it is indispensable as a teaching and learning tool. Increasing numbers of students make their class presentations multi-media shows. Their attendance and learning in a course is influenced primarily by a) technology resources available to the course's instructor and students, b) the comfort and appropriateness of its classroom.

## MOFFITT GENERAL ASSIGNMENT CLASSROOMS

In 2007, a Library-commissioned review of Moffitt Library's infrastructure revealed that the HVAC, mechanical, electrical, lighting, plumbing, sprinkler, fire alarm and telecommunications systems needed to be upgraded or redesigned to accommodate current and future technological demands and programmatic changes. Additionally, all existing restroom facilities and elevators required upgrading to comply with current ADA/disabled access requirements.

The Library determined that, while the infrastructure improvements were underway, they should make changes to the program spaces in order to better support the learning and research needs of

the campus community, with particular emphasis on meeting the evolving needs of undergraduate students. The project goals are as follows: 1) offer vibrant exhibition, teaching, and community spaces; 2) accommodate a diverse and evolving assortment of work, study, and learning modalities; 3) streamline operational and functional support for learning and research; 4) meet disabled access, heating and ventilation, and ubiquitous computing needs; and 5) evince a commitment to sustainable design.

The four General Assignment (GA) classrooms on the first level of Moffitt (two stories below grade) have the same problems as the library space: bad ventilation, poor lighting, and restricted disabled access (both from the exterior and within the building). The entrance to the GA space is problematic in that the stairs are narrow, steep, and poorly lit, and the elevator is too small. The basement itself is catacomb-like, with corridors that are constricted and poorly lit. Additionally, there are no restroom facilities at that level of the building, which is a problem both for students with disabilities and for the able-bodied who use the space in the evenings after the library restricts access to other floors. The Library is responsible for bringing the classroom space up to code in terms of ventilation and accessibility, and those renovations offer an opportunity to improve the classroom area simultaneously by opening up the corridors, changing the lighting and ceiling height, flattening the floors, and installing moveable seating.

The current configuration of the GA classrooms in Moffitt has two 89-seat rooms (101 and 102) and two 52-seat rooms (103 and 106). The two larger rooms are fairly heavily used, and the two smaller ones are less heavily used. Table 1, below, presents an overview of usage for 2009. It shows that only one of the larger rooms (102) comes close to capacity every day, every semester, and the typical usage is well below capacity. That is, the median usage is about 50 for one and 75 for the other. One room is also used to some extent in the evenings. The smaller rooms are also underutilized, with well over half of the courses meeting in these classrooms having enrollments under 35. One of these rooms (106) hosts one evening class.

| | **#101 (89 seats)** | **#102 (89 seats)** | **#103 (52 seats)** | **#106 (52 seats)** |
|---|---|---|---|---|
| **Spring 09** | | | | |
| 8a-5p MWF | 10-66 range (47.5 med; 44 mean) | 36-85 range (57 med; 70 mean) | 25-38 range (33 med; 32.5 mean) | 7-48 range (32 med; 29 mean) |
| 8a-5p TTh | 37-57 range (42 med; 35 mean) | 61-84 range (65 med; 68 mean) | 12-40 range (37.5 med; 32 mean) | 37-54 range (50 med; 46 mean) |
| 5p-9p | 6-44 range (22 med; 25 mean) | NA | NA | 21 |
| **Fall 09** | | | | |
| 8a-5p MWF | 8-87 range (63 med; 54 mean) | 51-56 range (55 med; 54 mean) | 7-44 range (19 med; 22 mean) | 31-47 range (41 med; 40 mean) |
| 8a-5p TTh | 54-89 range (79 med; 77 mean) | 63-82 range (74 med; 73 mean) | 3-41 range (16 med; 19 mean) | 21-56 range (37 med; 36 mean) |
| 5p-9p | 16-54 range (30 med; 33 mean) | NA | NA | 21 |

***Table 1.*** *2009 Enrollments in Moffitt GA Classrooms, showing ranges, medians, and means.*

All the windowless classrooms are stuffy, with raked floors and fixed seats. Most faculty and students assigned to them complain about their incommodiousness. The fixed seating in every room makes it very difficult for teachers to move about and nearly impossible for students to work in small groups or pairs. History of Art faculty members are satisfied with the rooms because they are dark and raked--optimal for slide viewing; furthermore, there is a slide storage space and art viewing /seminar room nearby (#104).

Given the narrowness of the two large rooms and the floor raking in each room, the rooms must be modified to meet requirements for accessibility. The EHDD architects explored and presented five options that ranged from minimal renovation to active learning designs. Due to the basement location, all options have a slightly lower ceiling than might be ideal, but the architects have optimized the sight lines in their designs. Comparative figures and costs for these five options are in Table 2 below and floor plans are found in Appendix H.

The minimal renovation (Option 1) satisfied the building code requirements of providing disabled access to all four classrooms and toilet rooms for a cost of $2.2M. This option keeps the same number of classrooms but, to make room for a ramp/elevator, reduces the seating from 89 to 70 in the large rooms, and from 52 to 38 in the smaller rooms.

| | **Raked Rooms** | **AL Rooms** | **Total Seats** | **Cost** |
|---|---|---|---|---|
| Current | 2@89 + 2@52 | none | 282 | |
| Option 1 | 2@70 + 2@38 | none | 216 | $2.2M |
| Option 2 | 1@86 | 1@108 or 2@54 | 194 | $2.4M |
| Option 3 | 2@86 | 1@54 | 226 | $2.3M |
| Option 4 | 1@86 + 1@70 + 1@38 | none | 194 | $2.2M |
| Option 5 | 1@86 + 1@70 + 1@38 | none | 194 | $2.2M |

***Table 2.*** *Comparative rooms sizes, types, and costs for the five options developed by EHDD. The options differ in their informal learning spaces and toilet facilities. All meet the access requirements. The cost excludes exterior circulation, stair, and elevator addition, which will be added as required by the building code.*

Based on information from the Office of the Registrar on desirable classroom sizes, we directed the architects to include in their design options rooms that a) yielded at least one 80-seat classroom, for which there is a continuing need on this campus, and b) included active learning spaces in two sizes: 50-seat and 100-seat. Thus, Options 2-5 have fewer than four classrooms, but the rooms have greater seating capacity than those in Option 1. Option 2 has one 86-seat room with a raked floor and flexible seating and one active learning classroom that seats 108 and is based on the University of Minnesota model. This room can be reconfigured on a semester-by-semester basis to create two 54-seat active learning rooms by adding a temporary wall. Option 3 has two 86-seat rooms and one 54-seat active learning room. Options 4 and 5 are variations on Option 1, with no active learning space. All five plans include rest room space and an area for informal learning in the lobby area; Options 4 and 5 include a small seminar room.

It is striking that **the cost differential between the minimal required renovation of Option 1 ($2.2M) and all of the other options, including those with active learning furnishings and technology, was only 10% more, or about $200K**.

## RECOMMENDATIONS

### Moffitt Recommendations

The designs the architects presented to the working group made it clear that the Library's stated goal of offering "vibrant…teaching spaces" could also be realized in the Moffitt general assignment classrooms. The Moffitt renovation presents a unique opportunity to create a large active learning classroom on campus. In light of that, and in consideration of a) the small cost differential between the various design options, b) the campus need for rooms that seat at least 80 people, and c) the total seating capacity of various options, we recommend EHDD's Option 2.

Among the many attractive features of Option 2 are the following:

- A large (~100 seat) active learning classroom, dividable into two ~50 seat rooms;
- An improved 86-seat lecture hall with flexible seating and less rake; and
- Informal learning spaces in the spacious lobby area.

### Campus Recommendations

For the same reasons that Moffitt Library will be renewed to "accommodate a diverse and evolving range of …learning modalities," the faculty and students with whom we have spoken requested active learning classrooms and more informal learning spaces in many of the buildings on campus. In this vein, the working group makes the following recommendations:

- Develop more ALCs when resources allow and space permits;
- Create more informal learning spaces on campus, with glass-surface boards outside classrooms, available laptop stations, and benches in lobbies, as has been recently accomplished in Dwinelle;
- Establish an incentive/matching program for departments to create more informal learning spaces in departmentally controlled space.
- When classrooms on campus need refitting, use flexible furnishings that can accommodate group activities and allow instructor mobility.

### Recommendations for Support of Faculty in Active Learning Classrooms

The addition of an active learning classroom in Moffitt Library will create opportunities for faculty to pilot new courses and try out alternative teaching modes. However, instructors will require assistance with instructional design, course curriculum design, assessment and evaluation. Currently, ETS supports instruction in a number of the large lecture halls and has some technology specialists available for ALC support. In addition, ETS has a relatively new program, the Teaching Enrichment Program (http://ets.berkeley.edu/node/1254), for which it is reconfiguring an open position in its Training and Support Unit. The new position could assist faculty with activity-based learning concepts, and curriculum design.

The working group suggests three approaches for assisting faculty in their course design. Each requires a different level of funding.

One approach would be to invite faculty to be part of an early-adopter cohort, and organize drop-in lunches for people who are teaching in the room each semester to exchange ideas, showcase best practices, and share war stories. ETS could be directly involved through a process similar to that used at Stanford's Wallenberg Hall: faculty apply to teach in the new learning environments and, based on their desired outcomes, an instructional designer and technologist work with the faculty members throughout the semester to achieve the objectives and goals of the course.

A more formal approach would be to organize a program such as the Presidential Chair Fellows colloquium, where faculty piloting courses in this new learning environment would be given an opportunity to meet monthly with each other and with key instructional support staff on campus (Library, GSI TRC, ETS, OED) to assist them in their curriculum development. The members of the forum would be able to apply for or be nominated for the fellowship, and they would be offered a small stipend (e.g., $2000).

A third option would be to conduct a full-scale curricular redesign on the lines of the Mellon Initiative. In order to use the Mellon model or something like it, we would need a major investment from an external donor or private foundation. It might be better first to build a culture of active learning on campus in the aforementioned ways and then search for additional support from a donor to leverage these efforts.

To recruit faculty to use the active learning classrooms, ETS, OED and/or the Committee on Teaching could sponsor a panel session to hear from the early adopters who have had success in piloting new courses in the new Moffitt classroom. A call to department chairs would ask them to nominate faculty to use the new room. Additionally, announcements and invitations could be sent to faculty who have engaged in curriculum development, including the Mellon, Presidential Chair Fellows, Lecturer Fellows, and participants in AC Engaged Scholars programs and ETS programs.

Finally, the working group recommends activities such as the following to publicize the classroom:

- Partner with OED and academic departments that pursue and support activity-based learning concepts.
- Market the Moffitt classroom and informal learning space in the planning and building phases, e.g., publish articles about the classroom, its capabilities, and the unique ETS support staff & program.
- Publish on the Web profiles of the faculty teaching in Moffitt, as well as the students learning there, and their experiences in the classroom.
- Explore working with experienced room design and furnishing programs, including Scale-Up, Herman Miller and KI furniture. (KI has assisted other institutions in assessing designs of ALC environments and related academic success.)

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## ACKNOWLEDGEMENTS

Colleagues with expertise in areas related to classroom provided valuable information to the working group: LaVern Lazzereschi, Classroom Scheduler in the Office of the Registrar; Steve Tollefson, Director of the Office of Educational Development; Robert Schlick, Faculty Development Specialist in the Office of Educational Development; Billy Riggs, Architect with Physical & Environmental Planning; Christina Middleton, Administrative Assistant in ETS; Stan Mar, Project Manager in Capital Projects; and Sukhjit Johal, space planner for the UC Library.

The working group would like to thank the EHDD architects Jennifer Devlin, Greta Jones, and Andy Sohn for meeting with us, explaining the possibilities and constraints in the Moffitt classroom space, and patiently working through all the options we asked them to evaluate.

The original working group included an additional seven faculty and staff. After the first few meetings it was determined it would be easier and more time-efficient to gain input from faculty by reducing the size of the working group and, instead, holding focus groups and individual interviews with a broad set of faculty. The core group thanks these faculty and staff for their willingness to participate in the original group: Meg Conkey, Professor, Anthropology; Darcy Grigsby, Professor, History of Art; Greg Niemeyer, Professor, Art Practice; Kerry O'Banion, Principal Planner, PEP; Victoria Robinson, Coordinator, American Cultures; Cara Stanley, Director, Student Learning Center; Derek Van Rheenen, Director, Athletic Studies Center.

## CORE GROUP MEMBERS

Deborah Nolan, then Acting Dean of Mathematical and Physical Sciences in L&S and Professor of Statistics, chaired the core group that consisted of the following members: Brenda Farmer, Assistant Director, Classroom Services & Special Events, ETS; Mara Hancock, Director, ETS; Sarah Hawthorne, Assistant Provost, Academic Compliance & Disability Standards; Walter Wong, Associate Registrar; Sarah K. Nathe, Chief of Staff, Teaching, Learning, Academic Planning & Facilities (Staff); and Cynthia Schrager, Assistant Vice Provost, Teaching, Learning, Academic Planning & Facilities (Staff).

## APPENDICES

## Appendix A: Characteristics of Desirable Learning Spaces

Modern Classrooms should include:

- Aesthetics or ambience (choices of colors, natural lighting, food/drink etc.)
- Comfortable & flexible furniture
- Lighting options/scenes
- Wireless networking
- Plenty of infrastructure (electrical)
- Up-to-date hardware & projection equipment
- Collaborative software
- Writing surfaces for content creation
- HVAC, creature comfort
- Must be maintained continuously & have sufficient resources allocated to them
  - refresh/upgrades of technology
  - refresh room environment & ongoing custodial services
  - support services for curriculum redesign & instructional technologists

Optimal Outcomes for Teaching & Learning

- Transition from traditional teacher-centered or passive lecture approach to active & social learning or learner-centered education.
- Support multiple types of learning: collaborative, blended, integrated, immersive, hybrid.
- Over time, rethink space scheduling, make a variety of teaching settings available to a greater number of faculty.
- Learning spaces require more area per student (revisit assumptions about space allocation)
- On-going assessment, learning objectives and desired educational outcomes

Collaborative Learning Environments

- Learning spaces need to be a combination of the space, pedagogy and technology.
- Technology facilitates the use of the physical space with the virtual space.
- The space must be convenient to end users on the campus.
- Spaces need to conform to the individuals using them. We should not be creating spaces for one purpose only, spaces we create need to fulfill many functions, depending on what the occupants need.
- A learning space is an investment, we need to take a long-term view of continuously reviewing spaces – there needs to be a continuous revenue investment in modern learning spaces if they are to stay fit for their intended purpose.

## Appendix B: Active Learning Spaces in Peer Institutions

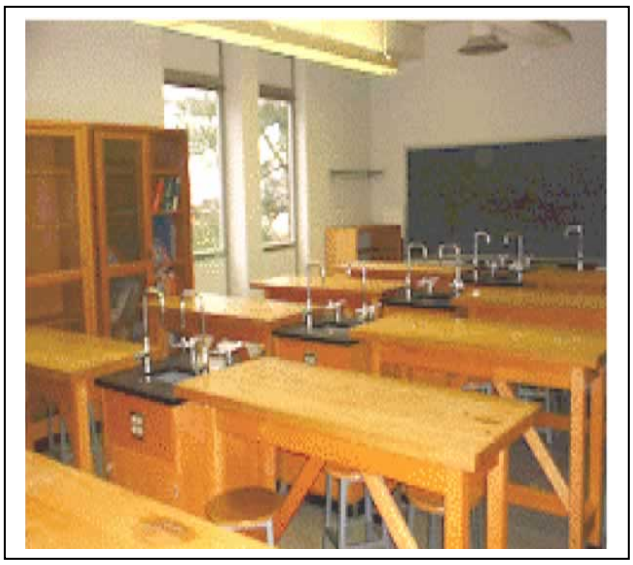

An introductory class on electricity and magnetism at MIT.

The University of Minnesota has active learning classes for biological sciences (shown here) and electrical engineering. Ten more will come on line for Fall 2010.

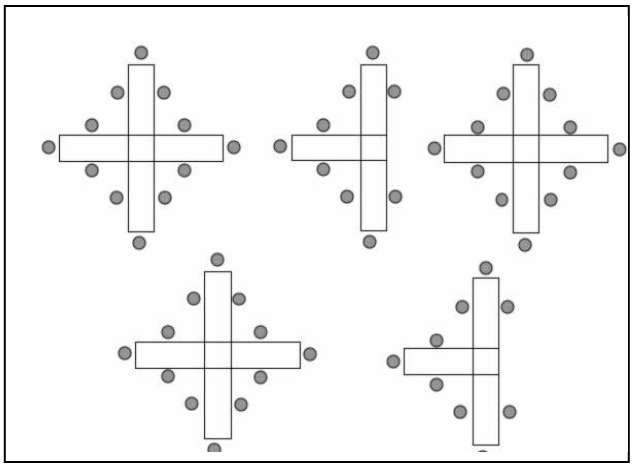
The Wallenberg Learning Theater at Stanford seats 60 students

A smaller classroom at Stanford with furniture easily configured for teamwork

A room at North Carolina State used for physics, chemistry, engineering and GIS classes. Inset in upper left corner shows room as it used to be.



Before and after at Western Kentucky University



The University of Alabama prefers X and T shape tables to the more common round ones

**Appendix C**
**Meeting with Student Advisory Council on Undergraduate Education, 10/14/09**

Attending: Peter Volberding, Carine de la Girond'arc, Andrew Stokols, John Tran, Alex Carsten, Regine Labog, Willie Marquez, Catherine Koshland, Cynthia Schrager
Guests: Sarah Nathe, Brenda Farmer, Sarah Hawthorne

**Q: Where are your favorite learning spaces on campus? Least favorite? Formal and informal?**

**106 Stanley**--intimate classroom, 70-100, different from Pimentel, can see the professor, chairs are comfortable.
**Bechtel Auditorium**—OK, but seats conducive to sleeping.
**Dwinelle 145 and 155**—bad, seats uncomfortable, desks squeak, writing surface too small.
**60 Barrows** feels like a prison.
**200 Wheeler** has charisma, is not institutional, but has a window that won't close in the rain.
**CED classrooms** – equipment run down, desks falling apart.
**Haas classrooms** are good.
**Goldman School** – big lecture room is good, has outlets, tiered.
**McCone**—has some good rooms for classes of 50 people. Best size for collaborative learning.
**112 Wurster** is a model—flexible furniture; this is a departmental space, not a GA classroom

Not enough space on campus for groups to work on projects. In libraries you have to be quiet. Need lounges, flexible furniture. Study spaces in lib are always busy. Plus, small groups need to be able to talk and eat. Warm enough and out of rain (FSM terrace not great in winter). All cafes on campus are hot spots.
**CITRIS Peet's** –lots of tables with outlets, plus a lounge area that also has outlets.
**FSM** – always fighting for spot with outlet, good for group work, need more spaces like that.
**Café in Dwinelle** – often crowded.

**Q: Your thoughts on what an active learning space would look like?**

- Classroom walls that can be written on/more writing surfaces.
- More blackboards or whiteboards for small group work
- Classrooms with less furniture for more flexibility.
- Having a single table makes it easier to collaborate, round tables best.
- It would be great if there were group places where you could project to a screen so all members of group can see, to do practice presentations.
- Need more video conferencing for international studies.
- Need AirBears to be more consistent.
- Assigned seats--assigned seats were a great thing in Big History, that allowed relationship building with neighbors, created community.
- Computer lounges. There used to be a few computers at SLC, were taken out recently.
- Lack of places to print.
- It's frustrating when there are spaces that are often open and unused, but you can't use them unless you're in a specific class.

**Appendix D**
**Meeting with Presidential Scholar re Active Learning Classrooms, 10/22/09**

Faculty member: Matthew Potts, ESPM
Interviewers: Brenda Farmer, Cynthia Schrager, Sarah Nathe, Anastacia Kaser (notes)

**Q. What learning spaces work/ don't work, and why?**

A space where everything was combined would be helpful for classes on forestry: lecture + projection screen + boards+ computer lab (to do computational lab exercises). In class, we do writing of equations on board, as well as role playing.

The computer lab I use is very traditional with rows of workstations, but pods for groups of students would be better.

An active learning classroom could permit role-playing of multistakeholder discussions, useful for preparing students for real world, professional situations. Students have to bring many skills all together to learn to be good resource managers.

How do you bring the outdoors indoors? But even movable blackboards would be great (use them both inside and out). Can you take something out to your site to project images for a group? Take a camera outside before class and project onto a large/ whole wall to give a sense of a location? Like an Imax movie. Or meet outside yet still have technology available.

Macro and micro – document camera.

Technology that helps versus being caught up in the coolness of the technology.

Will students be able to generationally change to new media policies as they move into their working life, after having shared so much personal info on social media?

**Appendix E**
**Meeting with Faculty Focus Group, 12/7/09**

*Deb Nolan*, Statistics, Acting Dean for Physical Sci, Chair Cmte on Active learning,
*Robert Beatty*, MCB, lecturer, classes of 100-150 students, labs 32, VLSB, Dwinelle, Pimentel, Evans, Burge, Tolman, Barker, others.
*Jean Retzinger*, Media Studies, 250 students, Anderson Aud, 30 in Wheeler, Haas, Evans, Dwinelle,
*Gene Irschick*, History, last 5 years taught in Dwinelle, including room 88 Dwinelle (since 1964), ~40 students, ~17, smaller seminar classes,
*George Lakoff*, Linguistics, 38 years here, taught in many venues on campus, this semester in Wheeler (50-75 students),

Interviewers: Brenda Farmer, Sarah Nathe, Sarah Hawthorne, Cynthia Schrager, Anastacia Kaser (notes)

**Assessment of various rooms:**

**Wheele**r rooms are large, high ceilings, big windows that open. Some newer classrooms in other buildings don't have windows. Rooms with no windows cause students to be sleepy because the air is stale.
**Birge 50** is a disaster: no windows, steeply sloped. Lecture spaces in Dwinelle, VLSB best. You can do "Oprah" format: circulate throughout the space.
**Dwinelle 88** is warm in color and materials that give students a good feeling; they are very productive.
**Dwinelle 145** great.
**LSA Annex** lecture room is good–-fits 90 but cozy.
**GL**'s best room is **T4-100** because of windows, door to outside, desks and chairs that move, no chairs with arms. Chairs w/arms are terrible.
**Goldman Sch of Public Policy** 150good--horseshoe shaped, slightly raked, somewhat flexible, with windows.
**Moffitt Library** rooms are the worst. Need air, lighting, moveable chairs.
**Evans** not good, but better than Moffitt. In basement rooms there are no windows, no air, no circulation, like a bomb shelter. Small classrooms in Evans are cramped, jammed with chairs, no flexibility.
**Evans 10** provokes varying opinions: two hate it, one grew to love it, one thinks it's ok. There is no space between the first row and lecturer area.
**103 GPB** great for seminars.
**290 Hearst Mining** is great, a beautiful remodel.
**LeConte** rooms are freezing.

Smaller classes could do more interactive style. Would like to have some days lecture, some days with small groups, want flexibility to change it up for each class – all agree on this. Can change format based on what's working, what topics the students are having problems with. If fixed tables/ chairs, very difficult to do small groups. Different disciplines need different teaching formats.

MCB Lab sections use 3-4 rooms – equipment, computer, lecture. Students move between rooms, lots of interaction, lots of good feedback from students on how that builds community. Students get to know each other.

Classroom set up in the video was nice - round tables and moveable chairs--but there is a question on the utility of problem-based learning in certain disciplines.

How well could the semester-long enforced teamwork go over with our very competitive students?

Other factors in the environment – lighting, comfort, furniture.

Tech is a baseline, a tool, not the highlight of the room.

**Appendix F**
**Meeting with Faculty Focus Group, 12/9/09**

Attending:
*Sue Schweik* – English, 15 students in 202 Wheeler, 8 students in Disability Studies 309 Wheeler.
*Paula Fass* – History, 150 stud in 160 Kroeber (technically holds 135): hot in summer, no windows
*Tabitha Kanogo* – History, 102 Moffitt in basement, safety issues with narrow stairs, crowded, gets v hot, incident of v bad odor for about a week.
*Philip Stark*, Statistics, 110 McCone holds 100, 115 enrolled, need to webcast this course, but no power at podium and needs extension cord to run laptop. When screen is down it blocks board space. Would like screen PLUS board space. Anderson at Haas has good white boards.
*Kathleen McCarthy* - Classics and Comp Lit, mostly small classes (30 and under). Big issue is furniture in smaller rooms in Dwinelle and Wheeler. In a seminar style room, need regular chairs not desk chairs. In Wheeler 102, 17 students is the allowable limit, yet it's too many for that space. Best lecture spaces are VLSB 2060 and GPB (which has a flatter rake). Would like screen + board space + proper lighting. Students would like more outlets in lecture halls.

Interviewers: Deb Nolan, Brenda Farmer, Sarah Hawthorne, Cynthia Schrager, Anastacia Kaser (notes)

Stark holds office hours in the SLC – it has large tables and board, and he can conduct problem solving session with a group. This works very well. Need more spaces like this. Likes the idea of using webcasts for lectures (instead of live) and then have problem-solving sessions with small groups, possibly in an ALC setting similar. Group office hours is a great idea.

There was a lot of interest in informal learning spaces, as well as the possibility of scheduling the ALC room on a more occasional basis for particular class sessions. Perhaps make one building a workshop for the campus, add more security and resources, and see if it encourages pride and citizenship?

Could see using a room like shown in the Minnesota model on occasion rather than for entire course, for office hours it would be great, for peer editing of papers. Situations in classic languages are text-oriented, but McCarthy a transparency that is projected to have students look up rather than down at book; a set-up like Minnesota could work for this.

Need a tech person to be available when something goes wrong, about every 3rd or 4$^{th}$ lecture. Funds for this would be better than more funds on fewer showcase classrooms.

Process of reserving classrooms is based only on number of students. Could we refine this to request chairs w/o desks to pull up at table? Keeping chairs in rooms is very difficult.

UC Irvine classrooms all have laptops and projectors and instructors only have to bring a data stick to the room. Having computers in the rooms would solve many problems.

**Appendix G**
**Interviews with Faculty**

*Cari Kaufman*, Statistics
*Yun Song*, Statistics and EECS
*Rasmus Nielsen*, Statistics and Integrative Biology
*Janelle Scott*, Education and African American Studies
*Ingrid Seyer-Ochi*, Education
*Charles Henry*, African American Studies
*Na'ilah Nasir*, Education and African American Studies
*Ken Goldberg*, IEOR and Center for New Media
*Angy Stacy*, Chemistry
*Allison Post*, Political Science and Global Metropolitan Studies
*Jason Corburn*, City & Regional Planning and Global Metro Studies
*Abigail De Kosnik*, Theatre, Dance & Performance Studies and Center for New Media

Goldberg absolutely would use an ALC. Since he doesn't teach large classes, he would be happy with one that seated 50 or so. Could also see using the space for part of a semester in certain classes.

Stacy would definitely use an ALC that seated around 100, for both office hours and certain classes. She often has 50-70 students in her regularly scheduled office hours, awkwardly trying to do collaborative work in a teaching lab that does not conduce to it. She would also like to rewrite the curriculum for Chemistry courses taken by pre-med students so that students from below-average high schools could be taught in a collaborative and supportive ALC setting.

Scott would use the ALC for both classes and small conferences and symposia. Flexible furniture would include tables that can be converted from one size and shape to another. Thinks informal learning spaces should not be all tables and chairs, but also some comfortable chairs in which students can relax and study independently.

Nasir would definitely use the ALC for classes and for conferences. Would like it to include a Polycom so she could reliably link in outside speakers. She also likes tables that can be changed in shape and size; all tables and chairs should be on wheels. Enjoys the level of tech support she receives now in Dwinelle (close to ETS) and thinks that would be critical to successful use of an ALC. Was shocked at how few innovative spaces we have when she arrived here two years ago.

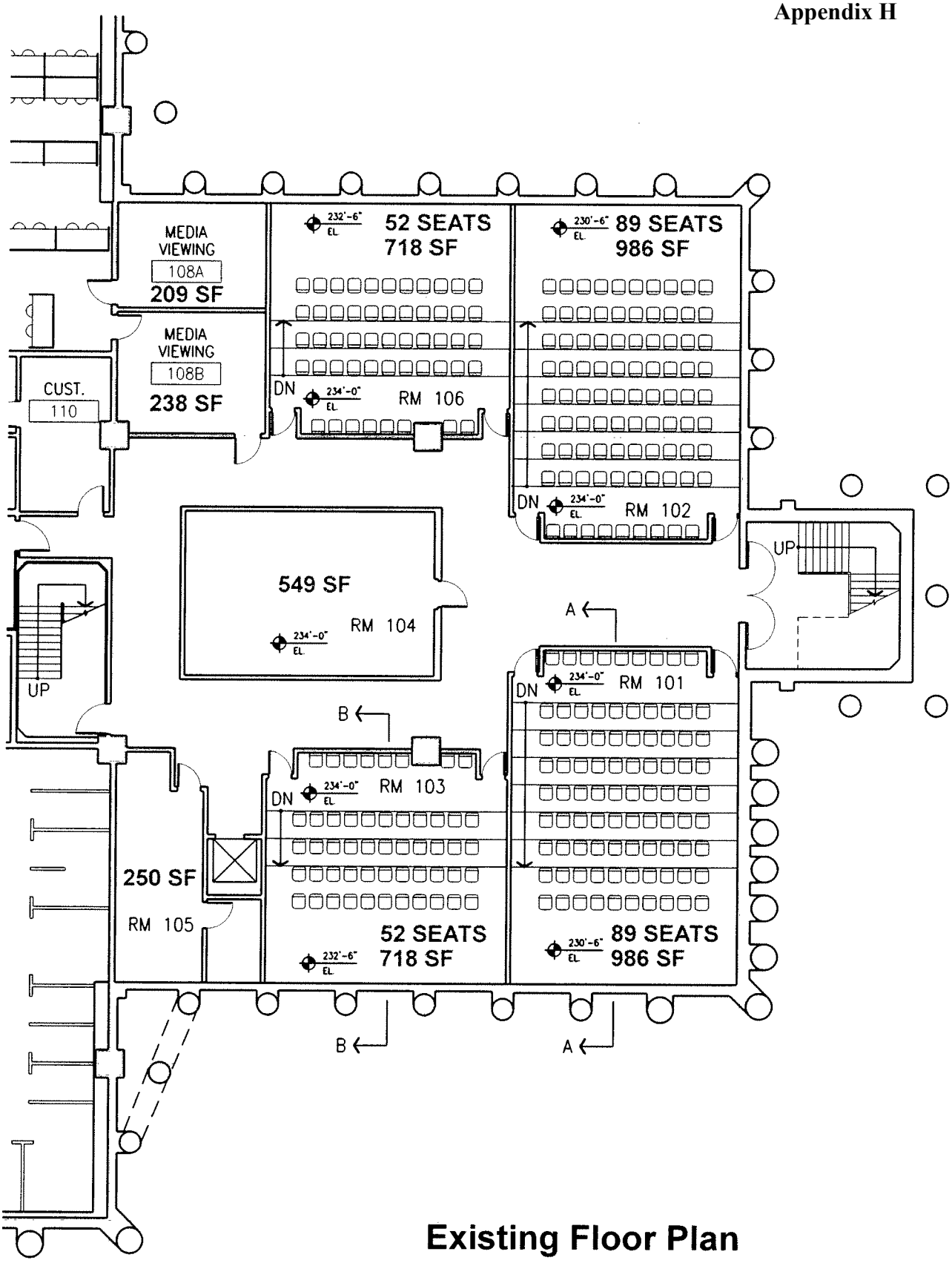
Post and Corburn imagine the ALC would be more useful in working with sections rather than whole classes. In a classroom, they would want smaller tables (5-7), not round (but changeable in shape and size), and screens the students can gather around and project to. Both loved the idea of creating more informal "student-centered" learning spaces around campus.

Kaufman, Nielsen and Song all think that applied courses could take best advantage of an active learning approach, but that courses heavy in theory would need more traditional lecture. They would have to completely revamp the courses they now teach. They could see using the ALC for some class activities, but are not predisposed to change their "direct instruction" approaches.

DeKosnik thinks the U of Minnesota classroom would meet all her needs in an active learning space: computer, connectivity, many screens, whiteboards or smartboards, flexibility in tables and chairs (does not like big round tables) so much reconfiguration is possible, all furniture on wheels, plenty of electrical outlets. She would use the ALC for all her courses.

DeKosnik learned basic active learning approaches at Northwestern as a GSI there; school trained GSIs and TAs in it. In her classes, students use lots of media in their presentations—there is much technology-mediated interaction between presenters and the other students. Nonetheless, active learning spaces can be created without technology, and the extent of its use probably depends on the subject matter of the course.

Henry has little experience with active learning pedagogy, but has been teaching an online course through Extension, and likes it, so he is open to trying the new space and approach.




## Existing Floor Plan

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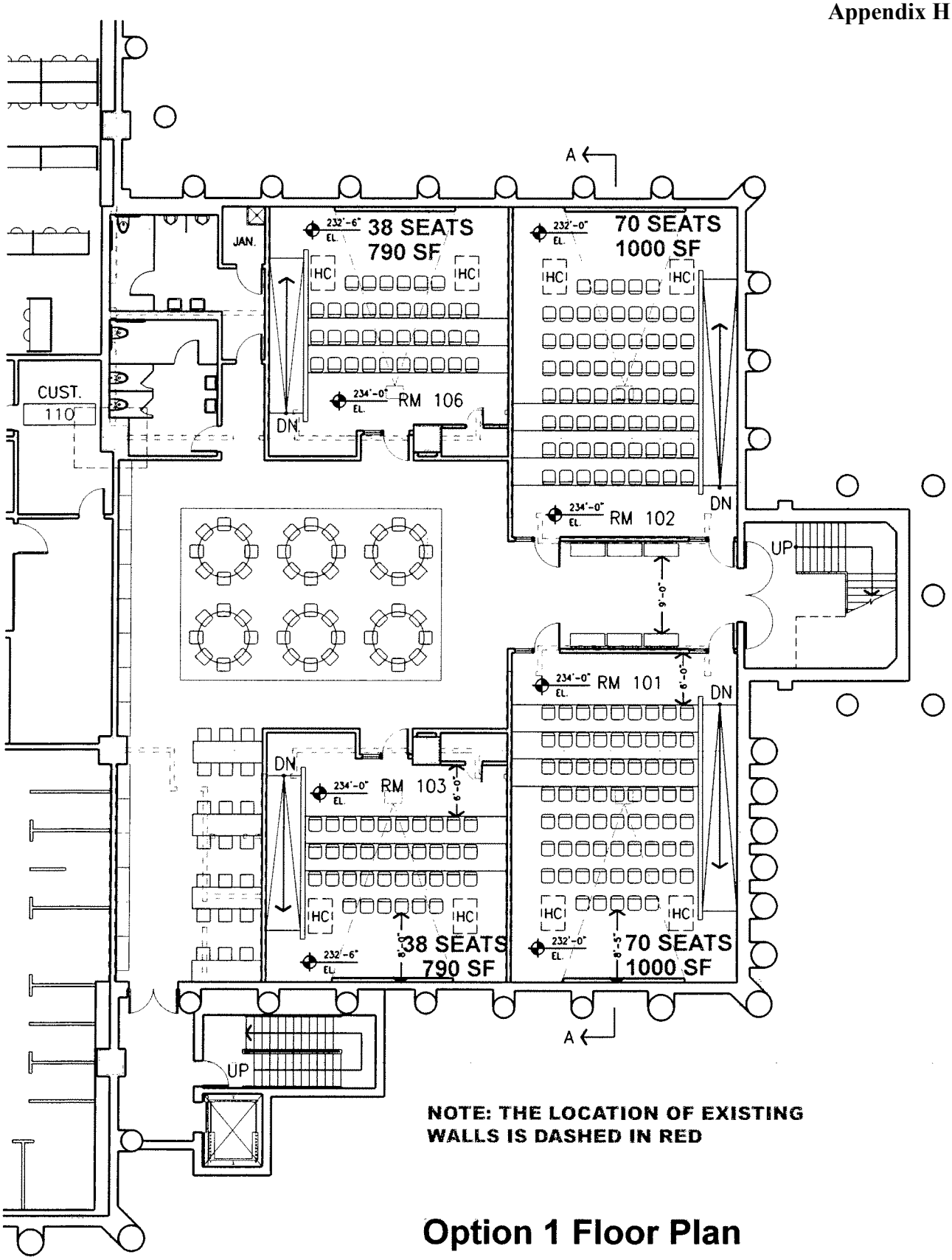


**NOTE: THE LOCATION OF EXISTING WALLS IS DASHED IN RED**

## Option 1 Floor Plan

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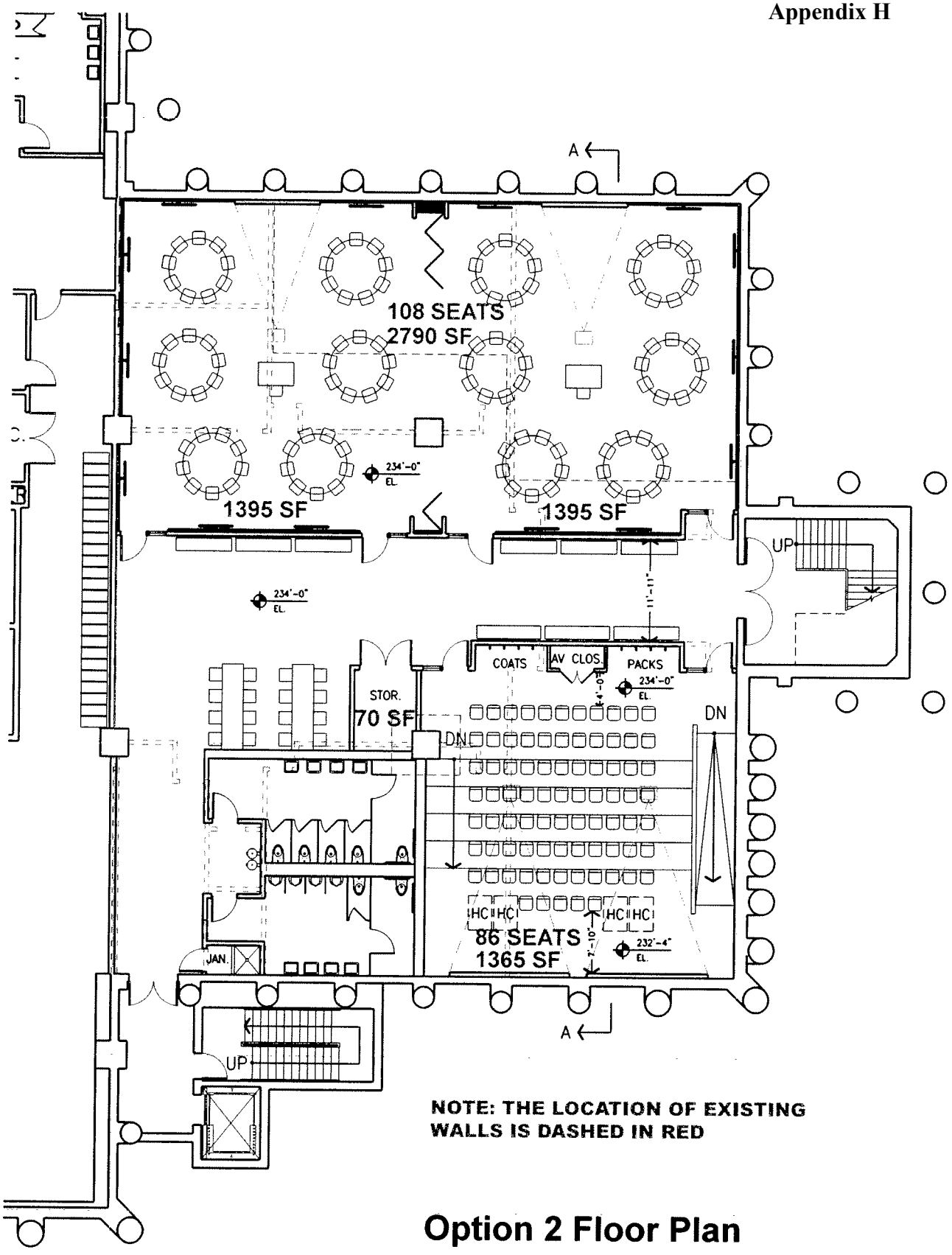


**NOTE: THE LOCATION OF EXISTING WALLS IS DASHED IN RED**

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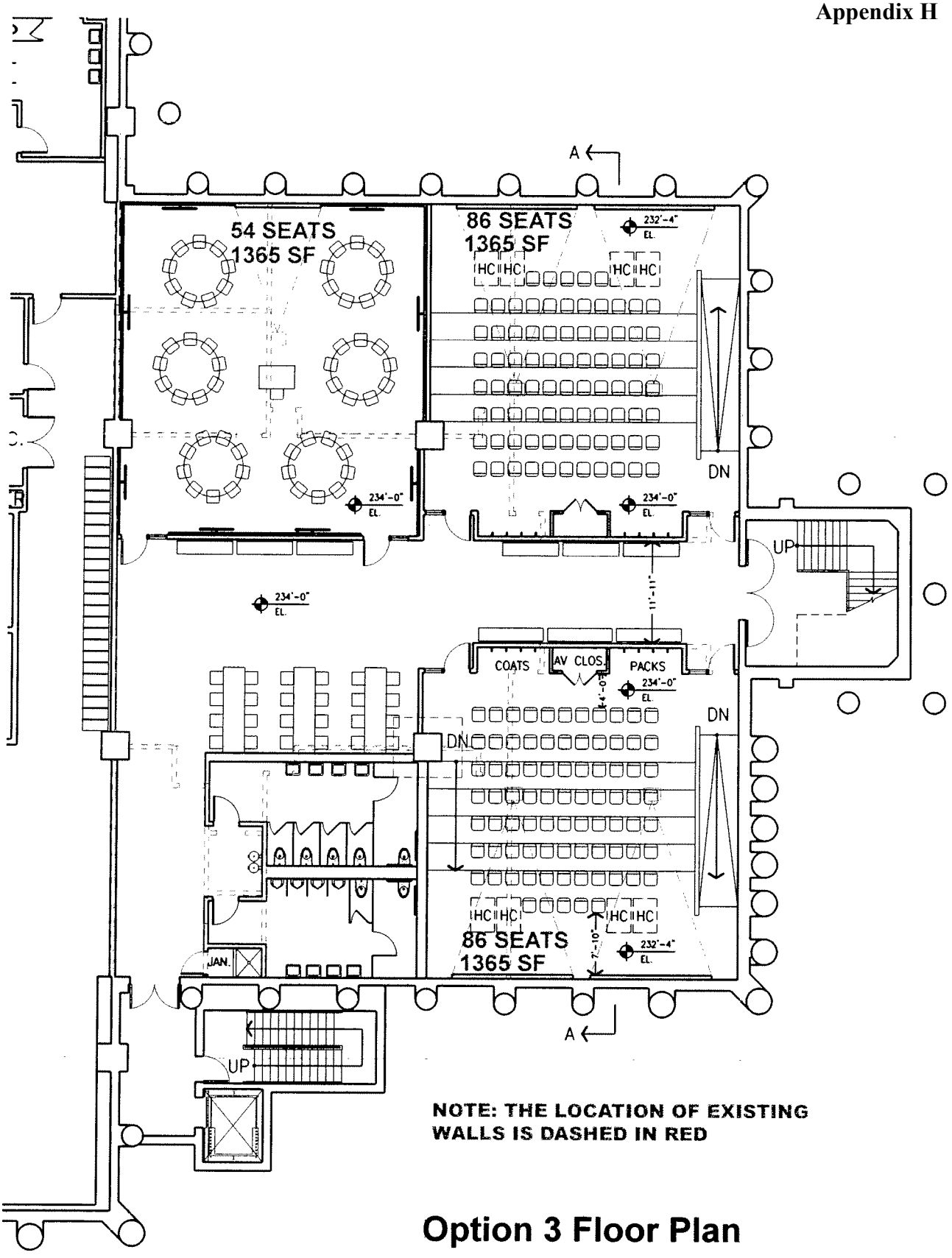


## Option 3 Floor Plan

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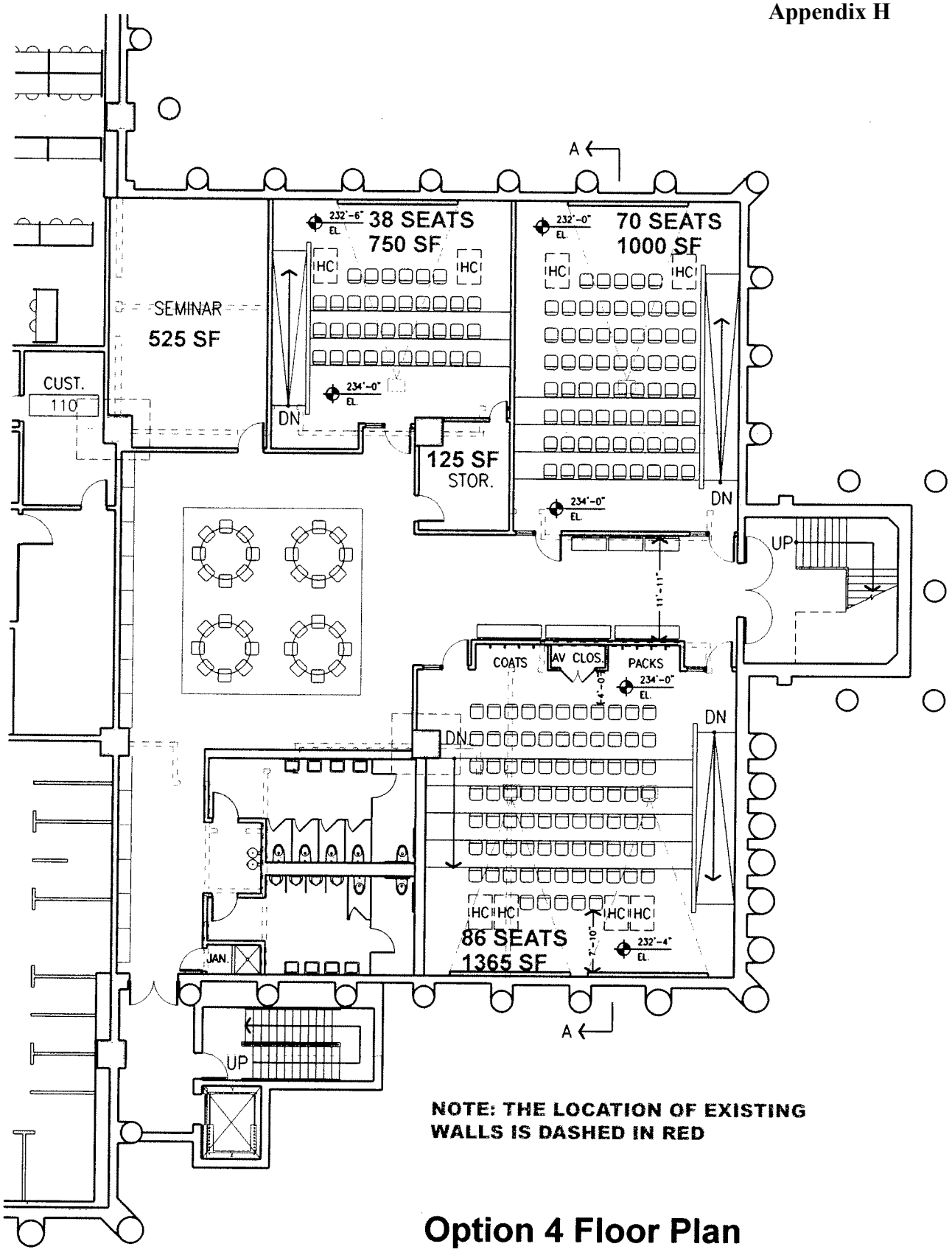


## Option 4 Floor Plan

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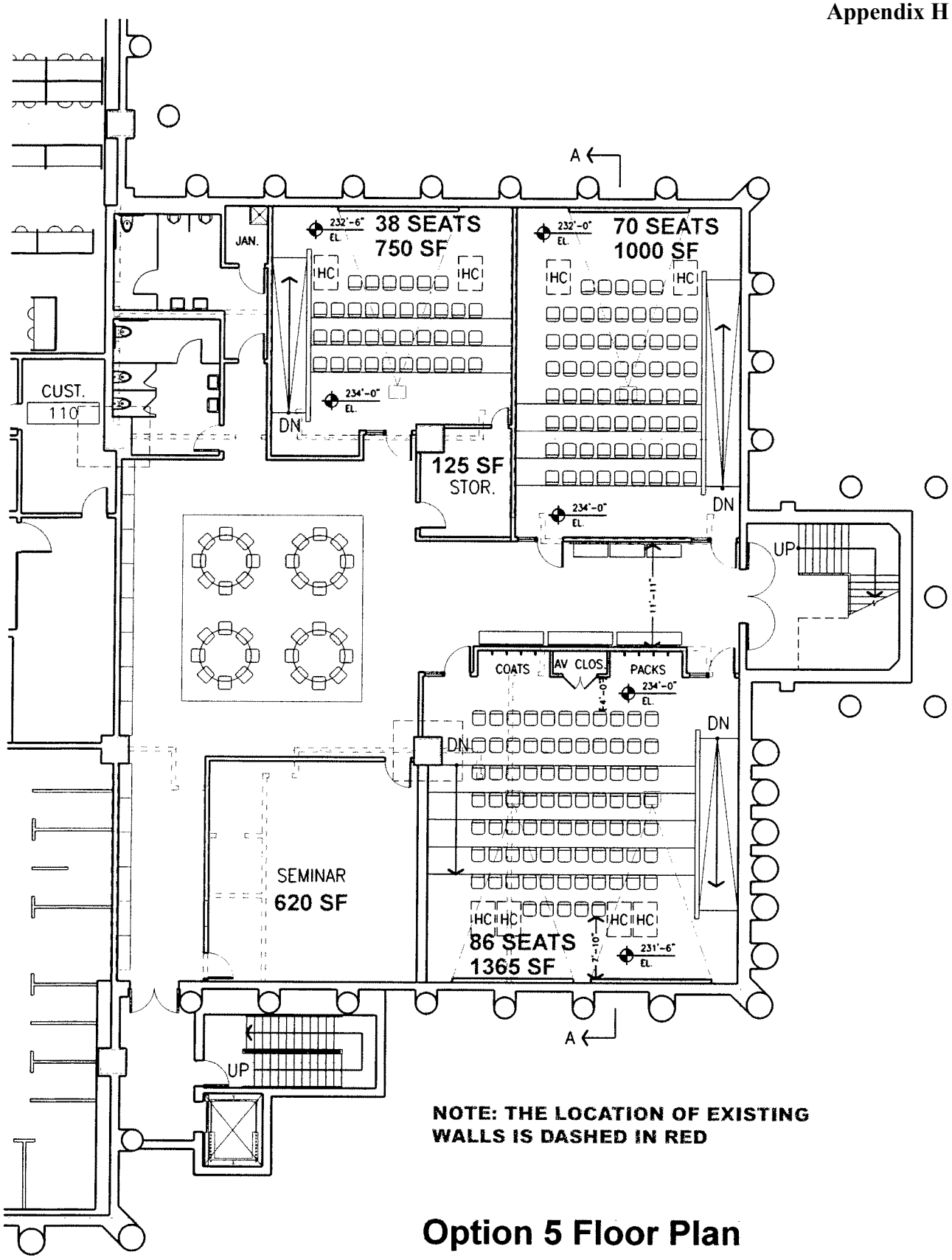


## Option 5 Floor Plan

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OFFICE OF THE CHANCELLOR
200 CALIFORNIA HALL #1500

BERKELEY, CALIFORNIA 94720-1500

July 7, 2009

Professor Meg Conkey
Professor Darcy Grigsby
Director Mara Hancock
Professor Greg Niemeyer
Acting Dean Deborah Nolan
Principal Planner Kerry O'Banion
Coordinator Victoria Robinson
Director Derek Van Rheenen
Director Cara Stanley
Associate Registrar Walter Wong

**Re: Active Learning Classrooms working group**

Dear Colleagues:

In recent meetings of the Moffitt Program Committee, which is overseeing the renovation of Moffitt Library, it has become apparent that now is a good time for the campus to rethink what we want our general assignment classrooms to look like in the 21st century. To what degree should we be investing in the development of "active learning" classrooms? If we agree that we need them, how should they be equipped? Should they be one size or many? It is critical that we involve faculty members extensively in this discussion.

Because of your stated interest in this issue, or because you are already engaged in rethinking classroom design, technology, and pedagogy, we hope that you are willing to serve on a working group to take a systematic approach to these questions. We have asked Deborah Nolan to chair the group and coordinate the drafting of recommendations. We will be ex officio members and participate to some extent in meetings.

Colleagues with expertise in areas related to teaching and learning have been asked to serve as resources to the working group. LaVern Lazzereschi of the Office of the Registrar, Brenda Farmer of ETS, and Steve Tollefson of the Office of Educational Development will be available to provide data or information to inform your discussions. In addition, we suggest you contact the following faculty for input: Whitney Davis of Art History, Ole Hald of Mathematics, Alastair Iles of ESPM, Jasper Rine of MCB, or other teaching innovators of whom you are aware.

The group will meet during the summer and intensively during the fall in order to produce recommendations by the end of the semester. We intend for the findings of the working group to

be applied immediately to the work in Moffitt, set to begin in early 2010.

Sarah Nathe in VP Koshland's office and Cynthia Schrager in VP Maslach's office will staff the working group. Elizabeth Albee in VP Koshland's office will contact you soon to schedule the first meetings.

Thank you for your assistance in addressing this important issue. There is no need to reply to this invitation unless you are unable to serve. However, if you have questions, please don't hesitate to contact any of us.

Best regards,

Catherine Koshland
Vice Provost-Academic Planning and Facilities
& Co-chair CCCPM

Harry LeGrande
Vice Chancellor-Student Affairs
& Co-chair CCCPM

Christina Maslach,
Vice Provost-Teaching and Learning

cc: Whitney Davis
Brenda Farmer
Ole Hald
Alastair Iles
LaVern Lazzereschi
Jasper Rine
Steve Tollefson