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ABSTRACT

Administrators from the Universities of Delaware, Rhode Island, and Vermont describe the processes that were followed on their respective campuses in the construction of economical and rapidly completed student housing. The design-build approach was utilized in which contractors prepare plans to meet the client's budget and facility requirements. This method (1) permits the client to select the design most suitable to his needs and budgets; (2) necessitates that the client incur costs only after the selection of the design, thereby avoiding costly architectural drafting; and (3) assures that the architect's service (contractor paid) are directed toward team cooperation between the contractor and the client. Three speeches provide detailed accounts of the procedures followed beginning with the initial decision to construct housing to the completed buildings. (MLF)

HOUSING IN A HURRY

Proceedings of North Atlantic Conference

March 1972

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THE UNIVERSITY OF DELAWARE STORY

OF

HOUSING IN A HURRY

Society for Campus and University Planning
Massachusetts Institute of Technology
March 18, 1972

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Since my time is limited and the story a long one, I will plunge right in and tell it. Before I begin however, I must state that I, as an architect, was once a firm opponent to any suggestion remotely related to "package building", now I find myself a staunch advocate of, if not "package building" then of something closely related to it. There has been a great change in what constitutes "package building" as I understood it before and as I understand it now. Needless to say, it has been an education, one which I am delighted to share with you.

How did the University of Delaware make the decision to design-build? You might say we were backed into it, or driven to it since it finally became a conscious decision at the time it remained the only available course.

First of all the Administration of the University of Delaware, concluded that it would be preferable if an educational institution could concentrate on education, rather than the hotel business. A committee was therefore appointed and charged with investigating ways and means of getting out of the business.

The search began in the winter of 1969. Firms the University thought might be interested in financing, designing, building, owning, and operating college housing were contacted and invited for interviews. Few wanted to accept this total committment.

Those that did, upon investigating the Newark market, politely bowed out. Why? They found that they could not compete with the University's own housing which has been subsidized over the years via loans, gifts, and grants; and which has been largely financed through tax free bonds. The developer, in order to make a profit, pay interest and taxes is forced to charge much higher rental rates, rates beyond the student's ability to pay. In addition City zoning was restrictive and land attractive to a private developer, i.e., land adjacent to the University's academic core, was simply not available. Without some guarantee from the University, guarantees which the University could not give, private developers were not willing to participate.

By April, 1970, the results of the search consisted of two unsolicited design-build proposals. These proposals were based on requirements the firms themselves decided would meet the University's needs. Upon comparison of the two proposals, the University found it impossible to make an unbiased judgment due to the many differences in design and specifications. Two very attractive prices were developed, however, prices much lower than expected or experienced on past projects. So attractive were they, in fact, the board of trustees instructed the University officers to prepare design-build proposal requirements for public advertisement.

On May 15, 1970, an architect was commissioned to prepare design-build proposal requirements. A week later an outline draft was prepared and by June 15, 1970, the document was completed and the University advertised for proposals in the Philadelphia, Baltimore and Delaware news media.

Place yourself for a moment in the position of an owner who has never taken this approach before, or an architect and his consulting engineers, who hasn't either, and try to imagine the difficulty of writing such proposal requirements. The professional's integrity demands the architect protect the owner, but how do you do it with minimal specifications? How do you write a contract for such a project?

How do you define the parties who will participate in this contract? Who is the owner? Who is the contractor? Who is the manager or the developer if there are ones? What will be the position of the architect in the scheme of things? Who is he working for? How does he effectively represent the owner? How does one avoid a conflict of interest? How does an architect who is the owner's representative approach these questions? Times are changing and the only way to find out was to try writing such a document. We wrote one, it may not be perfect, but it served its purpose well. This is that document. It contains 200 pages and 5 site drawings.

There are some unique conditions in this proposal which you may be interested in.

1. The University had the right to waive any informalities in any submission and the right to reject any and all proposals. No award was offered, even had the University decided not to build. There was little likelihood of that however, since the need was critical.

2. Judgment of award was to be made on the following points:

   a. Upset price of project.

   b. Quality of design, i.e., aesthetic quality, technical quality and the quality of student environment provided in terms of the established program.

   c. Time required for construction.

3. A bonus-penalty clause was included paying a lump sum per day for every day the contractor completed early, or late, but no bonus payment if completion occurred after August 15, 1972.

4. A cost sharing clause was included for savings made during the course of design and construction, if these savings were found acceptable to the University. This sharing was to be split 70% to owner, 30% to the design-build team.

5. To encourage freedom of design and technology, the proposer could submit with his proposal, any number of alternates, add or deduct. This we hoped would encourage system design and construction.

The proposal document contains the following sections:

A) Instruction to proposers, B) Suggested contract, C) Contract between design-build team and architect (The standard A.I.A. agreement), D) Project program and E) Outline specifications.

Following are actions recommended one carefully considers in preparing proposals requirements:

1. Where possible follow A.I.A. requirements for design competitions. These should be amended to suit a design-build competition.
2. Allow sufficient time to prepare proposal requirements.
3. Allow sufficient time to prepare and submit proposals.
4. The firm preparing proposal should be the same firm judging submissions, and should not participate in the competition.
5. Specify limit of number and type of submission documents required.

Six weeks after advertising, proposals were received, this was August 4, 1970. Thirty days were allowed for judging and award. Actually it took longer, but no entrees withdrew their proposal for obvious reasons.

Initial judging was done by a consulting architect and an engineering firm who had no direct interest in the project. Eight submissions were received, seven of which were considered acceptable, two firms gave alternate proposals. Frankly, the University was overwhelmed by the number and the quality of the submissions since almost every firm provided more than asked for. The following slides will give you some idea of the size of the task.

Before showing slides of the actual submissions may I orient you to the location of the sites selected for the project.

1. Campus Map
2. North Campus Master Plan

3. Rendering of Pencader Residence Hall

4. Rendering of Clayton Hall

The following slides show renderings or models of the proposals in order of descending prices. The number of documents submitted in support of each proposal will be given as each slide is shown.

Rank of Proposal

1. (Highest Price)	31 Mounted drawings and color boards.
2.	21 Mounted drawings, color boards, 1 model and practically a complete set of working drawings.
3.	6 Mounted drawings and color boards and 6 blue prints.
4.	10 mounted drawings and color boards 1 site model, one suite model of high rise, one model of typical floor of low rise.
5.	35 mounted drawings and color boards.
6.	18 mounted drawings and color boards and an almost complete set of working drawings.
7.	31 mounted drawings and color boards.
8. (Lowest price)	6 mounted drawings and color boards.

With each proposal was a set of contract specifications matching closely or in some cases exceeding the proposal requirements.

From this it is obvious the problems faced by the judges. The University fully realized the expense and effort that went into the preparation of these proposals and desired to give

each proposal full consideration. The extent of the submissions along with the numerous alternates proposed made it exceedingly difficult to compare proposals. For example one firm submitted 38 alternates. At first a point score system was assigned. This was discarded because of the difficulty of weighing aesthetic qualities against technical qualities. The judges finally decided to make their judgment strictly on quality of design and allow the University's administration to judge the projects in respect to cost and time. The first round judging resulted in the following standing:

Standing	Rank in Descending Order of Prices
1.	1
2.	8
3.	7
4.	5
5.	2
6.	6
7..	4
8.	3

The University was knowledgeable about the qualifications of all firms but one, this firm placed second, and ranked lowest in cost. The judges and members of the senior administrative officers of the University visited a project under construction by this firm and spoke with the owner to determine the firm's qualifications. The result of the trip was more than satisfactory.

At this time, late August, 1970, hearings were scheduled to give each firm an opportunity to present its proposal and clarify any points which may have been overlooked by the judges. Because of their standing, two refused the invitations. Forty-five minutes were allowed for each presentation, this proved more than enough.

The result of the hearings changed the standing in the judges' minds as follows:

Standing	Rank in Descending Order of Prices
1.	1
2.	7
3.	5
4.	8
5.	2
6.	6

The firms were advised of their standing. Complaints were received from some firms dropped by the wayside, rumors of suits were heard, political pressures were felt.

Time limits my describing in detail the actions and analysis that took place during this judging period. Additional hearings were held with the first, second, and third, place firms, each first being advised of the deficiencies in their design.

The project was finally awarded to the third place firm because they most ably overcame the deficiencies found in their proposal.

Actions to avoid in judging and awarding a design-build contract are:

1. Establish definite limits to design submission, so many exhibits, no more, no less.
2. Limit the number of alternates by establishing dollar limits which result in substantial savings.
3. Never, under any circumstances advise contestants of their standing.
4. Make announcement of award only when final choice is made.
5. Hold only one hearing for all and a second for really competitive leaders.
6. If possible, keep identity of teams concealed until leaders are selected.
7. Reduce time for judging to minimum.

Advantages gained by University through design-build proposals:

1. First time members of administration were exposed to ten different solutions to the same problem.

2. Ideas, but not solutions proposed by all competitors were available for the University's consideration once a final award was made.

   a. For example several proposals indicated that a precast concrete structure might be less costly than steel. Only after the award was made did the University advise the winner that this appeared to be worth their consideration. This and the fact that the team was considering systems of this nature resulted in the common agreement to use a system of precasting instead of a system of structural steel.

3. Greater exploratory design work was obtained at no cost to the owner other than the preparation of the proposal requirements. Even if an award is given the amount of schematic design work prepared far exceeds the cost involved.

4. The University received eight proposals instead of only the three or four normally experienced through the common design, bid, build approach.

During final contract negotiations some modifications were mutually agreed to. These were:

1. $500,000 was cut from the original proposal price by acceptable reductions in systems, floor area, materials, etc.

2. The cost of the work consists of:

   a. A fixed fee for design, construction and project management.

   b. A fixed construction cost.

   c. A construction contingency.

3. The split in shared savings is 50/50 but does not become effective until after the construction contingency is saved and reverts to the owner.

4. The design-build team hired an accounting firm who certified quarterly all expenditures on the project.

5. An itemized cost estimate for construction was submitted with the initial contract and with each monthly invoice. The monthly estimates shows actual prices for each item and the charges against each item.

6. Other minor modifications were agreed to.

The contract was awarded on October 15, 1970 and ground was broken on December 3, 1970. Before foundation work could begin, a final decision had to be made on the type of structural system to be used. The design-build team first proposed a change from structural steel to poured in place concrete at no change in cost. This was readily accepted. A week later they proposed precast concrete, specifically the bison system, a system developed and extensively used in England. A visit to England was made by representatives of the owner and the design-build team to examine the system in use and under construction. This change was accepted at no increase in cost.

Foundations for the project were placed during the winter months, the worst construction time of the year. Fortunately a somewhat milder winter than usual, an excavation with excellent drainage and a gung-ho contractor pushed the job along. The first panels were erected on March 26, 1971 and the two towers, with the exception of the stair towers, were topped out on November 15, 1971, slightly more than seven and a half months after the first panels were set. Erection time averaged one floor per week and at one point met a schedule of one floor every 3-1/2 days. Completion of the first tower, completely furnished, is expected about April 14, 1972, the second tower, barring strikes in the building trades, about June 1, 1972. The following slides taken during construction will give you a clearer picture

of the project and the advantages of the structural precast system used.

In summary, what are some of the advantages and some of the disadvantages in using the design-build approach.

Some of Advantages Are:

1. Savings in Time and Cost: At least one year perhaps more has been saved in completing the project from initial design to construction. For example the University concurrent with the construction of this project, is building a low rise residence hall for 768 students and a dining hall for 2,000 students. Design for these units began in March 1968, construction began May 15, 1969. Completion of construction of this project was originally scheduled for January, 1971, but is now scheduled for July, 1972. The total time lapse for this residence hall will be 51-1/2 months. The design for the design-build project began May, 1970 and construction will be completed July, 1972. A time period of 26 months. It is not really possible to compare these two projects because they are not identical, but a savings of at least one year seems reasonable. Any way you slice it, one year savings in time on a $10,000,000 project amounts to a saving of $1,000,000 in today's construction market.

Other cost savings will be made, in that the total construction contingency will be returned to the University and some shared savings are expected.

2. Quality of Construction: The quality of construction is equal to and in most cases higher than any previous residence hall the University has ever constructed.

3. More effective Administration and Management of Project from Conception to Completion: The team approach allows greater input from all parties concerned not the least of which is that of the contractor during both the design and construction phases. The team approach places the contractor where he should be, in a more professional position.

4. Greater Control of Costs due to the flexibility of the team approach, changes advantageous to the owner can be made as the project proceeds and through value analysis, the owner can make a judgment on the advantages of these changes, both in cost and function.

5. Common Goals: Each member of the team, including the owner has a common goal, to build the best building for the least cost, in the shortest time. Conflict is reduced but not eliminated, between members of the team. The conflict remaining is positive rather than negative, since it is one directed toward saving money for each member of the team. The owner is the final discision maker, but the architect still remains the owner's advisor.

Some Disadvantages Are:

1. Once the proposal requirements are set and an award made, input from all interested members of the University community is limited.

2. Due to fast tracking, decisions must be made without delay.

3. Rapid circulation of information to all parties is essential, but was not achieved. This could be accomplished if the owner's representative attended all meetings between contractor, developer and architect.

4. The position of the architect can be a tenuous one and requires the highest degree of integrity.

You may find the following data of interest:

Design-Build Team:	Ogden Development Corporation Frederic G. Krapf & Son, Inc. (a joint venture & prime contractor to the University) Charles Luckman Associates, Architect (hired by joint venture)
Number of Buildings:	Three, two residence towers (1-16 stories for 620 students and 1-17 stories for 678 students) and one 2-story student commons building.

Number of Apartments:	One-bedroom 255 @ 2 each = 520 students Two-bedroom 197 @ 4 each = 788 students Each suite contains bedroom(s) for two students each, a living-dining room, kitchenette, and bathroom.

Gross Floor Area:

Towers:	366,043 square feet
Commons:	27,074 square feet
Total	393,117 square feet

Cost:*

Construction	$ 9,410,800
Construction Contingency**	600,000
Furnishings	1,200,000
Total	$11,210,800

Unit Cost:

Construction Cost/Student	$ 7,250.00
Construction Cost/Square Foot	23.94

Yearly Rental Rates:

	Delaware Resident	Non-Residents
2-Bedroom	$665.00	$765.00
1-Bedroom	795.00	895.00

*Exact costs will be determined on completion of project. Costs shown do not reflect cost sharing, bonus payments, or all change orders.

**Reverts to the University.

In conclusion, the experience described I considered to be an extremely successful one. I personally have the highest regard for all those who have participated in this team effort, the personnel working for the joint venture, and those working for the architect. May I extend an invitation to all of you whom are interested to visit the University and examine the results first hand. Thank you.

University of Rhode Island

"Housing In A Hurry"

Society for College and University Planning
Massachusetts Institute of Technology
March 18, 1972

Joseph C. O'Connell
Vice President for Business Affairs
and
Treasurer
University of Rhode Island

SCUP CONFERENCE, 18 March, 1972 (Saturday)

I can assure you that I probably have more courage than I have good common sense or I wouldn't be here standing before a group of professional experts in the field of planning and architecture trying to tell them something which I'm sure they already know.

In trying to get housing, I made the mistake when we started at the University of Rhode Island of calling it "instant housing". That is a mistake that I won't repeat. It may be alright for Chase & Sanborn and Maxwell House, but it doesn't work in housing. This gave a very bad image to the whole deal. I came to the University of Rhode Island in '68, a month after a new president arrived on the scene. By the time I got there he'd been harrassed by letters from the legislators and their constituents about the fact that we did not have adequate housing to take care of a vast flood of applications. He turned to me and said, "Joe, I want some housing and I don't want to wait three years for it." Well, fortunately I'd spent some time at Cooper Union just before going to the University of Rhode Island, among architects and builders and planners and people who had imagination. And I'd heard a great deal about some potential development. So I decided I'd start looking around and see what I could do in a hurry. This was in September of '68. And, to make I guess a longer story shorter, I went through the gamut of the companies that you all have seen

advertising in the professional publications and discovered that they weren't very interested in me for two reasons: One was because URI was a state university and they were convinced that we couldn't do anything without an awful lot of red tape; secondly, they were only interested in doing something if they could handle the financing as well, since this is where they really would make their money. However, I was fortunate enough to get in touch with a rather small builder out in Michigan, who had done some dormitory work at a college in Pennsylvania. And we talked to him, told him what we wanted, and shook hands, I guess in early October (remembering that I got there in September), we shook hands in early October of '68 after I'd taken a look at something he did in Pennsylvania, and he started to work. There were no specifications, there were no plans, other than what I'd seen of his previous work, and there certainly was no contract or commitment on either side -- as a matter of fact, there was no financing at that time either. Obviously, I wouldn't be here today if we hadn't worked out the problems of financing and contracting and we did. This was blind luck -- I was lucky enough to get a man whose integrity was of the highest, who took great pride in his work, and who looked upon this experience at the University of Rhode Island as an opportunity to increase his proficiency in this kind of housing and also, perhaps, to increase his business.

Alright, now, what did we build? The first project that we built, we broke ground for in November 1968; we moved into it on September 22, 1969, a little over 10 months later. We built four three-story dormitories with a central lounge, masonry block, brick-faced construction, housing 352 students, and there were two head resident suites. Cost included buildings, central laundry room, recreation room, fallout shelter, lounge areas, carpeting throughout, all furniture and all drapes installed in the student rooms, fire protection devices and emergency lighting, for a per-bed cost of $4,276. Now let me tell you something: when I went into Rhode Island I antagonized every architect, builder, and union official in the State. There were lynch parties organized; there were investigations, newspaper headlines; I was reproved by interviewers on radio and TV. There was a political campaign going on, and both candidates for governor had something to say about this; the head of the AFL-CIO, the building trades, everyone took a crack at me. The project was investigated from stem to stern. Now I'm not going to pretend to you that I'm a technicial expert -- I'm not; you can ask me a lot of questions about architecture and engineering that I can't possibly answer. But I can assure you that we were studied and surveyed by every professional group in the State to see whether we were putting over some sort of deal and getting cardboard construction -- this was the charge that was made. They came down and looked at the

specifications; they investigated the buildings; they looked at the wages that this man was paying his laborers; and they tried to find out what was wrong and how this could possibly be done, and they couldn't find anything wrong. I can assure you that all aspects were looked into by experts. The cost-per-bed was $4,276, fully furnished, and no one ever disputed that figure. This meant that we could maintain our room-rent structure at that time, $450 for our better halls. Obviously, there was an awful lot of luck in this thing -- an awful lot -- I was lucky in that I ran into the right man at the right time. He didn't need to invent this particular method in order to suit me. He had done it before.

We got attractive buildings -- I've got handouts that I can pass out later on to let you take a look at them. I think you'll agree that they're as attractive as 99% of the college residence halls you'll find on university campuses. I said to other groups of architects and planners that I feel that after a thousand colleges and universities in this country have built 10,000 residence halls that it shouldn't be necessary to re-invent the wheel each time we design a new residence hall. I do not feel the same way about a library building or a fine arts building, or other specialized buildings, perhaps. I certainly don't feel that a dormitory is so unique or has to be such an architectural monument that we cannot take advantage of the experience of others. And that's exactly what this man did -- he developed a double-loaded corridor, standard plan with variations. For example you can have your lounge in the

middle, you can have it at the end, or you can do various things like that -- but basically it is a pre-engineered design. And after all, what are college residence halls -- most of them are double-loaded corridors, with or without gang toilets, with or without suite arrangements with connecting baths, or they're a series of clusters around a common small lounge -- again with or without gang toilets and with or without private toilets. But you have basically two general outlines in college residence halls, and they're building them all over the country all the time, so why should we have to hire an architect to design $100,000 worth of plans, and then go out to bid the thing, and discover that we don't have enough money to hire the contractor and get the job done. In this package deal, I went to a contractor, and I said "I've got $1,800,000 to spend. What will you give me for $1,800,000?" He told me what he would give me and we bought it. That's the way you buy an automobile. That's the way you buy many other things. This is something that I think architects are going to have to accept to become part of the team. As a matter of fact, from what I read in architectural publications, I think architects are looking at this and deciding that they can no longer allow their clients to participate in a gamble that may cause the client to wind up with several hundred thousand dollars' worth of plans, yet not the funds to construct a building. We had the services of an architect in the package deals that we used but the architect was hired by the contractor.

For the first package deal we got proposals from five or six firms. If we had five or six people working on this and giving us schematic drawings and preliminary plans, let's say arbitrarily that they each spent $5,000 or $6,000, so they spent perhaps $60,000 gross. That's money that I didn't have to spend; it was their gamble; it was their risk that they were willing to take. And when we turned all but one of them down, they absorbed the loss; not the University of Rhode Island, not the students who were going to live in the residence halls.

Okay, that was the first project. Cheered by our first success and the fact that the lynching party that was organized by the local chapter of the AIA couldn't find the campus, I went ahead with another. In the meantime the architects had come around; they were cooperative. One of the leading antagonists of the first project came down, looked the building over, and made a public statement that we'd gotten good value for our money. The architects were beginning to see the light and were getting cooperative and wanted to help us. This open-mindedness I have tremendous respect for. The contractors, the labor people, and others were still fairly antagonistic. And the architects, don't misunderstand me, were not wildly enthusiastic - they didn't whole-heartedly like it, but they were professional people and they came down and looked it over and they said, "You did not get cheated; you got your money's worth and

you got a good building." And I thought that this took an admirable amount of professional courage.

For the second project, a lot of ground rules were imposed on me. So we went out to about 50 different contractors -- anyone who was interested in it at all, anywhere in Rhode Island, or in New England, or all over the country, and we said to them "We've got $2,500,000; what will you give us for it?" We sat down with the Associated General Contractors and answered a lot of questions which were resolved and incorporated into skeleton specs. We did the same thing with the AIA, and I insisted that we have a presubmission conference to answer further questions so that no one could say that there were any hidden deals. We were very fortunate to have the Research and Design Institute in nearby Providence and we asked them, at the insistence of the Association of General Contractors, to assemble a panel of people who were knowledgeable in the field to evaluate all submissions independently. The idea in the minds of those who did not approve our methods was not to let the same guy get the contract again. "This fellow from Michigan, there must be something wrong with him; don't give him a chance to get rich." Go out and ask 50 contractors what they'll give you for $2,500,000. Get an independent panel so those folks down at the University can't make the selection. And then make the recommendation. And a lot of other safeguards, and we'll let you try it again, but we still don't like it much. Well, after going through

all that procedure and having the presubmission conference and answering a lot of questions and getting in people from all over the country and asking 50 people what they would give us for $2,500,000, we wound up with about six proposals and one of them was from the builder of the first project. The panel met independently, off our campus. I didn't even meet the members of the panel (I knew their names, and made a point of not meeting them during the evaluation). The panel came up with the unanimous recommendation that we give the second proposal to the contractor/builder of the first proposal. This didn't surprise me, because I thought the man had ability. There were at least one or two other proposals that had substantial merit, but none of them could give us the value and the price that this man could. Now we're talking about a $2,500,000 project and the per-bed cost on that amounted to $4,722 (the other one was $4,276). This one, that turned out to be $4,722, was a little fancier. I think we added a few amenities, but basically this included carpeting, furniture, mailboxes, fire protection devices, emergency generator, phone conduits to each room, laundry rooms, furniture and appliances for the housemother's suite -- everything. This was a turnkey operation; the students could move right into it. It was the same kind of project -- masonry brick-face, fire-proof construction, but it was slightly rearranged, the lounges were put in at the end of the building and the buildings were slightly skewed to make them fit the landscape, and the site

available. Again, we had the services of an architect, but he was hired by the contractor.

Perhaps a total of $60,000 or $70,000 was spent by the unsuccessful bidders but it was not loaded onto the fee which the student had to pay to live in the room, nor did it leave me stuck with a set of plans that I couldn't build. If I sound critical of the existing system, it's because I am. I've been stuck, during my career, with two sets of plans costing more than $100,000, which I owed the architects, as a legal and ethical and moral debt, and which I couldn't afford to build. It's alright to have this little clause in your contract that the architect agrees that he'll redesign it to meet your budget, but this doesn't work. It is seldom fair to the architect to force him to do this, because probably it's not his fault -- there've been so many changes in the program that he was never able to find out what people really wanted. So, I'm very sensitive about buying plans that I can't build. In this project, again, we were able to do all this without any expense to ourselves. I doubt if we spent more than $1,000 - $2,000 to get us to the point of starting construction. Usually, by that time, you've spent $100,000 and the architect is not certain his building will ever be built.

The first one, you remember, I started in September of '68 and opened in September '69. And this one we started working on early in '69 but we actually didn't let the contract until July 15 of '69. On September 13, 1970, this hall, containing 504 beds, was opened and occupied.

Now, let me be completely honest when I say that each of these was done in less than 12 months and moved into and occupied. Not everything was perfect, but they were suitable for occupancy, and the amazing thing is -- I refer to this because in today's climate it has surprised me -- the students in each instance moved in and accepted the few unfinished details with enthusiasm. In one of the residence halls (not because of any fault of the contractor but because there was a strike of glazers) we couldn't get the windows in until well into November. In this day and age it's amazing what students will do if things are put to them properly. But they considered that this was an innovative thing; they were happy to be in this new hall. They put up with temporary polyethaline plastic, and they liked it.

What about the halls -- the two residence halls? Are they easy to maintain? Yes. Have they held up well? Yes. Have we had any complaints about the quality of construction? Yes. Have we had any complaints about the quality of construction that we considered serious enough to bar us from doing this in the future? No. Again, I'm not a technician. We had a lot of outside people come in and evaluate this thing, and try to find something wrong with it. One of the biggest contractors in Rhode Island was originally a bitter opponent of this idea. Shortly before he died, he came down to inspect the project, saw me and said,

"Joe, I want to tell you I was wrong. You've gotten a real bargain." Well, what we got I think was a $7,000 per bed hall, for something like $5,000.

There was a lot of apprehension on the part of the people in the state who were stirred up by influential contractors and architects. So we did a lot of things that I wouldn't recommend that you do unless you have to. For instance, this outside evaluating team - that was great, and we had some good talent on it, but it was something that actually slowed the process down for a week or ten days, and when you're talking about building something in 11 months, a week or ten days is important. I have architects working with me in my department. I have engineers working there. We have a community planning department, we have some people on the campus outside of my control, faculty members who are certainly not controlled by any business office person, who were capable of providing an independent opinion. The pre-submission conference I think was very good because this got everybody in the room at the same time, architects and builders, people from my staff; we involved students in this, obviously -- we got everyone in the act. Well, this occupied another week, until we had the meeting and answered all the questions and typed them up and sent them out to the people who were there. This perhaps needn't have been necessary in such great detail, but

there were questions about the soil conditions, about the rock removal and all these things were answered in open hearings before the press and anyone else who wanted to come. Now if you're not from Rhode Island, you've got to think this is much ado about nothing, but you have to recognize that Rhode Island is a very small state. We have one state university, we have one major newspaper, and everything we do is headline news. Everything that is said about us appears on the front page. This is not true of Brown or Providence College, but it is true of the University of Rhode Island. In Rhode Island, the Governor will call you up and he'll say, "What's this I hear about what you're doing down there?" Or the Lieutenant Governor will call up and say "I've got three contractors in my office and they're screaming about this." Or the Secretary of Labor will phone you and ask you some questions. And after you get through answering the questions of the Secretary of Labor, you discover that he had just resigned as the head of the AFL-CIO to take his current job. So it's a very, very intense political atmosphere, and probably it's good because it keeps one honest and keeps you on your toes.

Okay, so much for undergraduate housing. We then thought that we'd been pretty lucky and come that far without getting into trouble, so we applied the same technique to graduate housing. We went to HUD (and by this time HUD had gone along enthusiastically -- mild interest in the beginning to wild enthusiasm at the end), and they were really ready to help us. We got a commitment from HUD of $1,750,000 to build graduate housing. And that's it -

we didn't have any schematic drawings, we didn't have any plans, we didn't even know how many units.... well, we told them we wanted about 100 apartments, but that was it. Okay, so we did the same thing again. We went out to a long list of people and we said "We've got $1,750,000. What will you give us for it?" We went to builders and architects, said what will you give us, with a guaranteed delivery date? Here's roughly what we want. We want laundry rooms, we want community rooms, we want lighted parking areas, we want fire-protection devices, we want this, that and the other, we want utilities, electric heat, stoves, refrigerators, and disposal units. And 23 firms expressed interest and asked us questions and we answered them. We had to have another conference -- one of these pre-submission conferences. Some of the potential bidders then came back to us prior to the submission deadline and said, "Well, here's what we think you said you wanted for your $1,750,000. Is this on the right track?" This happened in several instances and each time we said "Yes, it is." Or we told them where they were on or off. We started this procedure in January '71. The architects by this time, I would say, were very cooperative; they were not resisting us at all. The contractors had at least been convinced of our honesty, although reluctantly, so they weren't accusing us of fixing any deals. And, fortunately for me, the gentleman who had built the

first two projects had decided he wasn't interested in this one, so I didn't have to worry about the panel selecting him again, which would have been three points against us in a row. But we went out and we tried to concentrate on local bidders, this being very important because the labor situation in Rhode Island is very bad. So from January '71 until September 1, 1971, we were going through the same procedure again - award panel, meetings etc.. The award panel came in with a selection which we thought was excellent (there were again a couple of others that were good), but all the money that had been spent to develop these things to get them to the point where you're making a final decision and determining that you had enough money to go ahead, all that money had been spent by someone else, not by the University -- it would not have to be loaded onto the cost that the tenants would have to pay in this graduate housing.

So on September 1, 1971, we made final approval of the planning, going through a now-familiar procedure -- I'm not going to bore you with it again. The site work commenced on September 15, 1971, for 100 apartments, 65 three-bedroom and 35 two-bedroom, 7 buildings, including such items as roads, parking areas, exterior lighting, a 1900 sq. ft. community building, laundry facilities, exterior storage areas in each building, bicycle shelters, all on-site utilities, stoves, refrigerators, and disposal units -- we expect to have all that ready during

the summer of 1972. The target date, the completion date, is September '72. But the contractor is working hard (of course, as you know, we had a great break in the weather this year); he's very anxious to get out of there; and I think that we're going to have these dorms ready for occupancy this year when the students return.

Now again in all of these projects we have had student and faculty participation. We also used Research and Design Institute and, thank God, I had all that help or we would never have been able to get everything done. I don't think that this is the only way to get things done, and I am sure there are people in this room who have a lot more know-how in these matters than I have. But since I'm the guy who has to worry about how to pay the bill for the next thirty years, I want something that starts out as low cost as possible.

These are attractive buildings. The graduate housing complex is going to be very exciting. They are plain but handsome buildings naturally sited in a rustic area. We had the graduate students deeply involved in all this, and now in establishing the eligibility criteria for moving in, because we're determined that we are not going to turn the graduate apartments into a ghetto. We do have some graduate housing now, and are horrified to see children sleeping in the kitchen, and in the bathroom. We are not going to permit this with the new buildings.

Since I made some comment about the architects, I want to say publicly that the architects, after the first experience, have been most professional in their desire to cooperate and help participate in this new approach. And I think that it is wrong, if not impossible, to build buildings without architects. You don't get the kind of supervision that you deserve during construction if you don't have a responsible architect. Actually we have not built any buildings without the services of an architect. All these projects have involved the services of an architect, but his design services have been hired by the contractor. That certainly is a variation from the normal practice.

If the architects can, within the scope of their legal and professional limitations, handle the approach to low cost housing in such a way that the initial contact is with the architect and then the architect work with the contractor, fine. But up to this time I've had to talk to the contractor first, saying, "I have X dollars, what will you give me for it?", and then making it clear that I want an architect's services.

Questions

I will be glad to answer any questions that I can.

Q. You mentioned that the contractor in the first project wasn't interested in the third, (Graduate Apartment). Did he find that he had problems, that he was in over his head?

A. He had some problems due to the fact that he was a small builder and had three projects assigned to him rather rapidly. And he had not done this particular kind of building. He has done nurses residences and dormitories and residence halls but he hadn't done "apartment type" houses.

Q. Can you comment on the amount of your own time and your staff's time that each of these took? Half of your time for the past year, or two full-time assistants, or whatever it may be?

A. It didn't take any more of my time than would be taken in any other project.

The projects are successful: the students like them, they are easy to maintain. They are the most popular halls we have. Maybe I had three or four phone calls from political leaders. I had a lot of letters. I talked to a couple of people and asked them to get me some information that I sent to the Governor. I didn't hire any extra people to do any of this.

Q. What would you advise a University that was going to do this kind of construction program, which had not been involved in any construction programs for the past few years as to the amount of staff time that would be required?

A. State universities? I don't think there is any extra time, if you lay your plans carefully. I went to the State Budget Director and to the State Attorney General before I got into this to determine that I had the legal authority to go out to

contractors without bidding. The State University in Rhode Island has legal authority to negotiate a contract to build a residence hall. Now obviously you have to use that authority very sparingly since the Trustees must approve the contract. But this was a question that I had to settle before we got started. Some states may not have that authority. Some states may mandate competitive bidding. It is not mandated in Rhode Island. We normally do it; 99% of the time we do. We also have the authority in Rhode Island to issue revenue bonds directly related to the project that is being constructed. This may not be the case in all states. Each is different.

First you have to find out if you have the authority to do it. Once you have the authority you have to go ahead. I suppose if I were smarter.... I might have taken a couple of weeks before starting, to get together with the architects and contractors and tell them what I was planning to do before they read it in the newspapers. That is a piece of advice I might give you, if you have that much time.

Q. I have three questions. One I think you have already answered. You don't have bidding laws in Rhode Island.

A. We do but in this instance we were exempt.

Q. The second one was that I seemed to gather that each project takes a little longer from the first initiation to the construction.

A. Well, none of them took twelve months. Now I don't know any project in the country that you can conceive in your mind and get built in twelve months.

No, this was due to the preliminary steps, deciding that we were going to build graduate housing and how we were going to finance it and what kind - that took longer each time. This took a longer time on my part not on the builder's side, because I had to involve the graduate students and the graduate dean and people like that.

Q. Could you give us some statistics on the number of beds? the cost per square foot.....?

A. I'm not impressed with cost per square foot because you know that if you make your bedrooms larger, your cost per square foot can go down but I'll give it to you if it is something you can use.

Q. Can you give us the number of beds per unit?

A. Let me give them to you chronologically. Heathman Hall, which was the first one we built, has 352 beds, net square feet 71,700. Don't pull out a slide rule to prove I'm wrong because I'm reading this. Net square feet seventy-one thousand seven hundred. Cost per square foot twenty-one dollars ($21.00). Cost per bed, which to me is the important figure because I am paying for it per bed not per foot, four thousand two hundred seventy six ($4,276).

Housing '70 which was five hundred four beds. Total net square feet one hundred seven thousand six hundred fifty four. Cost per square foot twenty-two dollars, eleven cents, ($22.11). That's not too much inflation for a year later. And cost per bed, four thousand seven hundred and twenty-two dollars ($4,722). I'll have to explain that, although this hall was under five thousand per bed, it did have a few extras in it that the other one did not have, especially in the accommodations for manager and head resident.

On the Graduate Housing, which is where actually the cost per square foot might be more helpful, we have sixty-five three bedroom apartment, and thirty-five two bedroom apartments on a ten-acre site. We have a nineteen hundred square foot community building, free standing. Everything I am giving you is included in the contract price. Our contract price is one million seven hundred fifty four thousand dollars. We may add a few items, but it is going to be under a million nine, total project cost. The present signed contract is one million seven hundred fifty four thousand two hundred ninety three dollars. The total net square feet is eighty seven thousand seventy five square feet. The cost per net square foot is sixteen dollars, fifty-four cents ($16.54). This includes everything that I read to you before.

Any of you that are seriously interested in this kind of stuff, we run tours on the hour and half hour, and we are tickled pink to show it to anyone.

Q. Your presentation was really very exciting; I want to thank you for it. We have found that the acceptance on the part of students and dormitory people is directly proportional to the amount of reaction we have allowed the students during the planning process. I would like you to answer how much you found.
A. Well, the first one we started pretty fast. There was a student housing committee. What we did was keep them informed and listen to them. For instance, some minor thing, I think it was bathtubs, some one of us male chauvinists had the idea that we had to have a lot of bathtubs around for the girls. They said "no, we don't want bathtubs." We said thank you very much for this advice and we took out a lot of bathtubs. In the second project where we had more time we said to them, how do you like this first building that we put up? What would you like to have changed? They gave us some ideas, but they liked it so much that there was very little to change and we went on from there. In the Graduate Housing, that is why I had that longer lead time from January to April when we really started talking to students, that was all internal. We did involve them and the graduate dean and anyone else we could. There has been a lot of input from the students. They like the halls. They are very pleased with them.
Q. During the course of construction, do you employ supervision? Do you employ independent firms to look out for your rights?

A. Yes, we did. Well remember, we have an architect. According to professional standards of an architect, even though he is on the payroll of the contractor, getting his money from the contractor, his obligation is to me. I believe in this professional code, and had confidence in the architects involved, and believe that we got that service from them. However, we hired an independent mechanical contractor to check on some of this other stuff for us. The architect participated in the selection of the person we hired. It is not the best of all worlds, but we think it worked pretty well. The proof is in the pudding; we've got pretty good buildings. The one in '69, this is now two, two and one-half years old, we've had no trouble. What I mean is, that we have no more troubles with this building than you have with any new building. These aren't perfect. We've had some problems. Nothing more than I've had with the building I've paid seventy-five hundred or eighty-five hundred dollars for per bed.

Q. You say per bed figures of four or five thousand dollars meaning that is the contract price?

A. This includes everything, carpeting, beds, furniture, everything.

The figures are four thousand seven hundred twenty-two dollars and four thousand two hundred seventy-six dollars. That includes furniture, carpeting, drapes, lounge furniture, mailboxes, fire detection devices, emergency generator, phone, laundry rooms, and furniture and appliance for the housemother's suite.

Q. Are these basically single accommodations?

A. No, they are double. Modules of two double rooms with connecting bath.

UNIVERSITY OF VERMONT

"HOUSING IN A HURRY"

A report of the University of Vermont's Married Student Housing and Living/Learning Center, given to the North Atlantic Conference of the Society for College and University Planning, held at M.I.T., Cambridge, MASS.

MITCHELL N. CALL
COORDINATOR OF
FACILITIES PLANNING
MARCH 28, 1972

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"HOUSING IN A HURRY" - TALK BY M.N. CALL

SOCIETY FOR COLLEGE & UNIVERSITY PLANNING -
NORTH ATLANTIC CONFERENCE - M.I.T. - MARCH 18, 1972

In September, 1969 the University of Vermont opened for occupancy the first 89 units of Married Student Housing. Within the next few weeks, ground will be broken for the construction of the "Living/Learning Center", scheduled for completion in August 1974, and will provide 600 undergraduate student beds, together with appropriate recreation, study and food facilities, but with a substantial amount of "academic" or classroom-library-seminar-faculty space within the same complex. Both of these projects did not use the traditional three-step program-design -bid technique. Since the concept of "fast tracking" is not clearly defined, at least not as I interpret it, I think it valid to say that both of these projects were "fast tracked".

However, since my tenure as the Coordinator of Facilities Planning at the University of Vermont is a year and a half, I was not a direct participant in the programming and planning of these facilities. Our experience so far has indicated some level of commitment to this programming process, and I would be an active member of the team in the future, but so far I can only speak as a reporter-historian.

In 1969, when construction started on the Married Student Housing, the University had a population as follows:

Full-time Undergraduate students, 5466.

Full-time Graduate students, 550.

Medical Students, 25.

Other part-time Students, 477.

Faculty and Staff, 271.

We were then housing 2751 undergraduate students in conventional dormitories, and 74 families of Faculty and Staff in apartments. No housing provisions were made for Graduate students, Medical students, or Married students. At the same time, the two cities that surround the University, Burlington and South Burlington had seen substantial population increases --- caused by the opening of an IBM plant within five miles, and substantial expansion of a General Electric Plant, plus the many smaller concerns, service operations, etc. that accompany such population explosions. It was increasingly evident that the University would have to do something for student housing as our students, and potential students were having an almost impossible job of finding any form of housing, adequate or not. City officials didn't hesitate to point out the pressures that this student body had on an already tight rental market in the area. My predecessor's files as early as 1962, when we had but 3,843 students, and only 145 married students, shows concerns by the city and the university, which being a normal academic institution, we responded in the normal academic manner --- we established a committee to study the problem and report on its recommendations. By 1967, we had had three different committees to study and report, and each committee had, as committees are want to do, developed a survey questionaire which had been distributed, collected, tabulated and digested.

Each came to the same conclusion — we needed Married Student Housing, and we needed it right then. We sprang to action -- and appointed a committee -- but this time with the mandate to develop a full program for construction of a Married Student Housing Complex.

This latter committee was far faster acting and more responsive than you would anticipate after reviewing the track records of the previous three. Using the data provided by these other three committees, updated to account for the passage of time, the committee quickly developed a program and interviewed and appointed an architect. The particular choice of an architect was most propicious; the firm of Julian Goodrich Architects, Inc., South Burlington. Mr. Goodrich was given the program and asked to develop a scheme, to be sited on the main campus, just beyond the present residence complex, on about 5½ acres of land. The program called for 100 units of Married Student Apartments, with appropriate recreation, laundry and community facilities. And since the City of Burlington had a height restrition of five stories, to be low rise, which would make the density of the project more like Boston than Burlington, so a second set of schematics were developed, using high-rise concepts.

Concurrent to the development of the schematics with preliminary estimates, the financial officials of the University were negotiating with Washington, and the facility officer with various city and state agencies. In May, 1968, we had completed detailed architectural plans of both the high and low rise schemes, and have preliminary approval for funding the project

under the College Housing Loan Program. The Board of Trustees gave the green light to proceed with construction bids on 100 units of the high rise project. We were stunned by the bid openings -- the lowest being in excess of 50% higher than the original estimate, -- and well beyond the limits prescribed by the College Housing Loan Program. In defense of the architect, let me point out that he had made his original estimate in good faith, and then had an independent and reputable estimating service prepare a second estimate. They were consistent, but the contractors didn't agree.

Back in about 1900, the United States Army had constructed an army base in the two neighboring towns of Essex and Colchester, which they operated until about 1950. In 1964 the University purchased a major portion of the base from the General Services Administration, and had converted many of the old Officer billets into apartments for faculty and staff. Of the portion of the base that the University owned, there were two tracts of land that are open and "available" for construction. All during the investigation for the Married Student Complex, various people had suggested that the old "Fort Ethan Allen" should be the site for Married Students, but these suggestions were put aside because of the distance from the Campus (five miles), the lack of adjacent academic facilities, and probably a desire to give the faculty living there a "breather" from students. With construction blocked on the main campus, this became our "fall-back" position, and the architect was instructed to prepare plans for a 50 unit complex on the back lot of Fort Ethan Allen. This he did, and we went

to the Colchester town officials for building permits and zoning variances. While we were trying to get the zoning arranged, the architect had completed his drawings for a 51 apartment, 9 story complex on the site, and we went to bid. Again we struck out, with the lowest bid being $23,100 per unit, well beyond the figures that HUD would accept.

So far, all you have heard is a long story about the trials and tribulations we went through, without results. I went into this this history with a purpose, and I probably accomplished something else. For one thing, anyone who has been down this road before, I have probably made you reaffirm your belief that "there's got to be a better way".

It was about this time that we got on the "Fast Track", and we did so because of the persuasiveness of our exceedingly loyal architect, Julian Goodrich. He had stuck by us through thick and thin, and well understood the plight we were in. Julian's brother John is a local Burlington Construction Contractor, and although he had not been involved to date, he and Julian took the committee through a number of Garden-type apartment complexes that John Goodrich Construction had or was in the process of constructing, in the $14,000 - $15,000 per unit range. Because these were in the process of construction, the committee and consultants to the committee were able to thoroughly review the entire process. Some minor changes were suggested, and an outline specification was prepared and accepted by the committee. Then at the request of the committee Mr Goodrich made a proposal on February 14, 1969 that read as

follows:

"I am pleased to quote the sum of ONE MILLION THREE HUNDRED THIRTY-FOUR DOLLARS for the construction of sixty 2-bedroom apartments, 29 1-bedroom apartments, and 2 apartment units for use of community space in accordance with latest plot plan, floor plan layouts, design sketches and outline specifications, as submitted.

This proposal includes architects' fees, "key in the door" construction costs, construction financing and insurance.

At the completion of the construction of the apartment units, the University of Vermont would simply purchase the project for one lump sum figure.

The above proposal assumes an immediate starting date, with occupancy of about 40 units in August, 14 additional units in September, twenty-six in October, and the total project completed by November."

The University Board of Trustees, on February 15, 1969, the next day, authorized the administration to negotiation, and accept this proposal. Meanwhile, a number of hurried trips were made to Washington to confer about the debt service grant reservation already approved, and to determine whether or not this process of negotiated contract would be acceptable. The Washington decision was that, because the University had gone through the bid process twice previously on this same project prior to the receipt of this proposal, that the competitive requirements of their program had been satisfied. We did, however, on federal recommendation, have two additional estimates made of the proposal, and both estimates were above the proposal amount.

The University completed its review of the proposal and plans, and pending final decision by the local zoning authorities, we advised the architect and contractor on March 16, 1969 to proceed post-haste. The architect, I might add, was taking a well-deserved rest in Spain, and was woken up by an overseas phone call from his brother very early that morning. Construction started immediately, some equipment moved on the site the next day, and in early September, 1969 -- six months after commencement, three of eleven buildings were turned over to the UVM Off-Campus Housing Office and occupied by married students. These three buildings contain 21 apartments. More followed each month and by December all 89 units were occupied, with the Community Center following in January. The certificate of 100% completion by the construction firm was accepted on February 23, 1970 -- exactly 333 days after acceptance of the proposal. This was about 235 actual working days on the job.

The project was, at that point, considered by the architect to be 95% complete, as the landscaping subcontract was not completed until later in the spring, but we were up and operating a Married Student Complex.

What did we have? -- 56 garden apartments, with 42 two-bedroom and 14 one-bedroom units, plus 33 two-bedroom town houses and a community center. The Community Center is central to the complex and contains pay laundry and drying facilities, custodial and maintenance storage, and a large meeting community room with fireplace, and table and chairs.

How well were they built? The Outline Specifications, which, for the entire job ran only five pages double spaced is attached, as Appendix I. These specifications indicate that construction is similar to a well-built residential complex, such as the garden-type apartments available hereabout on the rental market.

What about the finances of the whole project? These 89 units were constructed on property previously owned by the University, on a level, rough grassed area, totalling 6.4 acres. The construction costs, including architectural fees was $1,437,000, or $16.14 per square foot. The project was approximately 89,000 square feet including common space, and actual construction costs ran to $14.97 per square foot, which is a real bargain in today's market. It was totally financed under bond, using the College Housing Loan Program, and is self-amortizing, including custodial, maintenance, and proper reserves, with monthly rentals of $115 for a one-bedroom apartment, and $130 for a two-bedroom unit, or either type. The University furnishes the water (totalling approximately 600,000 cubic feet annually), and the tenants assume the cost of electricity. The average annual electrical bill, which includes all utilities, heat and hot water runs between $250 and $300 per unit. We presently budget $15,000 annually for all custodial, maintenance, and similar costs. This includes the salaries of half-time fix-it man, and about one and one-half custodians, who also shovel snow, plow parking lots, cut grass, etc., as well as assist in the repainting, refurbishing and maintenance within the project.

Is it a success? -- We would give it an unqualified "Yes", and so do others. The complex received a Project/Design Honor Award for the 4th Biennial HUD Awards for Design Excellence, with a jury commendation that

the project was one of the best in the awards program. The development also received an Honorable Mention in the 15th annual Homes for Better Living program sponsored by the American Institute of Architects in cooperation with "House and Home" and "American Home." Most important, it has received almost unanimous approval of the students living there, to the extent that they have recommended that identical units be constructed, if and when a second complex is implemented. We are considering very strongly this possibility on a somewhat larger scale of 150 or more units. We are also committed to "fast-tracking" the project, either "turn-key" as this one, or "design/build" as I will describe a little later.

For anyone contemplating a similar type of project, let me give you a few random comments on what we have experienced during occupancy:

We presently have a mix of 75 two-bedroom to 14 one-bedroom units -- but our waiting list shows a first preference of 54 for one-bedroom, and 43 for two-bedroom. When we construct more units, we will probably go 50-50 one and two-bedroom.

We provide each tenant a complete rug shampoo every year -- basically for our own protection. The labor, machine and materials are supplied, with the stipulation that the tenant assist in moving furniture, etc. If possible, we would like to increase this to twice a year.

The pathways about the complex are too narrow for a snowplow. We now have to use snow-blowers, with additional expense and inconvenience.

The Common Room in the Community Center is very infrequently used, as the social demands of Married Students are quite different than the bachelor students. Any future complex would probably not have a commons room. There has been however a heavy use of the laundry facilities.

We put in carpeting in the kitchen, and this practice seems somewhat questionable. Possibly the best material would be a quarry tile or similar floor for this area.

Although good quality hardware was used, we would in the future, use the very best available. At the entrance door, we would use a lock with an interchangeable core, for new tenants. This entrance door probably should have had a lock with dead-bolt, plus an interior chain lock.

We have prohibited, by lease, the installation of roof antenna for television. Aesthetically, I concur, but we should have wired for cable TV.

Our lease also restricts such things as washers and dryers, additional refrigerators, freezers, pianos, outdoor fences, clothes lines, air-conditioners. We now find that we should also have excluded water-beds.

We used acoustical spray painted ceilings throughout. They do seem to have a propensity to scratch, and they are nearly impossible to patch and repair without redoing the entire ceiling. Probably the standard acoustical tile should have been used.

Acoustical considerations were probably the greatest complaint in the entire project. The party walls have a 45 STL rating, which should be increased to about 65. The floors in the garden type apartments seem to give the greatest problem, and any future complex will have this much better treated than the present carpet on 3/4 plywood, ½" sound board, ½" sheet rock, and acoustical spray paint. When you consider it, this cliential is possibly a little unique in the area of sound. When they make noise, they are capable of considerable noise, but when they wish to study, they can hear the proverbial pin drop.

One other area that we did not treat as well as we should have was storage. Although we provided adequate storage within the apartment, no provisions were made for "outside" storage -- such things as bicycles, winter tires, lawn furniture, play toys, skiis. We should have provided each apartment with an 8 x 10 storage unit, accessible either right inside the front door, or just outside. As a matter of fact, our architect told us this, and we didn't believe him. We do now.

We provided each apartment with ceiling lights throughout but won't again. Next time, we will wire appropriate plugs with one of each outlet connected to a switch, and the other alive.

And the perennial problem -- parking -- we provided 108 spaces for 89 units. We should have a minimum of 150. I would suggest a factor of 1.5 to 1.75 per apartment, but possibly our demand might be a little greater because our location is five miles from campus. As many student spouses work, they

very often need a second car. Also we did not provide for long term storage for boats, trailers, and we have eight or ten of these about the site.

This is UVM's Married Student Housing Complex and we consider it a resounding success. The next one will be even better. Our experience with "turn-key" was excellent, and we would certainly consider this method again. I am convinced that a major part of this success was due in no small measure to an excellent, and strong, architect, who was able to exercise sufficient control over the contractor. He considered very strongly the needs of his client, and as a matter of fact, was responsible for having some improvements made to the project during construction that improved their utility at some expense to the contractor. One item in particular stands out. The kitchen cabinets were ordered in accordance to specifications. When received, it was obvious they were inferior to the quality of the project, and so they were returned and replaced at a nat additional cost of over $20,000. As Mr. Goodrich said "sometimes we architects are better artists than businessmen, and we'd sooner see a good design than a larger profit." Another point that led to the success of the venture: at their request, the University employed a "Clerk-of-the Works" with full authority on our behalf, and he had to approve everything on a day-to-day basis. Once a month a progress punch list was submitted, and any problems, errors or ommissions were ironed out immediately. This resulted in a much cleaner punch list at the end, and assured the contractor that he wouldn't be forced to undo a good deal of work to correct an error at the end of the job.

The success of any job, no matter what technique is used, is really one of a good team of owner, architect and contractor working together to a common end. We were exceptionally lucky to have both an excellent architect and an excellent contractor, so we got what we wanted, — an excellent project.

Now, lets look at the Living-Learning Center. The concept of a Living-Learning Center is effectively an educational concept where a significant portion of the academic functions of the residents of the center takes place in or about the same complex as they sleep, eat, study and play. The UVM proposal called for a facility that would permit and encourage:

" - a sense of non-institutional living
- the integration of academic life with living
- a willingness on the part of the faculty to participate fully in the program.
- student/faculty and student/student academic and social interaction.
- a sense of responsibility, on the part of all participants, for its program."

It calls for residence facilities for 600 students, and 10 resident faculty, with attendant recreational, lounge, and eating facilities, together with approximately 20% of the space devoted to academic facilities, in such as general classrooms, faculty offices, graduate student offices,

music practice areas, library space, computer terminals and some unprogrammed "experimental" space.

With a program of this type determined, it is, of course, easy to move to the next step in the normal construction process, of interviewing and engaging an architect to prepare working schematics, and later construction drawing and bid specifications, and then to go to bid. However, the University determined to go a different route, along a "fast-track" and to use the process called "Design/Build".

Design-Build is certainly not new -- it has been used for some years successfully by industrial and commercial interests. I believe, however, that our "Living-Learning Center" will be one of the first examples of Design-Build in an academic environment.

Let me run through our time-table of the Living/Learning Center, and I'll briefly explain each step in the Design/Building process as we have determined it.

1. Development of Preliminary Program - In September, 1968 a Committee on Experimental Programs was constituted in our College of Arts and Sciences to investigate possibilities of the cluster college concept, and under a National Endowment for the Humanities Planning grant, the committee visited and studied a number of universities with residential colleges. In April 1969, the committee recommended a two-year Experimental Program that provided for 120 freshmen to be admitted each year, with a specific building set aside for the program, to contain accommodation, classrooms and administrative offices. This was instituted in September, 1969 and has been continued since, with continual evaluation. The process has been considered successful, but suffering from the lack of adequate facilities. It was then decided that appropriate facilities should be constructed, embracing the concepts of the Experimental Program, and the Living/Learning Center proposal evolved.

2. Planning Consultant - Through funds provided by a grant by the Educational Facilities Laboratory and after interview of a number of qualified firms, Philip Bobrow & Associates Ltd., of Montreal was appointed as consultant. They spent considerable time discussing the program with the administration, faculty and students, and I believe it was at their recommendation to go "Design/Build."

3. Preparation of Appropriate Program - Under Mr. Bobrow's supervision, the preliminary program was expanded to a final "Request for Design/Build Proposals" plus necessary "Prequalification Documents." At the same time, negotiations started in Washington for funding, as well as approval of the "Design/Build" process. We also began talking to various architects and contractors to develop a list of potential bidders for "Design/Build."

4. Prequalification Applications - On the 21st of May, 1971 we sent out to all interested parties a request for prequalification applications. This was a small booklet that outlined briefly the concept and program, and requested applications with appropriate information to evaluate the terms for prequalification, asking such things as the size and capabilities of the company, the principals involved, the annual volume of business, the architectural background and their financial statements.

5. Prequalification - Prequalification applications were returned on or before June 7, 1971 and a time was set aside for prequalification interviews, if necessary. On June 21, the University notified ten teams that they had prequalified.

6. Proposal Bonds - For firms that had prequalified, proposal bonds were immediately requested. This was a performance bond of $20,000 that had to be posted by each prequalified team before a "Request of Design/Build Proposal" was issued to them, and would be returned

after submission of a completed proposal within the time limit established. If the bond was forfeited, it would be distributed among the teams who submitted a complete proposal but were unsuccessful. The intent was to insure an adequate number of completed proposals for a competitive evaluation.

7. Release of Request for Design/Build Proposals to Prequalified Teams - This took place between June 21 and June 28 after posting of bond, and this document was a key to the whole scheme. It outlined in rather explicit form the program requirements, the budget, site locations and all other pertinent information. It was a document of some 245 typewritten pages, and included the following:

a. History of the Experimental Program
b. Objectives of the University
c. Design/Build Proposal Instructions
d. Design documents required
e. Time requirements
f. Cost requirements
g. Program Contents
    1. Project requirements
    2. Building requirements
    3. Cluster requirements
    4. Group requirements
    5. Unit space requirements
    6. Moveable furnishings requirements
h. Evaluation committee and procedure
i. Contract information

The content requirements of a unit space requirement for the student "Study/Bedroom" will give you some insight into the way each and every space was detailed.

STUDY/BEDROOMS

Two types of Study/Bedrooms should be provided, one type for single occupancy, the other for double occupancy.

All apartment spaces must respond to the following user needs:

1. The need for students to express their individual or group personality
2. The need for individual privacy
3. The need to belong and "feel at home"
4. The need for social interaction at several levels

The primary functions of the Study/Bedroom are:

1. Casual Study
2. Intensive Study
3. Dressing
4. Relaxing
5. Entertaining
6. Music, T.V.
7. Storage
8. Sleeping

Design/Build Teams are required to provide a minimum of 100 square feet net usable floor area for single occupancy Study/Bedrooms and a minimum of 160 square feet net usable floor area for double occupancy Study/Bedrooms.

OR

Demonstrate that the area provided for each Study/Bedroom is adequate to satisfy the stated functions.

Study/Bedrooms should be near the Living Spaces but should not open directly into them.

Study/Bedrooms should be close to Bathroom Spaces.

Study/Bedrooms should not be adjacent to house entrances or common spaces, to reduce noise problems.

The design of the Study/Bedrooms and their furnishings should be adaptable to at least four substantially different spatial arrangements.

While windows which begin at 30" above the floor allow maximum use of furnishings, other types of visual effects may be desirable; designers are encouraged to explore window concepts which could physically improve the space.

The location of doors, windows and built-ins should be considered in terms of their effect on wall space.

There should be a visual relationship among elements in the space, including walls, floor, windows, doors and furnishings.

The use of natural materials and of textured surfaces are important factors in the quality of this space.

At least 50% of the exposed wall space within the unit space must be usable as a tack up surface.

All single occupancy study bedrooms shall have a built-in closet of not less than 65 cubic feet. All double occupancy study bedrooms shall have 2 built-in closets of not less than 65 cubic feet each.

All materials in the Study/Bedrooms should:

- Contribute to Livability
- Be easy to Maintain
- Contribute to Sound Reduction
- Have a Flame Spread Rating of Not More than 25
- Have a Long Usable Life

Study/Bedroom entrance doors must be 1 3/8" solid core hardwood

The door stops must be continuous on all four planes, and should have a soft cellular seal on all four planes.

Internal walls should have an accoustic rating of not less than STC 30, including windows.

Floors and ceilings should have an accoustic rating of not less than STC 55 in place.

The floor should be carpeted, with a guaranteed life of not less than 10 years.

Every type of space was detailed in this manner, and there were 77 different unit space types.

8. Notice of Intent to Submit - By July 2, 1971 at the latest all prequalified design/build teams were instructed to give notice as to whether or not they intended to submit a proposal. Of the original ten who prequalified, three decided to submit. The others were returned their bonds, and their documents were collected. On July 6, the University advised the three remaining contestants to proceed.

9. Proposals Received - The University received the three proposals on the 13th of September, 1971. In the interval, great care was taken to insure that no competitive edge was granted any of the teams, with explicit instructions to all University personnel to respond to no questions, or have no contact with the teams. Clarification that any team requested was handled within one office, and both the question and answer was submitted by letter, and copies forwarded to the other teams.

The proposals were submitted in the following manner:

A. Drawing - Including a 1"-16' site plan, 1"-8' floor and roof plans, two sectional plans at 1"-8', plus elevations and a perspective or isometric, showing the entire complex. Also included were furniture drawing, structural, mechanical and electrical systems, and food facilities equipment, all prepared to the "design development" stage, in accordance to AJA practice.

B. Model - Each proposal included a simple model 36" x 48" to show site lines, roads and access, final contours, and location of the complex.

C. Written Report - The written report to cover General Information, Specifications, Consultants' reports and Cost Breakdowns - basically in accordance to CSA/AIA 16 - division format.

10. Evaluation - On Wednesday, September 15, 1971 the evaluation of the proposals began - behind closed doors. The results were tabulated and the decision known the following Wednesday.

I believe that the evaluation - both in methodology and in practice, is one of the very important parts of this entire process.

The process was one of using a weighted point count for every element, multiplied by a weighting established on the importance of its element to the University objectives. This was developed to provide a maximum point count of 100,000 points.

For the purpose of this project, the percentage of points were distributed as follows:

Project	5%
Building	15%
Cluster	5%
Group	8%
Unit spaces	60%
Movable Furnishings	7%

In each major program area, the items were broken down into all the lower order elements, each with its own weighing factor, that would total to the major program percentage. In the Unit Space area, for instance, each of the 77 types were indentified, originally weighted by the amount of square footage programmed for each, and modified up or down somewhat according to their relative importance to the objectives of the program.

Each unit was judged on a 1-10 point scale, with the similar unit from each proposal evaluated concurrently. The point count awarded was multiplied by the predetermined weighted factor, and when all units of the proposal were evaluated, the weighted factor times point counts were totaled and the project with the highest total was recommended for award of contract.

The evaluation committee was twelve persons, primarily chosen by the university, and included the following:

- A Trustee of the University of Vermont
- A Vice-President for Business Financial Affairs
- A student in Experimental Program
- A faculty representative of the Experimental Program
- A Construction Specialist.
- A Program Consultant to the University

An independent design critic will be appointed in cooperation with Educational Facilities Laboratories.

11. Announcement of Results - After the Evaluation Committee completed its deliberations, and advised officials accordingly, the winner was announced on September 27, 1971. A period of negotiation on small matters ensued, the Trustees of the University formally approved and the final contract for construction was signed on December 6, 1971. The contractor has very recently moved onto the location and ground-breaking will be within a very few days. The contract calls for completion on or before August 1, 1973 and occupancy in September 1973.

Financing for the Living/Learning Center is to be approximately 80% from HUD under the College Housing Program, that is funded by bonds of the University with assistance under the debt service grants of HUD, and the balance for academic facilities, from the Office of Education, Bureau of Higher Education. The total budget for the entire project is

$6,180,000 — with $450,000 earmarked for furnishing and the balance of $5,730,000 for design and construction. The estimated total square footage would be approximately 168,778 square feet, or at a project cost of $33.95 per square foot, including landscaping, site development and design.

A couple of points I'd like to make in closing about "Design/Build".

There is one substantial advantage to the owner, that of the early and fully determined budget. This allows for much earlier more solid funding plans, and eliminates that terrifying moment when bids are opened and they are all well over estimate. That is, obviously, if your original budget was sufficient to allow reputable firms to submit a proposal in the first place.

The method also allows for two areas of substantial cost savings, or program improvements. First, with the marriage of designer and contractor, the experiences of each should allow for the development of a design that is most cognizant of construction techniques and cost saving devices, and local market conditions. These are items that are probably best known by the contractor, and sometimes not well enough known by the architect. Secondly, with the elimination of the necessity of full construction drawings and specifications prior to the "bid", the whole process can be speeded up, or "Fast-tracked" by the design-builder team. We estimate that the time saved on our project at a minimum of a year, and this can mean substantial savings. For example, the Vermont State Buildings Division recommends a 17% annual

inflation figure to update construction estimates this past year.

Obviously, there are some risks involved, both to the Design/Build team, who stands to lose their investment in preparing a proposal, and to the University, or owner, who does not have as direct a control on the evolution and final design solution to the problem. I'm not sure how you can satisfy the first, but you can certainly reduce the risk of the owner by insuring a good clear, tight yet not restrictive Proposal document. And as more projects use this method, we can only improve on the instrument. We are, so far, well satisfied with the product that UVM will receive.