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ABSTRACT

This report summarizes the results of a program initiated in July of 1967 that was based on the findings and recommendations of the First Phase Report, which was completed in June of 1967. Seventeen different school districts participated in systems programs, and 20 new schools and additions were completed during the 1968-69 school year. Evaluative studies of these schools by members of the Schoolhouse Systems Project indicate an agreement on the superiority of these buildings. Some of the improvements include a better learning environment, more functional space, and space that has a higher degree of future adaptability. In addition, systems construction costs were no more than those of conventionally designed buildings. Construction time was reduced significantly for systems schools--20 conventionally designed elementary schools took 14 percent longer to build than the 14 systems elementaries; eight conventionally designed secondary schools took 60.5 percent longer to build than the eight systems secondaries. Problems associated with the systems approach and recommendations for future building programs are discussed. Five appendixes contain a clarification of terms a list of all systems projects, the cost data for each school, the construction cost data, and a proposed construction program for 1970-73. A related document is ED 032 733. (Author/MLF)

SECOND PHASE

Report

Florida SCHOOLHOUSE SYSTEMS PROJECT

DEPARTMENT OF EDUCATION &
EDUCATIONAL FACILITIES LABORATORIES, INC.

SECOND PHASE REPORT

FLORIDA SCHOOLHOUSE SYSTEMS PROJECT

SPONSORED

BY

FLORIDA STATE BOARD OF EDUCATION

AND

EDUCATIONAL FACILITIES LABORATORIES, INC.

FLOYD T. CHRISTIAN

COMMISSIONER OF EDUCATION

TALLAHASSEE, FLORIDA

JULY, 1970

STATE OF FLORIDA

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A C K N O W L E D G M E N T S

Many people have contributed to the success of the program and it is impossible to give credit to all.

The architects, engineers and contractors who were involved in the projects should all receive considerable credit.

The Members of the Building Research Advisory Committee, listed on the preceding page, contributed valuable advice and communicated with their respective organizations. Without their support the program could not have succeeded.

The Florida Legislature provided consistent support.

Educational Facilities Laboratories contributed much more than money. Jonathan King, Vice President and Treasurer of EFL, continues to give valuable advice and encouragement when it is most needed.

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C O N T E N T S

I N T R O D U C T I O N

THE BEGINNING

In the first few months of operation the staff evaluated the School Construction Systems Development (SCSD) project, which was the only one in North America with buildings completed. Staff members visited twelve school buildings in California, Nevada, Illinois and Georgia, and one commercial building in Georgia, all built using at least four major subsystems developed for the SCSD Program.

During this period the staff also met in fifteen school districts in Florida on request and visited at least one recently completed building in each district. The conclusion was that the SCSD components offered a learning environment which was superior to that of 70 to 80 percent of the buildings in Florida and the potential for adapting the interiors was better than any of the schools including community colleges.

Architects and educators who are members of the development team, and architects and educators who were users of the subsystems in buildings were interviewed. The process and procedures were evaluated as well as the building products.

For several reasons the staff decided to consider adapting the SCSD Program. A review of user needs as compared to that of California indicated that the education programs in Florida and California were similar and manifesting the same trends. Buildings were visited in diverse locations to see that products were available and flexible design solutions were possible. Boards of education, administrators, and architects seemed less hesitant to join a program which would produce results quickly, and from which they could withdraw without upsetting a guaranteed market necessary to make the program a success.

The sixty-seven school districts of Florida indicated a potential market of fifteen million dollars of construction with a hoped for completion date of August, 1968 and an interest in using pre-coordinated building components.

The calendar on page 3 is reprinted from the First Phase Report. Actually only six courageous architects, with a total of

three and one-half million dollars of construction, remained in the program to completion of the buildings. With the success of Program 1, Programs 2 and 3 both doubled in size.

THE RESULTS

Performance specifications can be adapted to meet local conditions related to climate and code requirements in many cases without adverse economic results. For example, Florida does not require structural bracing for seismic load but does require structural bracing for hurricane winds. This type of change is easy to obtain.

Suppliers of materials to meet requirements can be developed rather rapidly by offering successive programs of size as incentive.

Evolutionary change of requirements to improve product quality or performance is also available.

Ideas concerning Program No.4 have changed since 1967. A program using the currently revised SSP Performance Specifications is tentatively scheduled for bidding around January 1, 1971. It will probably be called SSP No.4. User Requirements for K-12 are rewritten and the entire program will be reviewed.

A large, long range, research and development program is needed and justifiable only when something is needed which doesn't exist or if a significant upgrading of quality is desired. Two programs are beginning in Florida that fit this need. A higher education program for community colleges and universities is beginning. "User Requirements" for community colleges are nearly completed. A portable building systems program will begin soon and "User Requirements" for the program are partially completed.

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CALENDAR

PROGRAM №1		PROGRAM №2		PROGRAM №3		PROGRAM №4	
VOLUME PURCHASE PROGRAM. EXISTING COMPONENTS.		SAME AS PROGRAM NO. 1		SAME AS PROGRAM NO. 2		LONG TERM RESEARCH AND DEVELOPMENT PROGRAM SEEKING NEW SYSTEMS.	
SET SCOPE ISSUE PERF. SPECS.	JULY '67 AUG '67					START EDUC. SPECIFICATIONS START PERF. SPECIFICATIONS	JULY '67
RECIVE BIDS DETAILS TO ARCHITECTS						ISSUE PERF. SPECIFICATIONS	OCT '67
BEGIN COMPONENT DELIVERY	JAN '68					RECIEVE "INTENT TO BID"	DEC '67
FIRST SCHOOL COMPLETED	JUNE '68						
LAST SCHOOL COMPLETED	AUG '68		JULY '68 AUG '68				
			JAN '69			EVALUATE 1ST SUBMISSIONS	JAN '69
						EVALUATE 2ND SUBMISSIONS	APR '69
			JUNE '69				
			AUG '69		JULY '69 AUG '69	RECIEVE BIDS NOMINATE BIDDERS	JULY '69 AUG '69
						START MOCK-UP TESTS, ETC.	OCT '69
					JAN '70		
						DETAILS TO ARCH'TS	FEB '70
					JUNE '70		
					AUG '70	FIRST SCHOOL TO BID	JULY '70
						LAST SCHOOL TO BID	JULY '71
						LAST SCHOOL COMPLETED	JULY '72

O V E R V I E W

A feasibility study was initiated in October, 1966. The First Phase Report was completed June, 1967, and a program based on the findings and recommendations of the report was started July, 1967. The results of the program are summarized in this report.

The objectives of the program were:

1. To build better schools
2. To build more economically
3. To build faster

Prior to October, 1967 there were no systems schools in Florida. Between October, 1967 and October, 1969 thirty separate school projects were bid with a construction budget of approximately $30,000,000 and an area of approximately 2,000,000 square feet. This volume of work is in excess of 20% of the new school construction for that period.

TABLE I

S Y S T E M S P R O G R A M S

PROGRAM	SCHOOLS	SYSTEMS BID DATE	SQ. FT. GROSS AREA	TOTAL CONSTRUCTION COST
SSP 1-A	6	October 1967	280,800	$ 3,615,000.00
LEON	1	January 1967	68,000	950,000.00
SSP 2	9	August 1968	485,000	8,150,000.00
SSP 3	8	December 1968	541,000	7,174,000.00
CLAY-DUVAL	3	June 1969	475,000	8,427,910.00
MARTIN	1	August 1969	61,000	916,692.00
ALACHUA - HERNANDO	2	October 1969	150,000	1,079,703.00
TOTAL	30		2,060,800	$ 30,313,305.00

Seventeen different school districts have participated in systems programs with three districts participating in two separate programs. Twenty-seven architectural firms have participated and three firms have been involved in two programs.

Twenty new schools and additions are completed and in use. All of these schools were visited by the Schoolhouse Systems Project (SSP) staff. Architects and educators are in agreement that the buildings are better. The improvements include a better learning environment, more functional space and space that has a higher degree of future adaptability. In addition, the architects have done very well to meet the challenge of designing exteriors with a variety of aesthetically good solutions.

The challenge was to build better buildings at no additional cost and this has occurred. The systems construction costs were no more than conventionally designed buildings. In fact, during the last year of the period, the systems buildings averaged slightly less than the state average for all new buildings. The question of cost is most controversial and it is difficult to make figures comparable. The only completely comparable figures available are those for the systems bids and general contract costs for systems buildings which are all carefully checked by one person for uniformity. However, evidence exists that on single buildings of less than 100,000 square feet, the systems costs are comparable to conventional construction. When the volume of construction increases to 500,000 square feet, the cost reduces 20% for the prebid systems. On this evidence it would seem wise to offer larger packages of work to bidders when possible.

The challenge to build faster was met with success. Twenty-six conventionally designed elementaries which were funded in the 1968-69 fiscal year were built in an average of 14% longer time than fourteen systems elementaries funded during the same year. Eight conventionally designed secondaries funded during the same period were built in an average of 60.5% longer time than eight systems secondaries. Construction time was significantly reduced for systems schools and there is promise of greater reduction.

In September, 1968, the School Building Research Advisory Committee began work. The program adopted for the current fiscal year has three parts:

1. Evaluation of past programs;

2. Identification of "User Requirements" for

all levels of education in Florida, kindergarten through university;

3. Assist local school districts, architects and engineers in the use of systems.

Future programs may include both research and development for new building systems and volume bidding to reduce cost of existing school building systems. The primary purpose of the Schoolhouse Systems Project is to carry on research into the needs of education and the development of new products to solve the problems which are identified. There is a significant cost reduction potential in volume bidding of school building subsystems for state wide purchasing, in a manner similar to that used for purchasing school buses.

The remainder of this report is to elaborate on and support the statements made in this brief introductory summary.

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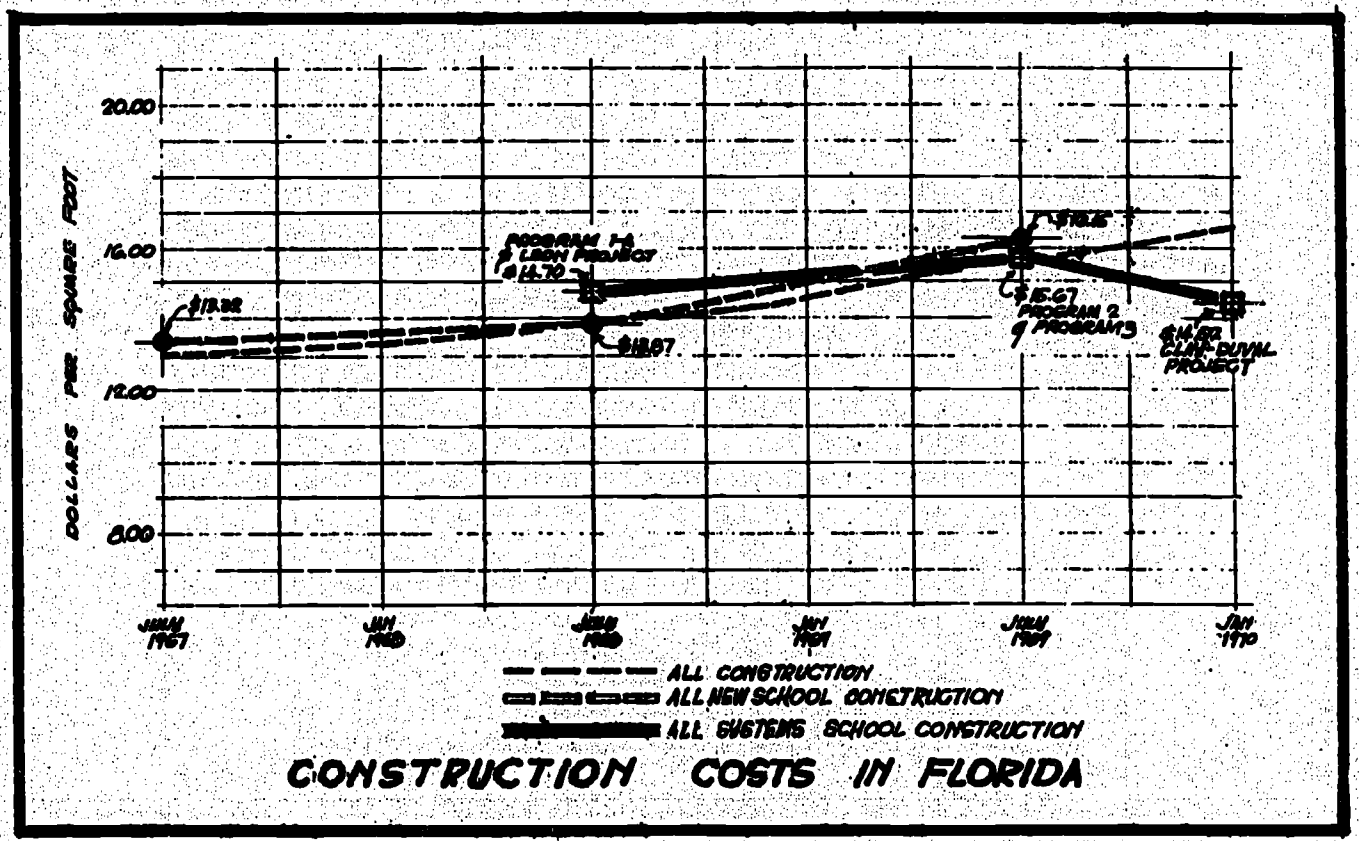
C O S T D A T A

In late 1966 and early 1967 the biggest question was whether a systems school could be purchased for the construction budgets prevailing in Florida. These budgets were $4.00 and $6.00 per square foot less than the budgets of the California school districts which were in a previous systems program, School Construction Systems Development (SCSD). Bidding in Program 1-A proved it could be done. Final construction costs averaged very close to the amounts budgeted for the projects and very nearly the same as non-systems schools. See Graph I. The purpose of grouping the six buildings of Program 1-A for systems bidding was to increase interest in the program and develop bidder competition, thereby reducing cost.

GRAPH I



It is possible to build schools at a cost lower than those which are using the school building systems but it appears to be most difficult, if not impossible, to build schools which meet the same educational requirements, which have as good an environment and which use as high quality materials for as low a cost.

One of the significant educational requirements is to provide for future unknown changes. This requires space that can be changed conveniently and economically. The requirement for change is based on the premise that change in the world is rapid and accelerating, and education must be able to respond in order to satisfy future needs. Buildings without pre-coordinated building subsystems fail to provide as high a degree of adaptability as is found in systems buildings. In order to develop the same degree of adaptability in non-systems buildings, architects and engineers would have to produce more work than they could afford within the traditional fee schedule. The cost of the facility would also be prohibitive.

In Program 1-A four subsystems were pre-bid: structure, lighting/ceiling, heating/ventilating/air conditioning (HVAC) and interior partitions. The interior partition prices were evaluated and rejected. The structural subsystem /1/ averaged $1.617 per square foot, the HVAC /2/ at $2.108 and lighting/ceiling /3/ at $1.413. The three basic subsystems made up 33 to 37 percent of the construction costs for the six schools in the project. General contract costs ranged from $12.23 to $17.08 and per pupil costs ranged from $900 to $1560.

/1/ The structural subsystem was steel and included anchor bolts, leveling plates, column base plates, 8" square tube columns, open web girders, open web purlins and deformed metal deck. The cost for this structural subsystem included erection or labor costs.

/2/ The HVAC subsystem was roof mounted multizone equipment, nominally 22 tons per unit, with up to 12 zones per unit, hot and cold deck, flexible terminal duct and relocatable supply air diffusers. Return air was through the lighting/ceiling system.

/3/ The lighting/ceiling subsystem was suspended slightly below the structure with a grid system capable of sustaining partition loads at random locations. The ceiling was a combination of coffers and flats. The light source was located in the apex of the coffers. The HVAC system "helps" the lighting/ceiling system by bringing the return air over the lamp and ballast, increasing the life of each and increasing the output by a factor of 1.17. The lighting/ceiling system "helps" the HVAC system by having integral air distribution boots and slots and return air slots. The distribution boots are relocatable.

Program 2 schools were bid in August 1968. Nine separate projects with nearly 500,000 square feet of space made up the program. Three schools were new and six were additions. To the original three subsystems were added cabinets, carpeting, and interior partitions (demountable), operable panel and operable accordian. The structural bid averaged $1.280 per square foot; the HVAC $2.106 and the lighting/ceiling $0.931.

TABLE II

SUBSYSTEMS COSTS

PROGRAM	SCHOOLS	BID DATE	SQ.FT. GROSS AREA	COSTS STRUCTURE	COSTS C/L	COSTS HVAC	TOTAL	ACTUAL* CHANGE	PLUS** ESCULATION
1-A	6	Oct.'67	280,800	$ 1.617	$ 1.413	2.108	5.138		
2	9	Aug.'68	485,000	1.280	.931	2.106	4.317	-16%	-21%
3	8	Dec.'68	541,000	1.164	1.145	2.255	4.564	-11%	-18%
Clay-Duval	3	June'69	475,000	1.26	0.97	2.35	4.580	-10.7%	-20.7%
Martin	1	Aug.'69	79,221	1.275	1.191	2.679	5.145	+1	-10%
Alachua-Hernando	2	Oct.'69	61,200	1.206	1.111	3.441	5.758	+12.1%	+.01%

*All changes are from the total ($5.138) of Program 1-A

**Inflation figure of ½% per month added for each month elapsed after bid for Program 1-A (October, 1967).

Comparing the basic three subsystems bids in both Program 1-A and Program 2, the average per square foot cost went down from $5.138 to $4.317, or a reduction of 16%. Program 2 was bid ten months later than Program 1-A and even a modest construction cost rise of 1/2% per month /4/ makes the inflation figure 5% and the difference in price 21%.

In December, 1968, less than four months after Program 2, a third program was bid which included eight schools in only three districts. The volume of work remained at approximately one-half million square feet. All six subsystems categories that were bid in Program 2 were repeated in Program 3. The six systems make up 40 to 45 percent of the total construction costs.

The structural cost again was lower than the previous bid and averaged $1.164 per square foot, HVAC was $2.255 per square foot and lighting/ceiling was $1.145 per square foot. The average of $4.546 was about 5% higher than Program 2, which was bid four months earlier, but still about 18% lower than Program 1-A, bid fourteen months earlier, when the 1/2% per month inflation factor is added.

LOCAL PROGRAMS

During the spring of 1969 the Commissioner's Advisory Committee on School Building Research recommended that state bidding programs conducted by the SSP staff stop to allow time for evaluation of past programs, but that the Department of Education staff help anyone requesting aid to run a program with bids received locally.

In June, 1969, the first locally received bids, for systems in Florida, were opened in Jacksonville. Two schools in Duval County were joined with one in Clay County. Nearly one-half million square feet was again offered but this time in two school districts and including only three schools.

One of the schools in the Clay-Duval Program was the Orange Park High School Addition. The original construction for Orange Park High School was in Program 1-A. This is the only two-story school of the thirty systems projects in the State. The architectural and engineering

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/4/ The inflation figure in Florida during the period was from 1/2% to 1-1/2% per month, depending on the particular construction area.

firm for Orange Park High School, listed in Appendix B, is one of three firms which have done two systems projects.

The average price of structure, HVAC and lighting/ceiling was $4.580, as compared to the $4.564 for Program 3 which was bid six months earlier. Applying the inflation increase of 1/2% per month, the net change was nearly 3% downward. Or, to look at it in another way, the systems costs were holding the line against inflation. A major difference between Program 3 and the Clay-Duval Program was the distribution of the work. Program 3 has eight schools -- six in Leon County, one in Seminole County and one in Palm Beach County. In Clay-Duval, the three school locations fall within a circle, 10 miles in diameter, laid over the Jacksonville area.

When the systems prices are compared for the basic three systems, for Program 1-A ($5.138) and the Clay-Duval Project ($4.580), we find that the average cost is 10% lower in the larger program. When the 1/2% per month inflation factor is applied for the twenty months between the two bids, the net savings is 20% in the systems cost.

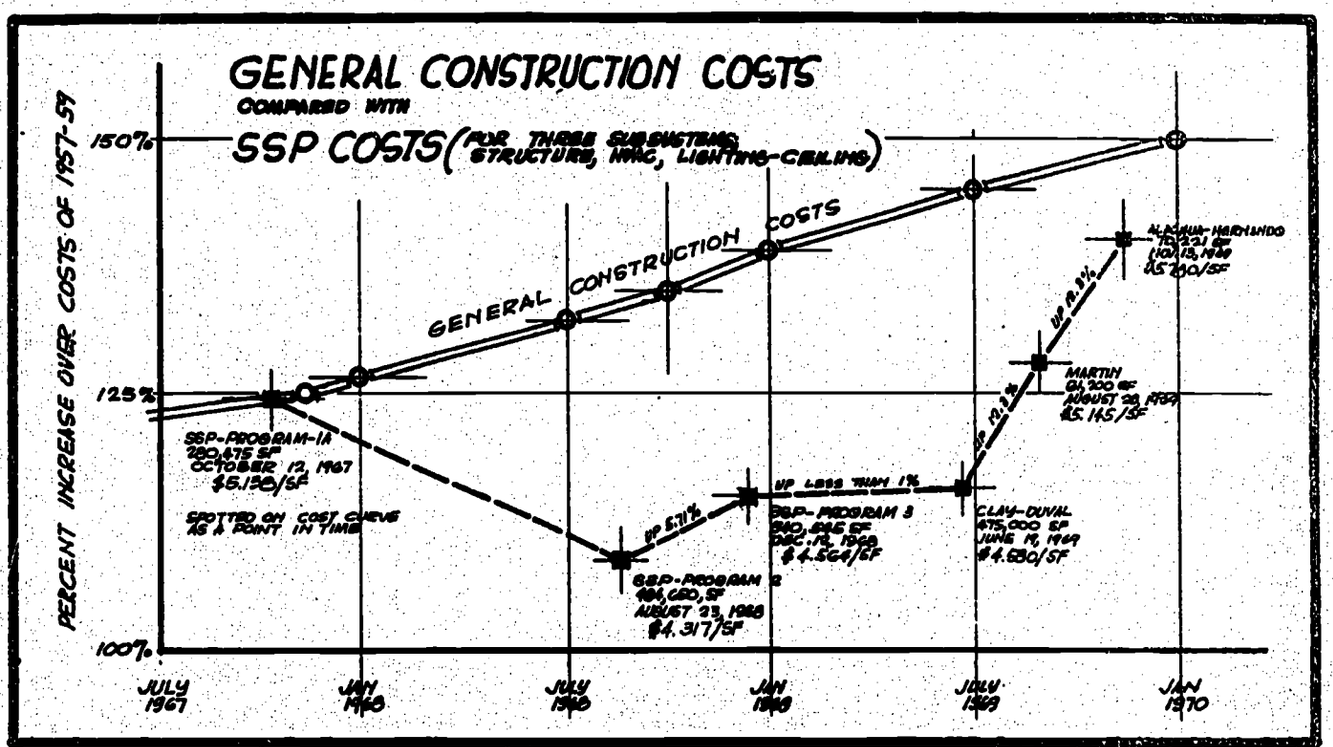
Two small programs have been bid since June, 1969 and in both cases the cost of systems went up significantly. Both programs were well under 100,000 square feet in size. We can only conclude that the cost is related to the volume offered the bidders. Graph II on the following page displays this information effectively.

ECONOMY

Evidence is offered in the preceding section that when one-half million square feet are purchased in one bid, the cost of the prebid subsystems may be reduced as much as 20%. But what is the total construction cost of the buildings which used the subsystems, and how do the costs compare to conventional construction of the same period? In Appendix C you can review construction cost figures for the last two fiscal years.

Graph I illustrates this information. Systems schools were constructed for 3% less than non-systems schools of the same period. This sample includes fifty-two schools. Eleven of the fifty-two schools were in SSP 2 and 3, where prebid systems were purchased for a substantial savings. Why were systems purchased at a significantly reduced cost and finished buildings purchased at nearly the same cost? Several reasons are evident. Budgets were established for the schools without

GRAPH II



regard to whether systems were included or not. The architect's responsibility was to provide the educational requirements, as completely as possible, within the budget. After the subsystems prices were established, each architect knew how much money remained to complete the buildings and his charge still remained to satisfy all needs within the budget. Seldom are moneys sufficient to satisfy all needs and seldom, at least in recent years, have bids been significantly lower than the budget.

It appears that the client and the architects may have an element of control over costs when using the systems process which they lose on the nonsystems part of the project.

Table III contains a comparison of cost data for Program 3. The square foot cost of systems is reasonably consistent for all schools. The square foot cost of the finished construction is consistent for all except the single school in Palm Beach County. The percentage of systems to total cost varies because the amount of systems used was relatively small as in the case of Spring Lake Elementary in Seminole County, or the general contractor costs were particularly high as was the case with Kirklane Elementary in Palm Beach County. The bid date was postponed twice in Palm Beach County and then only two general contractors bid.

TABLE III

PROGRAM 3

TOTAL COST / SYSTEMS COST / GENERAL COST

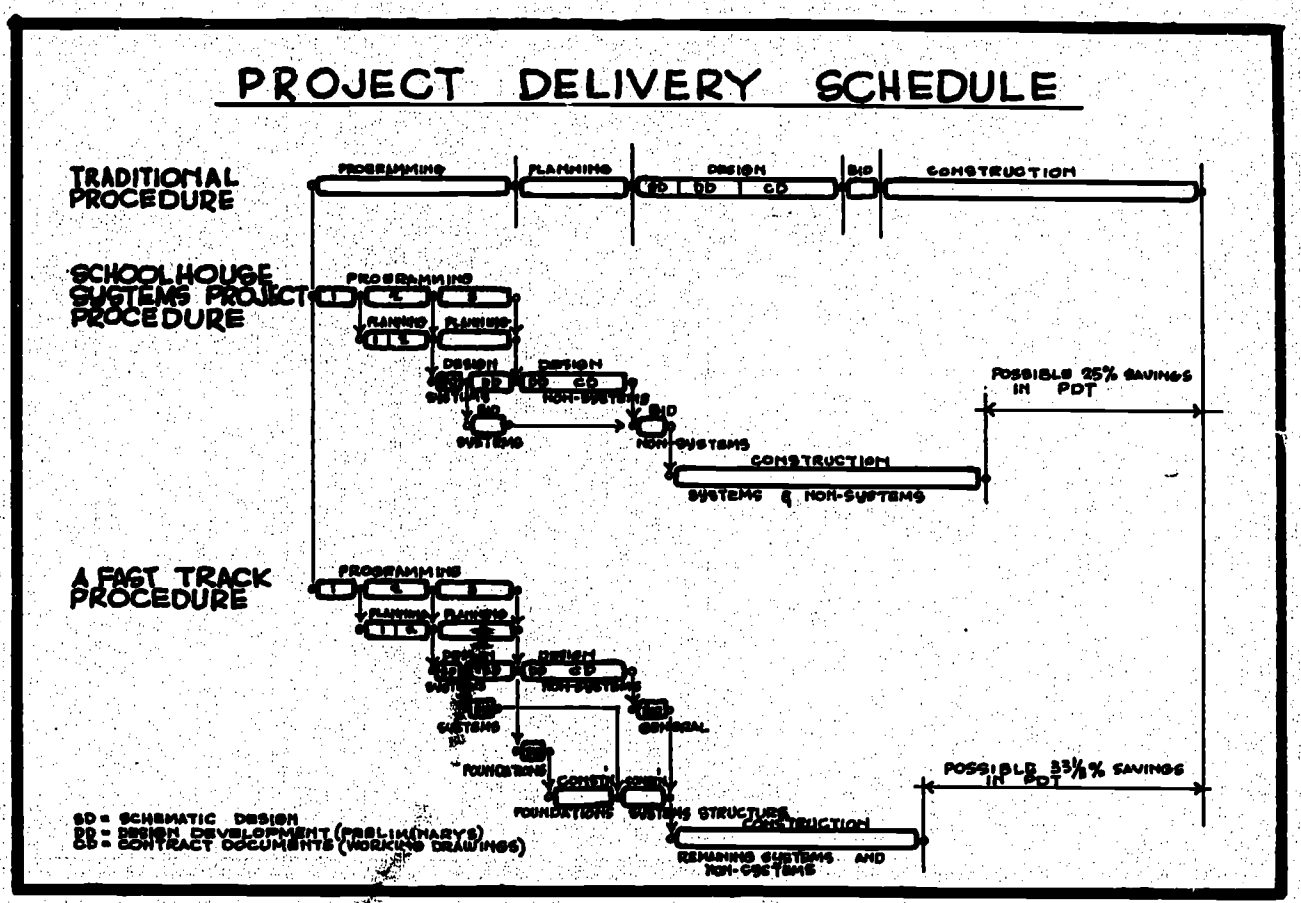
SCHOOL DISTRICT NAME	SCHOOL NAME	CONSTRUCTION COST (100%)	SYSTEMS COST	% OF TOTAL	GENERAL CONTRACT COST	% OF TOTAL	SQUARE FOOT COST
LEON COUNTY	School "A" (Astoria Park Elementary)	$ 714,170.	$ 301,132.	42%	$ 413,038.	58%	$13.94
	School "B"	PROJECT DELAYED INDEFINITELY					
	School "C" (Oak Ridge Elementary)	$ 744,040.	$ 304,467.	41%	$ 439,573.	59%	$14.84
	School "D" (Apalachee Elementary)	$ 631,486.	$ 281,279.	45%	$ 350,207.	55%	$13.72
	School "F" (Belle Vue Junior High)	$1,228,395.	$ 552,879.	45%	$ 675,516.	55%	$13.50
	School "G" (Fairview Middle) Rebid	$1,304,261.	$ 560,000.	43%	$ 744,261.	57%	$14.67
	New Sealey Elementary Rebid	$ 719,372.	$ 276,657.	38%	$ 442,715.	62%	$14.94
PALM BEACH COUNTY	School "L" (Kirklane Elementary)	$ 870,945.	$ 310,000.	36%	$ 560,945.	64%	$16.83
SEMINOLE COUNTY	Spring Lake Elementary	$ 698,595.	$ 240,726.	34%	$ 457,869.	66%	$14.74
AVERAGE		$ 863,908.	$ 353,392.	41%	$ 510,516.	59%	$14.65

CONSTRUCTION TIME

Data were gathered for both the time required for construction and the time required to deliver a project to the owner. Project delivery time started when the architect began planning and ran until the facilities were ready for use. There is increasing concern over the time required to get a building under construction and completed because of the acceleration of the inflation curve in recent years. Rapidly rising costs reduce the buying power of the construction dollar. Delays in time cost money.

Hasty decisions can also be costly so speed was sought without sacrificing good planning. The prebidding process used in the systems programs lends itself to changing the sequence of steps which must take place in the planning and construction process from the normal sequence. Normally, the decisions are made in a linear fashion, with one decision following another, but in the systems process, the time may be reduced by overlapping of the steps in the manner shown in the following schedule.

SCHEDULE



Most of the SSP schools were planned and constructed as shown in the middle sequence with good results. The Fast Track Project Delivery Process is presently theory as far as Florida's school construction is concerned, but two architects are currently committed to testing the theory. The Fast Track Process is not unusual for building construction in the private sector.

The tabulation included at the end of this section lists schools funded during the 1968-69 fiscal year. Time schedules are included for all schools. The sample is sufficiently large enough to provide averages which are valid. The following average data were obtained:

- 26 conventionally designed elementary schools constructed in an average of 303 days.
- 14 systems-designed elementary schools constructed in an average of 266 days.

- Conventionally designed elementary schools averaged 37 days longer, or
- Conventionally designed elementary schools averaged 14% longer.

- 8 conventionally designed secondary schools constructed in an average of 451 days.
- 8 systems-designed secondary schools constructed in an average of 281 days.

- Conventionally designed secondary schools constructed in an average of 170 days longer, or
- Conventionally designed secondary schools averaged 60.5% longer.

The reduction of construction time for systems schools was significant. This occurred in spite of the delays caused by dissatisfaction with the contracting process and the newness of the experience to many people involved. Systems schools were delayed by failure of subsystems suppliers to deliver on time as well as the delivery and installation of the prebid subsystems being slowed due to the lack of labor at most of the systems schools. This prompts the statement that there may be more promise than actual results.

The results of a study on project delivery time are conflicting. The following average data were obtained:

- 26 conventionally designed elementary schools delivered in an average of 478 days.
- 14 systems-designed elementary schools delivered in an average of 550 days.

- Conventionally designed elementary schools averaged 72 days less.
- Conventionally designed elementary schools averaged 15% less.

- 8 conventionally designed secondary schools delivered in an average of 774 days.
- 8 systems-designed secondary schools delivered in an average of 535 days.

- Conventionally designed secondary schools delivered in an average of 239 days longer.
- Conventionally designed secondary schools delivered in an average of 44.6% days longer.

The average project delivery time was significantly shorter for systems designed secondary schools (44.6%) and significantly longer for systems designed elementary schools (15%). Why do we get these conflicting results? One significant reason was the unduly long time expended on the five systems additions in Sarasota County. These projects were constructed in an average of 268 days as compared to an average of 262 days for all systems elementaries. However, the total time for project delivery averaged 630 days as compared to an average of 550 days for all systems elementary schools.

The problems in Sarasota which prolonged the projects seemed to be related to the change in the decision-making process from that which architects and engineers normally follow. No attempt will be made here to analyze all the correspondence files related to these projects for this would be a research project alone. The architects and engineers were obviously unhappy with the problems, and systems suppliers were greatly nettled by the long delays and changes but all held price commitments long beyond the required period.

Apparently, everyone connected with the Sarasota projects is reasonably happy with the resulting systems buildings as far as

environment, functional space, and cost are concerned. They were most displeased with the delivery time.

On the other hand, some of the non-systems schools required a tremendously long lead time before bids were taken, which may have been no fault of the architect and his team but due to failure to get decisions from the client. Some school districts used the building systems because they were interested in getting the buildings as soon as possible and these clients may have furnished information to the architects faster.

It is interesting to note which schools were built and/or delivered in the shortest time. This would indicate the potential. The schools with the shortest time follow:

Construction Time

Conventionally Designed

Rawlings Elementary - Alachua County - 235 days

Glen Springs Elementary - Alachua County - 242 days

Vanguard High School - Marion County - 306 days

Lyman High School - Seminole County - 354 days

Systems Designed

Oak Ridge Elementary - Leon County - 202 days

Astoria Park Elementary - Leon County - 202 days

Spring Lake Elementary - Seminole County - 204 days

Phillipi Shores Elementary Additions - Sarasota County - 205 days

Bradford Middle School - Bradford County - 168 days

East Naples Middle School - Collier County - 214 days

Fort Walton Beach High School - Okaloosa County - 287 days

Construction time was very good for the three Alachua Elementary Schools listed in the Tabulation. The construction contracts were written on the basis of a short construction period with significant liquidated damages.

The shortest times to plan and build follow:

Project Delivery Time

Conventionally Designed Elementary Schools:

Eisenhower - Broward County - 351 days

Cypress - Broward County - 376 days

Systems Designed Elementary Schools:

Oak Ridge - Leon County - 366 days

Astoria Park - Leon County - 366 days

Conventionally Designed Secondary Schools:

Apollo - Broward County - 566 days

Systems Designed Secondary Schools:

East Naples - Collier County - 288 days

Belle Vue - Leon County - 444 days

In summary, construction time was reduced significantly for schools using precoordinated building components. The results for total elapsed project delivery time are conflicting. There is much promise for reducing both significantly as is evidenced by the schools where the best results were obtained but the questions of contractual responsibility must be settled and delivery and installation controlled. Prefabrication and fast tracking are with us and offer something we need.

TABULATION

CONSTRUCTION TIME AND PROJECT DELIVERY TIME
FOR
NONSYSTEMS ELEMENTARY SCHOOLS

SCHOOL NAME	SCHOOL DISTRICT NAME	SQUARE FOOT AREA	ITEMS UNDER SEPARATE CONTRACT	SEPARATE CONTRACTS ADMINISTERED BY	DATE EDUC. PROGRAM GIVEN TO ARCHITECT	DATE BIDS RECEIVED FROM GEN. CONTR'S	DATE BUILDING SUBSTANTIALLY COMPLETED	CONSTRUCTION TIME	PROJECT DELIVERY TIME	REMARKS
Glen Springs	Alachua	48,594	Site Work, Carpeting, Equipment	BPI and Architect	6/14/68	1/10/69	9/8/69	242	466	Basis of contract award lowest base bid and shortest constr'n time. $250 per day value set for constr'n time evaluation.
Rawlings	Alachua	48,594	Site Work, Carpeting, Equipment	BPI and Architect	6/14/68	1/10/69	9/2/69	235	445	
Prairie View	Alachua	48,594	Site Work, Carpeting, Equipment	BPI and Architect	6/14/68	1/10/69	9/29/69	262	472	
Arcola Lake	Dade	55,639	None	None	5/1/68	10/19/68	9/19/69	327	514	
Bel-Aire	Dade	41,370	None	None	4/8/68	5/20/69	3/24/70	307	715	
Greenglade	Dade	36,911	None	None	4/1/68	11/21/68	9/8/69	291	526	
Miami Gardens	Dade	41,370	None	None	4/8/68	12/3/68	1/16/70	409	658	
Miami Lakes	Dade	36,911	None	None	4/1/68	11/26/68	9/9/69	287	527	
Norwood	Dade	36,911	None	None	4/1/68	11/19/68	9/10/69	295	528	
Olinda	Dade	55,639	None	None	5/1/68	10/19/68	1/26/70	454	636	
Primary "A"	Dade	20,000	None	None	6/12/68	3/11/69	1/27/70	322	594	
Lake Placid	Highlands	37,465	Site Work	BPI	5/14/68	11/19/68	9/2/69	287	476	
Pinellas Central	Pinellas	78,600	Carpet Furniture	BPI - Staff	8/5/68	5/2/69	6/1/70	395	665	
Florosa	Okaloosa	44,900	None	None	9/1/68	3/17/69	11/26/69	254	454	
Coconut Creek	Broward	45,808	Carpet	BPI - Staff	11/1/68	1/23/69	12/17/69	325	412	Construction worker strike of 37 days, beginning April 1, 1969 in Broward County. Labor in short supply during total construction period.
Cypress	Broward	45,808	Carpet	BPI - Staff	11/1/68	1/23/69	11/14/69	282	376	
Eisenhower	Broward	45,998	Carpet	BPI-Staff	11/1/68	1/30/69	10/17/69	260	351	
Fairway	Broward	47,046	None	BPI-Staff	3/1/68	9/4/68	7/7/69	306	496	
Castle Hill	Broward	45,808	Carpet	BPI-Staff	11/1/68	2/6/69	12/15/69	312	410	
Hollywood Cen.	Broward	40,743	Carpet	BPI-Staff	10/1/68	2/26/69	1/21/70	330	478	
Hollywood Park	Broward	45,808	Carpet	BPI-Staff	11/1/68	2/6/69	12/2/69	308	397	
Palmview	Broward	45,808	Carpet	BPI-Staff	10/1/68	1/15/69	12/19/69	338	445	
Annabel C. Perry	Broward	45,808	Carpet	BPI-Staff	11/1/68	1/30/69	2/12/70	379	469	
Mirror Lake	Broward	45,808	Carpet	BPI-Staff	11/1/68	1/15/69	2/10/70	377	467	
Sabal Palm	Broward	47,046	None	None	3/1/68	8/22/68	6/6/69	289	464	
Village	Broward	47,046	None	None	3/1/68	8/21/68	5/5/69	260	432	
							TOTALS	7,877	12,419	

TABULATION

CONSTRUCTION TIME AND PROJECT DELIVERY TIME
FOR
NONSYSTEMS SECONDARY SCHOOLS

SCHOOL NAME	SCHOOL DISTRICT NAME	SQUARE FOOT AREA	ITEMS UNDER SEPARATE CONTRACT	SEPARATE CONTRACTS ADMINISTERED BY	DATE EDUC. PROGRAM GIVEN TO ARCHITECT	DATE BIDS RECEIVED FROM GEN. CONT'S	DATE BUILDING SUBSTANTIALLY COMPLETED	CONSTRUCTION TIME	PROJECT DELIVERY TIME	COMMENTS
Boca Raton Junior High School	Palm Beach	153,121	Site Fill	BPI	12/27/67	7/23/68	8/25/69	395	619	Reuse of Plans
Apollo Middle School	Broward	127,950	Carpet	BPI-Staff	9/1/68	12/20/68	3/20/70	455	566	Strike of 37 days in Broward County beginning April 1, 1969. Labor in short supply during this period.
Deerfield Beach High School	Broward	238,274	Carpet	BPI-Staff	3/1/68	11/14/68	75% Complete	-----	-----	
Miramar	Broward	238,274	Carpet	BPI-Staff	9/1/68	11/20/68	80% Complete	-----	-----	
Lauderdale Lakes Middle	Broward	127,950	Carpet	BPI-Staff	9/1/68	12/20/68	80% Complete	-----	-----	
Lauderdale Middle	Broward	127,950	Carpet	BPI-Staff	9/1/68	12/18/68	85% Complete	-----	-----	
Plantation Middle	Broward	127,950	Carpet	BPI-Staff	3/1/68	12/18/68	3/18/70	455	748	
Richards Middle	Broward	127,950	Carpet	BPI-Staff	9/1/68	2/13/69	70% Complete	-----	-----	
Highlands Jr. High School	Duval	120,448	Site & Sewer	Engineer	10/20/66	12/21/67	3/21/69	456	842	
Cocoa Beach High School	Brevard	134,033	None	None	5/14/68	5/20/70	Incomplete	-----	-----	
Hialeah-Miami Lakes Sr. High	Dade	251,000	None	None	9/1/66	5/6/69	Tentative 3/1/71	-----	-----	Plans held for one year for financing.
Lyman High School	Seminole	173,900	Site Carpet	Architect	3/30/67	9/12/68	9/1/69	354	884	
Vanguard Sr. High School	Marion	120,000	None	None	7/1/68	3/21/69	2/21/70	306	570	
Port St. Joe High School	Gulf	153,000	None	None	5/15/67	6/7/68	7/15/70	768	1156	
Wewahitchka High School	Gulf	54,000	None	None	5/15/67	6/7/68	8/1/69	419	807	
							TOTALS	3,608	6,192	
							AVERAGE NUMBER OF DAYS FOR NONSYSTEMS SECONDARY SCHOOLS	451	774	

PROBLEMS

The most persistent problem has been working out a procedure for handling the prebid /5/ subsystems contracts and the relationship between the general contractor and his systems subs. A number of different approaches have been used with progressive improvement.

A satisfactory solution for a program with a single building is to incorporate the performance specifications into the architect's traditional specifications prescription /6/. The general contractor can submit all prices and can choose his subcontractors. This approach may reduce the sharpness of bidding competition among subsystem contractors.

On a large volume prebid subsystems project, when the buildings are needed as soon as possible, or in cases where the school board wishes to exempt from sales tax /7/ the materials part of the subsystem cost, the prebid and preselected subsystems contractors can still be assigned to the general contractors for contracting. In the Clay-Duval Program, for all three schools, separate contracts were entered into between the school boards and the subsystems contractors for materials only, thereby exempting from sales tax. The systems subs were then assigned to the general contractor for contracting. This made the systems suppliers subcontractors to the general contractors and still enabled the board of education to exempt from sales tax, which is a reduction of at least 1% of the total construction cost. On the Orange Park High School addition, in the Clay-Duval

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/5/ Prebid in the SSP programs refers to the receipt of bona fide component subsystems bids prior to receiving general contractor bids. Often component subsystems bids are received prior to the start of working drawings.

/6/ Architect's traditional specifications prescribe the products to be used, rather than how they perform.

/7/ The Florida tax laws and regulations permit exemption for construction under certain conditions which were met in some of the SSP programs. Exempting from sales tax is not an objective or necessary part of the program and meeting the conditions has caused some problems.

Program, exemption from sales tax amounted to 1.5% of the total construction contract.

Many complaints were heard about the problems of multiple contracts and the advice of the Commissioner's Advisory Committee, SSP staff and those who were involved in previous programs is to avoid separate contracts. Separate contracts are not necessary in order to use the systems process. Leon County entered into separate contracts for the six schools in SSP No. 3 for two reasons:

(1) to exempt from sales tax, and
(2) to reduce delivery time.

Leon County exempted $71,958 of sales tax. Part of this savings might have been used to coordinate the work and handle the problems which did arise but responsibility fell on the architects or administrators who were already overworked. The savings can become less important than the problems. The suggestion is to avoid multiple contracts, but if they are used, to understand the problems involved.

General contractors have complained about handling work on which they accepted subcontractors whom they didn't select, resulting in some loss of the normal control. It is true that the change in the bidding and contracting process tends to confuse normal relationships and normal procedures. Some general contractors prosecuted their responsibility very well. Some blamed all problems for delay on the loss of control, even in cases where component subcontractors were assigned to the general contractor for contracting.

Obviously general contractors need leverage over all subcontractors in order to prosecute their responsibility successfully. One form of leverage is financial. The SSP Performance Specifications contain liquidated damages of $100 per day, prorated on $250,000 of construction costs for each day of delay beyond a reasonable pre-established completion date. Several things occurred to abort the value of the financial control in most of the projects. Liquidated damages were assessed and collected in some projects but the most injurious procedure for rendering the leverage ineffective is the failure of most boards of education to collect when delays occur. This is caused by several popularly held beliefs. One is that the board can't collect liquidated damages, which is true if the specifications are improperly prepared. Two is that the client must prove a loss. This has been tested in court with the result that if a contractor accepts a reasonable completion date and fails, he is liable without the injured party proving financial loss. Three is that provision for liquidated damages requires provision for a reward if the contractor delivers early. This is true in the case of a penalty clause, but not liquidated damages. Four is that

contractors will bid higher. It is true that some contractors may not even bid because they are unsure of their ability to deliver but no evidence exists that those who do bid raise their prices and sufficient evidence exists that they don't when the pre-established construction time is reasonable.

Lack of effective communication caused failure to effectively control production. The liquidated damages clause was removed from the contracts for one county for all component subcontractors by someone connected with the local projects, even though the component bidders had all agreed to assuming liquidated damages when they presented their bids. This left the architects and general contractors without leverage.

Apparently we are failing to control the delivery schedule of contractors on most of the schools which we build because we witness the same kinds of unreasonable delays with many projects. Industrialization has allowed us to reduce construction time significantly on projects using prebid components as is shown in the preceding section of this report, but not as much as we should if we controlled production. This is an area requiring further study.

Other problems have arisen as can be expected with any building project but none are of a nature which have or will seriously retard progress with the systems process. No problems appear to be insurmountable.

Another problem has been communicating the program to various people who are involved in school planning and construction. Numerous groups in the State were originally negative to the systems process. The architects were always in favor of the research program, but many individuals were opposed to systems. Today the official position of the Florida Association of the American Institute of Architects is in support of the systems development program, as long as joining it is left to the client and his architect and not required by law.

At first the engineering societies, Florida Engineering Society, and the Council of Consulting Engineers of Florida, were both opposed, with a few individuals in support. The opposition has changed to a friendly and cautious appraisal of the program, with many individual engineers supporting the general concept of building systems.

Contractors, labor, Florida manufacturers and vendors have responded favorably in general when they were informed of the educational needs and objectives and how the program attempted to solve the problems. Communication has been a major problem and probably will remain so, but it is certainly less a problem than it was prior to this time.

CURRENT PROGRAM

Phase One extended from October, 1966 through June, 1967. It was the period for evaluating the feasibility of a Florida Systems Program. Phase Two, which extended from July, 1967 through June, 1970 has two distinct parts:

1. State bidding of systems - July, 1967 through June, 1969.

2. Current program - Evaluating, assisting and writing "User Requirements" - July 1, 1969 through June, 1970.

The evaluation consists of several parts. A "feed back" study for Program 1-A is completed. The consultant who conducted the study interviewed one hundred people who were involved in the six schools which were in 1-A, to discover problems with the process, and gather opinions concerning the end product. The participants interviewed included architects, engineers, superintendents, principals and general contractors. Some problems were identified, and the study has proven to be the basis for improvements. The most persistent problem was the dissatisfaction of general contractors, and the problems related to multiple contracts. In later projects this complaint was removed by assigning prebid subsystems contractors to the general contractors for contracting.

Informal feedback of information, from participants in other programs, is gathered regularly and this information is used to revise future programs. Some buildings are incomplete for Programs 2 and 3 at this time and complete evaluation is impossible.

The Bureau of Research, School of Architecture and Fine Arts, University of Florida, is in the process of field testing the six schools in Program 1-A. Staff from the College of Engineering are also involved. These tests are to determine whether the systems meet the criteria established in the performance specifications. Laboratory test data were required for acceptance of a subsystem and field testing is to reveal whether the systems meet the requirements when used by architects and engineers to design actual buildings.

Assistance to architects, engineers and school officials continues, and a number of bids, including single schools and small

projects with more than one school, have been received since July 1, 1969. The staff and consulting engineers to the project have assisted by providing up-to-date performance specifications and advice when requested.

In one case, an architect incorporated the systems performance specifications into the architects typical prescription specifications. The program was bid successfully. Competition was maintained between manufacturers by not specifying products acceptable. The general contractors submitted all prices and only one contract was needed. On single schools this approach proves satisfactory.

"User Requirements" (Educational Specifications) for K-thru-12 programs are complete, with August, 1970 as publication date. These are being prepared by a consultant working under the supervision of the staff of the Bureau of School Facilities. The consultant is gathering the new material from education specifications, accreditation standards, research and practice. He has visited eight selected school districts to determine the program and the direction education seems to be moving.

Community College "User Requirements" are being prepared by the Institute of Higher Education, College of Education, University of Florida. The first draft is completed and a final draft due around July 1, 1970. The raw material for this project is available in written form in educational specifications and campus plans for community colleges in the State. An instrument for gathering data was developed and visits to some selected campuses were made to obtain the answers.

The development of "User Requirements" is the first step in the systems process and is directed at future programs. The information can serve as a basis for determining which systems are most needed, the needs that are common, and those that are different for the various levels of education in Florida. After a program is organized, the "User Requirements" will be the most important single source of information needed for developing performance specifications.

RECOMMENDATIONS FOR FUTURE PROGRAMS

The prime purpose of the program is research to discover new ideas and development for the creation of new designs and new products. If a program is to continue the research it must have a practical application for actual construction. The ideas must end in brick and mortar, otherwise they may represent only interesting theory.

The first priority is to organize a higher education program to meet the special needs presented by our community colleges and universities. Most community colleges and universities in Florida have some buildings which are three or more stories in height. Most campuses are built in several stages, which dictates that many facilities will have at least two distinct uses during the early life of the space. The first buildings must house the entire program, and in some cases, the original space has housed three different functions during a five-year period. This requires easy and economical convertibility, which can be achieved best by a rational approach to development.

Some new subsystems may be added to those previously used in Florida. College and university planners are recognizing the continuing need to make space convertible over the life time of the buildings. They have also identified a need for a complex electric-electronic distribution system which could include all electrical systems such as audio call, clock, TV, learning laboratory distribution and electrical service. The electric-electronic system would organize the distribution for efficiency and would provide accessibility for future changes.

A higher education program would require a market of at least 1,000,000 square feet of space in one package to stimulate manufacturers' interest in making changes. The package should include work from at least three universities and three community colleges, which are geographically distributed, in order to guarantee that the products to be developed will have use on all campuses in the State.

A second priority for future programs is for a building system which can be ordered and delivered within 90 days, can provide the same level of learning environment and meet the same functional needs as permanently located buildings, can be moved at a cost of not over one-fourth the original cost and costs no more initially than permanent construction. It is not to fill the need for permanently located buildings but for relocatable space.

Prefabricated buildings are available now, but all of them fail to meet one or more of the requirements. If the needs are faced with a rational approach offered by the systems process, an acceptable system can be developed.

The need for "instant space" will continue and is sometimes caused by failure to plan early enough, but is also caused by surprises such as requirements that children be moved from one school to another, or the approval of funding for an educational program. Employment of personnel, and purchasing materials and equipment can be completed relatively fast when compared to planning and constructing space. This tends to exert pressure to move rapidly and buy prefabricated facilities, which consistently fall short of needs and are much too expensive in both initial cost and maintenance.

A third priority is to continue to assist architects and school districts to use the systems which are on the market. This advisory service would result in improving educational facilities in Florida by remaining in touch with the latest ideas and products which are produced by all the systems programs in North America and by constantly encouraging manufacturers to participate. Performance specifications could be revised continually as needs are identified and products become available.

A fourth priority is to develop procedures for purchasing systems on a large volume basis. The major objective of this program is cost reduction, rather than research and development. A second objective would be to control the product with performance specifications. Periodically, invitations to join would be offered to school districts and joining would be entirely voluntary. The construction can then be organized for state-wide bidding, or by dividing the State into zones which are appropriate. Zoning would be directed at increasing competition by compacting the delivery distances. More data, on the effect of location as related to volume, is necessary. A similar program is in its fourth year for purchasing school buses on a state bid. Under this program, thousands of dollars are saved by school districts in Florida. The cost of a bus is substantially the same in 1970 as was the case in 1958 in spite of inflation and numerous improvements.

Preliminary investigations indicate that a volume buying program for systems is feasible. A volume of work may be bid for which unit prices are established which can be held for an agreed upon period of time, and used for work not included in the original bid. This program would not require any actual state purchasing and no warehousing or delivery.

In order to prevent perpetuation of the use of performance requirements and to allow for innovation to continue, the requirements and products should be evaluated and revised before each bid, by continually gathering information as a basis for revising "User Requirements" and Performance Specifications. The volume of the program offered to manufacturers should be large enough to attract new competition and encourage product refinement to improve function and reduce cost. Further procedures may be warranted to provide the protective mechanism to prevent stagnation.

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APPENDIX A

CLARIFICATION OF TERMS

Industrialization of Construction Process:

Industrialization includes pre-engineering and pre-fabrication which are directed toward shifting the work required from the building site to the shop or factory where efficiency is higher and reduces time and lowers cost. It includes standardization of parts of the buildings and pieces which are used to take advantage of the efficiency of the assembly line.

Many stock or standard plan programs have failed to meet the needs of education and ended invariably as expensive failures because the educational market is fragmented and not as large and repeating as Standard Oil Stations or Holiday Inns. The systems process has brought the development of parts and pieces for the unique requirements of education and the standardization of parts and pieces while allowing considerable design freedom to meet the many needs found locally.

Systems Process:

The process used in school buildings systems programs in North America (including the Florida SSP) includes the following steps:

1. Identify User Needs:

   This includes the educational requirements for today and the future as found in educational specifications, code and regulation requirements, climatic conditions and other needs unique to the market area included in a project.

2. Prepare Performance Specifications:

   Architects and engineers translate User Requirements into performance requirements.

A P P E N D I X B

LIST OF ALL SYSTEMS PROJECTS

PROGRAM 1-A

Bid October 12, 1967

SCHOOL DISTRICT SCHOOL LOCATION	NAME	ARCHITECT	GENERAL CONTRACTOR
BRADFORD COUNTY Starke, Florida	Bradford Middle School	Don R. Morgan, Architect Post Office Box 987 Green Cove Springs, Fla. Tele.(904) 264-2561	Drake Construction Co. Post Office Box 609 Ocala, Florida 32670
BREVARD COUNTY Mims, Florida	Pinewood Elementary School	Hirshberg & Thompson, Architects Post Office Box 458 Titusville, Florida Tele. (305) 267-0711	Julian Evans & Associates, Incorporated P.O. Box 1227 Titusville, Florida
CLAY COUNTY Orange Park, Fla.	Orange Park High School	Allen D. Frye & Associates Architects 459 Kingsley Avenue Orange Park, Florida Tele.(904) 264-2484	John M. Bickerstaff, Builders 2021 Ernest Street Jacksonville, Fla. 32204
COLLIER COUNTY Naples, Florida	East Naples Middle School	William W. Zimmerman, Architect 283 Broad Avenue, South Naples, Florida Tele. (813) 642-4548	William Vander Linde, Inc. And Lonnie Jackson Construction Company, Inc. 1238 N. E. 38th Street Ft. Lauderdale, Fla. 33308
GLADES COUNTY Moore Haven, Fla.	Moore Haven Elementary School	McBryde & Parker, Architects 2120 McGregor Boulevard Fort Myers, Florida Tele. (813) 332-1171	William Vander Linde, Inc. And Lonnie Jackson Construction Company, Inc. 1238 N. E. 38th Street Ft. Lauderdale, Fla. 33308
NASSAU COUNTY Callahan, Florida	West Nassau County High School	Akel, Logan and Shafer, Architects & Engineers 110 Riverside Avenue Jacksonville, Florida Tele. (904) 356-2654	Harris & Harris, Inc. 1040 Nightingale Road Jacksonville, Fla. 33216

LEON PROGRAM

(Conducted by Architect)

Bid January 15, 1968

SCHOOL DISTRICT SCHOOL LOCATION	NAME	ARCHITECT	GENERAL CONTRACTOR
LEON COUNTY Tallahassee, Fla.	W.T. Moore Elementary School	Joseph N. Clemons, Architect 1200 Thomasville Road Tallahassee, Florida Tele. (904) 385-6153	Biltmore Construction Co. Post Office Box 360 Clearwater, Florida 33517

List of All Systems Projects

APPENDIX B - Continued

PROGRAM 2

Bid August 23, 1968

SCHOOL DISTRICT SCHOOL LOCATION	NAME	ARCHITECTS	GENERAL CONTRACTOR
MANATEE COUNTY Bradenton, Florida	J. Hartley Blackburn Elementary School	Douglas E. Croll Architect 1101 29th Avenue, West Bradenton, Florida Tele. (813) 958-8553	Proefke Nielson Construction Company P.O. Box 982 Dunedin, Florida 33428
OKALOOSA COUNTY Fort Walton Beach, Florida	Fort Walton Beach Senior High School	Ricks & Kendricks, Architects Post Office Box 1030 Fort Walton Beach, Fla. Tele. (904) 244-5567	Dyson Construction Co. P. O. Drawer F Pensacola, Florida 32502
PALM BEACH COUNTY West Palm Beach, Florida	Dwight D. Eisenhower Elementary School	Powell/Edge Partnership, Architects Phipps Plaza West Palm Beach, Florida Tele. (305) 832-1654	W.G. Lassiter Company, Inc. 4801 Georgia Avenue West Palm Beach, Florida
SAINT LUCIE COUNTY Fort Pierce, Florida	Edwards Road High School Phase III Addition	Starratt & Asklof, Architects 605 North 7th Street Fort Pierce, Florida Tele. (305) 464-1691	Ben Wood Construction Company P.O. Box 416 Fort Pierce, Florida
SARASOTA COUNTY Sarasota, Florida	Alta Vista Elementary School	Erwin Gremli, II, Architect 1790 Wood Street Sarasota, Florida Tele. (813) 955-1294	Logan & Currin 1003 East Avenue N. Sarasota, Florida 33577
SARASOTA COUNTY Sarasota, Florida	Brentwood Elementary School Addition	D. Thomas Kincaid & Associates 1274 North Palm Avenue Sarasota, Florida Tele. (813) 958-8553	Frank Thyne 2056 Main Street Sarasota, Florida 33577
SARASOTA COUNTY Sarasota, Florida	Fruitville Elementary School Addition	West & Conyers, Architects & Engineers Post Office Box 1539 Sarasota, Florida Tele. (813) 955-2341	Robert L. Brand P.O. Box 3501 Sarasota, Florida
SARASOTA COUNTY Sarasota, Florida	Phillippi Shores Elementary School Addn.	John E. Piercy, Architect 615 Palmer Bank Building Sarasota, Florida Tele. (813) 955-0467	John A. Hartenstine 3617 Jacinto Sarasota, Florida
SARASOTA COUNTY Sarasota, Florida	Wilkinson Road Elementary School Addition	Edward J. Seibert Architect 25 Park Place Sarasota, Florida Tele. (813) 958-1356	Rowe-Mitchell Contractors 1723 10th Way Sarasota, Florida

APPENDIX B - Continued

List of All Systems Projects

PROGRAM 3

SCHOOL DISTRICT SCHOOL LOCATION	NAME	ARCHITECT	GENERAL CONTRACTOR
LEON COUNTY Tallahassee, Florida	Apalachee Elementary School	Forrest R. Coxen, Architect Avant Building Tallahassee, Florida Tele. (904) 224-6317	Albritton-Williams, Inc. 2025 South Monroe Tallahassee, Florida 32304
LEON COUNTY Tallahassee, Florida	Astoria Park Elementary School	Joseph N. Clemons, Architect 1200 Thomasville Road Tallahassee, Florida Tele. (904) 385-6153	B & H Construction Company P. O. Drawer 1139 Quincy, Florida
LEON COUNTY Tallahassee, Florida	Belle Vue Junior High School	Huddleston, Satterfield, Evans & Lillie, Architects & Engineers 1215 West Tharpe Street Tallahassee, Florida Tele. (904) 385-2136	Bullard Engineering Company 532½ East Tennessee Tallahassee, Florida
LEON COUNTY Tallahassee, Florida	Elementary School "B"	Saxon P. Poyner Architect 233 Office Plaza Tallahassee, Florida Tele. (904) 877-5447	NO BID - PROJECT SET ASIDE.
LEON COUNTY Tallahassee, Florida	Fairview Middle School	Barrett, Daffin & Coloney Architects & Engineers P.O. Box 1698 Tallahassee, Florida Tele. (904) 224-9176	Burns, Kirkley & Williams Company Zillah Street Tallahassee, Florida
LEON COUNTY Tallahassee, Florida	New Sealey Elementary School	Mays Leroy Gray, Architect 547 North Monroe Tallahassee, Florida Tele. (904) 224-5218	Bullard Engineering Co. 523½ East Tennessee Tallahassee, Florida
LEON COUNTY Tallahassee, Florida	Oak Ridge Elementary School	Robert Maybin/Warren Dixon Architects 215 West Park Avenue Tallahassee, Florida	B & H Construction Co. P.O. Drawer 1139 Quincy, Florida
MANATEE COUNTY Bradenton, Florida	J. Hartley Blackburn Elementary School (Cabinets Only)	Douglas E. Croll, Architect 1101 29th Avenue, West Bradenton, Florida Tele. (813) 747-1894	NOT A GENERAL CONTRACT
PALM BEACH COUNTY West Palm Beach, Fla.	Kirklane Elementary School	Powell/Edge Partnership Phipps Plaza West Palm Beach, Florida Tele. (305) 832-1654	W.G. Lassiter Company, Inc. 4801 Georgia Avenue West Palm Beach, Florida
SARASOTA COUNTY Sarasota, Florida	Brentwood Elementary School Addition (Cabinets Only)	D. Thomas Kincaid & Asso. 1274 North Palm Avenue Sarasota, Florida Tele. (813) 958-8853	NOT A GENERAL CONTRACT
SEMINOLE COUNTY Altamonte Springs, Fla.	Spring Lake Elementary School	Schweizer Associates Architects/Engineers 174 Comstock, West Winter Park, Florida Tele. (305) 647-4814	Edward White Constrn, Inc. P. O. Box 2591 Orlando, Florida 32801

APPENDIX B - Continued

List of All Systems Projects

CLAY-DUVAL PROJECT

(Conducted by Architects)
Bid June 19, 1969

SCHOOL DISTRICT SCHOOL LOCATION	NAME	ARCHITECT	GENERAL CONTRACTOR
CLAY COUNTY Orange Park, Florida	Orange Park High School Addition	Allen D. Frye & Associates Architects 459 Kingsley Avenue Orange Park, Florida Tele. (904) 264-2484	R.B. Gay Construction Co. P.O. Box 3995 Jacksonville, Florida
DUVAL COUNTY Jacksonville, Florida	Edward H. White Senior High School	Willis & Veenstra Architects 411 East Monroe Street Jacksonville, Fla. 32202 Tele. (904) 355-0714	Batson Cook Contractor Florida National Bank Jacksonville, Florida
DUVAL COUNTY Jacksonville, Florida	Sandlewood Junior - Senior High Complex	Harry E. Burns, Jr. Architect 1114 Prudential Building Jacksonville, Florida Tele. (904) 396-2372	Batson Cook Contractor Florida National Bank Jacksonville, Florida

MARTIN PROJECT

(Conducted by Architect)
Bid August 28, 1969

MARTIN COUNTY Jensen Beach, Florida	Jensen Beach Elementary School	Starratt & Asklof, Architects 605 North 7th Street Fort Pierce, Florida Tele. (305) 464-1691	Oden Construction Co. P.O. Box 2429 Orlando, Florida 32802
MARTIN COUNTY Jensen Beach, Florida	Indiantown Middle School	Starratt & Asklof, Architects 605 North 7th Street Fort Pierce, Florida Tele. (305) 464-1691	Reinhold Construction Co. P.O. Box 666 Cocoa, Florida

ALACHUA-HERNANDO PROJECT

(Conducted by Architects)
Bid October 14, 1969

ALACHUA COUNTY Gainesville, Florida	Alachua Elementary School	Campbell & Salley Architects 218 Southeast First Street Gainesville, Florida 32601 Tele. (904) 372-8424	WITHDREW FROM SYSTEMS PROGRAM
ALACHUA COUNTY Gainesville, Florida	High Springs Elementary School	Adams & Hunter , Architects 1230 Northeast Ninth Avenue Gainesville, Florida 32601 Tele. (904) 376-8274	Arnold & Wright Contractors 904 South Main Gainesville, Florida
HERNANDO COUNTY Brooksville, Florida	Brooksville Elementary School	John W. White, Architect 10 West Broad Street Brooksville, Florida Tele. (904) 796-2130	Forrest Hills Bldg. Co. P.O. Box 273 Lake City, Florida

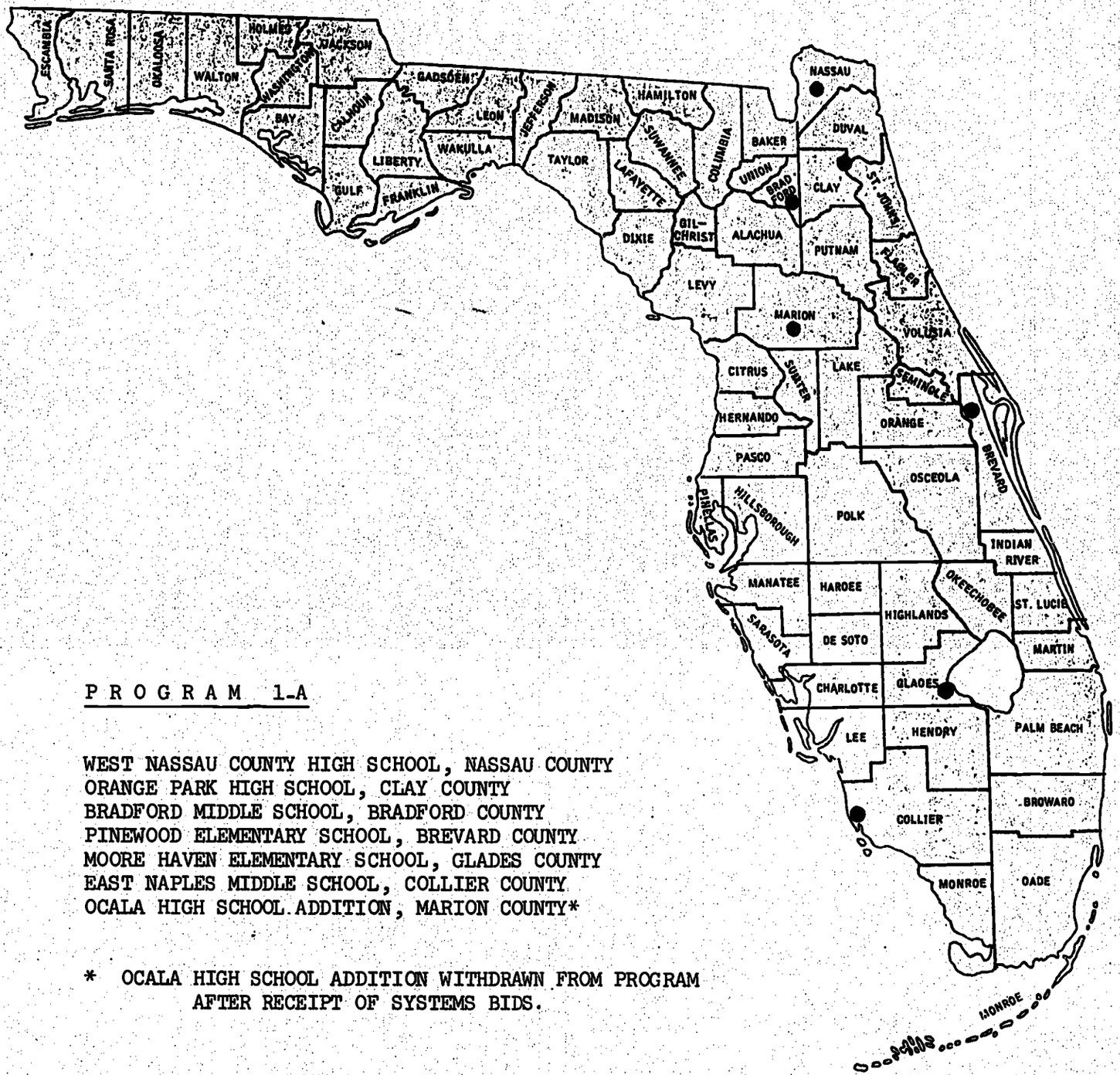
A P P E N D I X C

COSTS FOR EACH SCHOOL

INDIVIDUAL PROGRAM BID TABULATIONS

INDIVIDUAL SCHOOL PRICES FOR EACH SYSTEM

INDIVIDUAL SCHOOL COSTS ITEMIZED



PROGRAM 1-A

WEST NASSAU COUNTY HIGH SCHOOL, NASSAU COUNTY
ORANGE PARK HIGH SCHOOL, CLAY COUNTY
BRADFORD MIDDLE SCHOOL, BRADFORD COUNTY
PINEWOOD ELEMENTARY SCHOOL, BREVARD COUNTY
MOORE HAVEN ELEMENTARY SCHOOL, GLADES COUNTY
EAST NAPLES MIDDLE SCHOOL, COLLIER COUNTY
OCALA HIGH SCHOOL ADDITION, MARION COUNTY*

* OCALA HIGH SCHOOL ADDITION WITHDRAWN FROM PROGRAM AFTER RECEIPT OF SYSTEMS BIDS.

SCHOOLHOUSE SYSTEMS PROJECT - PROGRAM 1-A

October 12, 1967

BID TABULATION BY COMPATIBILITY

STRUCTURE Manufacturer	Amount	LIGHTING/CEILING Manufacturer	Amount	AIR CONDITIONING Manufacturer	Amount	TOTAL
(2) Macomber	$453,495	(2) Armstrong Cork	$364,000	(2) Lennox Industries	$489,400	(1) $1,306,895
Romac Steel	430,000	Armstrong Cork	364,000	Hill York	538,000	1,332,000
Houdaille-Duval-Wright	555,914	Anning-Johnson	296,287	Lennox Industries	514,970	1,367,171
Rheem/Dudley	584,989	Anning-Johnson	282,100	Lennox Industries	514,970	1,382,059
Houdaille-Duval-Wright	555,914	Armstrong Cork	364,000	Lennox Industries	489,400	1,409,314
Macomber	453,495	Luminous Ceilings	497,096	Lennox Industries	489,400	1,439,991
Romac Steel	430,000	Luminous Ceilings	497,096	Hill York	538,000	1,465,096
Macomber	453,495	Armstrong Cork	340,000	ITT Nesbitt	673,277	1,466,772
Houdaille-Duval-Wright	555,914	Anning-Johnson	296,287	ITT Nesbitt	645,490	1,497,691
Rheem/Dudley	584,989	Anning-Johnson	282,100	ITT Nesbitt	645,490	1,512,579
Houdaille-Duval-Wright	555,914	Luminous Ceilings	497,096	Lennox Industries	489,400	1,542,410
Macomber	453,495	Luminous Ceilings	497,096	ITT Nesbitt	640,701	1,591,292
Houdaille-Duval-Wright	555,914	Armstrong Cork	364,000	ITT Nesbitt	673,277	1,593,191
Houdaille-Duval-Wright	555,914	Luminous Ceilings	497,096	ITT Nesbitt	640,701	1,693,711
Rheem/Dudley	584,989	Luminous Ceilings	497,096	ITT Nesbitt	640,701	1,722,786

BID BREAKDOWN PER SCHOOL

SCHOOLS	DISTRICT	STRUCTURE	(3) Cost Sq. Ft.	LIGHTING/CEILING	(4) Cost Sq. Ft.	AIR CONDITIONING	(4) Cost Sq. Ft.	TOTAL COST PER SCHOOL Sq. Ft.	TOTAL
Bradford Middle School	Bradford	$ 60,357	$1.64	$ 45,316	$1.30	$ 80,441	$2.31	$5.25	$ 186,114
Pinewood Elem. School	Brevard	Alt.2,303 44,067	1.61	33,131	1.23	46,058	1.70	4.54	125,559
Orange Park High School	Clay	57,648	1.97	40,055	1.33	62,962	2.09	5.39	160,665
East Naples Middle School	Collier	116,584	1.54	102,320	1.49	129,928	1.88	4.91	348,832
Moore Haven Elem. School	Glades	88,026	1.56	69,941	1.53	86,286	1.89	4.98	244,253
Library & 12 classrooms Additions Ocala High	Marion	33,419	1.54	30,641	1.90	32,850	2.04	5.48	96,910
West Nassau Co. High School	Nassau	51,091	1.73	42,596	1.44	50,874	1.72	4.89	144,561
	T O T A L S	$453,495		$364,000		$489,400		$5.06	$1,306,895

(1) Lowest Compatible Grouping
(2) Apparent Low Bidders
(3) Cost per square foot of roof area
(4) Cost per square foot of enclosed building

WEST NASSAU COUNTY HIGH SCHOOL
Callahan, Florida
Schoolhouse Systems Project-Program 1-A
Akel, Logan & Shafer, Architects & Engineers
Harris & Harris, Inc., General Contractors

BUILDING SUBSYSTEMS BIDS RECEIVED	October 12, 1967
(School board directed that the subsystems contractors would contract with the general contractor when he became determined.)	
GENERAL CONSTRUCTION BIDS RECEIVED (rejected)	January 26, 1968
GENERAL CONSTRUCTION BIDS RECEIVED (awarded)	February 16, 1968
(The general contractor contracted with all subsystems contractors.)	
COMPLETION DATE	September 7, 1968

COST DATA:

1. Building subsystems	$ 181,660*
2. General construction	$ 255,390
Subtotal	$ 437,050
3. Sitework	$ 32,350
TOTAL	$ 469,400

Design Capacity: 420 pupils

Areas - General	30,432	
- Entrances, courts, etc. @ 1/3	2,992	
TOTAL	33,424	square feet

Cost/Sq.Ft. - Building subsystems (S, L/C & HVAC)	$ 4.30
- Building subsystems (S, L/C, P & HVAC)	$ 5.44
- Building only	$ 13.08
- Total (including sitework)	$ 14.04
Cost per pupil	$ 1,117.61

*Final adjusted costs for systems will differ slightly from the figures in the bid breakdown per school on page 40.

WEST NASSAU COUNTY HIGH SCHOOL
Callahan, Florida

GENERAL CONTRACTOR'S SCHEDULE OF COSTS FOR PAYMENTS

NO.	ITEMS	SITEWORKS	FURNISHINGS	BUILDING ONLY	TOTALS
		$	$	$	$
1.	Bonds, layouts, etc.			5,400	5,400
2.	Site work				
	a. excavation, grading fill and soil treatment			4,450	4,450
	b. piling	8,600			8,600
	c. paving and curbs	14,500			14,500
	d. storm sewer	3,600			3,600
3.	Concrete				
	a. pile caps	3,800			3,800
	b. grade beams			4,950	4,950
	c. floor slab			10,910	10,910
	d. tie beams			1,820	1,820
	e. student entry, courtyard & principal's court			3,240	3,240
	f. steel and wire mesh			4,400	4,400
	g. walks	1,850			1,850
	h. tests			400	400
	i. lightweight deck			7,300	7,300
4.	Masonry				
	a. brick			22,300	22,300
	b. block			11,200	11,200
5.	Misc. metalwork and walk cover			3,100	3,100
6.	Carpentry			4,600	4,600
7.	Millwork			10,750	10,750
8.	Roofing and sheetmetal			8,400	8,400
9.	Metal doors and frames			3,800	3,800
10.	Aluminum windows			1,600	1,600
11.	Glazing, fascia, alum. entrances & doors			7,000	7,000
12.	Finish hardware			4,100	4,100
13.	Resilient floor covering			6,500	6,500
14.	Ceramic tile			3,250	3,250
15.	Paint, glaze coat, caulk			5,250	5,250
16.	Toilet partitions, accessories, flagpole			1,670	1,670
17.	Educational equipment			8,900*	8,900*
18.	Food service equipment			22,800	22,800
19.	Carpeting			4,200	4,200
20.	Building subsystems				
	a. Structure (Macomber V-Lok)			51,860	51,860
	b. Lighting/Ceiling (Armstrong C-60)			41,000	41,000
	c. Partition (Aetna Aetnawall)			37,900	37,900
	d. HVAC (Lennox DMZ)			50,900	50,900
21.	Electrical			32,100	32,100
22.	Mechanical			50,500	50,500
23.	Final cleanup			500	500
	Totals	$ 32,350		$ 437,050	$469,400

* This includes science room casework, sinks, etc., home economics caseworks, sinks, stoves, refrigerators, etc.

ORANGE PARK SENIOR HIGH SCHOOL
Orange Park, Florida
Schoolhouse Systems Project-Program 1-A
Allen Frye and Associates, Architects and Engineers
John M. Bickerstaff, Builder-General Contractor

BUILDING SUBSYSTEMS BIDS RECEIVED — October 12, 1967
(School board directed that the subsystems contractors would contract with the general contractor when he became determined.)

GENERAL CONSTRUCTION BIDS RECEIVED — June 18, 1968
(Advertising for bids was delayed approximately six months awaiting funding of an approved PL 815 Project. The project was finally funded from state and local funds.)

SUBSTANTIAL COMPLETION DATE — April 5, 1969

COST DATA:

1. Building subsystems	$	195,703*
2. General construction	$	239,973
SUBTOTAL	$	435,676
3. Sitework	$	15,566
TOTAL	$	451,242

Design Capacity: 600 pupils

Area - General ..... 31,350 square feet

Cost/Sq.Ft. - Building subsystems (S, L/C & HVAC)	$	5.30
- Building subsystems (S, L/C, P & HVAC)	$	6.24
- Building only	$	13.90
- Total (including sitework)	$	14.39
Cost per pupil	$	752.07

*Final adjusted costs for systems will differ slightly from the figures in the bid breakdown per school on page 40.

ORANGE PARK SENIOR HIGH SCHOOL
Orange Park, Florida

GENERAL CONTRACTOR'S SCHEDULE OF COSTS FOR PAYMENTS

NO.	ITEMS	SITEWORKS	FURNISHINGS	BUILDING ONLY	TOTALS
		$	$	$	$
1.	Performance Bond			4,511	4,511
2.	Supervision			7,210	7,210
3.	Clearing			898	898
4.	Earthwork			2,687	2,687
5.	Utilities	1,112			1,112
6.	Curbs & gutters	3,480			3,480
7.	Paving	10,974			10,974
8.	Concrete			21,190	21,190
9.	Masonry			35,787	35,787
10.	Rough Carpentry			748	748
11.	Miscellaneous Steel			6,479	6,479
12.	Steel Stairs			2,877	2,877
13.	Roofing, Insul. & Sheet Metal			8,511	8,511
14.	Skylites			200	200
15.	Curtain wall, glass & glazing			12,299	12,299
16.	Driwall			502	502
17.	Toilet partitions			1,200	1,200
18.	Toilet accessories			689	689
19.	Lab equipment			2,410	2,410
20.	Metal door frames			675	675
21.	Finish Carpentry			11,710	11,710
22.	Finish hardware			4,965	4,965
23.	Resilient flooring			6,363	6,363
24.	Carpet			17,991	17,991
25.	Quarry tile			2,218	2,218
26.	Painting			3,131	3,131
27.	Cement wall coating			625	625
28.	Platform risers			1,945	1,945
29.	Fire extinguishers			133	133
30.	Plumbing & ventilation			32,337	32,337
31.	Electrical			49,682	49,682
32.	Building subsystems				
	a. Structure (Macomber V-Lok)			61,026	61,026
	b. Lighting/Ceiling (Armstrong C-60)			39,897	39,897
	c. Partitions (Hauserman Doublewall)			29,411	29,411
	d. HVAC (Lennox DMZ)			65,369	65,369
	Totals	$ 15,566	$ -0-	$ 435,676	$ 451,242

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BRADFORD MIDDLE SCHOOL
Starke, Florida
Schoolhouse Systems Project-Program 1-A
Don R. Morgan, Architect
Drake Construction Company, General Contractor

BUILDING SUBSYSTEMS BIDS RECEIVED (School board contracted separately with each subsystem contractor.)	October 12, 1967
GENERAL CONSTRUCTION BIDS RECEIVED (School board contract required general contractor to administer the subsystem contracts.)	February 22, 1968
SUBSTANTIAL COMPLETION DATE	August 18, 1968
FULLY COMPLETED DATE	September 9, 1968

COST DATA:

1. Building subsystems	$ 178,069*
2. General construction	$ 235,641
SUBTOTAL	$ 413,710
3. Furniture and sitework	$ 81,212
TOTAL	$ 494,922

Design Capacity: 450 pupils

Areas - General	36,693	
- Overhangs @ 1/3	900	
TOTAL	37,593	square feet

Cost/Sq.Ft. - Building subsystems (S, L/C & HVAC)	$	4.19
- Building subsystems (S, L/C, P & HVAC)	$	4.74
- Building only	$	11.00
- Total (including furniture & sitework)	$	13.17

Cost per pupil ..... $ 1,099.82

*Final adjusted costs for systems will differ slightly from the figures in the bid breakdown per school on page 40.

BRADFORD MIDDLE SCHOOL
Starke, Florida

GENERAL CONTRACTOR'S SCHEDULE OF COSTS FOR PAYMENTS

NO.	ITEMS	SITEWORKS	FURNISHINGS	BUILDING ONLY	TOTALS
1.	Bonds	$	$	$ 1,780	$ 1,780
2.	Temporary facilities			1,100	1,100
3.	Site preparation			3,400	3,400
4.	Footings			5,200	5,200
5.	Grading and compacting			2,300	2,300
6.	Soil treatment			800	800
7.	Concrete				
	a. Floor slab			14,900	14,900
	b. Concrete beams			2,700	2,700
	c. Sidewalks	2,200			2,200
8.	Masonry				
	a. Block			14,500	14,500
	b. Brick			13,500	13,500
9.	Carpentry				
	a. Rough			4,500	4,500
	b. Finish and doors			3,800	3,800
10.	Roof deck insulation			6,500	6,500
11.	Roofing and sheetmetal			9,654	9,654
12.	Roll-A-Way chalkboards			5,200	5,200
13.	Steel door frames			2,200	2,200
14.	Glass and glazing			1,200	1,200
15.	Alum. store front			1,600	1,600
16.	Glasweld soffit and fascia			6,700	6,700
17.	Finish hardware			3,100	3,100
18.	Terrazzo			1,600	1,600
19.	Ceramic tile, etc.			1,200	1,200
20.	Resilient tile and base			1,000	1,000
21.	Carpet			32,700	32,700
22.	Paint and caulk			2,000	2,000
23.	Spray glaze			3,500	3,500
24.	Room names			77	77
25.	Bath accessories			450	450
26.	Toilet partitions			2,500	2,500
27.	Skylights			380	380
28.	Flagpole			600	600
29.	Plumbing and heating			60,000*	60,000*
30.	Building subsystems				
	a. Structure (Macomber V-Lok)			56,577	56,577
	b. Lighting/Ceiling (Armstrong C-60)			45,318	45,318
	c. Partitions				
	Folding doors (Modernfold)			2,000	2,000
	Demountable partitions (Aetna Aetnawall)			18,654	18,654
	d. HVAC (Lennox DMZ)			55,520	55,520
31.	Electrical			25,000	25,000
32.	Paving and drainage	8,500			8,500
33.	Furniture		70,512		70,512
	Totals	$ 10,700	$70,512	$413,710	$494,922

* This includes a new chiller, 2 new pumps (1-5HP and 1-10HP), a new cooling tower and 150' of 6" chilled water and hot water lines, remotely located in an existing central plant.

PINEWOOD ELEMENTARY SCHOOL
Mims, Florida
Schoolhouse Systems Project-Program 1-A
Hirshberg and Thompson, Architects
Julian Evans and Associates, Inc., General Contractor

BUILDING SUBSYSTEMS BIDS RECEIVED — October 12, 1967
(Building subsystems bidders to be assigned as subcontractors to the general contractor when he became determined.)

GENERAL CONSTRUCTION BIDS RECEIVED — February 20, 1968
(Bids rejected - exceeded budget - preparations made to rebid.)

COMPLETION DATE, beneficial occupancy - December 26, 1968
(students actually occupied the school in February 1969)

COST DATA:

1. Building subsystems		$ 173,854*
2. General construction		228,388
	SUBTOTAL	$ 402,242
3. Furniture and sitework		$ 89,988
	TOTAL	$ 492,230

Design Capacity: 480 pupils

Areas - General	27,935	
- Porches, etc. @ 1/2	936	
TOTAL	28,871	square feet.

Cost/Sq.Ft. - Building subsystems (S, L/C & HVAC)	$	4.64
- Building subsystems (S, L/C, P & HVAC)	$	6.02
- Building only	$	13.93
- Total (including furniture & sitework)	$	17.05

Cost per pupil ..... $ 1,025.48

*Final adjusted costs for systems will differ slightly from the figures in the bid breakdown per school on page 40.

PINEWOOD ELEMENTARY SCHOOL
Mims, Florida

GENERAL CONTRACTOR'S SCHEDULE OF COSTS FOR PAYMENTS

NO.	ITEMS	SITEWORKS $	FURNISHINGS $	BUILDING ONLY $	TOTALS $
1.	Sitework				
	a. Clear & grub			5,030	5,030
	b. Cut & fill			6,860	6,860
	c. Paving & base	14,737			14,737
	d. Marl (grass area) & grass	11,060			11,060
	e. Concrete work in site (inlets, sidewalks, play area pipe, etc.	5,610			5,610
	f. Clay infield in diamond	260			260
	g. Sitework engineering	530			530
2.	Concrete slab			32,145	32,145
3.	Masonry			5,712	5,712
4.	Roofing & sheetmetal			15,489	15,489
5.	Stucco			4,250	4,250
6.	Glazing/storefront			4,669	4,669
7.	Casework			42,175	42,175
8.	Misc./carpentry/concrete			33,218	33,218
9.	Terrazzo			2,010	2,010
10.	Ceramic Tile			2,480	2,480
11.	Paint			3,905	3,905
12.	Carpet			25,615	25,615
13.	Building subsystems				
	a. Structure (Macomber V-Lok)			49,520	49,520
	b. Lighting/Ceiling (Armstrong C-60)			35,381	35,381
	c. Interior partitions (Donn Crusader)			39,770	39,770
	d. HVAC (Lennox DMZ)			49,183	49,183
14.	Mechanical			23,500	23,500
15.	Electrical			46,125	46,125
16.	Furniture		28,000		28,000
17.	Sewage disposal	14,000			14,000
18.	Water well & treatment	12,071			12,071
	SUBTOTALS:	$ 58,268	$ 28,000	$ 427,037	$513,305
	CHANGE ORDERS				
	#1. General rearrangement			(-) 24,321	(-)24,321
	#2. Storm drains (+) 2,077				(+) 2,077
	#3. Electric conduit to well			(+) 326	(+) 326
	#4. Grass Seed (+) 1,643				(+) 1,643
	#5. Four (4) platforms			(-) 800	(-) 800
	SUBTOTALS:	(+) 3,720	-0-	(-) 24,795	(-)21,075
	TOTALS:	$ 61,988	$ 28,000	$ 402,242	$492,230

MOORE HAVEN ELEMENTARY SCHOOL
Moore Haven, Florida
Schoolhouse Systems Project-Program 1-A
McBryde and Parker, Architects
William Vander Linde Inc. & Lonnie Jackson Construction Company, Inc.

BUILDING SUBSYSTEMS BIDS RECEIVED — October 12, 1967
(School board directed that the subsystems contractors would contract with the general contractor when he became determined.)

GENERAL CONSTRUCTION BIDS RECEIVED — May 15, 1968
(Contractor bid to complete the work in 200 days which would have been November 21, 1968.)

COMPLETION DATE — August 1, 1969
(Court actions had considerable effect upon the Board's completion date requirements and the contractor was given a significant extension of time.)

COST DATA:

1. Building subsystems	$ 268,620*
2. General construction	$ 431,557
Subtotal	$ 700,177
3. Sitework	5,000
TOTAL	$ 705,177

Design Capacity: 770 pupils

Areas - General @ full value
- Covered walks @ $\frac{1}{2}$
- Overhangs @ 1/3
- Total ..... 48,498 square feet

Cost/sq.ft. - Building subsystems (S,L/C & HVAC)	$ 4.67
- Building subsystems (S,L/C, P & HVAC)	$ 5.53
- Building only	$ 14.44
- Total (including sitework)	$ 14.54

Cost per pupil $915.81

*Final adjusted costs for systems will differ slightly from the figures in the bid breakdown per school on page 40.

MOORE HAVEN ELEMENTARY SCHOOL
Moore Haven, Florida

GENERAL CONTRACTOR'S SCHEDULE OF COSTS FOR PAYMENTS

NO.	ITEMS	SITEWORKS	FURNISHINGS	BUILDING ONLY	TOTALS
1.	Permits and Bonds	$	$	$ 4,870	$ 4,870
2.	Excavation & grading			3,650	3,650
3.	Concrete			39,078	39,078
4.	Reinforcing steel			4,450	4,450
5.	Masonry			39,304	39,304
6.	Misc. metal			1,568	1,568
7.	Carpentry			13,132	13,132
8.	Millwork			24,391	24,391
9.	Waterproofing and Damproofing			714	714
10.	Roofing and sheetmetal			38,300	38,300
11.	Caulking			1,238	1,238
12.	Plastering			9,960	9,960
13.	Dry wall			19,300	19,300
14.	Glazing			7,000	7,000
15.	Painting			9,532	9,532
16.	Finish hardware			3,432	3,432
17.	Finish flooring			3,600	3,600
18.	Ceramic tile			4,835	4,835
19.	Electrical			45,200	45,200
20.	Plumbing			26,146	26,146
21.	Storm drainage	5,000			5,000
22.	Carpet			33,000	33,000
23.	Concrete covered walks			40,000	40,000
24.	Misc. specialties			16,404	16,404
25.	Building subsystems				
	a. Structure (Macomber V-Lok)			77,480	77,480
	b. Lighting/Ceiling (Armstrong C-60)			68,286	68,286
	c. Partitions (Malone)			42,227	42,227
	d. HVAC (Lennox DMZ)			80,627	80,627
26.	General conditions			28,276	28,276
27.	Supervision			10,900	10,900
	C.O's #1, #2, #3			3,277	3,277
	Totals	$ 5,000	0	700,177	705,177

EAST NAPLES MIDDLE SCHOOL
Naples, Florida
Schoolhouse Systems Project-Program 1-A
William W. Zimmerman, AIA, Architect
William Vander Linde, Inc. and Lonnie Jackson Construction Co., Inc.

BUILDING SUBSYSTEMS BIDS RECEIVED — October 12, 1967
(School board directed that the subsystems contractors would contract with the general contractor when he became determined.)
GENERAL CONSTRUCTION BIDS RECEIVED — March 15, 1968
COMPLETION DATE (substantial completion) — October 15, 1968

COST DATA:

1.	Building subsystems	$ 435,719*
2.	General construction	$ 621,942
	Subtotal	$1,057,661
3.	Sitework	34,039
	TOTAL	$1,091,700

Design Capacity: 735 pupils

Areas -	General	73,988
-	Porches, covered walks @ ½	2,384
-	Finished, enclosed space @ 1/3	1,138
	TOTAL	77,510 square feet

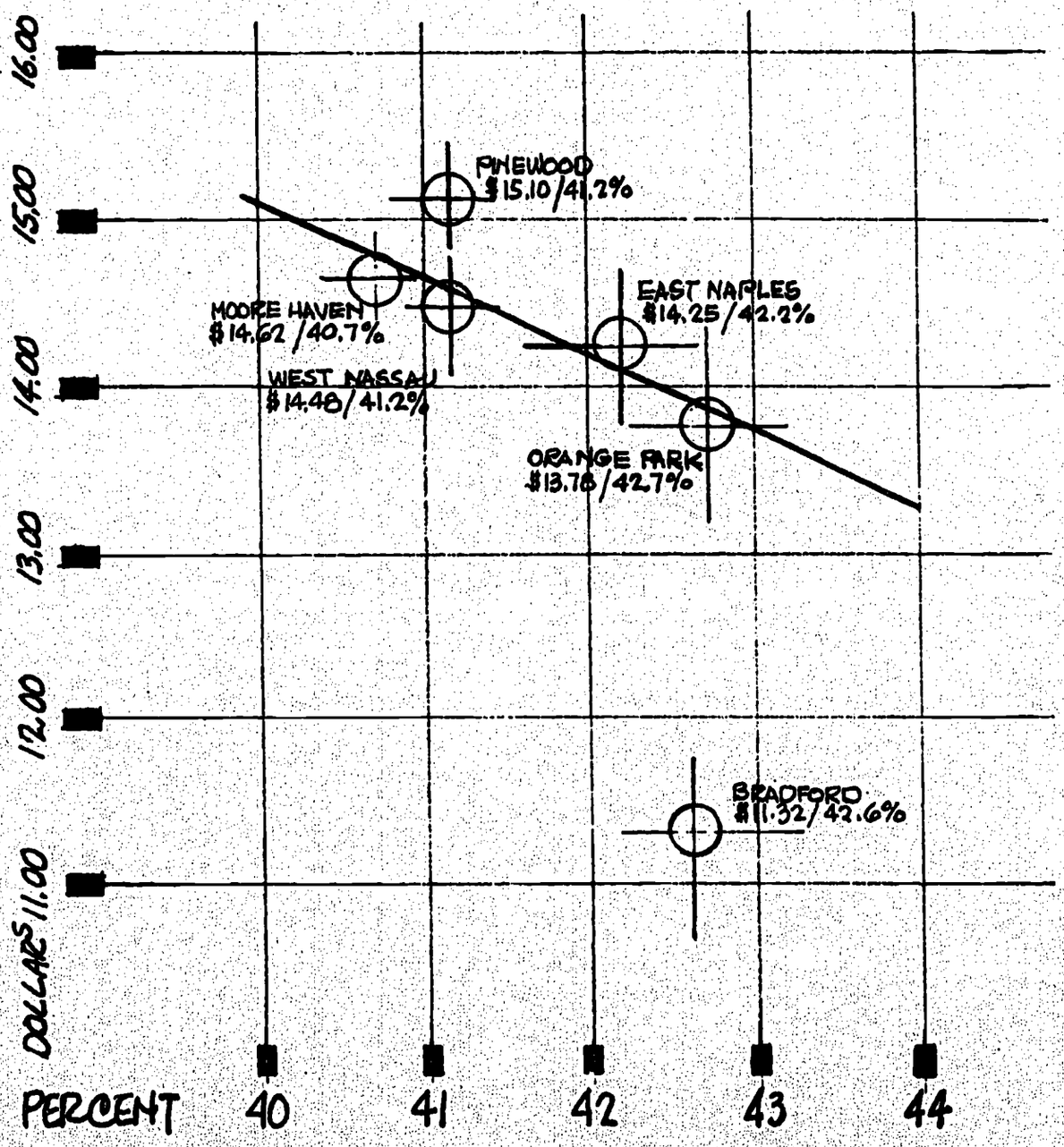
Cost/sq.ft. -	Building subsystems (S,L/C & HVAC)	$ 4.51
-	Building subsystems (S,L/C, P & HVAC)	$ 5.62
-	Building only	$ 13.65
-	Total (including sitework)	$ 14.08
Cost per pupil		$ 1,485.31

*Final adjusted costs for systems will differ slightly from the figures in the bid breakdown per school on page 40.

EAST NAPLES MIDDLE SCHOOL
Naples, Florida

GENERAL CONTRACTOR'S SCHEDULE OF COSTS FOR PAYMENTS

NO.	ITEMS	SITEWORKS $	FURNISHINGS $	BUILDING ONLY	TOTALS
1.	Job preparation				
	a. Bonds, builders risk, etc.			$ 7,825	$ 7,825
	b. Sub-contractors bonds			782	782
	c. Insurance			5,932	5,932
2.	Supervision			12,706	12,706
3.	General conditions			63,500	63,500
4.	Site preparation				
	a. Labor, layout, excavation			5,325	5,325
	b. Soil treatment			695	695
5.	Concrete				
	a. Concrete materials			21,200	21,200
	b. Rebars and mesh			3,100	3,100
	c. Form work			10,650	10,650
6.	Labor construction carpentry			7,280	7,280
7.	Lumber and misc. specialties			8,210	8,210
8.	Masonry			78,766	78,766
9.	Aluminum work				
	a. Windows and sills			3,515	3,515
	b. Entrance and glazing			44,000	44,000
10.	Millwork			24,000	24,000
11.	Misc. iron			12,700	12,700
12.	Roofing and sheetmetal			52,000	52,000
13.	Lath and plaster			7,600	7,600
14.	Resilient flooring			16,544	16,544
15.	Painting			9,100	9,100
16.	Caulking			1,700	1,700
17.	Kitchen equipment			20,000	20,000
18.	Tile work			18,250	18,250
19.	Plumbing			54,000	54,000
20.	Mechanical			9,000	9,000
21.	Electrical			71,662	71,662
22.	Building subsystems				
	a. Structural (Macomber V-Lok)			125,455	125,455
	b. Lighting/Ceiling (Armstrong C-60)			99,980	99,980
	c. Partitions (Donn, Modernfold)			86,356	86,356
	d. HVAC (Lennox DMZ)			123,928	123,928
23.	Paving and fill	18,298			18,298
24.	Sewage plant	15,741			15,741
25.	Carpet (Bids rec'd in May)			51,900	51,900
	Totals	$ 34,039	0	$1,057,661	$1,091,700



COST PER SQUARE FOOT (BUILDING ONLY)
COMPARED TO % SYSTEM IN BUILDING COST.

A P P E N D I X D

CONSTRUCTION COST DATA

The Survey Section, Bureau of School Facilities, Elementary-Secondary Division, gathered the following information and tabulated the data. The data is gathered and the report submitted to the U.S. Office of Education to comply with requirements of Public Law 815. The instructions ask that the total floor area include outside wall dimensions with covered passageways computed at one-half the actual area.

Note that reporting was the responsibility of someone in each school district and the normal variances can be expected which result from having a number of different people make judgments. For example, fixing pupil capacity requires some judgment.

EXPLANATION OF COST DATA ITEMS FOR SCHOOLS CONSTRUCTED
(New School Plants) During 1967-68

Information appearing in the attached table was taken from OE-4038, REPORT OF CONTRACT AWARDED for 1967-68, which is the official form used by the United States Office of Education to gather information needed to determine the average per pupil cost for minimum school facilities. The data contained in the table are restricted to new school plants only.

The total cost of each school plant includes the following:

Construction Contract
Legal and Administrative Expenses
Architectural and Engineering Expenses
Furniture and Equipment
Site Improvement

Following are average cost figures for twenty-six (26) elementary and seventeen (17) secondary school plants:

Elementary	Secondary
$1,081.16 (Per Pupil	$1,334.80 (Per Pupil)
$16.87 (Per Sq.Ft. total cost)	$16.17 (Per Sq.Ft. total cost)
$14.35 (Per Sq.Ft. contract only)	$13.87 (Per Sq.Ft. contract only)
85% (total expenditure for construction contract)	86% (total expenditure for construction contract)
$32,059 (Per teacher station)	$35,137 (Per teacher station)

Because of the variance of practice among the counties in the state in providing equipment and site improvement at new school centers, it is believed the figures contained in the column "Cost Per Square Foot Contract Only" would provide the most valid comparison for school construction cost among the counties of the state.

CONSTRUCTION COST DATA

New School Contracts Awarded July 1967 through June 30, 1968

COUNTY	SCHOOL	TEACHER STATIONS	PUPIL CAPACITY	TOTAL SQUARE FOOTAGE	CONTRACT COST	LEGAL AND ADMINI-STRATIVE
ELEMENTARY SCHOOLS						
BAY	Northside Elem.	16	444	48,456	$ 634,880.00	$ ----
BREVARD	Anderson Elem.	38	840	44,174	703,270.00	11,137.00
	Allen Elem.	24	720	35,230	527,717.00	11,350.00
	Carrol Elem.	24	720	35,230	531,926.00	16,576.00
	Imperial Estates El.	24	720	40,640	605,335.00	11,585.00
	Old Dixie Elem.	24	720	40,640	605,470.00	11,329.00
	Pinewood Elem.	16	480	27,020	479,234.00	11,277.00
	Stevenson Elem.	24	720	35,230	540,275.00	15,916.00
BROWARD	Lloyd Estates Elem.	16	480	33,400	430,833.68	9,782.00
DADE	Palm Springs North	28	840	44,305	706,400.00	10,000.00
	Kendale Elem.	22	660	37,634	577,700.00	7,500.00
ESCAMBIA	Reinhardt Holm Elem.	20	600	21,990	408,582.00	----
DIXIE	Cross City Elem.	24	720	43,734	496,838.00	----
DUVAL	Finegan Elem.	24	720	40,878	511,548.30	1,802.25
HILLSBOROUGH	Crestwood Elem.	26	720	49,570	683,937.78	25.00
	Kingswood Elem.	18	500	43,457	571,282.62	25.00
LEON	W.T. Moore Elem.	30	870	60,000	950,279.00	149.50
OKALOOSA	Kenwood Elem.	24	720	40,560	592,930.00	----
	James E. Plew Elem.	14	420	30,420	466,829.00	----
ORANGE	Apopka Elem.	16	480	37,329	494,200.00	2,396.74
	Ivey Lane Elem.	25	735	47,829	571,700.00	1,637.05
	Lake Sybolia Elem.	16	480	37,329	471,329.85	1,652.88
	Riverside Elem.	16	480	37,329	500,685.00	1,076.23
	Windermere Elem.	16	480	37,329	478,351.47	1,743.92
SUWANNEE	Live Oak Elem.	22	660	38,815	432,972.00	850.00
VOLUSIA	New Elem. "I"	8	240	16,900	240,986.20	150.00
ELEMENTARY TOTALS		521	15,449	990,338	$14,215,036.90	$127,960.57
SECONDARY SCHOOLS						
BRADFORD	Bradford Middle	24	730	34,800	415,900.00	$ ----
BROWARD	Broward Hills High	78	2,002	164,900	2,399,013.45	26,513.77
DUVAL	Highlands Jr.	49	1,148	120,448	1,437,045.00	544.94
GADSDEN	New Quincy High	27	600	84,410	1,223,584.46	----
OKALOOSA	Crestview Senior	41	1,225	110,000	1,896,780.00	----
HERNANDO	Brooksville Jr.	9	270	9,695	151,940.00	147.50
LEE	Cypress Lake Sr.	28	748	66,800	1,057,880.00	----
NASSUA	W. Nassua County Hi.	13	325	29,500	471,372.86	554.56
ORANGE	Meadowbrook Jr.	37	1,350	103,614	1,270,395.00	4,512.40
	Conway Jr. High	48	1,500	103,614	1,387,798.00	3,358.14
POLK	Ft. Meade Jr.-Sr.	24	750	76,177	852,565.00	----
PUTNAM	Crescent City Jr.-Sr.	25	792	75,609	920,344.00	----
	Interlachen Jr.-Sr.	23	712	77,374	903,161.00	----
SANTA ROSA	Middle Grade School	30	900	50,544	610,848.00	625.23
SEMINOLE	Lakeview Jr.	26	711	45,240	537,312.00	----
WALTON	Walton Sr.	26	780	86,542	1,127,230.00	----
VOLUSIA	Deltona Jr.	11	320	29,340	451,706.93	150.00
SECONDARY TOTALS		519	14,863	1,268,970	$17,114,875.70	$ 36,406.44
GRAND TOTALS		1,040	30,312	2,259,245	$31,329,912.60	$164,367.01

CONSTRUCTION COST DATA

New School Contracts Awarded July 1967 through June 30, 1968

ARCHITECT AND ENGINEERING	FURNITURE AND EQUIPMENT	SITE IMPROVEMENT	TOTAL COST	COST PER PUPIL	COST SQUARE FOOT	COST PER SQ. FT. CONTRACT ONLY	CONST'N CONTR.% of TOTAL	COST PER TEACHER STATION
$ 39,901.55	$ 40,000.00	$ 4,413.98	$ 719,195.53	$1,619.81	$14.84	$13.10	82	$44,950
39,921.00	92,000.00	---	846,328.00	1,007.53	19.16	15.92	83	30,226
15,831.00	79,600.00	---	634,498.00	881.25	18.01	14.98	83	26,437
30,506.00	79,600.00	---	658,608.00	914.73	18.69	15.10	81	27,442
34,543.00	79,600.00	---	731,063.00	1,015.37	17.99	14.90	82	30,461
18,164.00	79,600.00	---	714,563.00	992.45	17.58	14.90	85	29,773
26,552.00	48,000.00	---	565,063.00	1,177.21	20.91	17.74	85	35,316
16,208.00	79,600.00	---	651,999.00	904.44	18.48	15.34	83	27,133
9,956.79	34,331.76	---	484,904.23	1,010.22	14.52	12.90	89	30,306
29,500.00	90,000.00	114,000.00	949,900.00	1,130.83	21.44	15.94	74	33,925
50,500.00	75,000.00	3,500.00	714,200.00	1,082.12	18.98	15.35	81	32,464
19,479.10	33,443.65	2,500.00	464,004.75	773.34	21.10	18.58	88	23,200
31,128.00	41,250.00	7,500.00	576,261.00	829.66	13.18	11.35	86	24,011
17,054.51	23,931.33	16,480.50	570,816.89	792.80	13.96	12.51	90	23,784
41,036.27	40,000.10	28,300.00	793,299.15	1,101.67	16.00	13.80	86	30,512
34,276.96	26,250.00	21,121.93	652,956.51	1,305.91	15.00	13.15	87	36,275
49,889.65	125,500.00	88,713.00	1,214,531.15	1,396.70	20.25	15.84	78	40,504
29,646.50	41,068.89	---	663,645.39	921.73	16.36	14.62	89	27,652
---	25,219.55	---	492,048.55	1,171.54	16.18	15.35	95	35,146
15,464.93	32,150.00	3,715.00	547,926.67	1,141.51	14.68	13.24	90	34,245
19,435.94	40,323.00	11,368.82	644,464.81	876.82	13.47	11.95	89	25,779
15,558.79	26,000.00	1,500.00	516,047.52	1,075.10	13.82	12.63	91	32,253
16,505.62	36,323.00	---	554,589.85	1,155.40	14.85	13.41	90	34,662
17,982.29	26,000.00	5,475.00	529,552.68	1,103.23	14.19	12.81	90	33,097
28,508.51	65,320.00	---	527,650.51	799.47	13.59	11.45	82	23,904
14,459.00	14,200.00	15,000.00	284,795.20	1,186.65	16.85	14.26	85	35,569
$ 662,009.41	$1,374,311.28	$323,594.23	$16,702,912.39	$1,081.16	$16.87	14.35	85	$32,059
$ 24,295.00	$ 70,000.00	$ 7,000.00	$ 517,195.00	$ 708.49	$14.86	$11.95	80	$21,548
81,945.37	358,950.00	55,000.00	2,921,422.59	1,459.25	17.72	14.55	82	34,454
67,796.58	202,999.98	1,500.00	1,709,886.50	1,489.45	14.20	11.93	84	34,836
67,260.00	250,000.00	15,000.00	1,555,844.46	2,593.07	18.46	14.50	78	57,684
94,839.00	180,000.00	---	2,171,619.00	1,772.75	19.74	17.24	87	52,966
9,116.40	21,800.00	7,500.00	190,503.90	705.57	19.65	15.67	80	21,167
63,473.00	60,000.00	3,000.00	1,184,353.00	1,583.30	17.73	15.84	89	42,298
39,165.49	26,007.64	---	537,100.45	1,652.62	18.21	15.98	88	41,315
42,764.28	70,118.00	45,820.65	1,433,610.33	1,061.93	13.84	12.26	88	38,746
34,126.96	116,478.00	16,610.00	1,558,371.10	1,038.91	15.04	13.39	89	32,466
47,657.46	88,000.00	37,500.00	1,025,722.46	1,367.63	13.41	11.15	83	42,738
55,220.64	17,907.82	8,567.50	1,002,039.96	1,265.20	13.25	12.17	92	40,082
54,189.66	23,642.80	---	980,993.46	1,377.80	12.68	11.67	92	42,652
36,651.00	30,000.00	385.00	678,509.23	753.90	13.42	12.09	90	22,617
---	---	---	537,312.00	755.71	11.88	11.88	100	20,666
67,634.00	112,723.00	---	1,307,587.00	1,676.40	15.11	13.03	86	50,292
25,970.42	24,200.00	25,000.00	527,027.35	1,646.96	17.96	15.40	86	47,912
$ 812,105.26	$1,652,827.24	$222,883.15	$19,839,097.79	$1,334.80	$15.63	$13.49	86	$38,226
$1,474,114.67	$3,027,138.52	$546,477.38	$36,542,010.18	$1,205.48	$16.17	$13.87	86	$35,137

CONSTRUCTION COST DATA

New School Contracts Awarded July 1, 1968 through June 30, 1969

ARCHITECT AND ENGINEERING	FURNITURE AND EQUIPMENT	SITE IMPROVEMENT	TOTAL COST	COST PER PUPIL	COST SQUARE FOOT	COST PER SQ.FT. CONTRACT ONLY	CONST'N CONTR. % OF TOTAL	COST PER TEACHER STATION
$ 22,923.44	$ 51,000.00	$ ---	$ 862,048.44	$1,112.32	$17.74	$16.22	91	$34,481.94
43,235.44	51,000.00	---	883,738.44	1,140.31	18.19	16.25	89	35,349.54
23,434.61	51,000.00	---	881,147.61	1,136.96	18.13	16.60	92	35,245.90
7,200.00	55,818.00	---	749,285.00	1,152.74	16.36	14.89	91	26,760.18
7,219.00	55,818.00	---	743,495.00	1,143.84	16.23	14.78	91	26,553.34
7,239.00	55,818.00	---	747,824.00	1,150.50	16.33	14.87	91	26,708.00
8,840.00	55,818.00	---	769,741.00	1,184.22	16.73	15.22	91	27,490.75
8,088.00	55,818.00	---	762,819.00	1,173.57	16.21	14.57	90	27,243.54
22,618.00	55,818.00	---	685,154.00	1,054.08	16.82	14.81	88	24,469.79
7,200.00	55,818.00	---	749,291.00	1,152.76	16.36	14.89	91	26,760.39
25,058.00	55,818.00	---	759,272.00	1,168.11	16.58	14.69	89	27,116.86
7,343.00	55,818.00	---	755,676.00	1,162.58	16.50	15.04	91	26,988.43
7,477.00	55,818.00	---	736,075.00	1,132.42	16.07	14.58	91	26,288.39
8,128.00	55,818.00	---	767,627.00	1,180.96	16.32	14.63	90	27,415.25
25,852.00	55,818.00	---	793,595.00	1,220.92	16.87	14.79	88	28,342.71
45,000.00	165,000.00	$ 22,600.00	1,266,350.00	1,407.06	22.76	18.44	81	40,850.00
38,000.00	150,000.00	23,000.00	1,108,000.00	1,731.25	26.78	21.63	81	50,363.64
31,700.00	143,600.00	1,400.00	984,600.00	1,538.44	26.67	21.81	82	44,754.55
65,500.00	140,000.00	---	1,038,129.00	1,622.08	25.09	20.05	8[illegible]	47,187.68
28,000.00	140,000.00	---	986,000.00	1,540.63	26.71	22.11	8[illegible]	44,818.18
65,000.00	140,000.00	---	1,025,789.00	1,602.80	27.79	22.16	80	46,626.77
76,000.00	165,000.00	---	1,237,000.00	1,374.44	22.23	17.72	80	39,903.23
43,000.00	70,000.00	---	610,000.00	1,694.44	30.50	24.75	81	50,833.33
32,718.00	9,186.12	275.00	587,644.82	1,030.96	15.69	14.56	93	30,928.67
33,326.00	44,583.00	75,703.00	788,528.45	1,051.37	16.78	13.51	81	30,328.02
38,242.00	65,133.00	1,337.60	833,363.85	1,111.15	15.15	13.24	87	32,052.46
42,076.00	---	104,386.00	882,955.00	1,177.27	17.66	14.72	83	33,959.81
39,062.00	45,278.00	48,823.00	877,467.38	1,169.96	16.87	14.31	85	33,748.75
35,300.00	41,700.00	75,000.00	700,000.00	2,064.89	19.74	15.37	78	53,846.15
31,151.90	35,000.00	---	689,189.00	883.58	15.49	14.00	90	26,507.30
26,815.41	69,042.00	21,500.00	984,664.31	1,875.55	22.38	19.71	88	49,233.22
52,504.13	69,042.00	32,500.00	1,038,341.42	1,977.79	23.60	20.10	85	51,917.07
73,525.00	125,000.00	---	1,584,750.00	1,886.60	20.15	17.46	87	56,598.21
43,604.00	45,000.00	10,000.00	797,199.00	1,084.62	16.88	14.79	88	29,525.89
$1,072,379.93	$2,485,380.32	$416,524.60	$29,666,760.62	$1,302.23	$19.09	$16.44	86	$34,820.14
$ 125,000.00	$ 486,000.00	---	$ 2,823,000.00	$1,568.33	$21.06	$16.39	78	$50,410.71
23,957.00	234,600.00	---	2,261,361.00	1,796.16	17.67	15.58	88	41,877.06
136,115.00	574,775.00	125,000.00	4,794,585.00	2,320.71	20.12	16.53	82	65,679.25
55,262.00	574,775.00	104,000.00	4,634,238.00	2,243.10	19.45	16.30	84	63,482.71
24,327.00	234,600.00	---	2,260,897.00	1,795.79	17.67	15.58	88	41,868.46
23,291.00	234,600.00	---	2,207,805.00	1,753.62	17.26	14.81	86	40,885.28
25,723.00	234,600.00	---	2,253,452.00	1,789.87	17.61	15.53	88	41,730.06
397,800.00	1,691,000.00	81,000.00	8,185,800.00	3,148.38	32.61	23.91	73	95,183.72
67,997.00	148,813.00	1,500.00	1,442,764.08	924.48	11.98	10.17	84	27,745.46
117,966.59	75,000.00	---	2,144,847.00	1,787.37	14.02	12.76	91	40,468.81
45,953.15	33,315.29	5,905.88	835,511.82	1,856.69	15.47	13.90	90	43,974.31
68,624.00	65,896.00	45,867.00	1,443,249.25	1,603.61	16.98	14.85	87	41,235.69
72,990.00	---	108,481.00	1,493,620.25	1,531.92	16.78	14.73	87	31,779.15
95,000.00	241,000.00	15,000.00	2,023,900.00	1,605.00	16.87	13.91	82	49,363.41
143,145.38	250,000.00	---	3,292,959.43	1,568.08	19.60	17.26	88	47,042.28
85,093.00	239,000.00	65,000.00	2,450,994.10	1,929.92	16.01	13.47	84	59,780.34
191,388.00	227,680.00	4,375.00	3,269,809.00	2,042.35	18.80	16.38	87	59,451.07
$1,765,212.12	$5,780,254.29	$556,128.88	$50,050,004.93	$1,914.40	$19.12	$15.97	84	$51,544.80
$2,837,592.05	$8,265,634.61	$972,653.48	$79,716,765.55	$1,628.77	$19.11	$16.15	85	$43,728.34

APPENDIX E

PROPOSED CONSTRUCTION PROGRAMS
1970-73

Information was requested of all counties by contacting superintendents and all community colleges by contacting presidents. At the time of finalizing the report, the following had failed to report:

COUNTIES

Franklin
Lee

Information was requested from school districts for the construction programs for the next three years. Pages 61-64 includes a total of approximately 13.1 million square feet and $312 million of new schools and 3 million square feet and $123 million per year, based on current programs without additional needs. A savings of 1% on construction cost would be $1,230,000.

The information on additions to elementaries is interesting. It shows that we will average about 633,000 square feet annually and about $15,000,000 in 289 separate projects. If joined, this could have an impact on the product available.

Duval County responded to our request for information but stated that it was impossible to predict the volume of construction accurately until after the completion of the survey report.

It would be reasonable to estimate that the Duval County School District would have about $10 million dollars in construction per year, provided that they finance it.

The amount of construction in Lee County will be substantial, although this information was unavailable at the time of this publication.

PROPOSED CONSTRUCTION PROGRAM - FISCAL YEAR 1970/1971

FOR

ELEMENTARY AND SECONDARY SCHOOLS

SCHOOL DISTRICT NAME	NEW PLANT CONSTRUCTION						MAJOR ADDITIONS TO EXISTING CONSTRUCTION							
							ELEMENTARY SCHOOLS							
	NUMBER OF ELEMENTARY SCHOOLS	NUMBER OF JR. HIGH SCHOOLS	NUMBER OF SR. HIGH SCHOOLS	NUMBER OF VO. TEC. SCHOOLS	TOTAL AREA	TOTAL BUDGET	NUMBER OF SCHOOLS	TOTAL AREA	TOTAL BUDGET	NUMBER OF JR. HIGH SCHOOLS	NUMBER OF SR. HIGH SCHOOLS	NUMBER OF VO.TEC. SCHOOLS	TOTAL AREA	TOTAL BUDGET
ALACHUA														
BAKER	1				25,000	$ 500,000	1	12,000	$ 180,000	2			24,000	$ 440,000
		1			30,000	600,000								
BAY							1	3,600	65,000	1			12,000	215,000
BRADFORD										1			5,000	90,000
											1		14,000	180,000
BREVARD		1			150,000	3,000,000						1	25,000	500,000
BROWARD	4				181,600	3,000,000								
			3		741,822	13,500,000								
CHARLOTTE	1	2			165,000	2,883,000								
CITRUS	1				10,400	150,000								
CLAY			1		73,125	1,315,000								
COLLIER	2					2,450,800								
			1			5,936,000								
				1		3,591,500								
DADE	3				150,000	3,300,000	1	7,000	150,000					
		1			115,000	3,200,000								
			1		240,000	6,100,000								
DESOTO		1			62,000	1,040,000								
ESCAMBIA				1	67,750	1,124,685					1		10,000	200,000
GILCHRIST							8 Rms.	7,500	250,000					
HARDEE										1			8,250	165,000
HENDRY							1	14,138	254,484		1		3,026	49,000
HERNANDO	1				33,000	532,486								
HIGHLANDS			2		215,600	3,880,800	4	68,233	1,091,728		1		13,000	234,000
HILLSBORO	2				80,000	1,440,000	15	70,200	1,263,600	1	2		12,300	221,400
			3		552,940	9,952,920								
HOLMES	1				70,000	550,000								
INDIAN RIVER	1				35,650	868,900								
JACKSON											1		3,670	38,867
												1	10,000	170,000
LEON											1		9,360	150,000
LEVY	1				22,000									
MANATEE												1	34,000	750,000
MARION											2		80,145	1,202,175
MARTIN	1	1			105,000	1,489,639	2	26,000	250,000	1	1		38,000	643,000
MONROE	2				75,000	2,000,000	1	10,000	250,000					
NASSAU											4 Rms.		3,000	60,000
											4 Rms.		3,000	40,000
OKALOOSA		2			175,515	3,705,160					6 Rms.		6,500	130,500
OKEECHOBEE	1				30,800	500,000								
ORANGE	5				240,000	3,272,420	9	100,000	1,200,000					
OSCEOLA	1				30,920	690,000	2	20,800	322,800	1			15,600	265,200
PALM BEACH												1	35,000	650,000
PASCO			1		63,450	1,269,000	2	5,152	103,029					
				1	57,069	1,141,372								
PINELLAS	2				150,000	2,800,000	11	76,000	1,520,000		13		130,000	
POLK		2			180,000	3,500,000	6	43,000	860,000			1	40,000	700,000
SARASOTA							6	26,083	299,660	3	1		50,367	826,685
SANTA ROSA		1	1		85,500	1,100,000								
SEMINOLE	1	1			128,000	2,132,000					1		37,952	715,000
ST. JOHNS				1	29,304	613,685								
SUMTER							3	9,000	144,000	1	1		5,400	86,400
TAYLOR											1	1	15,750	315,000
VOLUSIA	1				68,000	1,300,000	1	27,000	500,000					
WAKULLA											3		2,250	45,000
WASHINGTON							1	12,000	160,000					
TOTALS 70/71	32	13	13	4	4,439,445	$ 94,819,417	75	537.706	$8,864,301	12	45	6	646,570	$9,088,227

PROPOSED CONSTRUCTION PROGRAMS - FISCAL YEAR 1971/1972

FOR

ELEMENTARY AND SECONDARY SCHOOLS

SCHOOL DISTRICT NAME	NEW PLANT CONSTRUCTION						MAJOR ADDITIONS TO EXISTING CONSTRUCTION							
							ELEMENTARY SCHOOLS							
	NUMBER OF ELEMENTARY SCHOOLS	NUMBER OF JR. HIGH SCHOOLS	NUMBER OF SR. HIGH SCHOOLS	NUMBER OF VO. TEC. SCHOOLS	TOTAL AREA	TOTAL BUDGET	NUMBER OF SCHOOLS	TOTAL AREA	TOTAL BUDGET	NUMBER OF JR. HIGH SCHOOLS	NUMBER OF SR. HIGH SCHOOLS	NUMBER OF VO. TEC. SCHOOLS	TOTAL AREA	TOTAL BUDGET
ALACHUA						$			$		1		4,500	$ 68,000
BAY							1	10,000	200,000					
BRADFORD							1	6,000	90,000	1			15,000	225,000
BREVARD		3			300,000	5,400,000	80 Rms.	80,000	1,200,000		1		14,000	270,000
BROWARD	4				181,600	3,000,000	8	105,348	2,106,968	8		8	80,000	1,200,000
CITRUS		1		1	127,950	3,952,860				8	9		977,876	19,557,527
CHARLOTTE							3 Rms.	2,250	54,000	1			9,500	150,000
CLAY		1	1		166,000	3,030,000						1	5,000	90,000
COLUMBIA			1		170,000	2,747,680								
DADE	3				150,000	3,300,000	1	12,000	300,000	2	2		60,000	1,500,000
		4	1		700,000	18,900,000								
ESCAMBIA				1	19,355	330,000								
GADSDEN	1				37,000	425,000								
HARDEE							3	23,684	473,662					
HENDRY		1			60,000	1,300,000								
HERNANDO										1			10,800	250,000
											1		3,600	100,000
HIGHLANDS										2			266,861	480,350
HILLSBORO	2				100,000	1,800,000				1	3		109,000	1,962,000
			1		205,620	3,701,160								
LAKE	1				28,470	400,000								
			1		184,301	3,300,000				1			56,277	950,000
LEON												1	16,000	200,000
LEVY							2	28,000	---					
MARION		1			52,429	734,006								
MARTIN							2	13,000	200,000		2		24,000	377,000
MONROE	1				82,000	2,000,000								
OKALOOSA	1				43,650	1,132,062								
ORANGE			2		300,000	7,204,800	3	30,000	800,000					
OSCEOLA	1				51,773	776,595								
		1			88,530	1,770,600								
PALM BEACH	3				198,000	5,000,000	30	560,000	17,000,000	3	1		110,000	3,400,000
			3	2	1,110,000	34,000,000								
PINELLAS	1				79,288	1,600,000								
		1			161,310	3,800,000								
POLK			1		95,000	1,800,000	10	39,500	800,000	3	1		881,500	1,880,000
SARASOTA							1	2,000	50,000	5	3		121,446	2,143,487
SAINT LUCIE							20 Rms.	18,000	386,100					
SANTA ROSA	1				40,000	500,000								
SEMINOLE	2				88,000	1,408,000								
SUMTER			2		160,000	3,000,000	2	17,000	272,000	1			5,600	95,000
TAYLOR												1	3,225	64,500
VOLUSIA	1				68,000	1,375,000	2	50,000	1,000,000	2			90,000	2,000,000
			1		214,000	4,300,000								
WAKULLA											2		1,500	30,000
TOTALS 71/72	22	13	14	4	5,262,276	$121,987,763	169	996,782	$24,932,730	31	26	11	2,865,685	$36,992,864

PROPOSED CONSTRUCTION PROGRAMS - FISCAL YEAR 1972/1973

FOR

ELEMENTARY AND SECONDARY SCHOOLS

	NEW PLANT CONSTRUCTION						MAJOR ADDITIONS TO EXISTING CONSTRUCTION							
							ELEMENTARY SCHOOLS							
SCHOOL DISTRICT NAME	NUMBER OF ELEMENTARY SCHOOLS	NUMBER OF JUNIOR HIGH SCHOOLS	NUMBER OF SENIOR HIGH SCHOOLS	NUMBER OF VO. TEC. SCHOOLS	TOTAL AREA	TOTAL BUDGET	NUMBER OF SCHOOLS	TOTAL AREA	TOTAL BUDGET	NUMBER OF JUNIOR HIGH SCHOOLS	NUMBER OF SENIOR HIGH SCHOOLS	NUMBER OF VO. TECH. SCHOOLS	TOTAL AREA	TOTAL BUDGET
ALACHUA	1				39,170	$ 587,000	3	26,300	$ 421,811					$
BAY			1		40,000	800,000								
BRADFORD											1		14,000	200,000
BROWARD	4				181,600	3,000,000	6	104,000	1,811,516	6			360,000	6,203,274
		3	2	1	860,398	17,358,560								
CHARLOTTE							12 Rms.	9,000	240,000					
CITRUS	1				25,000	440,000								
		1			43,000	800,000					1		10,000	200,000
CLAY			1		71,000	1,500,000								
COLLIER	3				---	3,871,000								
			1		---	5,936,000								
				1	---	3,591,500								
DADE	3				150,000	3,300,000	1	12,000	300,000	2	2		60,000	1,500,000
		4	1		700,000	18,900,000								
GADSDEN	1				14,000	200,000								
HILLSBOROUGH	1				50,000	900,000	13	57,460	1,034,280					
INDIAN RIVER			1		98,350	2,685,000								
LAKE										1			6,617	100,000
LEON												1	10,000	160,000
LEVY											2		16,000	---
MARION	1				40,105	521,365								
MARTIN							2	23,000	200,000		2		63,000	850,000
OKALOOSA	1				43,650	1,132,062								
OSCEOLA							1	20,180	343,060		2		18,060	370,020
PALM BEACH	3				198,000	5,000,000	20	225,000	7,000,000					
			3		910,000	30,000,000								
PINELLAS	1				79,288	1,760,000								
		1	1		455,012	13,730,000								
POLK							6	36,000	720,000	2	1	1	130,000	2,535,000
SARASOTA	1				30,000	472,160								
ST. LUCIE	1				53,690	827,970								
		1			100,230	1,804,140								
SANTA ROSA							1	3,000	100,000	1	1		15,000	300,000
SUMTER							1	5,400	97,200	2			1,800	32,400
TAYLOR												1	5,600	112,000
VOLUSIA	2				68,000	2,866,000	2	50,000	1,000,000	1			90,000	2,000,000
WASHINGTON							1	5,000	75,000	1	1		11,000	165,000
TOTALS 72/73	24	10	12	2	4,250,493	$135,401,277	57	567,340	$13,102,867	16	13	3	811,077	$14,664,694

TABULATION

COMMUNITY COLLEGES

NAME OF COMMUNITY COLLEGE	NEW BUILDING UNITS									MAJOR BUILDING ADDITIONS								
	1970/1971			1971/1972			1972/1973			1970/1971			1971/1972			1972/1973		
	NUMBER	SQUARE FOOT AREA	BUDGET	NUMBER	SQUARE FOOT AREA	BUDGET	NUMBER	SQUARE FOOT AREA	BUDGET	NUMBER	SQUARE FOOT AREA	BUDGET	NUMBER	SQUARE FOOT AREA	BUDGET	NUMBER	SQUARE FOOT AREA	BUDGET
BREVARD	1	56,000	$ 1,600,000	1	65,000	$ 1,755,000	1	60,000	$ 1,740,000	1	9,300	$ 230,000			$	1	[illegible]	$ [illegible]
BROWARD	2	50,000	1,325,000	7	256,500	7,110,200	4	151,550	4,391,900							2	[illegible]	[illegible]
CENTRAL FLORIDA				1	8,000	200,000	1	13,000	350,000	1	12,000	300,000						
CHIPOLA				1	50,000	1,000,000	1	10,000	200,000				1	27,[illegible]	[illegible]	3	[illegible]	300,000
DAYTONA BEACH	2	27,608	585,400							1	18,100	553,200						
EDISON	1	20,000	400,000															
FLA. JC AT JAX *C *S				6	194,000	5,000,000	6	161,898	5,000,000									
FLORIDA KEYS				1	30,000	600,000				1	5,472	73,250						
GULF COAST										1	5,460	110,000	1	23,332	[illegible]	1	[illegible]	[illegible]
HILLSBORO	25	40,000	700,000	15	280,000	7,000,000	15	280,000	7,000,000									
INDIAN RIVER													2	60,000	1,2[illegible]			
LAKE CITY				1	4,000	88,000	1	13,000	270,400	1	1,500	11,500	1	2,000	40,000			
LAKE-SUMTER	1	3,000	16,000				1	12,000	200,000				1	8,000	175,000			
MANATEE	1	38,500	1,140,000										1	35,376	1,140,000	1	16,500	350,000
*N	1	30,000	1,060,000	1	30,000	1,500,000	1	30,000	1,210,000	1	75,000	---						
MIAMI-DADE *S	1	12,000	600,000	1	200,000	3,400,000	1	60,000	3,000,000	1	50,000	---						
*DT				1	200,000	900,000												
*Med							1	155,000	9,500,000									
NORTH FLORIDA				2	6,225	65,000	1	6,400	150,000							1	[illegible]	[illegible]
OKALOOSA-WALTON	4	63,130	1,041,000															
PALM BEACH	-	---	---	-	---	---	-	---	---	-	---	---	-	---	---	-	---	---
PASCO							2	80,000	1,734,000									
PENSACOLA	1	15,180	300,000	1	---	750,000	1	---	1,000,000	1	---	20,000						
POLK	1	47,421	1,131,000	1	65,000	1,235,000	2	88,100	1,850,000				1	38,000	722,000			
ST. JOHNS RIVER				1	3,500	95,000	1	5,000	205,000	1	2,200	40,000						
ST. PETERSBURG	1	12,972	259,920	1	45,572	911,430	1	22,277	445,536	1	19,800	397,000				1	[illegible]	[illegible]
SANTA FE	4	160,000	2,500,000	3	100,000	1,500,000	3	100,000	1,500,000									
SEMINOLE							1	13,800	379,500				1	19,800	544,500			
SOUTH FLORIDA				1	16,000	320,000	2	35,000	750,000									
TALLAHASSEE	2	46,000	920,000	2	41,000	820,000	2	34,000	680,000							1	10,000	200,000
VALENCIA	3	160,000	4,700,000	3	125,000	3,240,000	2	77,600	1,820,000									
TOTAL	51	783,831	$18,278,320	51	1,719,797	$42,489,630	51	[illegible]8,625	$ 3[illegible],416,356	13	218,762	$1,717,250	9	199,511	$4,[illegible],500	11	127,134	$3,[illegible]

NOTE: THE FOLLOWING REPRESENTS 3,807,305 SQUARE FEET IN NEW CONSTRUCTION AND MAJOR ADDITIONS.

NINETEEN MILLION DOLLARS HAVE BEEN APPROVED FOR CONSTRUCTION IN THE 1969 SPECIAL SESSION FOR JUNIOR COLLEGES UNDER THE HIGHER EDUCATION BOND AMENDMENT.

ADDITIONAL NEEDS:

1970 - 1971	$ 18,953,570
1971 - 1972	44,066,360.00
1972 - 1973	35,851,366.00
TOTALS (1970-71 thru 1972-73)	$ 98,871,296.00
HE BONDS 1969-70	19,000,000.00
TOTAL	$117,871,296*

LEGISLATIVE REQUESTS FOR CONSTRUCTION, IMPROVEMENTS, EQUIPMENT, ETC. THROUGH 1972-73 IS IN THE AMOUNT OF $125,095,000.00

* The projects contained in the $98,871,296.00 do not include architectural and engineering fees and initial equipment, but would include built-in equipment.

* C: Central Campus
* S: South Campus
* N: North Campus
*DT: Downtown Campus
*MED: Medical Campus

STATE UNIVERSITY SYSTEM

SUMMARY CAPITAL OUTLAY BUILDINGS & IMPROVEMENTS

LEGISLATIVE REQUEST

	1969-71	1971-72	1972-73	1973-74	1974-75	1975-76	TOTALS
ACADEMIC SPACE*	$ 78,472,883	$ 31,389,153	$ 31,389,153	$ 31,389,153	$ 31,389,153	$ 31,389,153	$235,418,649
UF - HEALTH CENTER	32,189,999	--	--	--	--	--	32,189,999
UF - VETERINARY MEDICINE	--	--	12,500,000	--	--	--	12,500,000
USF - MEDICAL CENTER	--	--	18,000,000	--	--	--	18,000,000
SUBTOTAL	$110,662,882	$ 31,389,153	$ 61,889,153	$ 31,389,153	$ 31,389,153	$ 31,389,153	$298,108,648
LESS ANTICIPATED FEDERAL FUNDING	- 20,764,024	- 1,000,000	- 21,500,000	- 1,000,000	- 1,000,000	- 1,000,000	- 46,264,024
TOTAL STATE REQUEST	$ 89,898,858	$ 30,389,153	$ 40,389,153	$ 30,389,153	$ 30,398,153	$ 30,389,153	$251,844,624

* INCLUDES IFAS, UTILITIES, SITE DEVELOPMENT AND RENOVATIONS.