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ABSTRACT

Many school board members are inexperienced in the construction process and unaware of the steps to be taken in school building construction. For this reason, this step-by-step outline attempts in a few short paragraphs under each step in the planning, bonding, and building stages to offer suggestions and advice to the school board members. (Author/EA)

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Cooperative and Auxiliary Services
School Facilities Section
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SUGGESTED STEPS FOR PLANNING AND BUILDING A NEW SCHOOL BUILDING

INDEX

1

Introduction

The planning of school buildings is a complex undertaking which requires the cooperation of many individuals and groups. Studies dealing with the influence of the environment on the development of the child are constantly coming to our attention. The school population encompasses all of the children of all of the people as well as many adults, requiring a diversified school program and a variety of school facilities. With new materials, structural designs, and service systems, an intelligent use of them requires a high degree of technical ability. With these points in mind it is safe to say that school administrators, teachers, school boards, pupils, custodians, architects, educational consultants, and community groups all have significant contributions to make in planning the new building.

Architect - Educator Responsibilities

Effective architectural planning of buildings to house a complex educational program must be preceded by equally effective educational planning. Educators should plan the program to be housed in the proposed facility and the space requirements of the program. This should be done before an architect is asked to plan a school building. Architects' major responsibilities are to design a building to perform specific functions, to prepare drawings and specifications, and to supervise the construction. They must translate the educational specifications provided to them by the administrator, school board, and school planning specialist into a functional school building. Likewise, the administrators should not attempt to take over the functions of the architect.

School Board Responsibilities

The school board has the responsibility of providing an adequate educational plant which will, in a great way, aid or hinder the course of education in the community for the next 25 or 30 years. The building needs of the community should not be made piecemeal. A careful study or survey of the community, its present needs, as well as future needs, should be made and kept up to date so that it will reflect current conditions. This study obviously shows the need for a long-range program which should be developed into a master plan that will in turn aid in wise and economical use of public money. Schools cost money and a school board cannot afford to demand anything less than full value for money expended.

Planning Assistance

Consultants of the School Facilities Section of the Oregon Board of Education are available at no cost to your school district to assist in planning your school building needs. They are available to meet with your school board, administrator, citizens, architect, or faculty committee to assist in developing the educational blueprint which should be turned over to your architect.

Purpose of Document

Many school board members are inexperienced in the steps in school building construction. It is with this thought in mind that this step-by-step outline was prepared. It attempts in a few short paragraphs under each step in the planning, bonding, and building stages to offer suggestions and advice to the school board members. More detailed information is always available from the Oregon Board of Education.

In the Outline, Numbers Enclosed in Parentheses Indicate the Section in the Oregon School Law Which is Being Explained or Quoted

Step 1: Making a Study of Your School Building Needs

A. Evaluate your present educational program.

1. What is the educational policy of the community?
2. How well is the present instructional program meeting the policy goals?

B. Who could be used to evaluate the educational program?

1. The local school administration with local committees made up of community members (parents and nonparents), board members, staff, and students.
2. Staff of the Oregon Board of Education with skill in program areas.
3. Staff specialists from institutions of Higher Education, i.e., University of Oregon, Oregon State University, Oregon College of Education, Southern Oregon College, Eastern Oregon College, Portland State University.
4. School Planning Laboratory, Stanford University. This group has a fee schedule that varies and is related to the size of the district and quantity as well as quality of information requested.

C. Who could make a survey of the school building needs? These individuals can work independently or cooperatively.

1. The local administrator, with or without local committees.
2. The architect.
3. A school survey specialist.
4. Members of the School Facilities Section staff of the Oregon Board of Education are available to assist the local authorities.
5. A committee composed of representatives of the above groups.

D. The school building survey should answer the following questions:

1. To what extent are present facilities being utilized?
2. What kinds of restrictions are the buildings and grounds imposing on the curriculum?
3. Are the children being provided a healthy and safe environment?
4. How efficiently can the present buildings be operated?
5. Do the buildings provide an aesthetically pleasing environment?
6. What additional facilities are required to house the present enrollment with the present and future curriculum offerings?
7. Where should new school buildings be located?
8. How will the transition from present to future facilities be carried out?

Step 2: Develop Educational Specifications

Definition: Educational Specifications - (1) a written means of communication between educators and the design professionals, (2) identification of the educational program and factors which affect learning and teaching, (3) to foster intra-staff participation and commitment.

A. Who could help in program development and facility concept development?

1. This should be a locally controlled effort with outside organizations used in evaluations acting as district consultants.
2. Use members of the community with administration, staff, and students.
3. The architect.
4. The staff of the School Facilities Section of the Oregon Board of Education is available to assist the local school authorities.
5. A committee composed of local school board members, administration, staff, community members, students, architects, and school building consultant.
6. Committee size - Remember, research has shown that committees of five or six members produce the best results.

B. The program development activity should provide answers to these questions.

1. What directions will the program take in the future?
2. What are the goals of the programs?
3. What kinds of learning programs will be housed?
4. What kind of staffing pattern will be used?
5. What is the building philosophy?

C. Educational Specifications

OUTLINE OF A WRITTEN EDUCATIONAL SPECIFICATION

Each planning team should have as its objective the production of an educational-architectural plan for a "Model" school.

1. A brief statement of the school's philosophy and goals.
   . Is this a community school meeting the needs of all age groups?

2. A summary description of the major curriculum components.
   . Are the programs for noncollege bound students to be as strong as those for the college bound?
   . What outcomes are expected from each of the components?

3. A description of the student and staff organization.
   . How many students will be housed over the next 10 years?
   . What will be the maximum enrollment for the facility?

4. A description of the "typical" student day.
   . Will the building house an "open" or "closed" campus?
   . Will the schedule be modular or conventional?

5. A description of the "typical" teacher day.
   . Will there be work space for each staff member?
   . What will the teacher-student relationship be?
   . Will it be formal or informal?
   . What teaching strategy will be predominant?

6. A general description of the physical characteristics of the school.
   . What are the furniture and equipment needs and how they will be handled?
   . Projected level of utilization of each space.
   . What kinds of thermal environments will be needed? This includes heating, cooling, cleansing and circulating of air.
   . What acoustically treated spaces will be needed?
   . What kind of space flexibility may be required?
   . Will there be a need for small-group seminar areas or very large-group instruction?

7. A list of major spaces.
   . What activities will be carried on in the facility?
   . What are the space needs for each activity?
   . What are the site requirements?

8. A graphic representation of the area relationships.
   . Are vocational and academic areas integrated?
   . Will the IMC be a central, satellite, or combination facility?
   . Has consideration been given to noisy versus quiet activities?

9. A description of special functions and environmental considerations.
   . Will the interior be landscaped (organic and nonorganic materials) to aid the learning process?
   . Where will the overall flood of light be used as compared to accent lighting in nonclassroom areas?
   . Will splashes of color and accents enhance the aesthetics or aid in space identification?
   . How are the safety hazards identified?
   . Will the needs of physically handicapped individuals be considered?

10. A preliminary schematic design.
   . Does design meet the program specifications?

Step 3 - Methods of Financing Educational Construction

A. Current Budget

1. Pay as you go - It is possible to pay for construction, remodeling and alterations within the current budget. The period for letting the bid on construction must not extend beyond the current fiscal year. The funds budgeted for this purpose can be carried over into future budgets as funds dedicated for that purpose but not yet spent.

B. Future Budgets

1. Through the use of a serial levy, the people can vote to dedicate a given sum each year for a predetermined number of years (not to exceed 10) so that at the end of the period the district will have the predetermined amount of money available for use in capital outlay. This system is often used when fairly accurate, long-range projections of building need are available.

2. Negotiable, interest bearing warrants - These warrants are generally for small sums and should be treated in the same way as bonds. This means that the "Oregon School Bond Manual" should be consulted in handling these bonds and an attorney needs to be consulted. The interest rate on these warrants is usually greater than that paid on bonds. There have been cases where prior arrangements were made with local financial institutions for the sale of these warrants.

3. Reserve funds from current budget for future capital outlay - If a school district is operating within the six percent limitation, the Board of Directors may take action to set aside sums of money for a building project without the approval of the voters.

4. Lease-purchase agreements - Under ORS 332.125, a school district may enter into a lease-purchase agreement for a period of time not to exceed 10 years.

5. Bonding - Bonds are sold on the open market for capital outlay projects. All data concerning bonds, their use and sale is covered in the "Oregon School Bond Manual." This manual is available from the Oregon Board of Education.

C. Other Considerations in Financing Capital Expansion

1. In all steps of the project, it is recommended that the attorney employed by the district be consulted in order to assure compliance with the law.

2. The selection of an attorney to check the legality of the sale of all negotiable instruments is a highly significant step. This is particularly true in reference to school bonds. In addition to your local attorney, a special bonding attorney is required to check the legal procedures followed by the district in acquiring the people's permission to bond.

Step 4 - Select Your Architect

A. Legal Requirements.

1. Oregon law. Oregon Law (ORS 671.030) makes it unlawful for a person to make plans or specifications or to supervise the erection, enlargement, or alteration of buildings or any appurtenance thereto for any building project involving over 4,000 square feet of ground area and over 20 feet in height from the top of the foundation to the top of the rafter plate unless he is a registered architect or engineer.
2. An Attorney General's Opinion. An Attorney General's Opinion dated December 1, 1937, provides, "It is unlawful for a person who is not registered to practice the profession of architecture to design and supervise the construction of an addition to a school building, when such building and addition will have a ground area of more than 4,000 square feet."

B. Selecting the Architect.

1. The Oregon Board of Education does not recommend architects. A list of registered architects interested in designing schools is available upon request.
2. Items to consider in selecting the architect.
   a. How well do the firm's former clients rate them as architects?
   b. What has been the quality of design and detail work?
   c. How open has the architect's mind been to new solutions?
   d. What has been the quality of the total planning program?
   e. How well has the firm planned for present and future educational needs?
   f. How firm a grasp does the firm have of present day educational needs and practices?
   g. What quality of engineering services and other support services has the firm had available to them in the past?
   h. What type of contract administration has the firm given to projects under construction?
   i. How available has the architect been for frequent conferences to plan with the district staff, and has he worked with the staff in the design of the building?
   j. Have his designs been consistent with community expectation concerning school building appearance?
   k. Have the bids for construction of the facilities come in at an amount close to that allocated for the construction project?
   l. How has the architect handled problems arising after the building was accepted by the district?
   m. How has the architect handled change orders?

3. Complete the following tasks prior to selecting an architect.
   a. Visit facilities designed by each of the architects under consideration.
   b. Talk with former clients. The former clients need not be school districts.
   c. Check on the individual architect's character and professional integrity.
   d. Go over items in (2) with former clients.

C. The architect's contract.

1. Immediately upon selection of the architect a written contract should be drawn. Oral agreements often lead to confusion and dissension.
2. Contract forms prepared by the American Institute of Architects are available or your attorney may draw up a form.

   Address: American Institute of Architects
   519 SW 3rd
   Portland, Oregon 97204

3. The contract should be definite in regard to rate and time of payment to the architect.
4. The contract should be specific as to the services to be performed by the architect. Included in the services which may be performed are the preparation of a district master plan for facilities, preparation of preliminary drawings, working drawings, specifications, and large-scale detail drawings; the drafting of forms and proposals; assist the owner in taking of bids and the preparation of contracts; the issuance of certificates of payment; the issuance of addenda and change orders; and the general administration and supervision of the work.

D. Legal services - to be carried out under the direction of an attorney retained by the district.

1. The legal services of the architect.
   a. The architect may prepare advertisements for construction bids, advise the board regarding bids and bidders, and draw up contracts for construction. Standard forms will probably be used.
   b. The board should have its attorney examine and approve these advertisements and contracts if drawn by the architect.
   c. Advise the district as to their insurance needs during construction.

Step 5 - Secure Approval of Your Site

A. Approval of the site for a standard school is required by the following:

1. Oregon Board of Education for the educational adequacy of the site.
2. Department of Human Resources, Health Division, for sewage disposal, water supply, and other sanitary factors.
3. Local zoning and planning commissions (city and/or county), Department of Environmental Quality. Some commissions will provide conditional use permits for school buildings.

B. Recommended effective minimum site size.

1. Elementary - 5 usable acres plus an additional acre for each 100 pupils of anticipated maximum enrollment.
2. Secondary - 10 usable acres plus an additional acre for each 100 pupils of anticipated ultimate maximum enrollment.
3. Neighborhood schools - these should be considered separately.

Note: These acreages are very minimal. Districts are encouraged to contact park planners and develop programs for joint uses of ground and facilities. The National Council of School Facility Planners recommends 20 acres plus 1 acre for each 100 student enrollment contemplated. This figure is neither a maximum or minimum, but a recognition of the site needs.

C. Characteristics of a good site.

1. Readily accessible, possible future freeways, drainage right of ways, old restrictions are possible stumbling blocks.
2. Well drained.
3. Removed as far as possible from excessive traffic hazards, noises, and unsanitary conditions.
4. An ample supply of safe and potable water.
5. Soil of suitable type for construction purposes.
6. Consider purchasing sites in advance of need in a rapidly growing district.
7. Has an opportunity for exercising options to purchase.

D. Before you purchase the site.

1. Secure site approval of the Oregon Board of Education and Department of Human Resources, Health Division, before construction begins.
2. If a well is needed, test for ample water supply.
3. Determine population trends.

4. Consult your architect.
5. Check subsoil structure for load carrying capabilities.
6. Check load zoning at site.

E. Secure necessary forms for approval of the site from the School Facilities Section of the Oregon Board of Education. (See Elementary and Secondary Standards for other information regarding sites.)

Step 6 - Develop Your Preliminary Plans (Note: Only a schematic is provided prior to the bond issue. Preliminary plans are provided following the bond approval.)

A. Plan the building to house your educational program.

1. Preliminary meetings of professional staff, school board members, school building consultants, community leaders, and the architect.
2. Draw up the educational needs, including:
   a. Number and use of each classroom.
   b. Affinity or relative location of classrooms and other facilities.
   c. Approximate size of facilities.
   d. List of all other features you wish incorporated in the plans.

B. The responsibility of the architect for preliminary plans with cost estimates.

1. His plans should reflect the educational plant your educational specifications call for.
2. If you do not like the first preliminary sketches of the architect, have him rework them until you get what you want. Never accept the preliminary sketches until they satisfy you and are approved by the Oregon Board of Education.
3. Develop a set of tentative outline specifications with your architect.

C. Assistance from the Oregon Board of Education.

1. School building consultants and other personnel in the Oregon Board of Education are available to meet with your school board and the architect to aid in drawing up the preliminary plans and specifications.

Step 7 - Review of Your Preliminary Sketches

A. Responsibility for having preliminary sketches reviewed.

1. The school board should advise the architect to have preliminary sketches approved by the Oregon Board of Education before the working drawings are started.
2. This responsibility for plan approval should be a part of the contract between the school board and the architect.

B. Nature of preliminary sketches to be submitted for preliminary approval.

1. Plot plan drawn to scale.
2. Floor plan drawn to scale.
3. Elevations of at least one side of the building.
4. Sections where necessary to explain sketches.
5. Tentative outline of specifications.

Step 8 - Plan Your Working Drawings and Specifications

A. Importance of working drawings and specifications.

1. Working drawings should not be approved by the school board until they have carefully studied the drawings and specifications.
2. Change orders resulting from changes in working drawings are costly, if made after the contract has been let.

B. Final working drawings should include:

1. Site or plot plan.
2. Floor plans.
3. Elevations.
4. Sections.
5. Details.
6. Plumbing.
7. Heating and ventilation.
8. Electrical.
9. Structural plans.
10. Complete specifications.

Step 9 - Approval of Working Drawings and Specifications by the Local School Authorities and the State Agencies

A. Approval by the school board.

1. Approve after all specifications previously agreed upon by the school board have been met.
2. Adopt the plans by a motion.

B. Approval by other state agencies.

1. Approval by the Oregon Board of Education.
   a. Elementary and Secondary Standards require "all architectural plans for all new construction, whether it is a new building, addition to old buildings, or remodeling, shall be presented to the State Superintendent of Public Instruction before calls for bids on the construction are authorized." The responsibility for compliance with these provisions rests with the local school boards.
2. Approval by the Department of Human Resources, Health Division.
3. Approval by the State Fire Marshal (fee charged).
4. Approval by the Department of Commerce, Boiler and Pressure Division (possible fee).

Step 10 - Call for Bids and Award the Contract for the Construction

A. Legal requirements.

1. Oregon Law (ORS 332.285) specifies that (a) in any district with 1,000 or more children, according to the latest school census, when in the board's opinion the cost of any lot of furniture, stationery, apparatus, fuel, building, or improvement or repairs to the buildings will be at least $2,000,... (b) ... any district having less than 1,000 children, according to the latest school census, when in the boards's opinion the cost ... amounts to at least $1,000, shall advertise for bids.
2. (ORS 332.305) After opening bids, the board shall award the contract or purchase to the lowest responsible bidder, taking into consideration quality, probability of performance, and in the case of lease and rental agreements, condition and location of the premises.
3. The act also provides for public opening of bids at a time not less than 15 days after the initial advertisement for the bids.

B. Requirements relating to public works, contracts, bonds, etc., as covered in Oregon Law, ORS 279.008 to 279.544.

1. Bidder's Prequalification Questionnaire.
   a. Required to be submitted 10 days before the opening of bids and before a bidder is given a set of working drawings and specifications, if the total estimate of the project is to be $10,000 or over.
   b. No bid shall be received from any person who has not submitted the sworn statement as required above.
2. Bid bonds.
   a. (ORS 279.030) Each bidder shall furnish and file security with his bid in the form of a certified check or a surety bond.
   b. It shall not exceed 10 percent of the amount bid in the contract.
3. Performance bond.
   a. To be given by the successful bidder.
   b. This bond usually is 100 percent of the contract.
4. Payment bond.
   a. Sometimes combined with performance bond.
   b. ORS 279.510 provides that the contractor is to give a bond which is surety that all liens or claims against the site for labor or materials will be paid by the contractor.
5. Awarding the contractor is an important step.
   a. Work closely with your architect and legal advisor.
   b. Study carefully the "lowest responsible bidder" provisions as given in the Attorney General's Opinion of February 19, 1952.

Step 11 - Contract Administration by the Architect During Construction

A. In the contract with your architect, agree on the extent and nature of administrative responsibility you will expect during the construction program.

B. On large projects a clerk-of-the-works, who is on the job daily, will give a watchful eye to all construction. Or have the plant supervisor incorporate the district's personnel in the construction phase so that they know what is where upon completion of the building.

C. Working drawings and specifications should be followed to the letter by all parties unless the school board authorizes a "change order." The change orders should always be in writing and signed by proper authorties.

Step 12 - Accept the Building

A. Final acceptance.

1. Prior to the issuance of the certificate of final approval by the architect:

   a. The Board of Education should make an overall inspection of the building accompanied by the architect.
   b. See that all provisions of the drawings, specifications, addenda and change orders have been met.
   c. Accept the building only after you are satisfied with the entire construction job. You may occupy the buildings prior to the final acceptance only if this is a specified condition in the contract documents.

2. Have the architect provide the district with one or more sets of "AS BUILT" drawings.
3. Maintain extensive files on the project and retain all written communications for a period after the project is completed. This will avoid minor conflicts between the architect, contractor and district.

Step 13: Use of the Building

A. Who can provide help in learning how to use the building?

1. The architect who designed the building.
2. The educational specifications writing team, preferably those from the local district.
3. The custodial staff who has been instructed in the use of the building.
4. Equipment suppliers who provided the materials used in the building.

B. What can be done for the users?

1. The administration can provide an in-service program for the instructional staff.
   a. Educational specification writing team could explain the educational program that was originally conceived prior to the construction of the new facilities.
   b. The architect could explain how he carried out the educational specifications in creating space and providing the equipment designed for use in this building.
   c. The equipment suppliers could provide instruction in the operation of the pieces of equipment installed in the building.
2. Written directions should be provided for the use of the space and equipment. These written directions should be made available to each employee and a period of time provided so that the employees can ask questions regarding the utilization of the space and equipment.
3. Students should be instructed by the educational specifications writing team or the staff at school and the architect on the use of the building. The instruction should be periodical during the life of the building and reinforced by the instructional staff each year.
4. The maintenance staff needs to be familiarized with the most effective and efficient methods of caring for the facilities. The method of care should be specified by the suppliers of the materials and be part of the contract documents called for, if at all possible. The district is encouraged to promote meetings including engineers, janitors, and other physical plant staff.
5. After 18 months an evaluation team should review the success or failure of the building and its ability to facilitate the educational program.