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STATE OF NEW YORK STANDARD SCHOOL PLAN TYPE C-2, TWO-STORY SENIOR HIGH SCHOOL 1000 EXPANDABLE TO 1200 PUPILS.

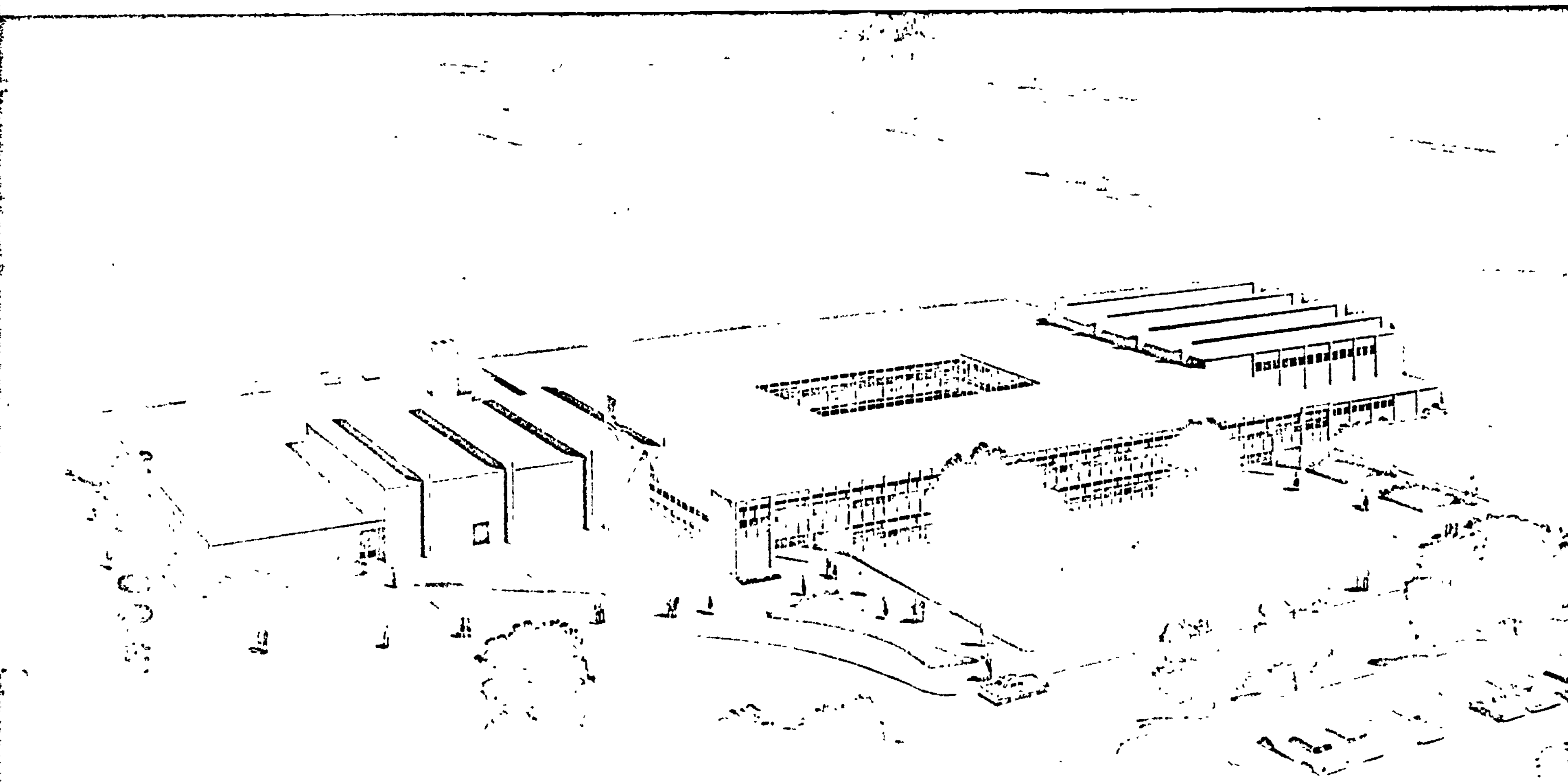
WIEDERSUM (FREDERIC P.) ASSOCIATES
NEW YORK STATE EDUCATION DEPT., ALBANY

EDRS PRICE MF-$0.25 HC-$1.08 25P.

DESCRIPTORS- *HIGH SCHOOL DESIGN, *SCHOOL LOCATION, *SENIOR HIGH SCHOOLS, SCHOOL CONSTRUCTION, SCHOOL EXPANSION, SCHOOL SPACE,

THE DESIGN OF THIS ECONOMICALLY PLANNED SCHOOL IS DEVELOPED TO SUIT A GENERALIZED SET OF AREA CHARACTERISTICS. THE COMPACT PLAN CENTRALIZES THE BULK OF STUDENT ACTIVITIES AROUND AN OPEN COURT, WHILE LOCATING THE NOISY AND HEAVY TRAFFIC FACILITIES AT THE PERIMETER OF THE BUILDING. THE DESIGN FEATURES--(1) CLASSROOM FLEXIBILITY AND MODIFICATION POTENTIAL DUE TO LOCATION AND ARRANGEMENT OF THE ACADEMIC AREA, (2) NOISE ISOLATION BECAUSE OF DECENTRALIZATION OF NOISY ELEMENTS, (3) MAXIMUM SAFETY DUE TO MINIMUM EXIT DISTANCES AT ANY BUILDING LOCATION, (4) SEPARATE PUBLIC ACCESS TO COMMUNITY FACILITIES, AND (5) ADAPTABILITY TO MOST SITES BECAUSE OF THE COMPACT RECTANGULAR PLAN. EMPHASIZED AS PROJECT CONSIDERATIONS ARE--(1) MODULAR DIMENSIONING, (2) CONSTRUCTION DATA, (3) STRUCTURAL SYSTEMS, (4) MECHANICAL SYSTEMS, AND (5) FALLOUT PROTECTION DATA. FLOOR PLANS AND A PERSPECTIVE ARE INCLUDED. (MH)

STATE OF NEW YORK
STANDARD SCHOOL PLAN
TYPE C-2



EXPANDABLE SENIOR HIGH SCHOOL 1000 TO 1200 PUPILS

STATE OF NEW YORK

STANDARD SCHOOL PLAN

TYPE C-2, TWO STORY

SENIOR HIGH SCHOOL

1000 EXPANDABLE TO 1200 PUPILS

-REPORT-

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Report
N. Y. S. Standard School
Type C-2

PREFACE

The building is designed to encompass a comprehensive, departmentalized senior high school program. It is compact and will fit almost any site. The interior partitioning is non-load bearing and will allow for future changes in room size, if desired. Traffic flow is excellent and should provide for good function. It is hoped that this building will meet the educational needs of a District requiring a senior high school for 1000 pupils, and economically provide the program indicated.

EDUCATIONAL FACILITIES AS PROVIDED IN PLAN TYPE C-2

These correspond satisfactorily to the recommendations of the State Education Department, and as modified in conference with other educational and architectural advisors.

TEACHING SPACES

No.	Title or Use	Comments
2	Industrial Arts	Storage Additional
2	Homemaking	
1	Future Homemaking	
1	Art	
1	Future Art	
1	Mechanical Drawing	
4	Senior Science	Storage & Preparation Additional
1	Future Science	
5	Business Rooms	
1	Instrumental Music	5 Practice Rooms
1	Choral Music	Related Areas
18	Classrooms	Varying in Size
1	Library	Related Areas
1	Double Study Room	Folding Partition
1	Single Study Room	
1	Double Gymnasium	Showers-Lockers
1	Auxiliary Gymnasium	
1	Auditorium	Capacity 819

FOR FUTURE EXTENSION

No.	Title or Use
6	Classrooms
2	Shops

ADMINISTRATIVE, PERSONNEL & COMMUNITY SPACES

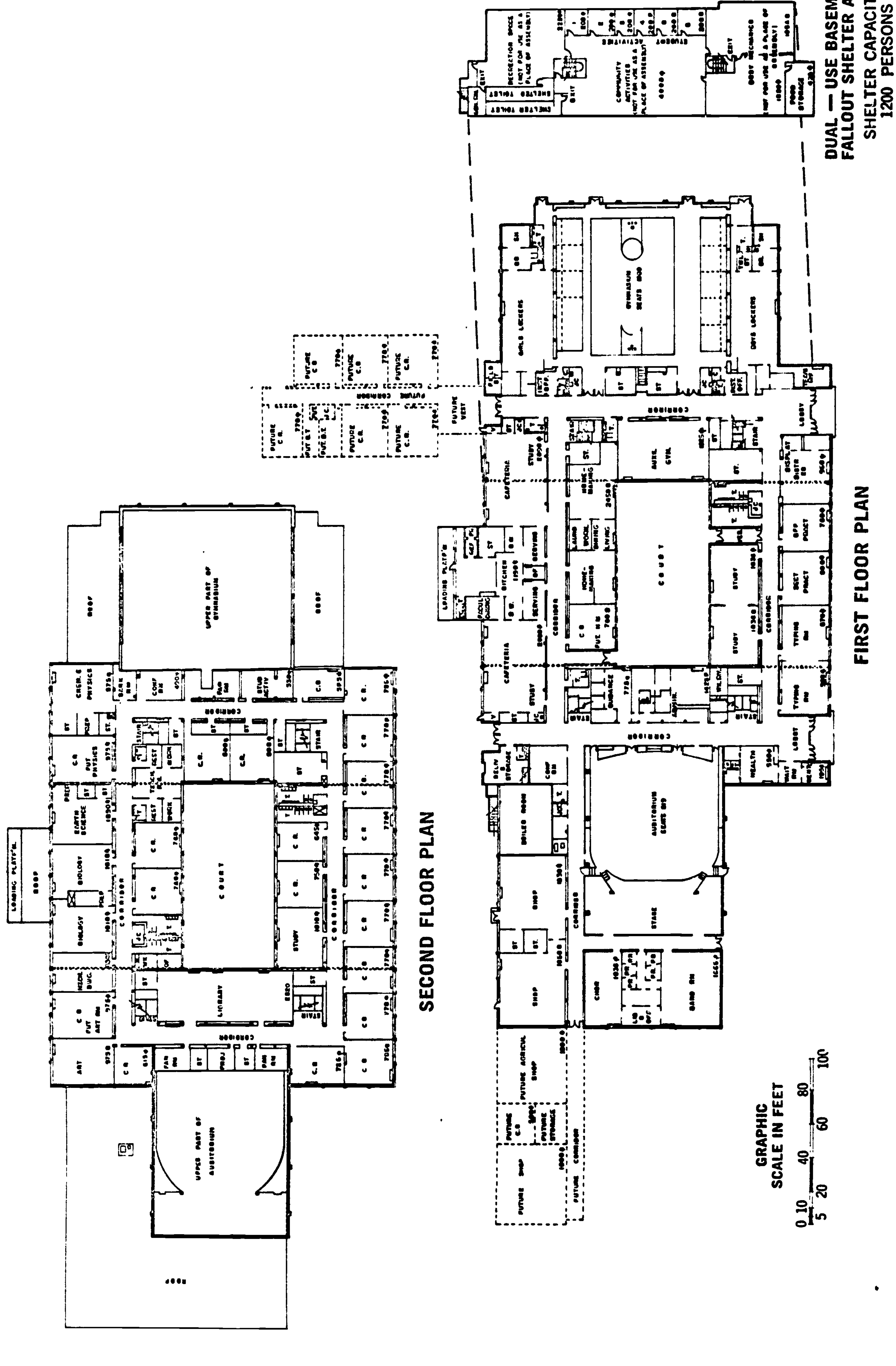
No.	Title or Use	Comments
1	Administration	Suite
1	Guidance	Suite
1	Health	Suite
1	Teachers Room	
2	Conference Rooms	
2	Cafeterias	2 Study Hall
1	Faculty Dining	
1	Kitchen	Related Areas
1	Student Activity	
1	Dark Room	

DUAL USE SHELTER AREA

No.	Title or Use
2	Toilets
1	Generator Room
1	Body Mechanics Area
1	Community Activities Area
1	Recreation Space
6	School Club Rooms
1	Food Storage

NOTE: The areas of all spaces noted above can be found in the floor plans

REPORT: N.Y.S. STANDARD SCHOOL TYPE C-2



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CRITERIA OF DESIGN

Upon being apprised of the room schedule and general requirements for this project, the architect's first action was to formulate a criteria of design. It was determined that this criteria would be an architectural interpretation of the educational facilities required and of how these might best be put to most efficient use. Therefore, the following requirements were deemed mandatory for incorporation in the design:

1. The plan should be compact yet spacious in feeling, with built-in durability and long-range flexibility. Compactness and durability are both economical features while for educational needs, flexibility is necessary to meet changing teaching methods and requirements.

2. The plan should include carefully thought out provisions for an economical future expansion program that would blend with the overall design. This program indicates that special rooms, such as homemaking, industrial arts, etc., will be required. Therefore, it is desirable that these facilities be added in close proximity to their respective existing departments for efficient educational administration.

3. The decentralization of heavy traffic and relative isolation of noisy areas would be required. This would allow for the least possible student distraction and would result in more efficient student travel by saving time and distance in changing classes.

4. Because of the growing community use of school facilities, certain areas such as the gymnasium, auditorium, administration, and a limited number of classrooms should be readily accessible to the public. This is truly an educational asset, since it permits greater cooperation between the school and parents, familiarizes the public with the school's function and, as adult education becomes more and more a part of community life, makes possible a more efficient use of the building for this purpose.

5. The adaptability of the building to almost any site, and the varying climatic conditions throughout the State must be given consideration. Naturally, each climatic condition calls for mechanical and structural deviations, but these are important educationally from the standpoint of the thermal environment and the resultant effect on the comfort level of the building. Further, the manner in which the building is situated on its site also affects the thermal environment as it does the natural light intensity. Therefore, the building must be one that will <u>properly</u> fit almost any site.

DESIGN SOLUTION

Considerable time was spent in a thorough study, analysis and evaluation of three preliminary schemes. One of these schemes was selected as a prototype. It was developed further and, wherever possible, some of the advantages of the other two schemes were incorporated along with other ideas that had developed during the study of all three.

The final preliminary thus developed provides for a compact building with full two story construction, except for the Gymnasium, Auditorium and rear portion of the Kitchen. Corridors and lobbies are minimum. All bus and public traffic is at the front of the building, which has two entrances. One of them, the public entrance, is on the Auditorium side.

The academic and bulk of student activities were kept in the central portion of the building, which developed into a two-story rectangle surrounding a central court for light and air. The court is also a focal point in the building for relaxation, socializing and contact with the out-of-doors.

The facilities that produce the most noise and traffic, such as Gymnasium, Auditorium, Cafeterias and Shops, are located at the extremes and the perimeter of the building in order to keep the main classroom area quiet and detached from these disturbing activities. Service for the building is to the rear, at one side, away from the Gymnasium and adjacent play areas to avoid the hazards of vehicular traffic. The long, rectangular shape of the building makes it adaptable to most sites, and the location of the Gymnasium and Auditorium will permit convenient public use of these elements without interfering with the main academic area.

As noted on the cover page of this report, this building is designed for the occupancy of 1000 pupils in its initial stage, and future addition can be provided to accommodate a capacity of 1200 pupils. The basic plan now contains classrooms in the areas of Art, Physics and Homemaking, which will be turned into special rooms when future expansion is indicated. This is marked on the plan. This is necessary so that these future rooms will be near their respective departments. The strategic placement of these classrooms will in no way interfere with the efficient function of the prime plan.

The area in the rear of the building and at the Gymnasium end, designated as future classrooms, has been so placed that it can be constructed in one or two stories. Therefore, if desired, more than the four classrooms required for future expansion could be added in this area. Future Shops will be a continuation of the present Shop area, keeping these facilities in their proper location. A first and second floor plan will be found in this report showing the additions as proposed. The following features are benefits which will result from the overall design solution.

Report
N. Y. S. Standard School
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1. Besides meeting the requirement for expansion to 1200 pupils, the location and arrangement of the academic area lends itself to flexibility in curriculum and to modification of classroom size for future change in teaching philosophy or requirements.

2. The noise level is kept at a minimum because of the isolation of noisy elements in the plan. The traffic density should be low because of the decentralization of heavy traffic elements.

3. Maximum safety is inherent in this design by virtue of the minimum distance to exits in any portion of the building, and the fact that each stairway from the second floor ends at an exit.

4. The plan readily lends itself to the public use of the Gymnasium, Auditorium, the Shops and Cafeteria, since they each have a separate entrance and, by the use of portable folding gates, can be used by the public without interference with the rest of the building.

5. This plan should be easily adaptable to most sites due to its ratio of depth to overall width. Thus, its compactness should be advantageous for restricted sites or those with minimum acreage.

The building described in this presentation is designed to provide a comprehensive educational program while offering the structural flexibility necessary to allow for changes in student enrollment and variances in teaching and administrative philosophy. Since two story construction was required, the campus idea was automatically eliminated. Consideration was given to the little-school-within-a-school concept, but the desired compactness would have suffered.

Further, it is our experience that this method of teaching has only been used in isolated districts and would not fit teaching philosophies of the average high school in this State. Therefore, the building was designed to conform to a basic concept of a Senior High School that would be desirable in practically any district in the State of New York -- a departmentalized high school fully adaptable, where desired, to team teaching.

PROVISIONS FOR FALLOUT PROTECTION

The dual use fallout shelter included in this school was developed by the D.P.W. in cooperation with the Education Department and can be utilized in a variety of ways to augment the school program and the affairs of the community. Suggested functions which the shelter space might serve are: meetings of scouts groups on all age levels, meetings of other community organizations and school purposes such as student government quarters, publications rooms, recreation, areas for a variety of remedial purposes, administrative offices, large group instruction and audio-visual activities.

The plans for the shelter are architecturally and mechanically complete with the exception of the structural design for the sub-grade work. This work is to be completed by the adapting architect to meet whatever soil conditions might exist.

The size of shelter space, the capacity of the mechanical systems, and the provisions for food and water storage are based upon the expanded capacity of the school with a proper allowance for teachers and staff. Any special conditions which will affect the capacity of the school will require changes in these factors of the fallout shelter design.

The location of the shelter under the building was made to obtain the best protection at the lowest possible cost. A change in the location of the shelter will necessitate additional shielding design. Shielding has been obtained by separating both with distance and with mass, the planes on which radioactive particles will rest in relation to the shelter area. It is to be noted that any dimensional or material changes in the area above the fallout shelter may effect the shelter design. For this reason the minimum mass of the interior partitions, floor construction, and total overhead construction upon which the shelter calculations have been based are indicated on the drawings.

If materials of lesser mass than the tabulated values are used, redesign of shelters will be required. It also has been assumed in the calculations that finish grade is never below the bottom of the first floor slab around the shelter area. It is, therefore, necessary to maintain this grade in order to avoid redesign of the shelter.

The shelter plan indicates emergency water supply in a group of tanks within adjacent crawl space. Wherever an adequate supply of well water can be obtained, it is suggested that the adapting architect substitute it as the fallout shelter water supply. The plans show self-contained toilet facilities in the form of sanitary tanks fitted with toilet seats. Wherever a septic tank and leaching field are available and the supply from the well is adequate, it is suggested the adapting architect substitute a system using periodic flushing of waste. Generator capacity should be checked, however, to be sure that an adequate power supply is made available during the emergency period for these possible substitutions.

The shelter area is designed for a minimum protection factor of 100 by use of "Design and Review of Structures for Protection from Fallout Gamma Radiation", an official publication of the Office of Civil Defense, Department of Defense. In this respect it meets requirements of the New York State Civil Defense Commission. Any changes to the shelter as specified and shown on the drawings should be discussed with and approved by the New York State Civil Defense Commission.

PROVISIONS AND FACILITIES FOR THE PHYSICALLY HANDICAPPED

In some districts, provisions must be made for children with physical handicaps, since their need for education is probably greater than for children with strong healthy bodies. Although the control of the first floor elevation and its relation to the finish grade is in the hands of the adapting architect, it is assumed that at least one of the front entrances will be provided with an unobstructed ramp into the building for students with wheelchairs. Further, if access to the second floor is deemed necessary, an elevator could be located in the area marked storage, located at the right of the building, opposite distributive education and across the corridor from the entrance and lobby.

Wheelchair toilet stalls and wheelchair lavatories are provided on the first and second floors for both boys and girls. All drinking fountains in the building are semi-recessed and readily usable by students in wheelchairs. Easy movement on each floor is available to these students since there are no changes of elevation on either floor that require stairs or ramps.

THE MODULAR METHOD OF DRAFTING USED

These plans have been drawn using the modular method of drafting. It is not the purpose of this report to give a complete analysis of the method, but simply to state some of the resultant benefits. Complete information can be obtained by contacting Modular Building Standards Association, 2029 "K" Street N.W., Washington, D.C. Some of the benefits of the use of the modular method are as follows:

1. Utilization of space in the planning stage is realized because of the usual benefits of orderly systematic dimensioning, and, as the module used is only four inches, no area has to be included to satisfy a larger unit of measure.

2. Materials that fit the four inch module used in this plan are mass produced and therefore are becoming relatively less expensive than special sizes.

3. Simplification of job layout for the contractor is achieved with this method by its very nature and, where modular building materials are used, unit sizes are automatically coordinated with the dimensions of the building, thus reducing material waste.

CONSTRUCTION

EXTERIOR WALLS

Selection of one of the exterior wall materials was somewhat dictated by the previous selection of a pre-stressed concrete frame. Since the concrete used in the pre-stressed spandrel beams is of high density and a good finish can be acquired, it seemed a logical choice to leave these exposed and use them as an exterior wall finish where they occurred. This is not only attractive, but, as stated before, a considerable saving in time and cost.

Where masonry occurs, it will be face brick using the Larson System of waterproofing. This system assures a watertight wall and permits easy field inspection since the outline of the waterproof units is easily seen while the mortar is green and the brick damp. An alternate is, of course, cavity wall construction. One shortcoming of this method is the inability to inspect for a clean cavity once the wall is up. When mortar collects in the cavity in any appreciable amount, blocking up the weep holes, a leak is inevitable.

Pre-cast architectural concrete panels have been chosen for the window wall area. It was thought that because of the complete lack of maintenance necessary for the rest of the exterior materials, it would be poor economy to indroduce a panel that needed painting or was subject to any form of corrosion or staining. Further, present methods of manufacture allow for almost any combination of textures and colors desired by the adapting architect.

WINDOWS

Since recently received bids have shown aluminum windows to be as economical and in some cases less expensive than steel, it seemed logical to use aluminum for the window materials throughout this project. This again is in keeping with the low maintenance of the remainder of the exterior.

The central classroom area will be provided with double hung and fixed window units. With the use of unit ventilators, the necessity to open and shut windows is kept to a minimum while maintaining good ventilation and circulation of air in the rooms.

Double hung windows are easily operated and safe, since they do not project into the room or outside the building. creating a hazard to children running by, and they are practically maintenance-free. The windows in the gymnasium are awning type and fixed. The operable windows are equipped with mechanical operators.

FLOOR MATERIALS

Lobbies and corridors are the most heavily trafficked portions of the building. For these areas three floor materials were considered -- terrazzo, vinyl asbestos and asphalt tile. Terrazzo was rejected because of the initial cost. Asphalt tile was rejected because its appearance is costly to maintain, since it loses its luster and becomes smudged and otherwise unattractive shortly after use. Vinyl asbestos was chosen as a happy medium because this material gives a good appearance at all times with a minimum of maintenance. Its life, although not that of terrazzo, is much longer than that of asphalt tile.

Asphalt tile with rubber base was chosen for all areas where traffic is at a minimum, where no unusual use of solvents, chemicals and other materials that attack asphalt is employed, and in areas where appearance became a factor. These areas are administration, art and mechanical drawing, business education, recitation rooms, dental and health suite, guidance, home economics, student activities, study halls, teachers work room, music suite and auditorium.

All toilets and showers, for reasons of sanitation and maintenance, have ceramic tile floors and base, while the locker rooms have a hardened concrete.In special areas, such as the cafeterias, science rooms and library, vinyl asbestos tile floors were specified.

Vinyl was used in the science areas and the cafeterias because of its resistance to certain food ingredients, chemicals and other materials found in these areas. Further, this material will insure continued good appearance and wear in the library and cafeterias, which will also be used as study halls. The small added cost will be more than offset by the saving in maintenance and continuing neat appearance.

INTERIOR PARTITIONS

Exposed masonry walls were chosen for all areas except portions of the auditorium, kitchen and music suite. This selection was made on the basis of economy and the fact that the noise level and transfer are low with an acoustically treated ceiling. Further, the prudent use of color by the adpating architect can turn these areas into a cheerful and bright environment for the student and teaching staff.

The corridors, locker rooms, gymnasium and cafeterias are all provided with concrete block and glazed cement wainscot for easy maintenance and cleanliness. The wainscot in the gymnasium is glazed cement for economical maintenance and to protect students against abrasions which could be inflicted in the gymnasium if these walls were left as exposed masonry. The kitchen walls are glazed cement tile from floor to ceiling, for a smooth, hard surface, thus eliminating high maintenance costs which could result from the heavy accumulation of dirt and grease.

The auditorium walls, for environmental and acoustical reasons, will be provided with exposed masonry interspaced with acoustical tile panels.

Library- Although the walls in this area are exposed masonry, book stacks cover three walls to the height of 7', with cabinets covering the area below the windows.

Music Suite walls, for acoustical reasons, are a combination of exposed masonry and perforated hardboard. Further on, a section will be added to this report covering sound conditioning for the auditorium and music suite.

ROOF INSULATION AND CEILINGS

Although some insulation value can be attributed to the two inches of lightweight concrete which was used primarily for leveling purposes on the top of the pre-stressed roof construction, positive insulation is gained by the use of one inch thick fibre board rigid insulation installed on top of the two inch leveling coat. Further insulation value is gained by the dead air space in the plenums formed by the underside of the roof construction and the ceilings. To cover the ceilings in this building it will be necessary to consider them area by area, since the type used and its installation varies as dictated by the use of the area in which it is to be installed.

The kitchen ceiling is to be cement plaster. This hard, smooth, non-porous surface resists the accumulation of dirt and grease.

The main auditorium ceiling has a hard plaster finish. The area under the Projection room is of hard plaster and acoustical tile. This, of course, was the result of study by the acoustical engineer, and is part of the overall sound conditioning planned for this area.

In the industrial arts rooms, cellular fibre acoustical tile is cemented directly to the underside of the second floor construction between the stems of the pre-stressed slabs. This method acquires the desired noise level in the most economical manner.

Throughout the classroom area and in the corridors, cellular fibre acoustical tile is cemented to a 5/8" thick suspended wall board ceiling of a 60 minute fire resistance rating. This method of application is specified, because it is an economical way of supplying a suspended acoustical tile ceiling that has the desired fire resistance rating requested by the Fire Underwriters Laboratories.

Further, the use of this method in the corridors allows for a tight plenum suitable for positive mechanical exhaust. This same method of application was specified in the auxiliary gymnasium and gang toilets - in the main gymnasium perforated hardboard sound insulation above.

In the storage areas, 5/8" gypsum board with a one-hour fire rating was specified for the aforementioned fire resistance purposes and to keep noise transfer to a minimum.

SOUND CONDITIONING

Except for special rooms, such as the auditorium, band room, choral room and practice rooms, sound conditioning has primarily been accomplished in the remainder of the building by the use of acoustical tile ceilings and proper consideration given to the control of sound transmission.

Sound conditioning studies for the auditorium were introduced at the preliminary stage. Since economy was a prime factor, the preliminary layouts, which have not changed in shape or size, were evaluated for periods of reverberation while using the most economical materials and layout. These basic plans could later be augmented if acoustical value made additions mandatory.

From the standpoint of sound conditioning, two breaks in each side wall were considered desirable to eliminate the possibility of a concentration of sound. These breaks, however, would have been expensive and the alternate method of using various wall materials to compensate for these breaks was pursued. The path-length difference between the direct sound and the reflected sound was not found to be great enough to develop an echo. For economy purposes the volume of the auditorium was kept well below the accepted unit of 200 feet per individual.

Breaks in the ceiling were necessary and four were included. Because of the seating capacity of this auditorium, the cubic content could not be lowered to a point that would eliminate the desirability of sound amplification.

Band Room - There are three prime considerations in this type of room - the period of reverberation, the sound intensity and the transmission of sound into other rooms. Fortunately, there are few points of transmission in this room, because of its location in the building.

Where sound transmission was a concern, partitions consisting of a double course of 4" block with a 2" space in between were used. However, for maximum sound attenuation, the partition was plastered on the inside of the cavity.

Choral Room - Sound intensity is not a concern in this room. The same method of construction to control sound transmission was employed in this space as in the band room.

Practice Rooms - All these rooms were formed of double block partitions with plaster in between to control sound transmission. All ceilings were entirely treated with acoustical tile and one large wall of each room was covered with perforated plywood from floor to ceiling, and backed with a 1" sound absorbent element. All doors in this suite are specified to be Riverband Sound Insulative Doors.

CONSTRUCTION - ALTERNATES

Because the educational program of this building is stable, and alternates for deleting from or adding to the area of the building will not be considered, alternates will be confined to finishes and changes within the structure. It is not to be construed by the adapting architect that he cannot use his own ingenuity and take alternates or actually make changes to the building in whatever area or category he so desires.

The purpose of alternates for finishing materials is twofold. If it is the desire of the local Board of Education to decrease the initial cost of the building, alternates for more economical finishes would be requested. If lower maintenance costs are desired, alternates for more expensive finishes would be considered. The suggested alternates will be listed separately as lower initial construction cost and lower continuing maintenance cost.

1. Lower Initial Cost

   A. Eliminate all hung ceilings.
   B. Substitute asphalt tile for vinyl asbestos - floors, lobbies and corridors.
   C. Substitute painted masonry for glazed cement walls in corridors.
   D. Substitute porcelainized steel laminated exterior wall panels for masonry wall panels.
   E. Substitute painted masonry for glazed cement walls in Boys & Girls Locker Rooms.
   F. Substitute painted masonry for glazed cement walls in Boys & Girls Toilets.
   G. Substitute painted masonry for glazed cement wainscot in Cafeteria - Study.

2. Lower Continuing Maintenance Cost

   A. Substitute terrazzo for vinyl asbestos tile floors in corridors and lobbies.
   B. Substitute structural facing tile for vitreous enamel surface on walls in corridors and lobbies.

C. Substitute ceramic tile for vitreous enamel surface on wainscot in Boys & Girls Toilets.
D. Substitute structural facing tile for vitreous enamel surface wainscot in Boys & Girls Locker Rooms.
E. Substitute structural facing tile for glazed cement wainscot in Cafeteria-Study.
F. Substitute aluminum main exterior doors for hollow metal.

Since this building will be constructed on almost any site in any area of the State of New York, and will be staffed and administered by people with varying educational and administrative philosophies, consideration must be given to possible alternates that will meet their needs.

1. With the growing trend toward team teaching on the secondary level, alternates may be taken to provide movable partitions between classrooms of similar use. This is possible in this building, since all classroom partitions are non-load bearing. Because sound transmission between classrooms is a problem, it is suggested that the alternates call for the substitution of a masonry wall with a folding wood partition of at least a 40 decibel rating.

2. Some districts may feel that a Little Theatre is desirable. Space is available for this in the two study halls at the front of the building on the first floor. This now is divided by a movable partition and can be used in a limited manner for the same purposes as a Little Theatre, but without the advantages of a platform, slanted floor, etc. The alternate would have to be made on the basis of a redesign of this area, incorporating the physical aspects of a Little Theatre.

3. The curriculum requirements change from district to district. A district in an industrial area may require a greater emphasis on industrial arts and vocational training, since a large portion of their graduates may be entering skilled trades such as metal working. A rural district may require agriculture or agronomy, while an urban district may emphasize business education or distributive education. These curriculum requirements would necessitate a change in room schedule which again, because of the flexibility of the partitions between classrooms, can be realized by an alternate to change the location of a classroom partition, thus increasing or decreasing a given area.

STRUCTURAL

First Floor Construction

The major portion of this area will be a 5" slab on grade. A 6" monolythic slab with intermediate piers averaging 14' spacing each way (i.e. a two-way slab) was chosen for location over the fallout shelter area for the following reasons:

1. A slab on grade is readily adaptable to almost any site. If beams or other supporting spans were used in the fallout shelter area, and the slab were a one-way span, it would be necessary to provide heavier and consequently more expensive reinforcing, and possibly a thicker slab.

2. If more excavated area is needed, the adapting architect can easily implement this by enlarging the area covered by the two-way slab described above.

3. Studies indicate that a slab on grade is the most economical first floor construction. Also, the dual use fallout protection area provided in the basement is more economical than similar facilities detached from the building, and certainly is much more utilitarian.

Second Floor and Roof Construction

To determine the design of the roof and floor construction of this building, consideration was given to two basic methods and materials - steel and concrete; or pre-cast, pre-stressed concrete. Steel was rejected and the latter material was used. This choice should be viewed from the standpoint that pre-cast, pre-stressed concrete does have definite advantages over steel and concrete for this particular building, and should not be evaluated on the basis of steel versus concrete. In this instance some of the advantages of pre-cast, pre-stressed concrete are:

1. Fallout Protection - Fallout protection was considered from the inception of the design. Concrete lends itself more readily as a built-in protection factor.

2. Flexibility - When considering flexibility in the design, it must be remembered that the ability of the educational program to change in the future may depend on space allocations other than those in the initial program. Therefore, educational flexibility is in direct proportion to the structural flexibility (i.e. the ability to re-arrange interior partitions economically and expeditiously).

   This flexibility should be built-in initially. To accomplish this, all classroom partitions are non-load bearing. The kitchen and cafeteria have been located in a logical position at the rear, in the service area of the building, and in the center of the first floor for easy access to all occupants of the building.

This position of large elements, plus the desire to keep the building in the form of a compact rectangle, resulted in spans of up to 40' at the second floor and roof. If steel had been specified, it would have necessitated penalizing the shorter spans by using deeper beam depths that were really necessary only for the longer spans.

3. Cost - While cost analyses show steel frame and concrete construction to be slightly lower than pre-cast, pre-stressed concrete, there are certain resultant cost savings in this concrete system that more than equalize this difference. These savings include the following:

   a. The spandrel beams and exterior supporting columns become a substantial portion of the exterior wall finish material.

   b. If, in the auditorium and gymnasium areas, steel framing had been used in the roof construction, there would have been a substantial increase in the cubic content of the building. Savings are therefore realized in the exterior wall construction, amount of heating and ventilating, etc.

   c. Where hung ceilings are required with pre-cast slab construction, the cost will be slightly more than that of steel joist construction in most areas, but more economical if the project is within a short shipping distance of the concrete plant.

Columns

A system of pre-cast concrete columns was chosen for several reasons:

1. The pre-cast column is economical and in this particular building where they make up a portion of the exterior architectural treatment, they become both an initial saving and a continuing maintenance-free feature of the structure.

2. As stated previously, change in room layout was assumed as an eventual necessity to accommodate future changes in educational method. These columns allow for this feature since they are independent of the location of the classroom walls.

3. We must again consider the advantage realized in the fire insurance rating. The pre-cast concrete column commands a lower insurance premium than does a steel column.

Framing

Pre-cast, pre-stressed concrete construction was specified for the entire structural frame, primarily to realize the design and economy features described. To reiterate, we feel that while every structural material has its place, this particular building and the program encompassed is satisfactorily suited to the use of pre-cast, pre-stressed concrete. Further benefits realized are:

1. The entire framing, including the second floor and roof decks, can be erected in little more time than is taken to erect a structural steel frame, resulting in the saving of the added time that would be required to place the roof and second floor decks in a steel frame construction.

2. Further time is saved in constructing the central portion of the building where the spandrel beams and columns form a portion of the finished exterior wall. In these areas, it is simply a matter of placing the window wall panels to enclose the structure.

3. By prudent location of the rear face of the column, heating lines can circumscribe the building with a minimum of chases and bends in the lines.

HEATING AND VENTILATING

A two pipe forced hot water system was selected for this school. One consideration is that the building is being designed slab on grade, and the heating pipes will be run in the corridor ceiling plenums, thus eliminating costly pipe tunnels and special pipe space that would be required with a steam system.

Heat is supplied by two low pressure boilers with a total heating load that will include the future additions. These boilers will be oil fired in the interest of choosing a fuel that is available and economical in all parts of the State. The temperature is thermostatically controlled in all areas but Storage. For emergency and safety purposes, each burner will be supplied with all usual controls.

Unit ventilators have been specified to meet heat and fresh air requirements in all instructional and administrative areas. This selection was made in view of the ability of unit ventilators to furnish the desired internal climate with very little maintenance.

Facilities for air exhaust have been specified for the corridors in accord with State Education Department requirements. Stale air from the classrooms is drawn directly into the corridor ceiling plenums, and is then exhausted through the duct work and roof fans to the outdoors. This method of exhaust was selected because it would prevent smoke from diffusing through the corridors in case of even a very small fire. Such smoke diffusion has occurred in the past, causing panic, unnecessary injury and death.

Some features of the heating and ventilation of this building include:

1. The cafeteria and auxiliary gym unit ventilators will provide heat and fresh air for six air changes per hour. Both areas require this constant displacement of air from the standpoint of odors and thermal environment.

2. The kitchen will be supplied with tempered fresh air which is exhausted through the range hoods and the dishwashing areas. This, of course, is for such reasons as physical comfort, the elimination of cooking odors and reduction of the accumulation of grease and dirt in the kitchen area which results in costly maintenance and an unsightly appearance.

3. The main gymnasium will be heated with convectors. Large capacity ventilating units supplying fresh air at the rate of five air changes per hour will remove odors and allow for good physical comfort.

4. The locker room, supplied with tempered fresh air by the use of unit ventilators, will be adequately exhausted by roof fans. The dampness created by the shower and drying areas, plus the storage of athletic clothes in the lockers, makes adequate ventilation absolutely necessary.

5. Since the auditorium depends completely on mechanical ventilation, this system will provide six air changes per hour, insuring bodily comfort at capacity population.

6. The toilet rooms, provided with convectors for heat, will be exhausted by a system independent of any other system, for reasons of health and comfort.

7. A gas incinerator fired for disposal of all combustible refuse will be provided.

PLUMBING AND SANITATION

Cold and hot water is supplied by insulated copper tubing in the building, with cast iron pipe for water service. Waste lines will be heavy duty cast iron except in the science room waste system where acid resistant "Knightware" pipe will be used. In the areas such as future science, future homemaking and future classrooms, all necessary piping will be brought to these points and capped off, ready for eventual use when needed.

Some of the features of the plumbing and sanitation systems of this building are:

1. Adequate 180° hot water is supplied directly to the kitchen from the hot water storage tank, eliminating the necessity of a hot water booster in the kitchen.

2. Waste from the science rooms will be collected separately from other waste systems to be sure that corrosive materials are confined to pipe that is designed to carry these materials.

3. Wall hung urinals and water closets are used because they permit easier and better floor cleaning, an important factor in these areas.

ELECTRICAL

A 120-208 volt, 3 phase, 4 wire solid grounded neutral distribution system was selected with transformer vault provided. This system was chosen over the 277-460 volt system because economic studies indicate that there is very little, if any, savings.

Further, if the 440 volt system were chosen, dry type transformers would have to be provided which would encroach on valuable space since the building is being constructed slab on grade. Finally, it is considered unsafe to use shop equipment operating on 440 volts.

Lighting will be supplied by incandescent and fluorescent fixtures with an intensity of 40 foot-candles at work level in all classrooms and office areas. Fluorescent fixtures were used wherever possible for their long tube life and low power consumption.

A clock and program system with clocks and buzzers will be provided throughout the building, and outdoors, for coordination and control of the student body and teaching staff. A 2 channel central sound system will be provided for the same reason.

Priority relays will permit emergency announcements at any location equipped with loudspeakers. For further coordination of the staff, and in emergencies, an intercommunication telephone system was included. It is a common talking selective ringing system.

The fire alarm system is non-coded with provisions for connection to the municipal system.

In view of the growing use of television as a teaching aid, empty conduits for the future installation of closed circuit television is provided in all instructional areas.

IMPORTANCE OF THE ADAPTING ARCHITECT

It must be clearly understood that while these plans and specifications are complete in every respect, they cannot include foundation design and specifications, orientation on the site, site development, service connections, construction supervision, amendments due to local requirements or any addendum to these plans and specifications that may be dictated by the special educational or administrative requirements of the local district.

Therefore, it is absolutely necessary that when this building is to be constructed, the local Board of Education select an architect to adapt this building as previously described. Further, he must guide the local Board of Education from the inception of the program to its successful completion.

To describe all the many services that will be performed by the adapting architect during the building program would be too voluminous and actually unnecessary to list here. Therefore, the following remarks will be confined solely to those areas that affect the completion of this building.

The adapting architect will undoubtedly be consulted when choosing a site. After this has been done, he will furnish a land surveyor with a list of requirements for survey. This survey will not only show the boundary lines and topography of the site, but will show the size and location of all utilities, existing buildings, if any, adjacent roads and other means of access, trees, fences, legal grade elevations of sidewalks, curbs and other permanent improvements.

The survey will also show mean high and low water levels and a description of the general topography, i.e. general flow of streams, wooded areas, etc., and any other pertinent factors related to the location, construction and service to the building.

The adapting architect is then able to locate the building on the site. He will consider orientation, thinking in terms of natural light intensity, the relative location of playing field and outdoor athletic facilities, service road, bus loading and unloading, the best possible access to the site and their relationship to the connection point at the building of the existing utilities such as water, gas, storm and sanitary sewers, and electric light and power.

When subsoil structure has been determined by borings, the adapting architect will, in conjunction with his structural and mechanical engineers, decide upon the best possible substructure for the building.

It is probable that no two buildings will require the same type of foundation. Some, of course, will require piles, others spread footings, etc. These decisions will have to be made for each site on which this building may be constructed. If storm and sanitary sewers are not available, a decision will have to be made on where to locate proper disposal systems.

After all these architectural and engineering factors have been decided, the adapting architect must hold meetings and conferences with the local Board of Education and their administration, trying at all times by questions and discussion to determine their philosophy of education, administrative and general needs. In this manner, he can incorporate, wherever possible, any facility or item peculiar to that particular district.

Perhaps the local district will have need for a little theatre which, as noted previously, could be placed where two adjoining study halls are now shown. Room size can be changed at will in this building before construction begins, and indeed some of the aforementioned expansion may be required initially.

In short, with proper coordination between the district and the adapting architect, this building can be made to fit the needs of any district in any area in the State of New York.

When this preliminary work is completed, the adapting architect will proceed with the preparation of all the necessary plans and specifications for the type and size of school building best suited to the educational needs of the community.

His services also will include site landscaping - the final phase in creating an educational institution which the local citizens may look upon with just pride.

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