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Southern Italy Earthquake Reconstruction Program

**U.S. Agency For International
Development**

Final Report

For The Following Schools:

Catoli

Azzilco

Sotete

Grattaciarola

Sant Angelo Del Lombardo

Vallate

Covering Period From:

September 26, 1981 To October 28, 1982

**P/JRB Architects
Bethesda, Maryland**

Prepared on: 30 December 1983

P/JRB ARCHITECTS

A Subsidiary of Science Applications, Inc.

FORWARD

This final report summarizes the activities and major decisions performed from the Conceptual Design Phase through to the Construction Contract Award for this project.

It is also the last end item to be submitted to A.I.D. terminating the contractual agreement (NEB-0001-C-00-1045-00) for the base contract between A.I.D. and P/JRB Architects. A supplemental final report for Calabritto Elementary School (Mod. Nos. 6 and 8) will be submitted separately.

Analysis of the bids received reveal that the actual bid taken was an average of 16 percent lower than the architects' estimated cost figures at the time of bid receipts.

At this writing with the U.S. dollar exchange rate at 1600 lire, an additional cost savings will be realized since the bulk of payout will occur during the construction period.

We would like to take this final opportunity to express our appreciation for the assistance provided to us by the A.I.D. offices in Washington, D.C. and Naples, Italy, in addition to the various town officials that we visited.

Finally our entire firm would like to personally express to U.S.A.I.D. our appreciation for being selected to render architectural/engineering services for this internationally significant project. We hope the completed buildings will serve the Italian people well for many future years.

This report was prepared jointly by Richard J. Passantino, Miguel Aparicio and Barbara K. McCombie.

This project has been funded at least in part with Federal funds from the United States Agency for International Development (U.S.A.I.D.) under the Contract Number NEB-0001-C-00-1045-00. The content of this publication does not necessarily reflect the views or policies of the U.S.A.I.D., nor does mention of trade names, commercial products, or organization imply endorsement by the U.S. Government.

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1. INTRODUCTION

On November 23, 1980 an earthquake registering 6.8 on the Richter scale struck Southern Italy. The area affected by the quake included the regions of Naples, Salerno, Avellino, Benevento, Potenza and Caserta with major damage centered in the Provinces of Avellino, Salerno and Potenza.

The United States was one of the nations responding immediately with emergency relief assistance to the Government of Italy and its citizens in Southern Italy. U.S. relief efforts were under the direction of the Agency for International Development's Office of U.S. Foreign Disaster Assistance. An appropriation of \$50 million was authorized by the U.S. Congress for relief and reconstruction efforts necessitated by the earthquake's damage.

After assessment of the damage to the Southern Italian Provinces by a Presidential Delegation and an A.I.D. reconnaissance team, and ensuing discussions with officials of the Italian Government, it was determined that the funds appropriated for reconstruction would be best utilized in a school construction program.

The building of new schools was perceived as meeting the U.S. government's objective of assisting the Government of Italy and the Italian people in a tangible, visible way. The long lasting humanitarian impact and the visibility created by wide distribution of the benefits among the population, especially the youth of Italy, were the major goals of the project.

Early in the design phase several objectives were established by A.I.D./Naples in consensus with Italian authorities to help guide the direction of the architectural design. These included:

- Construction in a style and character indigenous to the region, utilizing local materials and labor techniques.
- Utilization of design and construction practices demonstrating superior earthquake resistance characteristics.
- Construction of larger schools that would provide a complete range of facilities on carefully chosen, adequately sized sites, and with greater faculty utilization than existing Italian schools.
- The planning of schools that would permit greater variety in the educational programs they would house, a departure from the traditional Italian specialized schools with a single program focus.

- Emphasize secondary schools, thus encouraging students to continue their education beyond the mandatory age of 14, and retaining more young people in the communities where they have matured.
- Selection of diversified locations for schools to serve a larger regional population, not limited to the town in which they are situated.
- Creation of schools capable of providing programs and services for other than enrolled students, with the intent that the schools would increasingly become centers for community events, family recreation, and adult and vocational education.

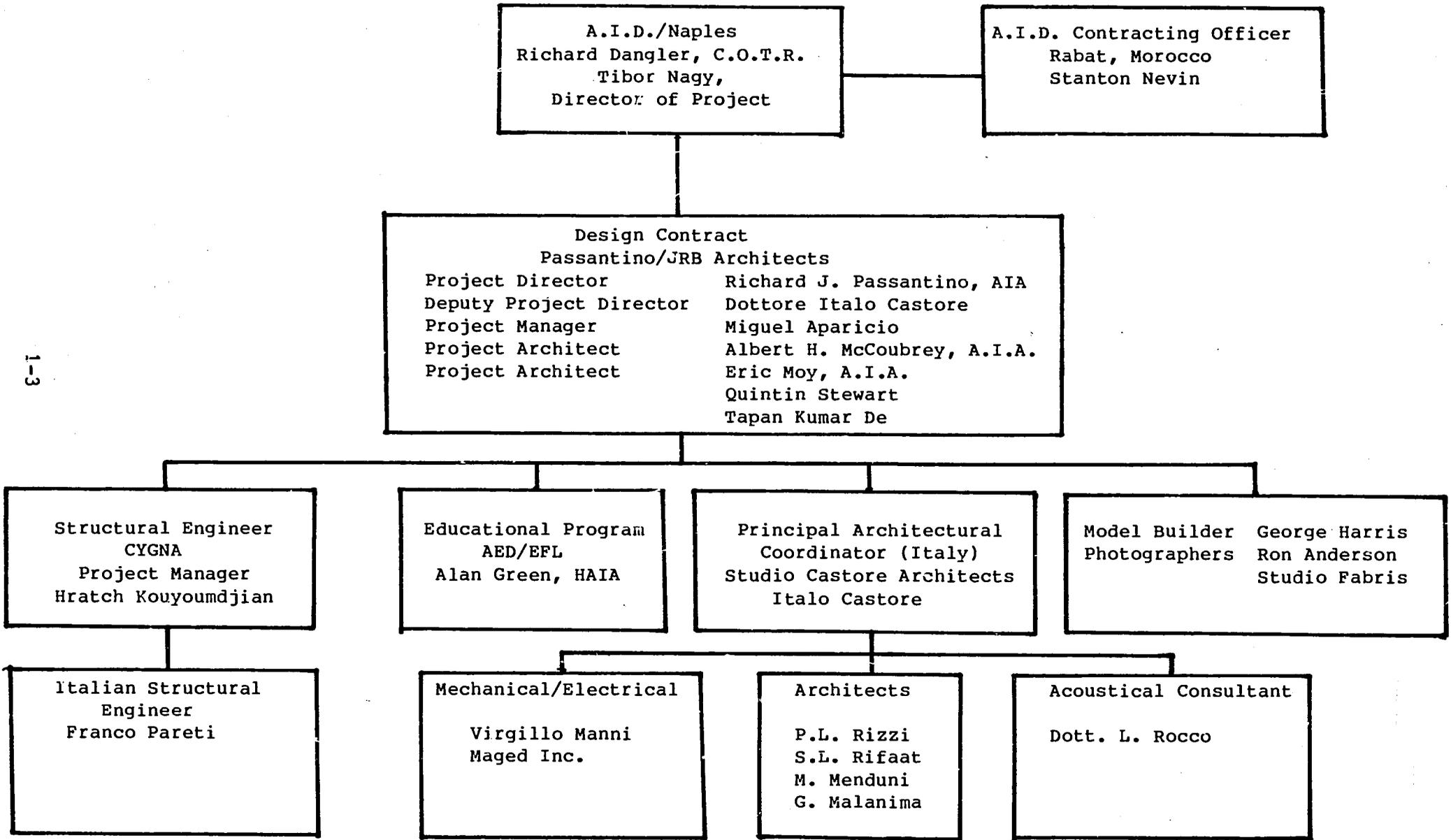
This move toward "comprehensive" schools reflects the changing educational requirements of the region. The communities involved are developing economically, and there is a return of population to the small towns and cities. A greater percentage of students are seeking higher levels of education than in previous years, with an increasing ratio of girls to boys. Both groups are seeking a greater variety of educational goals than in the past.

As a result of a competitive selection process, Passantino/JRB Architects, (Bethesda, MD), was selected as the prime A/E design firm. Studio Castore, Inc., an Italian architectural firm based in Florence, Italy, and CYGNA Consulting Structural Engineers of San Francisco, California, were the major subcontractors for the six initial schools under AID Project No. 145-81-01. The educational programming was provided by Educational Facilities Laboratories of New York.

A seventh (elementary) school was subsequently awarded to the Passantino/JRB and Studio Castore architectural team with the structural engineering being performed by Martin, Cagley and Middlebrook of Bethesda, Maryland. A supplemental report is being provided for the seventh project, located in the comune of Calabritto.

Project Organization

Southern Italy Earthquake Reconstruction Project
Administrative Chart Base Contract for A/E Design Services



1-3

3

2. HISTORY OF PROJECT

On 19 May 1981 P/JRB Architects was notified by A.I.D. that the firm had been given first preference for negotiation. Following this, an "authorization to proceed" letter for the project was received, dated 8 July 1981. The contract (No. NEB-0001-C-00-1045-00) was definitized on 19 February 1982 with an effective date of 19 June 1981.

A letter agreement between P/JRB Architects and Studio Castore was signed on October 6, 1981, followed by a formal subcontract for Italian A/E services, which was finalized on 22 February 1982.

A subcontract agreement with CYGNA for structural engineering services was finalized on 22 June 1982.

AID Modification No. 2 to the original contract became effective October 23, 1981 amending the scope of work by authorizing the procurement of all necessary field surveys, site investigations, and analyses required for the development of final architectural and engineering designs. These were to include, but not be limited to: topographic, property, utilities, and other design surveys; soil/foundation investigations, including any necessary sampling, testing, and seismic investigations and analyses. This modification also recognized that in cases where the local municipality had already performed these tasks, it would become the responsibility of P/JRB to determine whether the work performed satisfied the architects' requirements in terms of completeness and quality of report.

Modification No. 3 was executed February 19, 1982, after final negotiations, targeting project completion dates.

Modification No. 4 for full funding authorization on the negotiated contract amount was signed with an effective date of 5 May 1982.

Two subsequent modifications were awarded for the design and preparation of all bidding documents for an elementary school to be located in Calabritto, Italy.

3. STATEMENT OF WORK - SUMMARY

- A. P/JRB Architects, with subcontract support from Studio Castore and CYGNA, was contracted by AID to provide services for the design of six earthquake resistant elementary, secondary, and vocational training schools in Southern Italy.

These schools were to be located at six sites in the Province of Avellino, one of the areas most severely damaged by the earthquake of November 23, 1980. The communities designated for this construction effort were Grottaminarda, Vallata, Calitri, Sant' Angelo Dei Lombardi, Avellino and Solofra.

Design criteria were to be developed in coordination with A.I.D., incorporating the traditional design concepts applied in Southern Italy. Emphasis was to be placed on the functionality of designs, the use of building materials locally available and a standard of building design compatible with the surroundings. A level of construction substantially above that commonly displayed by local schools and public buildings was requested. These designs were also to incorporate energy conservation features known to be beneficial and cost effective.

P/JRB was responsible for:

- Extensive site investigations and recommendations to U.S.A.I.D. on their suitability.
- All field and office work and other services required to provide conceptual drawings and architectural renderings to A.I.D.
- Inspection of indigenous architectural design and construction methodology for the Southern Italian region.
- Visitation of local and regional area schools prior to the development of educational programs.
- Formation of educational space programs.
- Detailed architectural and engineering designs.
- Earthquake resistant structural designs.
- Utility designs including electrical, heating and ventilation, water, sanitary and sewage disposal systems and some limited air conditioning at the Avellino project.
- Limited landscaping and site improvement designs.
- Complete plans, specifications, cost estimates and other bidding documents required for competitive construction bidding.

- Bid analysis, evaluation and recommendation of contract awards.
- Reporting documents to U.S.A.I.D. on the progress of the projects.

The design and construction of the schools was to conform to Italian building standards and codes except when, in the judgment of the architects and engineers, it was considered necessary to provide a greater safety level, in which case the Uniform Building Code, 1979 Edition, could be applied.

- B. During the period July 22 through July 28, 1981, an initial site visit was conducted by the Architectural/Programming Team. The team consisted of:

Richard J. Passantino, AIA	P/JRB Architects, Bethesda, MD
Albert H. McCoubrey, AIA	P/JRB Architects, Bethesda, MD
Alan Green, H.A.I.A.	Educational Facilities Laboratories, New York, NY
Michele Menduni	Studio Castore, Florence, Italy

Upon arrival at the United States Consulate in Naples the group received a briefing from the AID Project Director, Mr. Blaine Richardson, U.S.A.I.D., to establish and clarify:

- project goals
- overall strategy and work plan for the projects
- procedures
- responsibilities
- communications

Ms. Denise Pool, the bilingual Project Assistant, accompanied the group on a three-day visit to the six sites. In most instances the group made contact with local comune and educational representatives and obtained pertinent site and educational programming information.

C. Site Descriptions

1. Grottaminarda - July 23, 1981

The town, just off a major autostrada, with a population of 8,000, suffered minimal earthquake damage. The community's request was for a technical institute to accommodate 500 students in an Electronics/Electro-Technical and Mechanical program, with potential for future laboratory expansion.

The chosen site is quite large (24,000 square meters) and located on a gently sloping hillside, well suited for the intended use. It is satisfactorily drained and proportioned. Access to the site is currently restricted by housing adjacent to the road; however, an additional access route is available. The site is well suited for the intended use.

2. Vallata - July 23, 1981

Vallata is a small town in the Avellino region with a well developed municipal organization. In a meeting with Aturo Saponara, Headmaster of Grottaminarda, and other comune officials, the community's ambition for its proposed building was outlined - it included supplemental swimming pool, library, auditorium, sports facilities, etc. While some of these elements were inappropriate to include, the educational program was further developed in discussions with Sr. Vito Nufrio, the then proposed headmaster for the new school.

The existing high school appeared to be intact structurally though it sustained some apparent damage to nonstructural components. However, engineering reports revealed that the piling supporting the building had failed, and the building was deemed to be unsafe.

Exposed crevices and test borings showed a very deep layer of sand and gravel deposits which appeared to be unstable. Groundwater was reported to be high and there was evidence of soil liquefaction which actually occurred during the earthquake. (Soil flow is a hazard throughout this region.) A preliminary investigation of the soil flow at the northeastern part of town had been conducted by a geologist whose report describes the general conditions that exist and which will continue to cause subsoil problems. A proper foundation design for the new building was deemed sufficient to circumvent these potential problems.

The new school site is located in town on a fairly steep (18%) slope terminating at the low side with a vertical drop of 30 feet - 10 meters or more. The A/E Team considered this site to have no major obstacles to full development of the school.

3. Calitri - July 24, 1981

This town consists of an older section located on top of a hill and a newer portion located in the valley. The older portion suffered almost total destruction during the earthquake, while the new part, more recent in construction, suffered only moderate damage. Ground ruptures and settlement of between 20 to 30 inches (500mm - 800mm) were evident. Aerial photos reveal clearly defined rupture lines across the town. Considerable lateral shifting of walls, roads, and buildings is evident in the old town.

The school site selected is approximately 20,000 square meters in area and located about a mile from the town center in a relatively flat valley. It is ideally situated at a crossroad and has excellent proportion and site drainage with a minimal number of geological problems.

4. Sant'Angelo dei Lombardi - July 24, 1981

Sant'Angelo dei Lombardi appears to have been the town closest to the earthquake's epicenter. The magnitude of destruction of the older buildings to the newer buildings was very pronounced, many experiencing total collapse.

The new school site is within the town immediately accessible to the main town road and bounded by a cemetery and existing residential buildings. The originally selected site of 8,000 square meters was too small in area and slightly below the recommended national norms for even junior high school construction. This imposed a number of design problems and at the request of the architects was substituted for the present site.

5. Avellino - July 24, 1981

Avellino is the largest town in the region and the Province capitol. Damage from the earthquake varied considerably, depending on the construction style of each building. The majority of the damage and resultant casualties were related to the old rubble-stone construction of the buildings. Newer buildings had varying degrees of damage to structural and non-structural components, depending on the construction framing techniques. At the time of our team's initial investigations, many buildings were shored or braced, indicating possible foundation and structural framing damage.

The originally selected site was adjacent to the town's old Conservatory of Music, located adjacent to a small plaza in the historic part of town. The Town Council expressed strong desires to have the damaged former Conservatory restored and incorporated into the new design. While appealing from an historical preservation point of view, this solution would have proven unjustifiably expensive and would have siphoned money away from the very much needed instructional areas.

The site ultimately provided by the Comune of Avellino proved to be a very difficult one for the design objectives, imposing many restrictions to building configuration. Access to the site was limited, the configuration of the building was, of necessity, designed to conform to the shape of the site, thus restricting the amount of outdoor playarea to a minimum. Also, a heavily travelled road bordering the perimeter of the site generates large amounts of traffic noise, a factor which had to be considered in the design of the acoustically treated areas. The finally adopted site presented a major challenge to the design team in locating and designing this new building for both student and community use.

6. Solofra - July 24, 1981

Solofra is a small town predominantly engaged in the leather tanning industry. There are over 100 small to medium-sized leather processing plants in the area. The town, situated near the epicenter of the earthquake, was one of the hardest hit. Major damage to the older stone buildings and lesser destruction to non-structural elements of newer buildings was noticeable in many locations.

The site, which was immediately accepted for the new school, consists of a gently sloping plot of land, quite ample in size (15,000 square meters). It is well situated outside of town near a main highway and a bisecting road. Its views are excellent and the site is favorable from a drainage standpoint.

A long discussion was held with the comune leaders concerning the type of facility desired. Their sole request initially was for a tanning institute, the main commercial interest in this area. Eventually this position was modified in favor of a broader educational program offering more diversity for the students.

For more detailed information refer to "Comprehensive Report for Earthquake Resistant Schools in Southern Italy".

- D. Following the A/E team's visit to each of the six sites, a meeting was held on July 25 with AID Project Director Blaine Richardson for the purpose of exchanging views and discussing the individual community's initial response to the site chosen for their schools. Due to the projected costs of the original programs, it was decided to scale back the size, capacity, and cost for each project as preliminarily developed by the Architect/Programming Team.

Additional points discussed were as follows:

- The designs were to be accomplished as rapidly as possible.
- Projects could progress independently as information was developed and approvals were obtained rather than releasing all six schools on the Italian bidding market simultaneously.
- Because of the size, cost, and desirability of completing the Avellino facility quickly, it was determined that the work effort for this school would receive initial priority.
- Construction administration was to be funded as a follow-up service under separate agreement to the design team's Italian affiliate. Italian law requires a Direttore di Lavoro for this size project.

E. A second engineering visit to these sites by representatives of the structural and mechanical engineers was conducted between August 19 and 24, 1981 and reports on these visits have been submitted to U.S.A.I.D.

F. Project Schedule

Other orientation meetings were held with USAID, P/JRB Architects and consultants to establish and clarify:

- project goals
- educational/community goals
- overall strategy and work plan for the projects
- procedures
- responsibilities
- communications and documentation

For further elaboration refer to prior reports and monthly progress submissions.

4. EDUCATIONAL PROGRAM

Prior to the commencement of the schematic design, the educational space requirements were developed by Educational Facilities Laboratories. This assignment was to develop an educational program and an analysis of the educational system of the region. Based on several visits to the site and several meetings with the Educational Board, local and regional officials, a comprehensive report was produced for U.S.A.I.D. outlining such areas as:

- background and objectives
- educational considerations
- planning and design considerations
- facilities programs for all six schools

A. Background and Objectives

The U.S. Government is providing six new schools for Avellino Province, Italy. The program, funded and administered through the Agency for International Development, is in response to the earthquake devastation which occurred in the area, November 1980. Altogether twelve schools will be built in the Naples area at a budgeted cost of \$41 million. The funds are to pay for the basic buildings and built-in equipment. Site acquisition, furniture and moveable equipment, and site development are not included in the referenced budget.

These are not "replacement" schools in the strict sense of the term. Rather the schools are being planned to expand the educational programs and community services in the six communities, and in turn serve nearby communities, as well as replace educational facilities severely damaged or destroyed in the earthquake.

The objectives of the program are:

1. To build larger schools (375 enrollment minimum and typically 500 enrollment), that provide a complete range of facilities on well located and adequately sized sites, and with an increasingly utilized full-time faculty.
2. To plan schools that permit greater variety in the educational programs they house, a departure from the traditional specialized schools with a single program focus. This move toward comprehensive schools reflects the changing needs for education in the region. The region is developing economically, there is a return of population to the small towns and cities, and a better educated population is essential to that progress. More girls, in addition to boys, are seeking education, and both have a greater variety of educational goals than in the past.

3. To place emphasis on secondary schools and thus encourage students to continue schooling beyond the mandatory age of 14, and to retain young people in the communities where they have grown up.
4. To locate schools so they serve a larger population, not limited to the towns in which they are located.
5. To create schools that can provide programs and services for other than enrolled students. From community events, to family recreation, to adult and vocational education, it is intended that the schools increasingly become community centers.
6. To demonstrate that these schools by their design, site planning, choice of materials, and use of indigenous design elements are attractive and appropriate physical additions to the communities in which they are located.

It is intended that these schools serve as models for new schools elsewhere in the region and throughout Italy, a proposition to which regional and national officials are committed.

B. Educational Considerations

As a basis for planning the schools, several educational considerations are fundamental.

1. From Specialized to Comprehensive Schools

The present Italian educational system provides for specialized secondary schools, each with a primary program focus—scientific, technical, classical, etc.

The schools being constructed under the U.S.A.I.D. program are planned to be more comprehensive and less specialized, allowing students within each school greater variety in programs and choice of educational emphasis. Such a change will not occur immediately, and certainly not at the same rate in all schools. Recruitment of faculties, preparation of curricula, reorganizing classes and schedules, and the acquisition of instructional materials and equipment will take time. The facilities programs that follow are derived from the standards for a basic type of school now prescribed by the traditional educational system. However, modifications have been made to allow each school to evolve into one that provides greater variety of programs and educational goals. For instance:

- more variation in the range of classrooms sizes
- larger libraries with opportunity for expansion
- shops and general laboratories that can be used for other than the prescribed subjects

This flexibility will be enhanced by the arrangement of facilities within the school and by keeping specialized built-in equipment and specialized design features to a minimum.

2. Toward an Extended School Day

Traditionally, Italian schools are scheduled for use 4-5 periods a day from 8:30 to 12:30-1:30, six days a week. Students are not provided lunch on the premises. Each period is usually 55 minutes in length with a 5-minute break between periods. A very few schools have been experimenting with an additional period per day and a lunch period. Students follow the same schedule each day, with gym offered 2 or 3 hours per week.

These six schools likely will be scheduled in the traditional way, but the design should permit moving toward a longer school day. The extended day may be used to increase enrollment with some students coming later and leaving later, and others with unscheduled time for library, study hall, or for physical recreation. This flexibility in scheduling will also permit students to take additional courses as they are added to the curriculum. The extended day can accommodate a second group of students in the afternoon and early evening, most likely adults for various continuing education and vocational training. The facilities designs allow such an extended day by providing each school with a lunch room, student lounge, more library space, classrooms that can be utilized for study centers, and similar features.

3. From Part-Time to Full-Time Faculty

Presently many faculty members have teaching responsibilities at two or more schools in a region, which limits course offerings, restricts students schedules, and reduces the utilization of facilities. Because these are larger schools than traditionally provided, with more students and class sections, the tendency will be to move toward more full-time faculty--or faculty shared only between two schools. This change will aid the move toward more flexible schedules, and more variety in course offerings.

4. Program Capacity vs. Functional Capacity

Because of the part-time faculty, and the relatively short school day, the program capacity of a school is based on the number of basic classrooms provided, not on the total number of student stations available for instruction. Thus a 20-classroom school has a program capacity of 500 (20 classrooms x 25 students per class). However, each school has additional student stations provided in laboratories and shops, which do not factor into the rated capacity of the school.

As the faculty becomes more full-time and the school day longer, the additional student stations will be used at the same time as the classrooms. Thus the functional capacity of the schools is larger than the current program capacity. For instance, in a 500-student school, there may be an additional 150 student stations in shops and labs. At a desirable 90 percent use of student stations, the functional capacity is almost 600 without considering unscheduled use of library, gym, etc.

Accordingly, the schools have been planned recognizing that eventually more students will utilize the school during the course of a day than suggested by the stated program capacity.

5. From Schools Only for Students to Schools That Serve the Community at Large

Traditionally Italian schools have been designed and administered to serve only the students enrolled in the formal educational program. However, it is obvious that these six new schools will provide programs and offer accommodation for other persons in the immediate and neighboring towns. Some of the expanded use will be for formal adult and vocational education, others for informal, irregular community activities. The precise nature of these uses cannot be prescribed now. However, these are schools that will be in use for more hours, by a greater variety of persons and for a wider range of activities than in existing Italian schools.

C. Planning and Design Considerations

To meet the design objectives for these schools, the following planning and design considerations were incorporated.

1. Site Planning

The sites were each provided by the six comuni involved, and while they meet the Italian minimum size standards, are small by American practices--and pose some difficult site planning problems when considering the following:

- a. The basic educational facilities as defined in the facility programs. In some cases over one third of the site will be occupied just by the school building alone.
- b. Access roads and service areas are close to buildings.
- c. Student drop-off and pick-up zones are very constrictive. Students will usually come from several communities, primarily by bus.

- d. Parking for faculty, administration and visitors is restricted.
- e. Playfields: well planned and developed ball fields (soccer) are especially important as the schools are used for total community recreation and the small sites restrict their inclusion.
- f. Additional facilities: the AID program provides only the basic school facilities. However, several communities desire additional facilities that may be provided by local and government funding. These have been noted in the facilities programs and their eventual inclusion on the site had to be considered in total site planning.

2. Planning for Use by the Larger Community

As has been noted, these schools will initially function as traditional schools, serving only their enrolled students. In time, it is expected that they will offer programs and services for others in the community.

To allow such eventual extended use, it was desirable to cluster the facilities that are likely to be used at any time and provide entrances to those clusters. The clusters are:

- auditorium, gymnasium, lunch room and support spaces
- classrooms and library
- laboratories and shops
- administrative and faculty offices

Toilets are available in each cluster, and each cluster is capable of being shut off from the remainder of the school.

3. Site Access and Circulation

With the exception of Avellino, each school will serve students and residents from surrounding towns in addition to those from the town in which it is located. These persons will come by bus, as well as private car. Access to the site, drop-off and pick-up points, parking, and exit points had to be carefully planned, and related to building entries and service area.

4. Access by the Handicapped

Public buildings in Italy require accommodation by the handicapped. Essentially this requires:

- grade level or ramped access to ground floor
- elevator or ramps between floors
- accessible toilet facilities on each level

Because several of the sites are sloped, sidewalks and entrances avoided steps or provided ramps if steps were used.

5. Multi-Use of Facilities

These are schools that will change over time--that will evolve. To allow such changes, a number of the standard facilities are planned for multi-use, and so pose design challenges. The auditoriums are to be used for lectures, meetings, music and drama by both students and residents. The science labs should be essentially multi-disciplinary to permit introduction of additional science courses. Several of the larger classrooms may be eventually used for teaching business skills. The design studios may become art rooms--or even vocational studios. And the lunch room is also to serve as a "student commons".

D. Facilities Programs

The facility programs are based on current Italian standards, but a number of modifications have been suggested to provide greater flexibility in educational programs, course schedules, and space utilization--as the schools move to more comprehensive programs and broader community use. For instance, libraries have been increased in size and function, science facilities are more varied, and a greater range of classroom sizes and capacities is proposed.

In comparison to American school planning practices, the total allocated gross area per student is at minimum levels. For instance, a comprehensive American high school for 500 students would be approximately 6,500 m², or 13 m² per student, while for Vallata the standards are 5,100 m² and 10.20 m². The discrepancy lies in the area provided for each facility, as well as in the range of facilities included.

To the former point, the typical American high school classroom for 25-30 students is approximately 70 m² while the Italian minimum standard is 50 m². We are proposing 60 m² for some classrooms. A 500-student American high school library would be 280-300 m², while the minimum standard for Italian schools is 200 m². We have increased the library somewhat and suggested an arrangement to permit expansion.

To the latter point, American schools would include, for instance, music and art rooms, and homemaking and industrial arts shops. We have suggested several ways some of these functions can be accommodated in dual use facilities, but these specialization features have not been incorporated.

In summary, the programs attempt to come close to the total area by Italian standards while introducing some spatial modifications and features that will permit the schools to adapt to an evolving comprehensive program and broader use.

5. SCHEMATIC DESIGN PHASE

Based on the team's discussions with U.S.A.I.D. Naples representatives and additional information obtained on engineering site visits conducted from 17 August through 24 August 1981, the architectural team began preparation of three schematic design solutions for each site.

New pedagogic tendencies in schools stress a close relationship between individual, group, or collective activities and relations with the community of which the school is a part.

These concerns influenced the school design that is internally open and extends itself to the town, becoming one of its expressions of community life. The possibility to use parts of the scholastic unit, such as the gymnasium and other sports facilities for these purposes was stressed.

Structurally, the schools' designs were very much influenced by the earthquake resistance features. It was determined early in the project that all new construction be designed with earthquake forces and detailing requirements in mind, along with proper construction supervision to ensure that correct concepts of design were implemented during construction. While no single factor could answer all aspects of earthquakes, there was no question that rational design and detailing practices developed could help to minimize losses and reduce hazards in the event of a future earthquake.

Some of these features influencing the designs are as follows:

- Simple rectangular or square floor plans, which are the most effective in earthquake design, were adapted in the majority of the schemes.
- All perimeter walls and certain interior walls were designed as shear walls with continuous footings throughout.
- Number of stories per school were kept to a minimum.
- All interior masonry partitions were reinforced horizontally and vertically.
- Most importantly, special attention was given to the structural details.

Conforming to the construction standards of the region, a mechanical cooling system was not necessary for five of the six schools. Only at the Avellino Music Conservatory where the acoustical integrity of the auditorium and music practice rooms were of prime concern did we provide a mechanical air conditioning system. At all of the schools, careful consideration was given to solar orientation, natural ventilation and shading, creating a comfortable environment with minimal energy usage. Space heating was provided by use of a perimeter hot water radiator system in classrooms, offices and corridors. Isolated ceiling mounted unit heaters were used in the gymnasiums, auditoriums and dining halls.

In three of the largest schools, hot water solar collector panels were incorporated with the design, supplying hot water for the locker room showers and kitchens.

On 16-17 November 1981, the contractor (P/JRB, with Studio Castore) presented to the A.I.D. selection panel, consisting of Blaine Richardson, Simour Tayenblact and Tibor Nagy, the 18 design solutions for the six sites. Included in the submission for each school were cost estimates, architectural renderings, models, site plans showing proposed design (1:200), existing condition plans of topo, utilities, etc., functions and flow diagrams, floor plans (1:200), longitudinal and cross sections (1:200) and two elevations (1:200).

At the conclusion of the presentation, A.I.D. had selected two viable design solutions for each of the six sites that met the school program and responded to site conditions. The final selection was left in the hands of the comune representatives of each town where the schools were to be built.

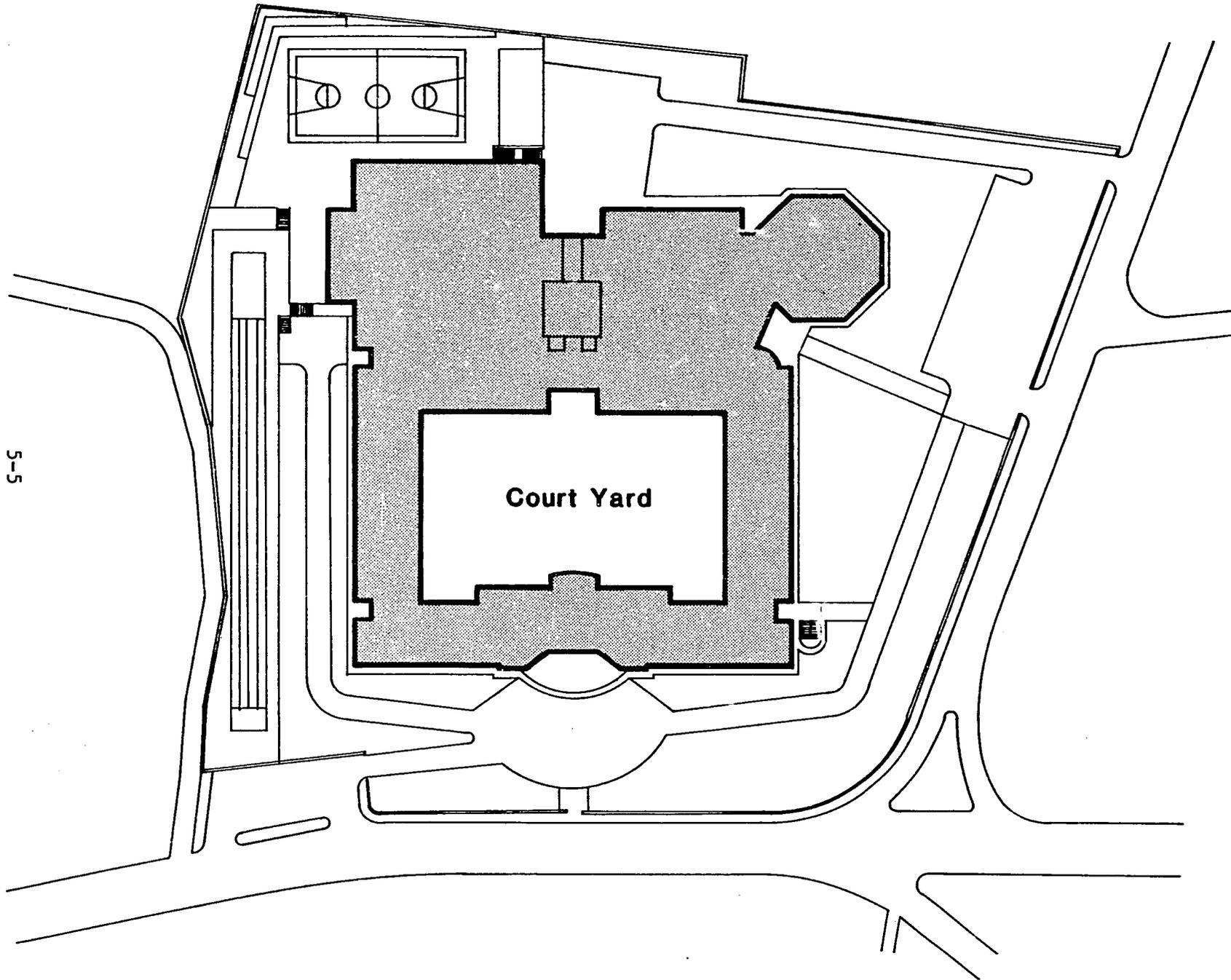
On Thursday, 19 November 1981, a full presentation was made both in Italian and English by the Contractor to all the comuni officials at the Avellino City Hall. Drawings of both design solutions were available, and in some cases models. A period of two months was allowed for the officials to review the schemes. On 15 January 1982 the final designs were selected.

Illustrations of the two design solutions (Scheme A and Scheme B) for each site follow, along with a description of Scheme A only, which was the final design selected.

A. Calitri

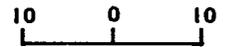
Design Description

- The building was planned in harmony with the site. The design is quadrangular in form and develops around a large open courtyard.
- Regular and specially equipped classrooms are developed on two levels connected by two flights of stairs and an elevator.
- Above the entrance hall is the library which projects over the entrance portico forming a defined entrance.
- All of the classrooms are naturally ventilated and face the outside of the building, while the courtyard forms the circulation connection between wings of the building.
- The building classroom elements are supplemented by an octagonal auditorium, a lunch room, offices and a gymnasium.
- Included in the design are four groups of student lavatories and the locker rooms for the gymnasium.
- The boiler room by Italian regulation has independent and direct outside access.
- All of the Italian laws relating to elimination of architectural barriers have been incorporated into the building's design.
- The site elements contain the parking lot and the access roads, in addition to a regulation basketball court, a running track, and a sandpit for the high and long jumps. Future sports areas are planned.



5-5

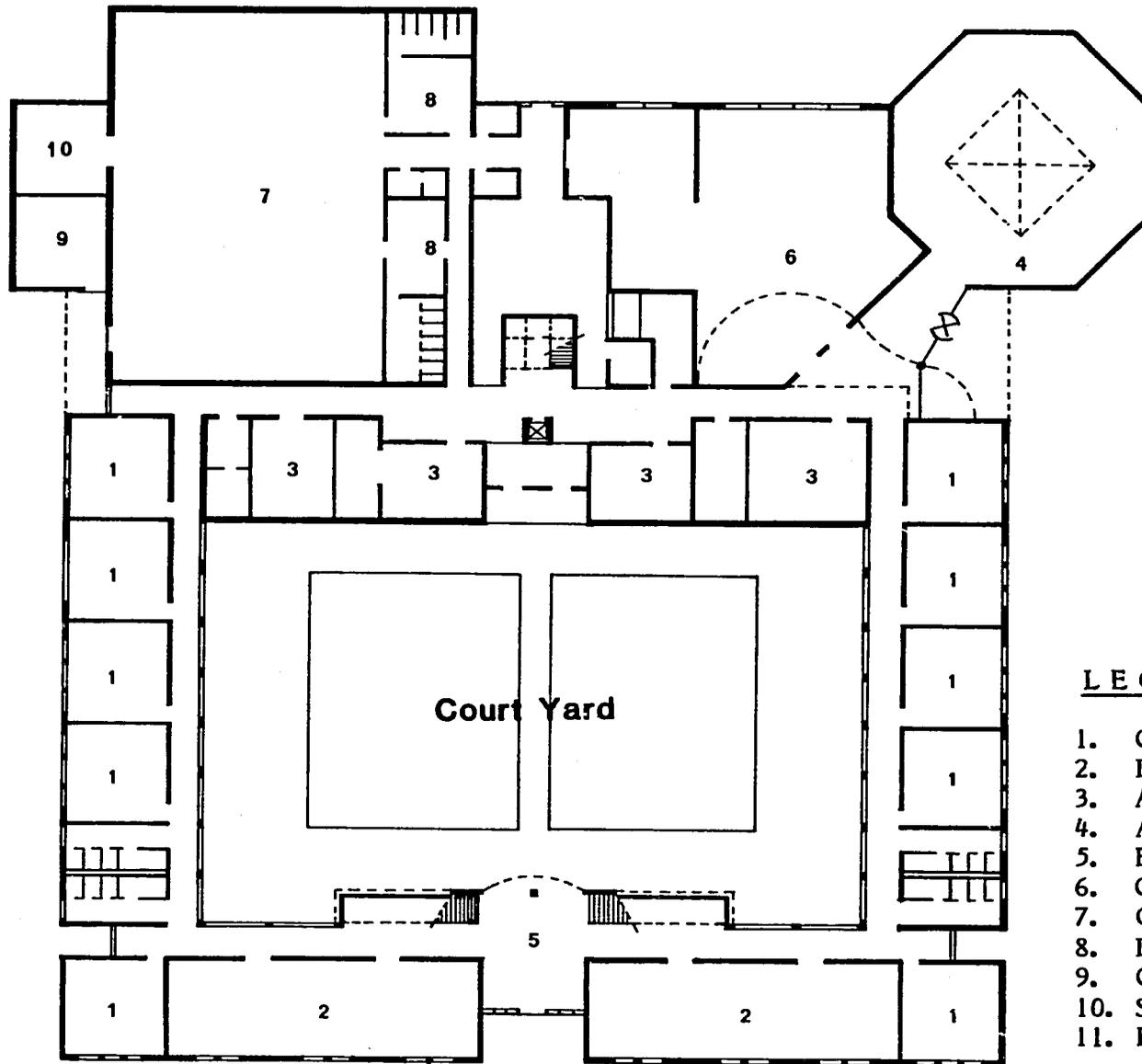
Site Plan



21

Calitri

5-6

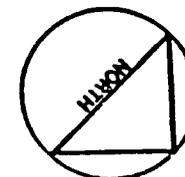


LEGEND

- 1. Classroom
- 2. Laboratories
- 3. Administration Offices
- 4. Auditorium
- 5. Entrance Lobby
- 6. Cafeteria
- 7. Gymnasium
- 8. Locker Room
- 9. Central Heating Plant
- 10. Storage
- 11. Library

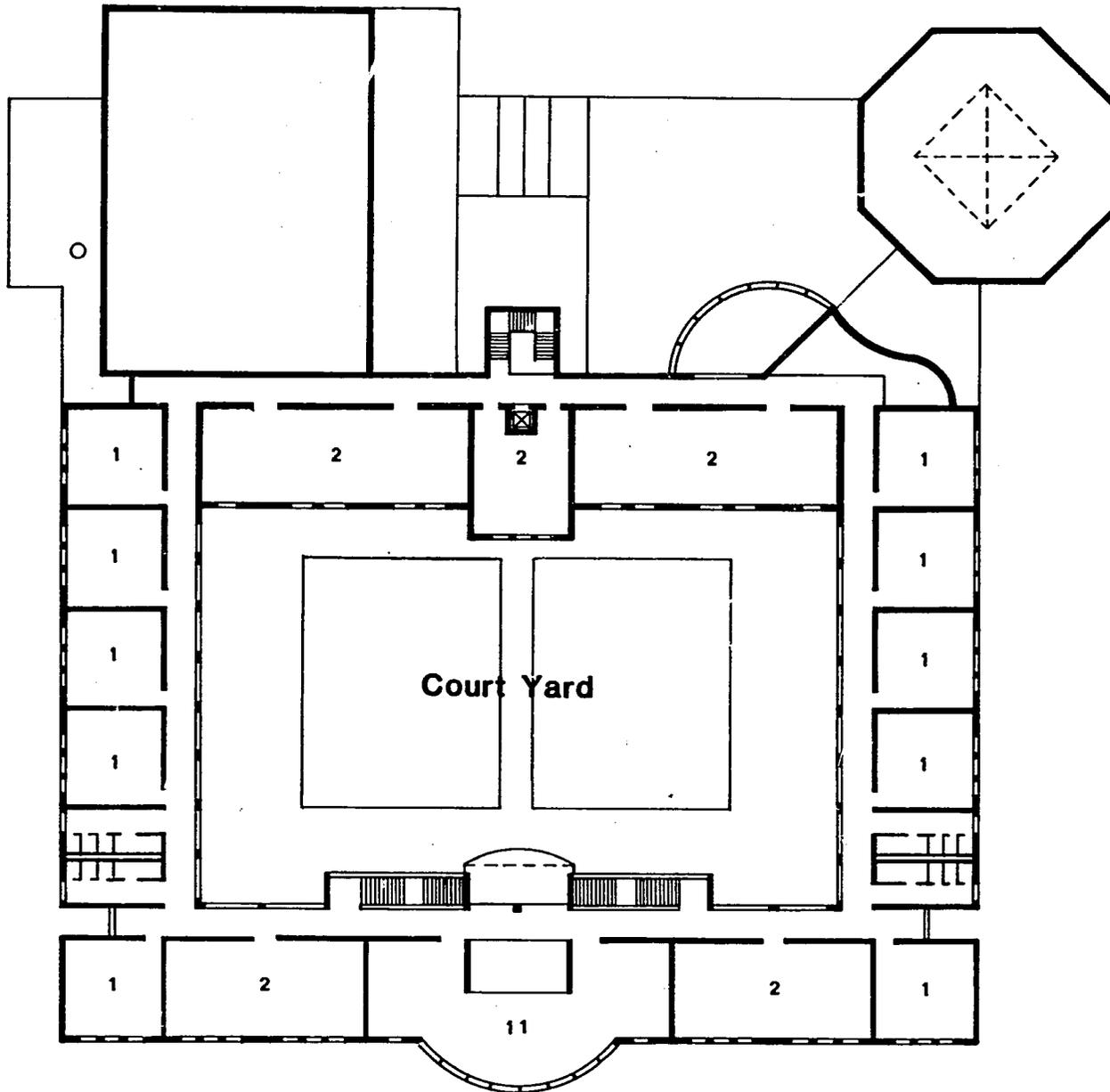
Main Entrance

Ground Floor



Calitri

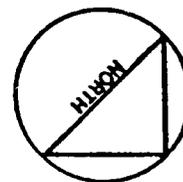
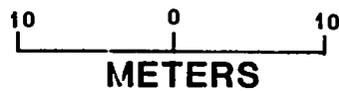
22



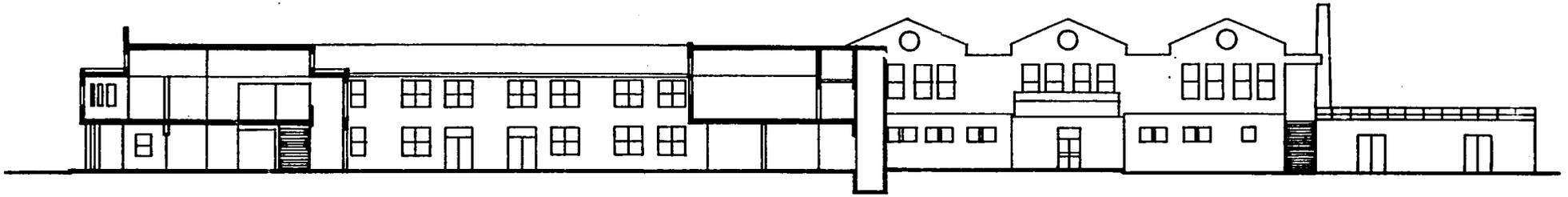
5-7

93

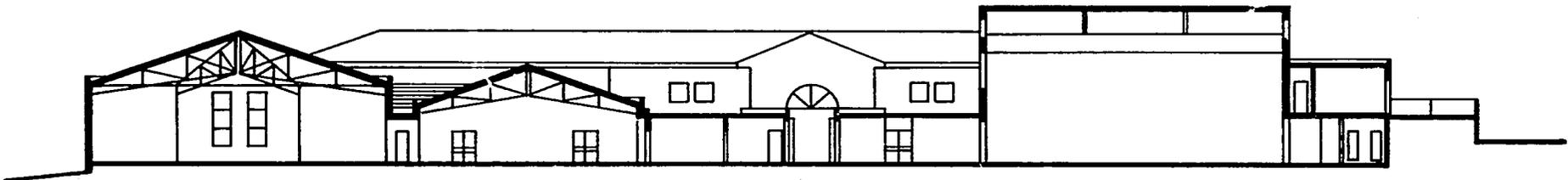
First Floor



Calitri

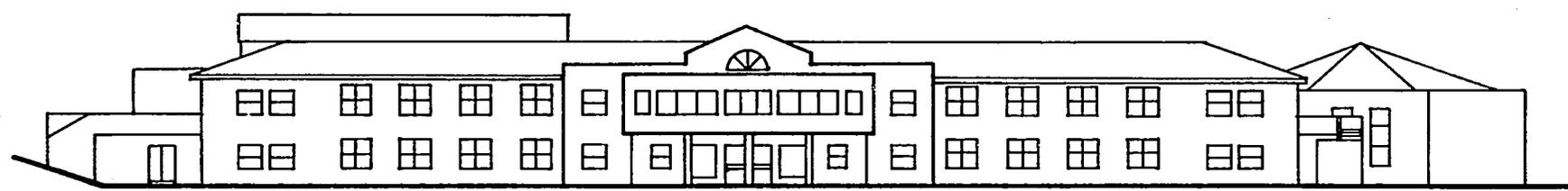


Longitudinal Section 10 0 10
METERS



Cross Section

5-8



Entrance Elevation 0 10
METERS



North - East Elevation

Calitri

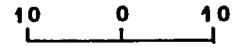
B. Solofra

Design Description

- The planimetric layout of the complete unit was based on its relation to the configuration of the site and to multi-access requirements. The school is planned for the study of industrial chemistry.
- The design unit develops along two principal axes in a T format whose longest wing is perpendicular to the main road.
- The major axis, composed of the entrance hall, auditorium and offices on the ground floor create the nucleus of the school. Custodian's lodging is provided on the second floor.
- The regular and specially equipped classrooms are provided on both levels with high ceilings and galleries.
- The main axis ends with a small cloister of classrooms on the ground floor and the library on the second level.
- The minor axis contains the gymnasium, the work areas and laboratories for the second and third year chemical students.
- Included are four groups of toilet rooms for the students plus the locker rooms for the gymnasium.
- The custodian's lodging and the boiler room have independent and direct outside access.
- All architectural barriers have been eliminated for both the horizontal and vertical access.
- The site plan provides for parking, access roads, a regulation basketball court, an all weather composition running track and a sandpit for the high and long jumps.

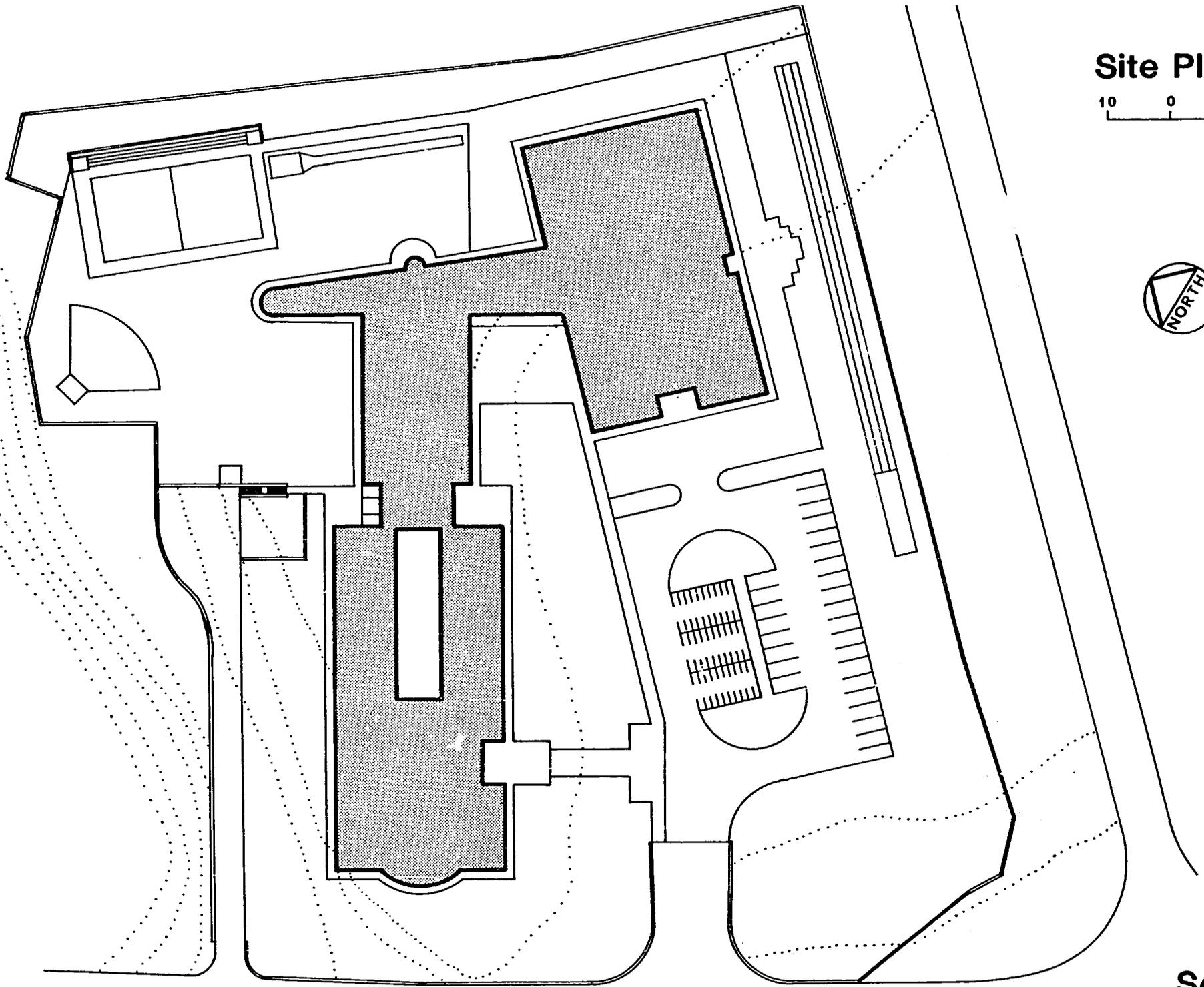
25

Site Plan

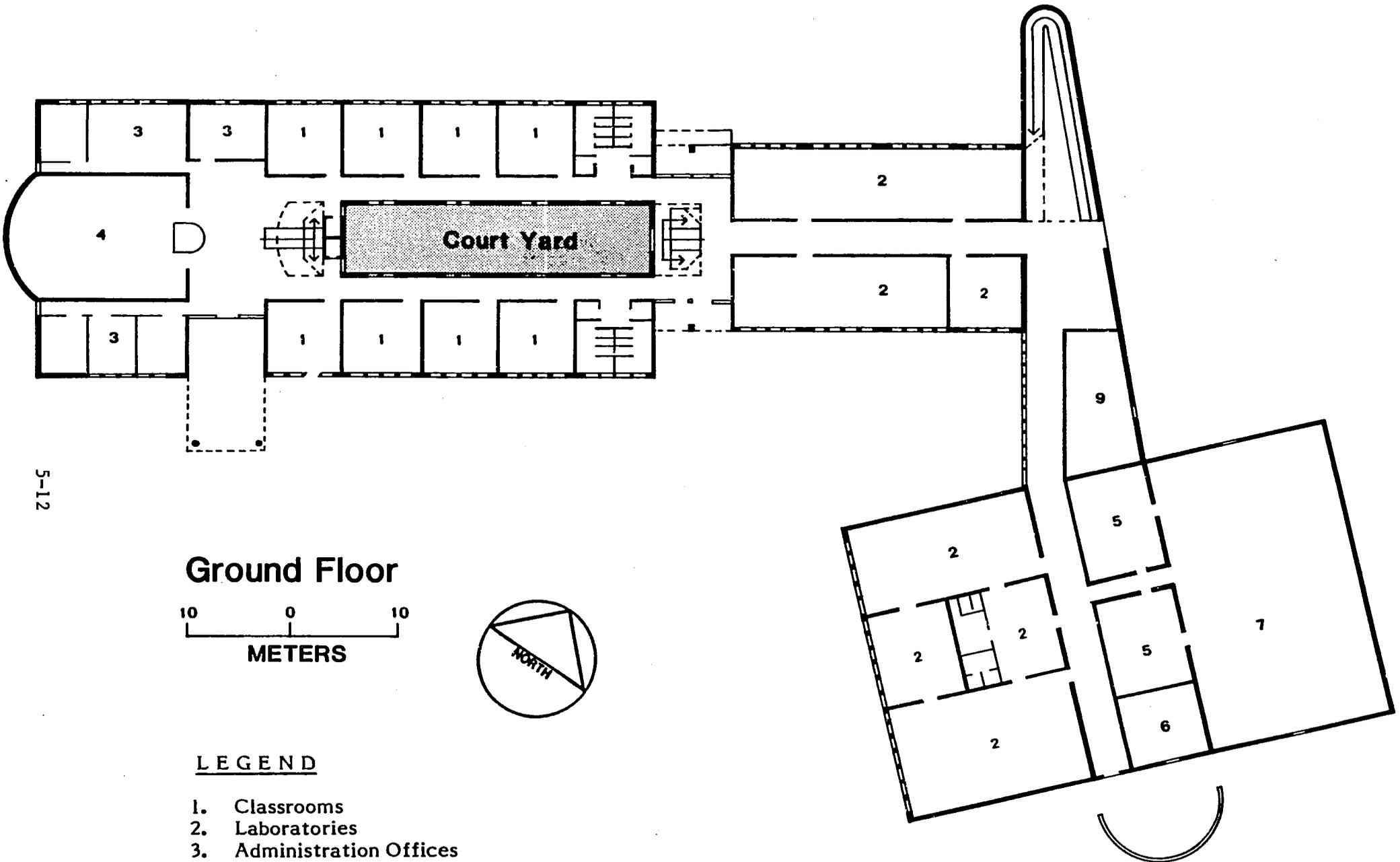


5-11

21

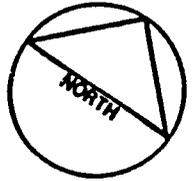
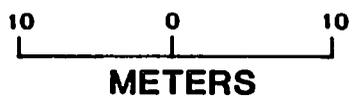


Solofra



5-12

Ground Floor

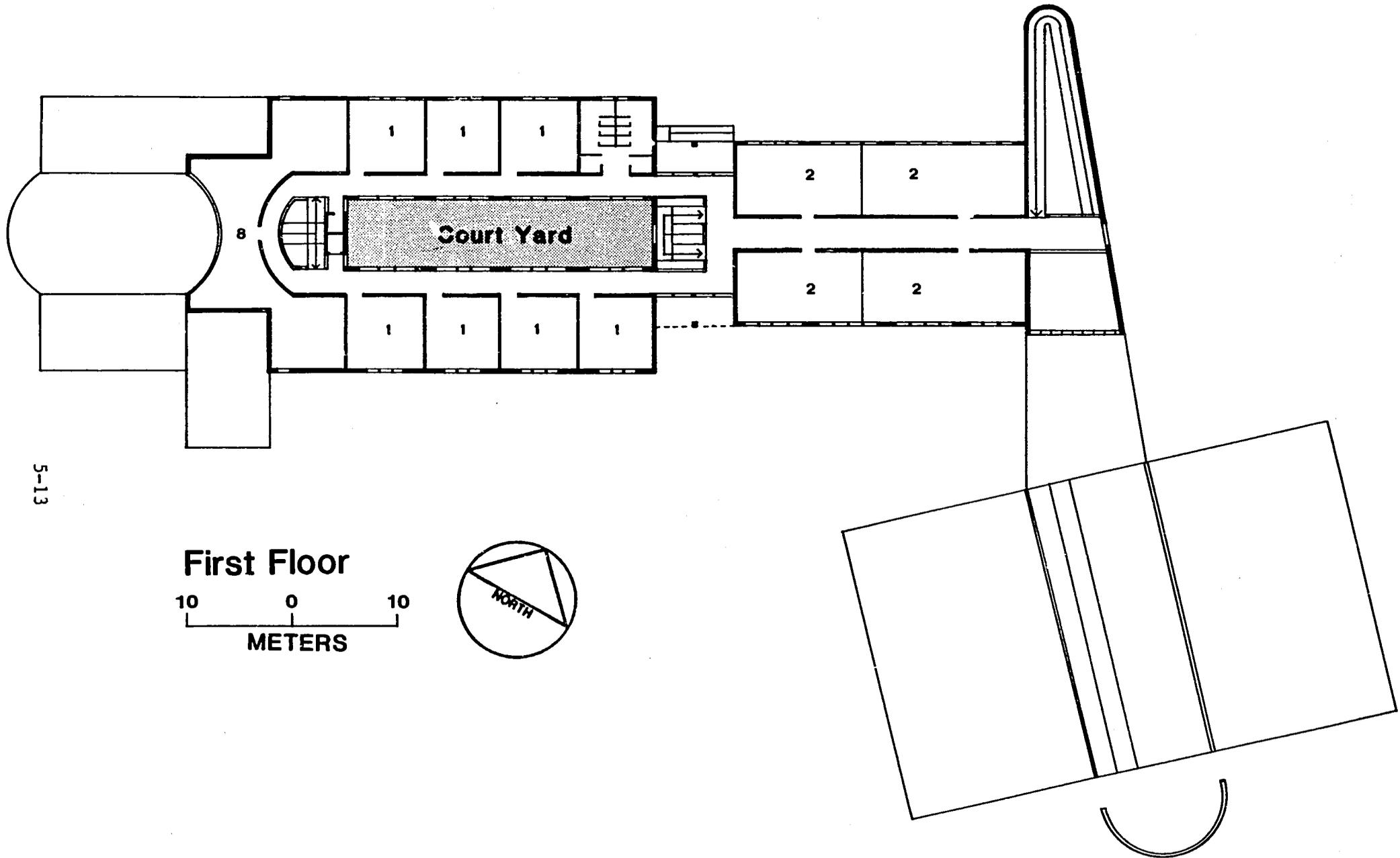


LEGEND

- 1. Classrooms
- 2. Laboratories
- 3. Administration Offices
- 4. Auditorium
- 5. Locker Room
- 6. Central Heating Plant
- 7. Gymnasium
- 8. Library
- 9. Custodian's Apartment

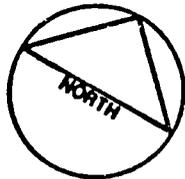
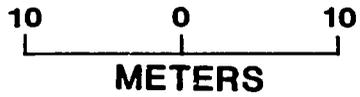
LP

Solofra



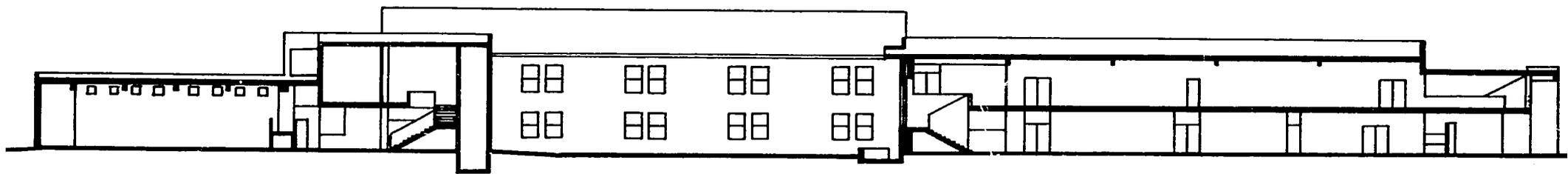
5-13

First Floor

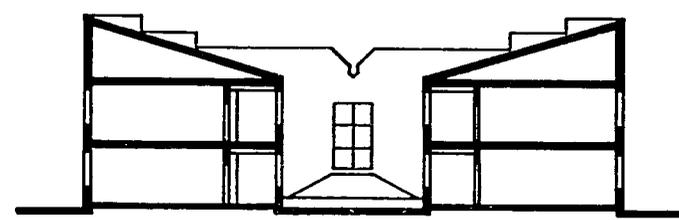


Solofra

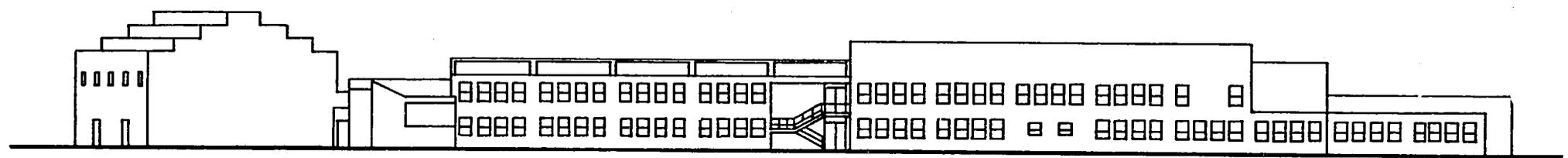
29



Longitudinal Section



Cross Section



North West Elevation

5-14

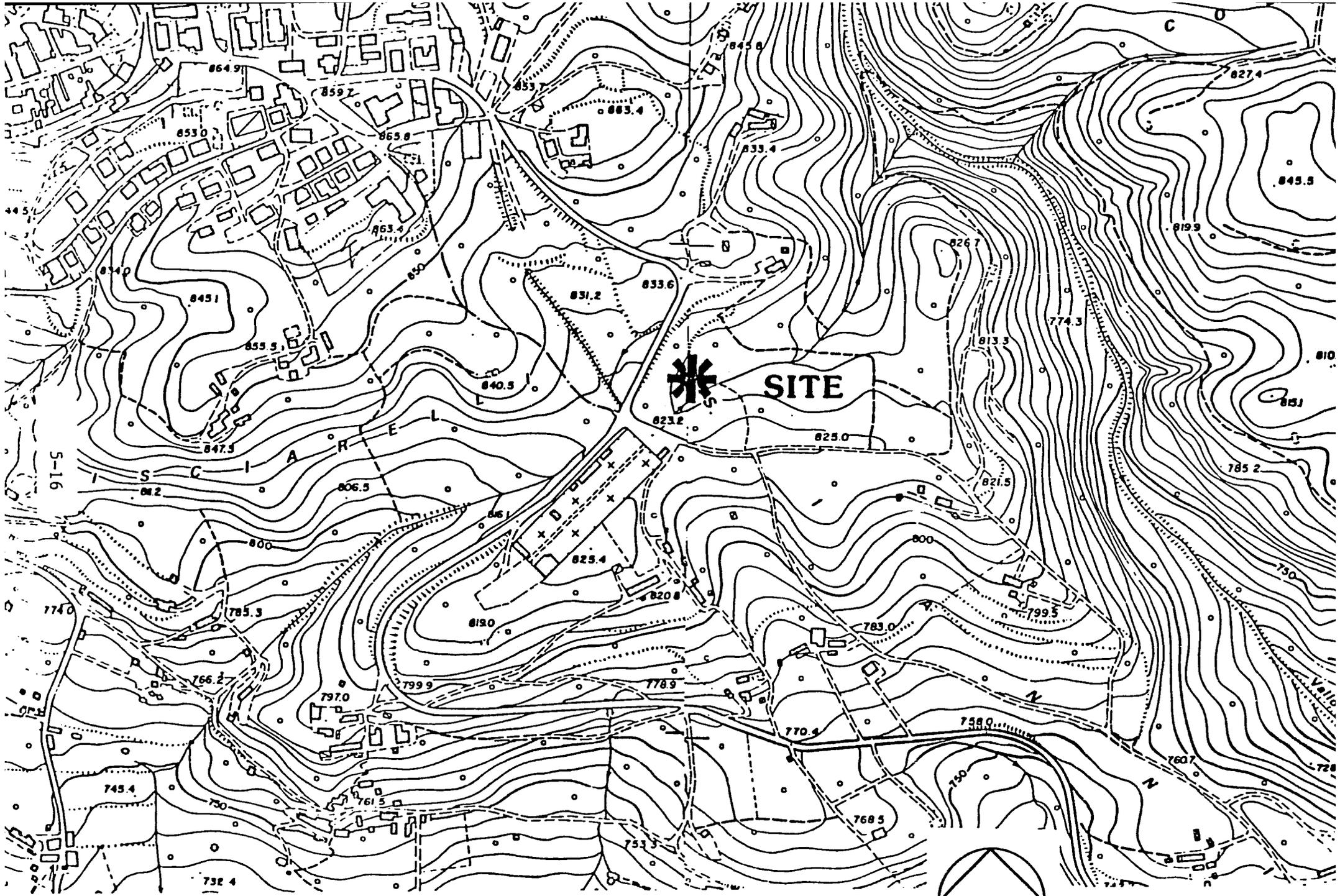
30

Solofra

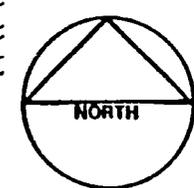
C. Sant'Angelo dei Lombardi

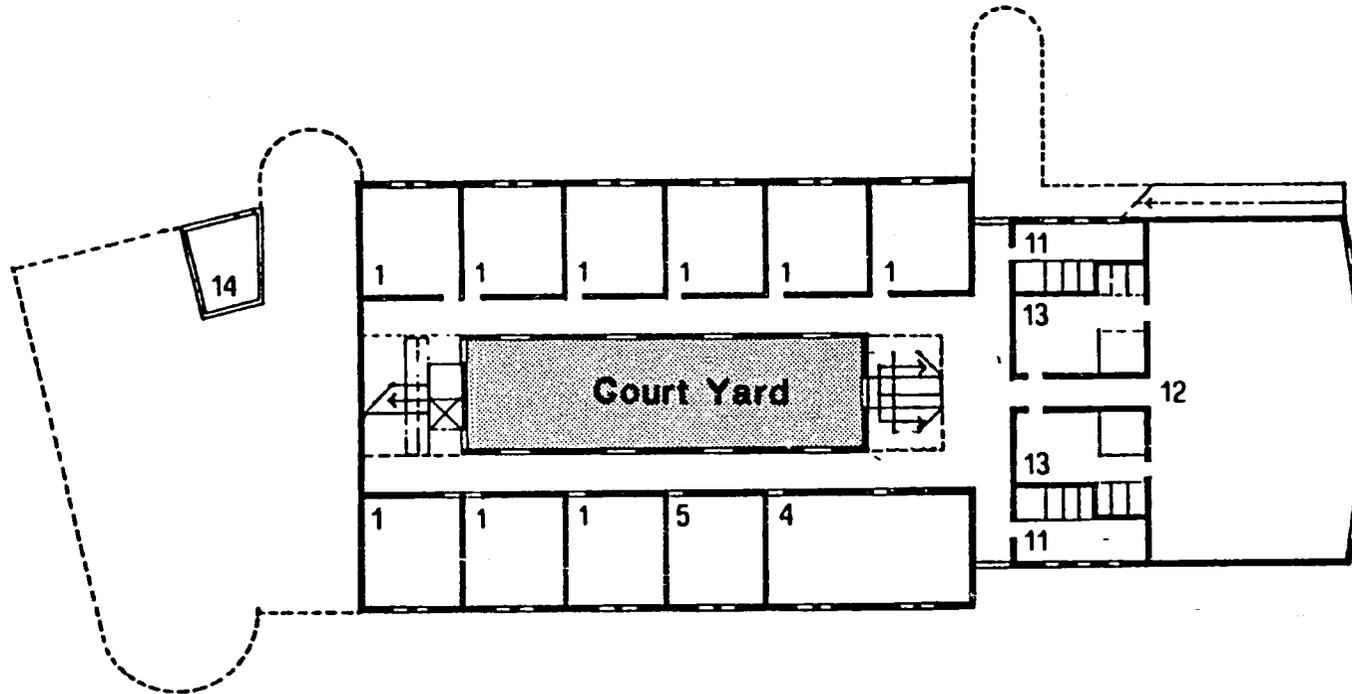
Design Description

- This relatively small school addresses such important design issues as space flexibility and community interrelationship, which will eventually enable the school to function as a center for community activities.
- The building was designed to the site to accommodate such elements as existing steep contours, various site entrances and respect for the adjacent cemetery.
- The two level design concept was developed along an east-west axis organizing the 17 classrooms, laboratories, teachers lounge and administration offices. This linear arrangement is terminated at each end by the auditorium and the gymnasium respectively. An open courtyard at the center of the school provides passive space for students and teachers.
- Due to the site's steep grade, entrance to the school is from the upper level. By the use of ramps and elevators, all architectural barriers between floors have been eliminated.
- A centrally located boiler room and a compact architectural layout allow a highly efficient heating system.
- The sport fields consist of a regulation basketball court and a 100-meter running track adjacent to the gymnasium.



Comune Di Sant Angelo Dei Lombardi

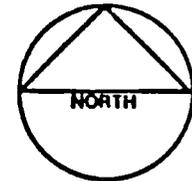
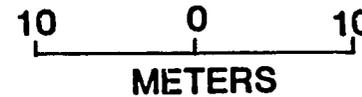




LEGEND

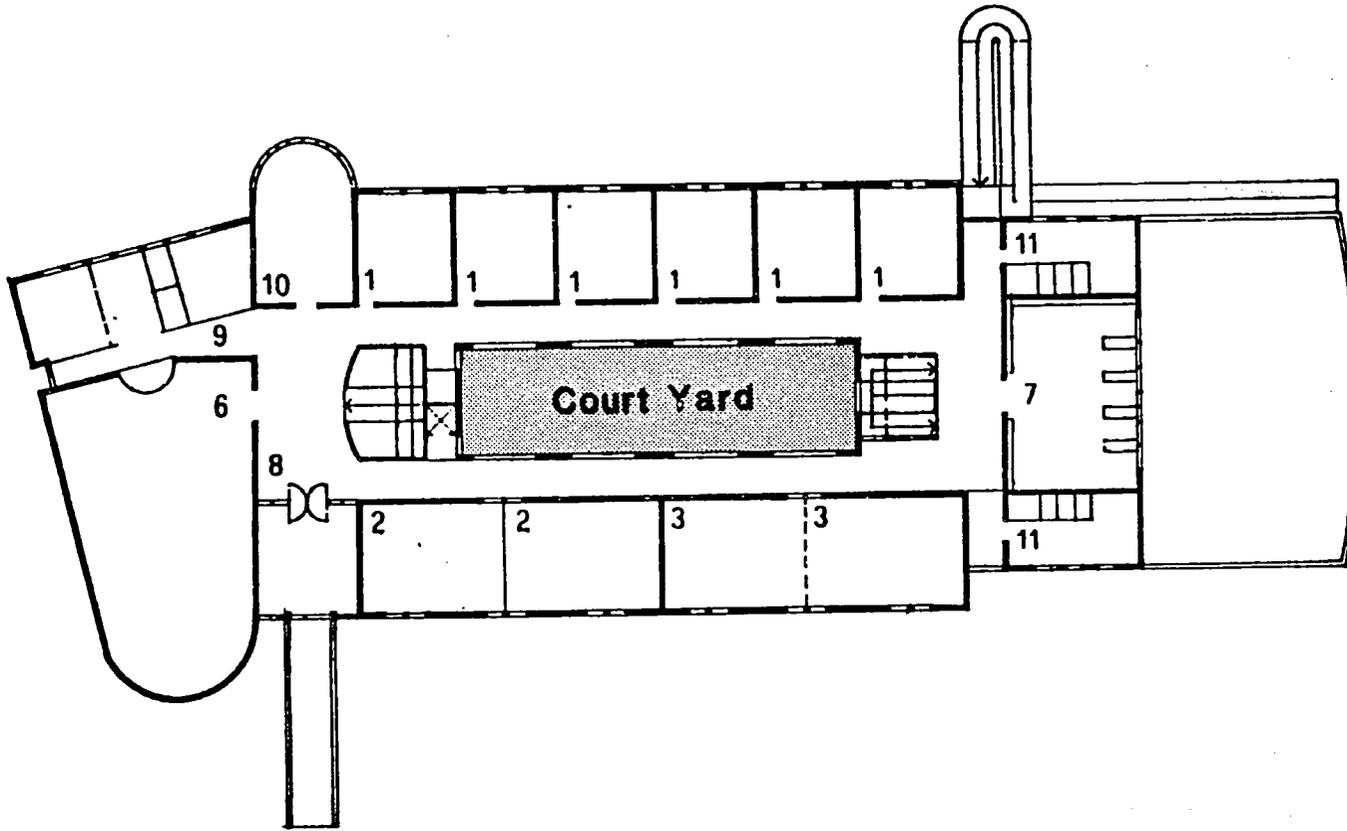
- 1. Classroom
- 2. Artistic Education
- 3. Technical Application
- 4. Scientific Observation
- 5. Music Room
- 6. Auditorium
- 7. Library
- 8. Entrance Lobby
- 9. Administration Offices
- 10. Professors' Lounge
- 11. Restroom
- 12. Gymnasium
- 13. Gymnasium Locker Room
- 14. Central Heating Plant

FIRST FLOOR

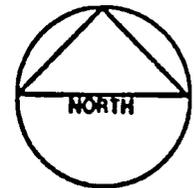
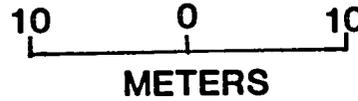


93

5-18

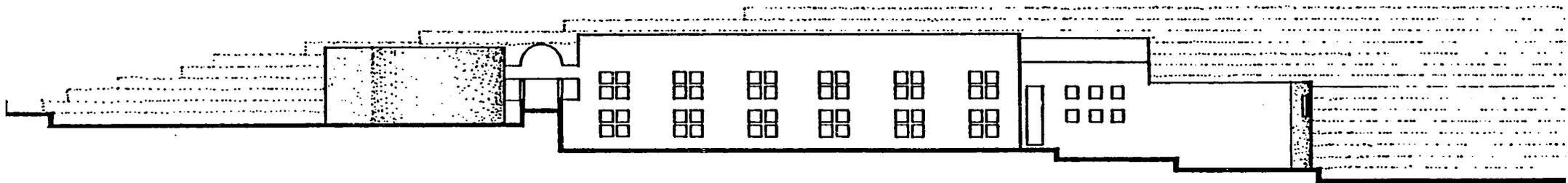


SECOND FLOOR



S'ANGELO DEI LOMBARDI

h

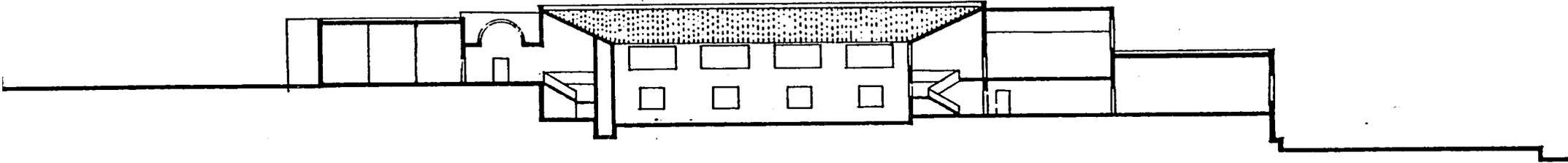


5-19

FRONT ELEVATION

95

Sant Angelo Dei Lombardi

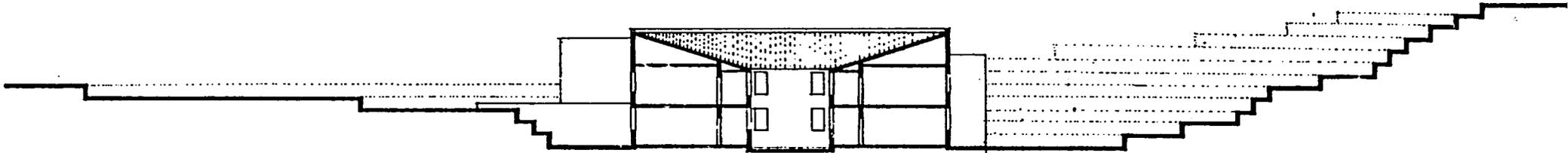


5-20

LONGITUDINAL SECTION

3/2

Sant Angelo Dei Lombardi

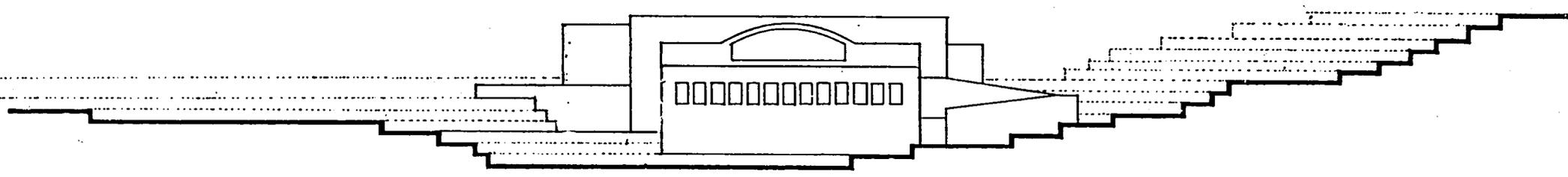


5-21

CROSS SECTION

31

Sant Angelo Dei Lombardi



SIDE ELEVATION

5-22

18

Sant Angelo Dei Lombardi

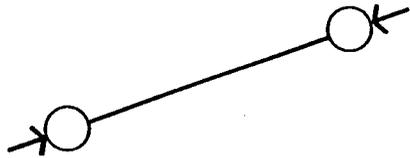
D. Vallata

Design Description

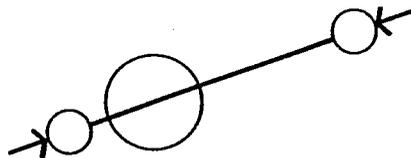
- A steep site and a picturesque view of the hill town of Vallata are the elements that generated the conceptual design for this school. Situated at the top of the hill, this linear arrangement is terminated at one end by a public court space. The plan is surrounded by a loggia, which becomes a formal entrance portico on the south creating a dialogue between the City of Vallata and the school.
- Defining the courtyard are the three primary public facilities: the gymnasium, auditorium and library. They create separate zones of the building, allowing for use of these facilities at all hours by the community without disturbing the students in the classrooms.
- The school's administrative offices are located in a tower at the intersection of the front colonnade and the gymnasium. Classrooms and laboratories are lineally arranged along either side of a large two-story circulation atrium. The atrium penetrates the entire length of the school, organizing the spaces and flooding the interior of the school with natural light from its high clerestory.



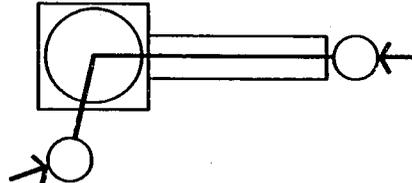
Comune Di Vallata



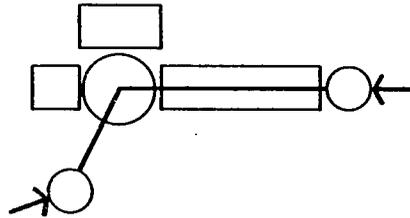
SITE ACCESS - PHYSICAL LINKAGE



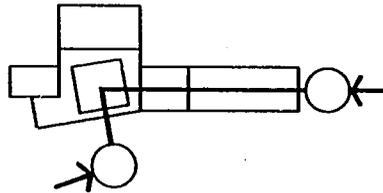
PUBLIC AREA



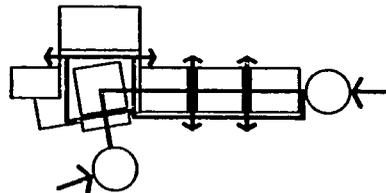
SOLAR ORIENTATION



AREA USE RELATIONSHIPS

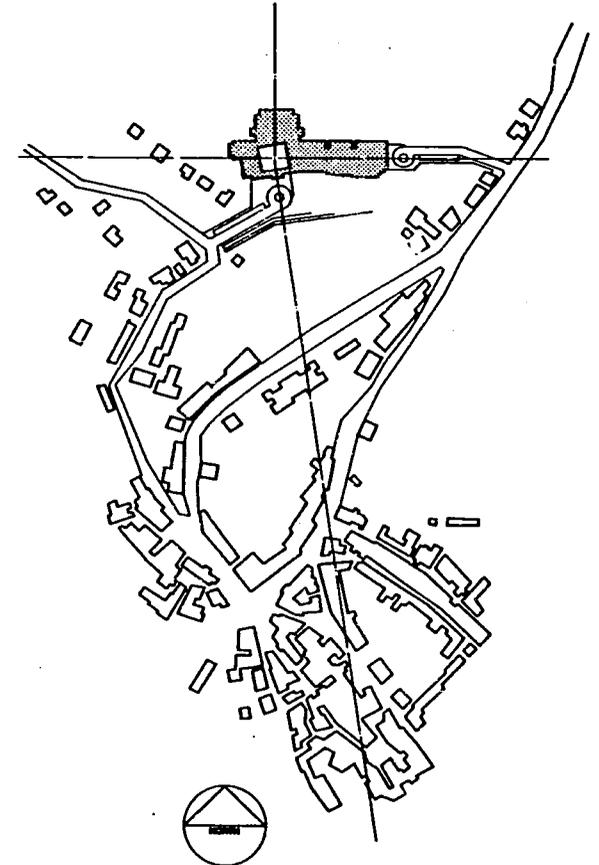


SCHOOL - TOWN CONNECTION
CONCEPTUAL DIAGRAM



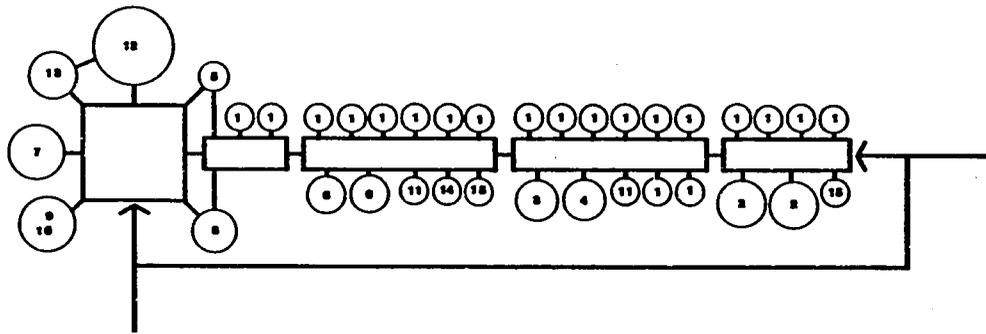
PENETRATION BUILDING MASS

5-25



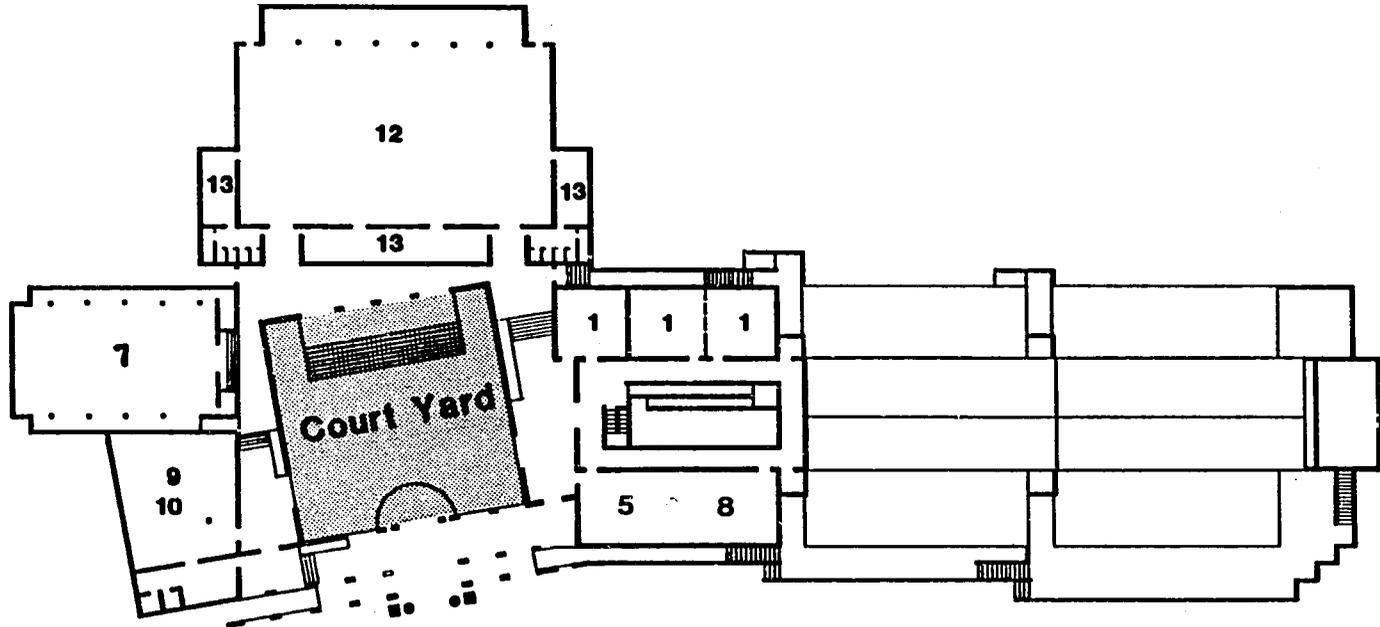
SITE PLAN

- LEGEND**
- INSTRUCTIONAL ACTIVITIES
 - CLASSROOM
 - PHYSICAL LABORATORY
 - NATURAL SCIENCE LABORATORY
 - CHEMISTRY LABORATORY
 - FOREIGN LANGUAGE LABORATORY
 - TECHNICAL DRAWING LABORATORY
 - COLLECTIVE ACTIVITIES
 - ASSEMBLY HALL
 - LIBRARY
 - COMPLEMENTARY ACTIVITIES
 - ADMINISTRATION OFFICE
 - INSTRUCTOR'S LOUNGE
 - RESTROOMS
 - PHYSICAL EDUCATION ACTIVITIES
 - GYMNASIUM
 - SUPPORT SPACE AND WAREHOUSE
 - SERVICE
 - CENTRAL HEATING PLANT & GAS STORAGE
 - STORAGE

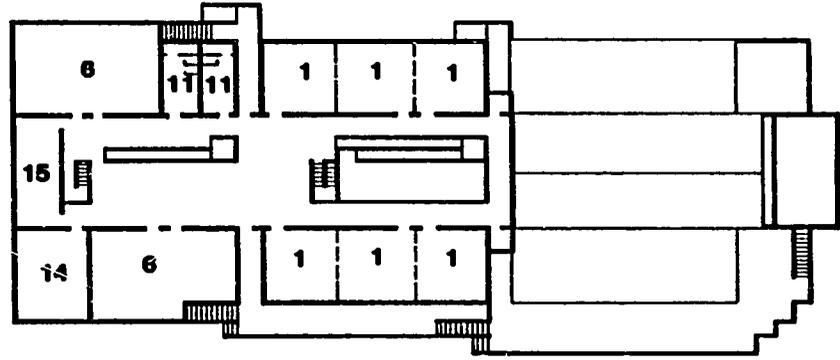
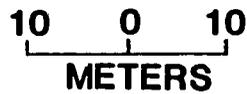


FLOW CHART

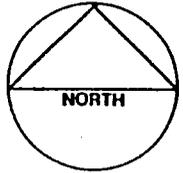
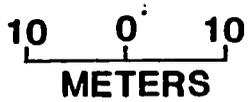
41



FIRST FLOOR PLAN



SECOND FLOOR PLAN



5-26

LEGEND

INSTRUCTION ACTIVITIES

- 1. Classroom
- 2. Physical Laboratory
- 3. Natural Science Laboratory
- 4. Chemistry Laboratory
- 5. Foreign Language Laboratory
- 6. Technical Drawing Laboratory

COLLECTIVE ACTIVITIES

- 7. Auditorium
- 8. Library

COMPLEMENTARY ACTIVITIES

- 9. Administration Offices
- 10. Professors' Lounge
- 11. Restrooms

PHYSICAL EDUCATION ACTIVITIES

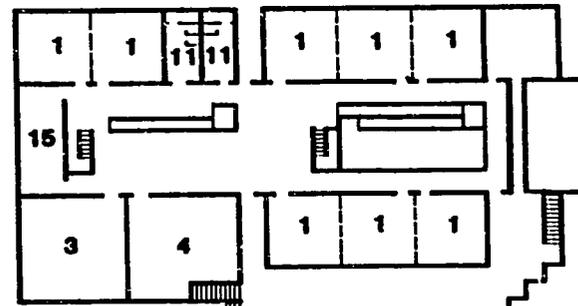
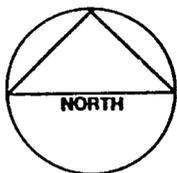
- 12. Gymnasium
- 13. Support Space and Dispensary

SERVICE

- 14. Central Heating Plant & Gas Storage
- 15. Storage

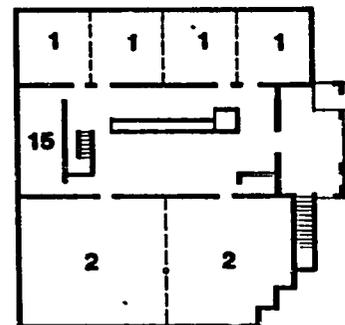
VALLATA

Handwritten mark



THIRD FLOOR PLAN

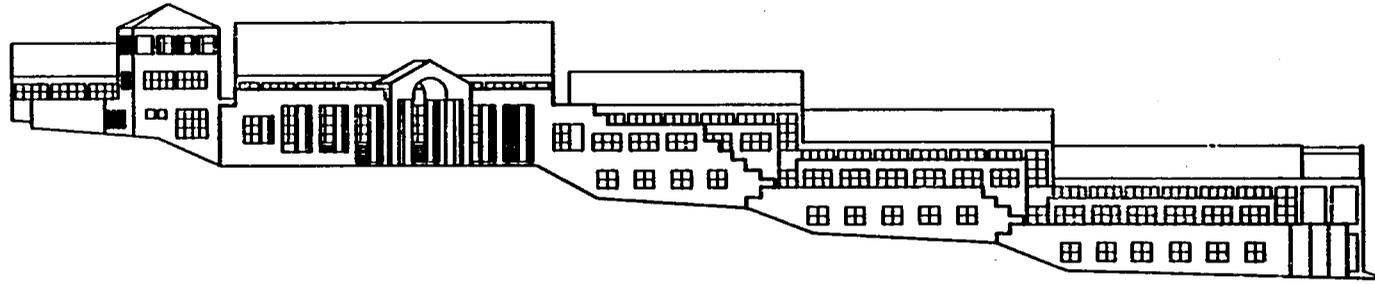
10 0 10
METERS



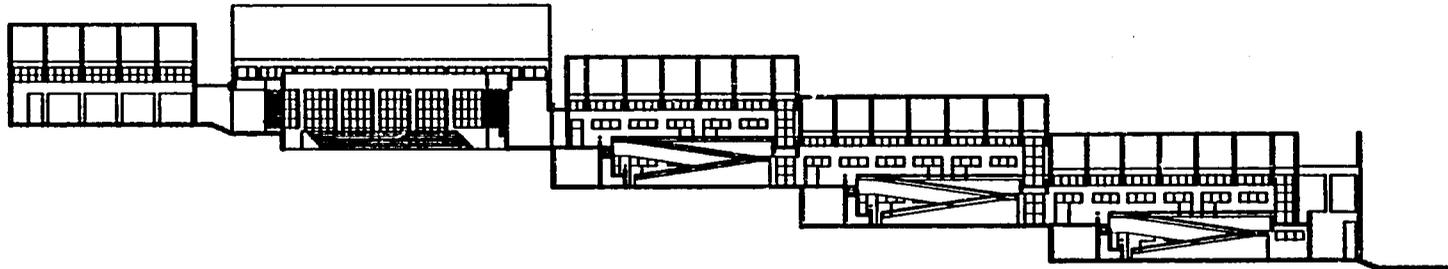
FOURTH FLOOR PLAN

10 0 10
METERS

Handwritten mark resembling a stylized 'A' or '19'.



FRONT ELEVATION

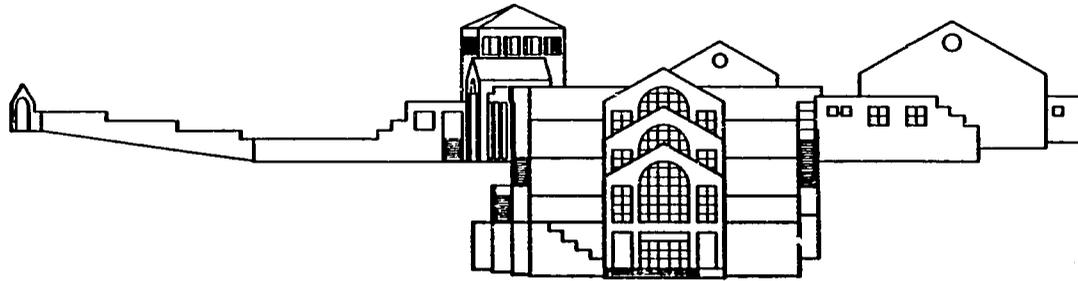


LONGITUDINAL SECTION

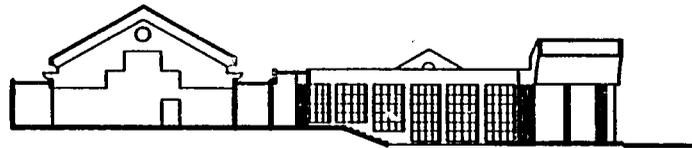
5-28

44

VALLATA



SIDE ELEVATION



CROSS SECTION

5-29

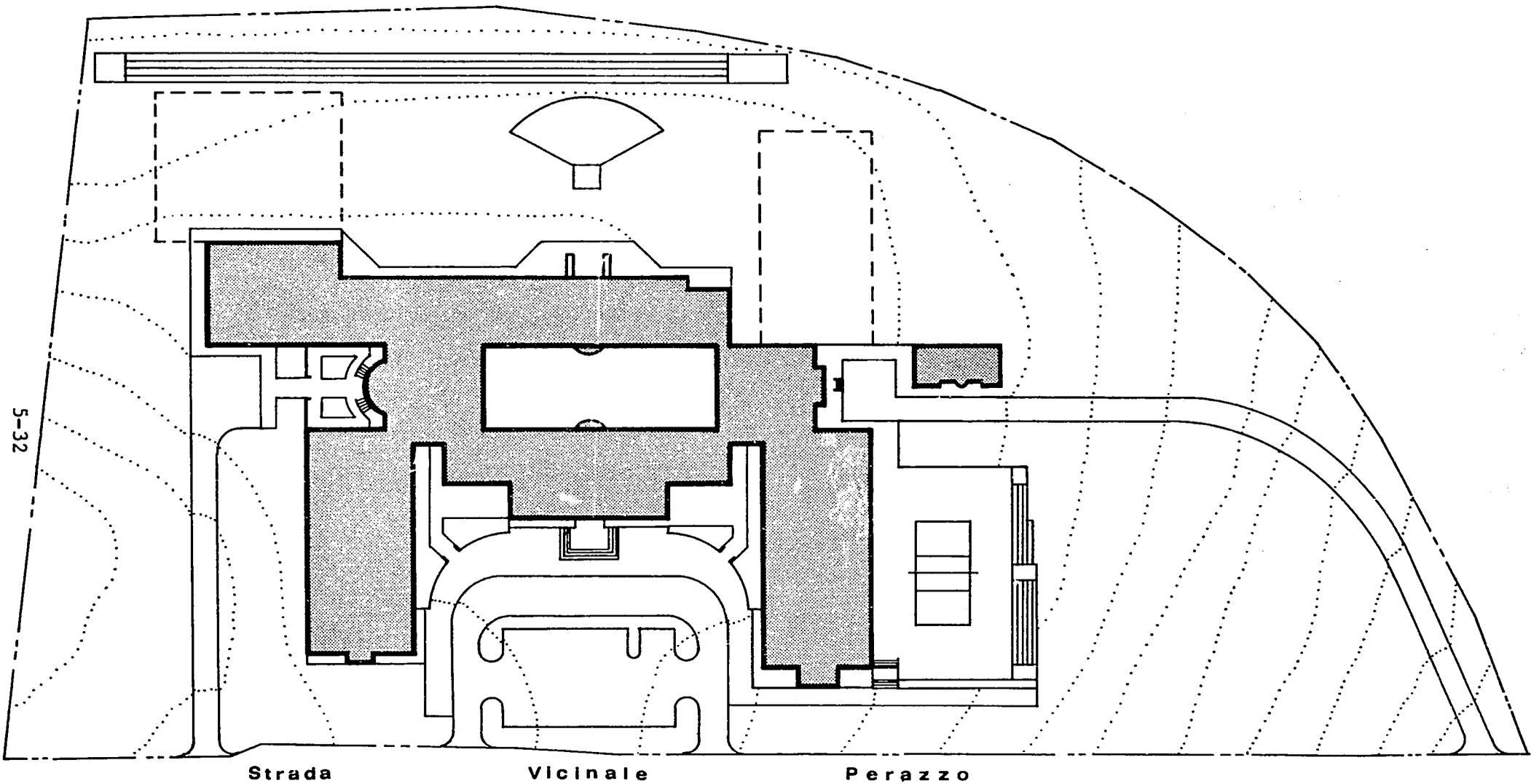
57

VALLATA

E. Grottaminarda

Design Description

- Grottaminarda, the largest of the six schools, is programmed as a technical academic center allowing students to pursue a full general coursework, as well as a specialization in the electronic field. It is designed for future expansion of laboratories, which have been presited and will be integrated with the first phase of the project.
- The two level, "C" shape plan is formed by two extending wings creating a formal main entrance to the school. Located between the two wings is the parking, entrance drive for vehicular drop-off area and the administration area, emphasizing its importance. Immediately entering the school, one is aware of a large open courtyard at the center of the school. A single loaded corridor runs along the perimeter on both levels with large operable windows providing light and capturing the local breezes for natural cooling.
- On the first level the corridor services the administration offices, auditorium, cafeteria and the electronic laboratories. It also connects the two-level classroom wing to the east and the gymnasium wing to the west. On the upper level the single-loaded corridor services the natural sciences laboratories, additional classrooms and the library.
- The structural system consists of concrete shear walls along the perimeter and selected interior locations with cast-in-place reinforced concrete joist systems for floor and roof construction.
- All of the mechanical and boiler rooms are located in a separate building situated close to the kitchen and gymnasium. A hot water solar collector is designed to provide hot water to the kitchen and the gymnasium showers.



5-32

Strada

Vicinale

Perazzo

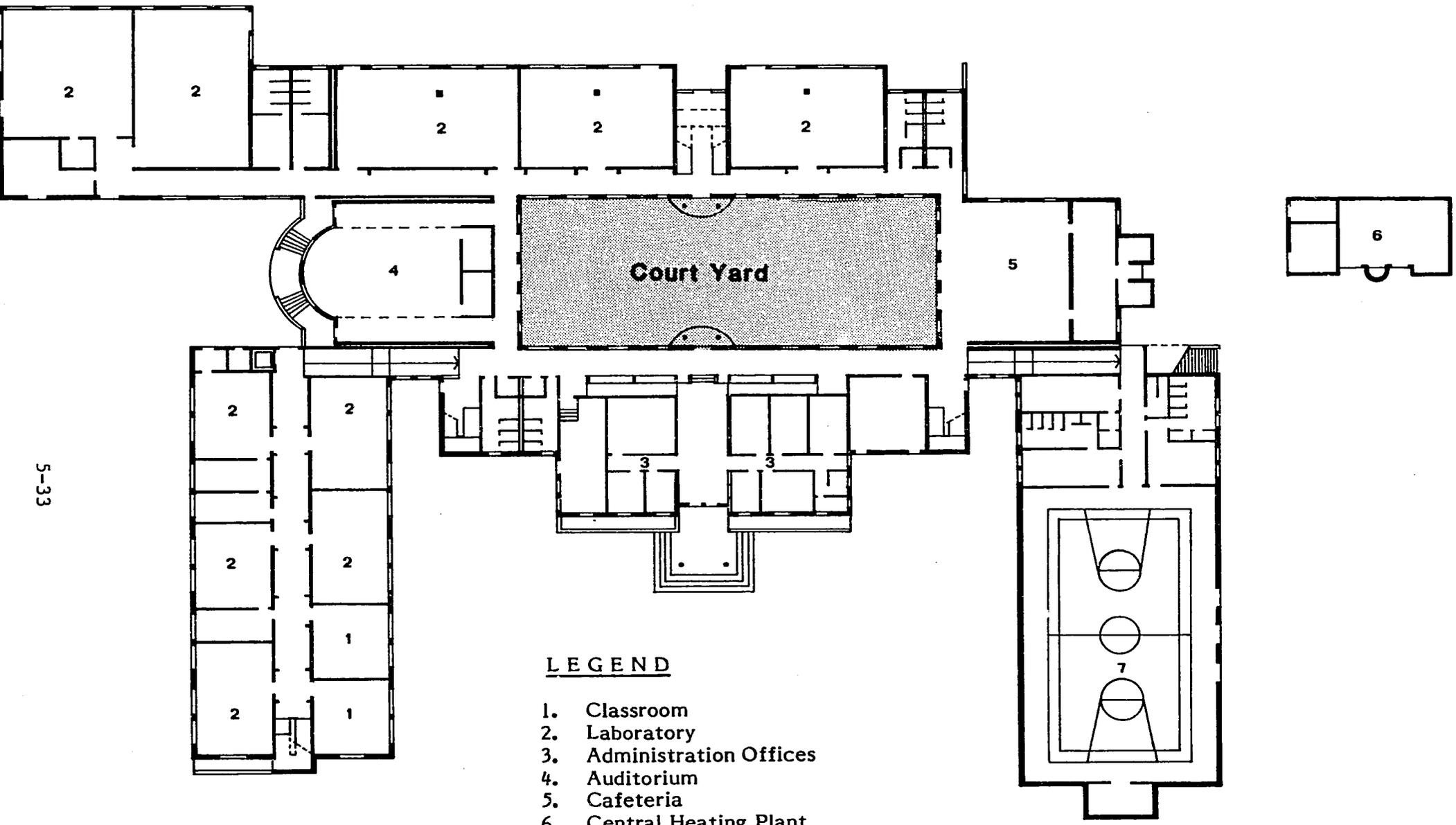
Site Plan



GROTTAMINARDA

SP

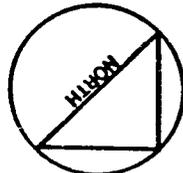
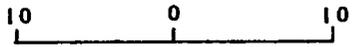
5-33



LEGEND

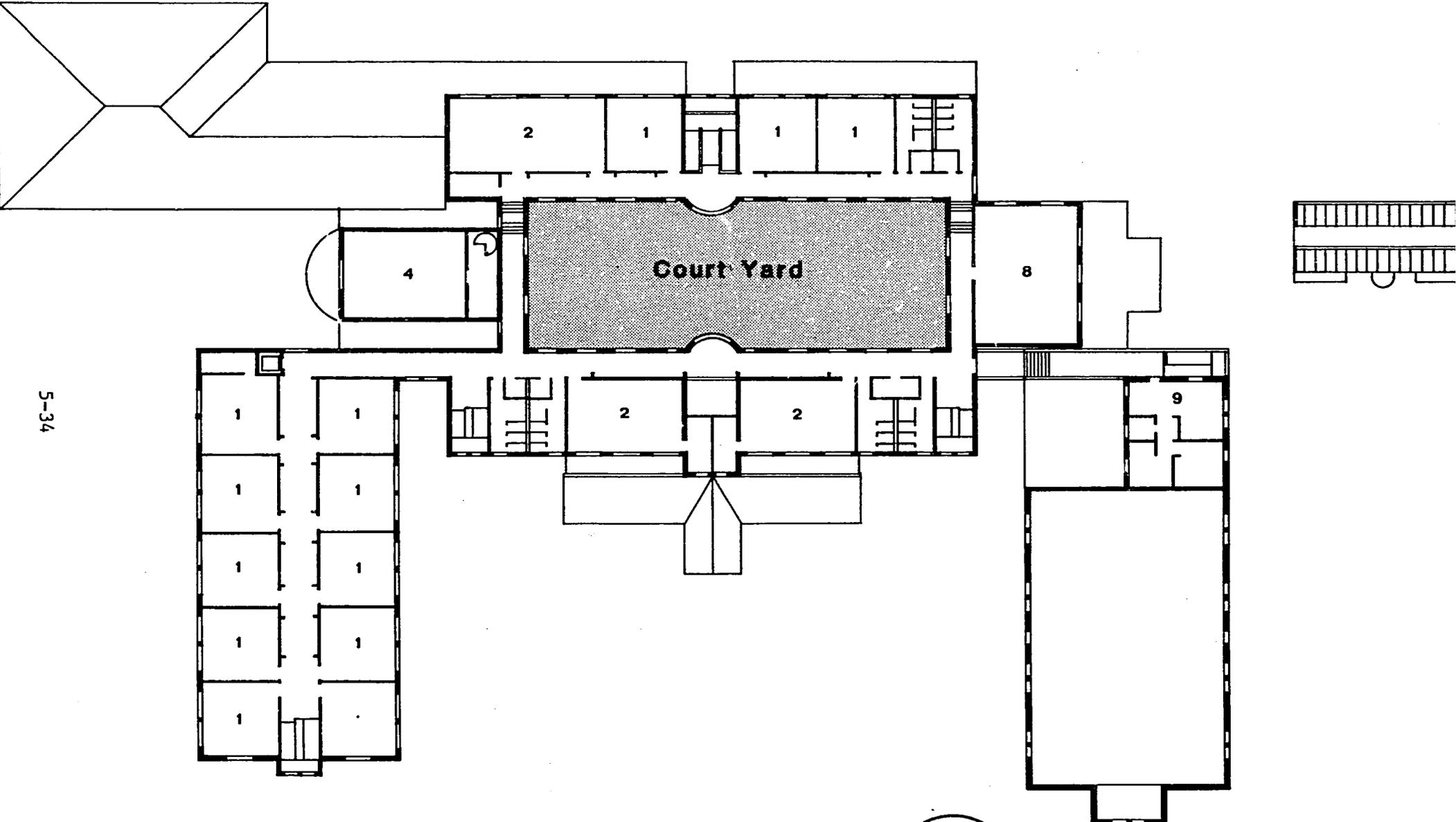
- 1. Classroom
- 2. Laboratory
- 3. Administration Offices
- 4. Auditorium
- 5. Cafeteria
- 6. Central Heating Plant
- 7. Gymnasium
- 8. Library
- 9. Custodian's Apartment

Ground Floor



GROTTAMINARDA

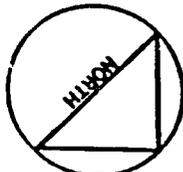
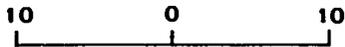
49



5-34

50

First Floor

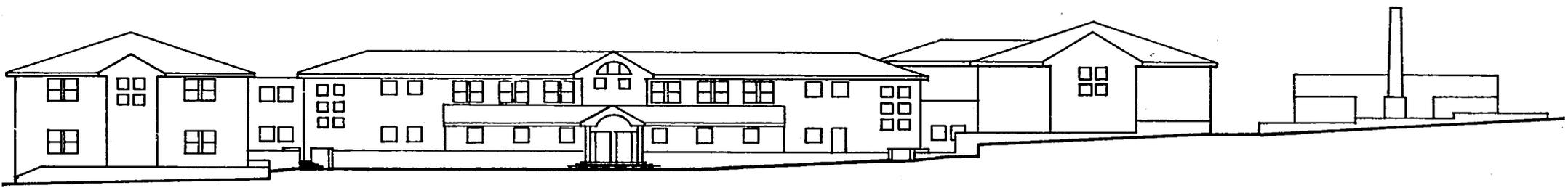


GROTTAMINARDA



Longitudinal Section

5-35



Entrance Elevation

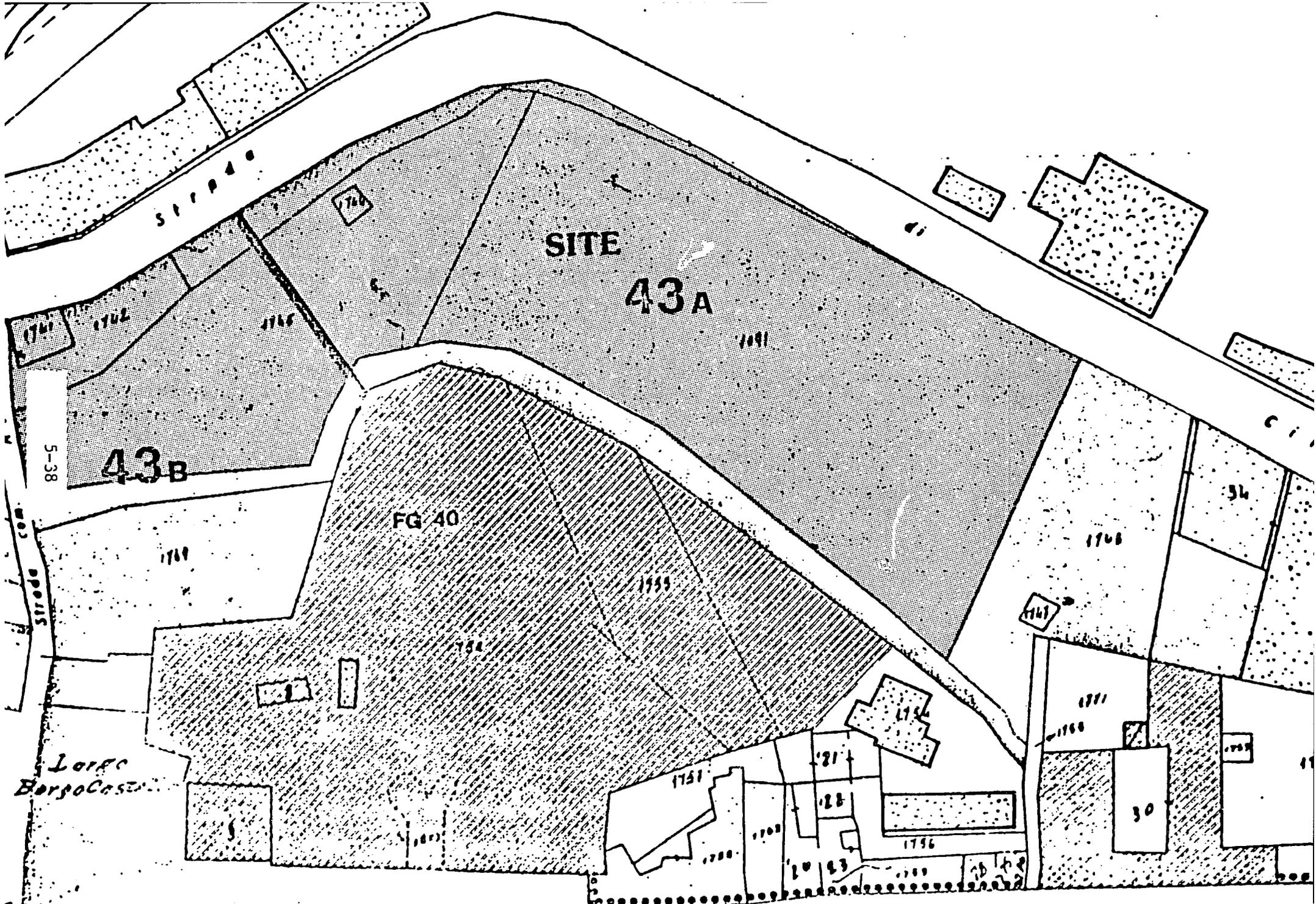
51

F. Avellino

Design Description

- The site for the Avellino school is viewed as an important link in the fabric of the town, connecting the piazza site near the old town to the west with a museum site to the east.
- The major road which curves around the site on the north is graded and sustains heavy traffic. The site itself drops steeply from the piazza level creating a depressed area to the west relative to the street grade.
- The program calls for three distinct zones or functional districts in the plan:
 1. The performance hall
 2. The Conservatory classrooms and studios
 3. The junior high school and auditorium
- Elements of these three units are arranged to form a long curving axis which presses closely to the edge of the road forming a continuous wall surface which reinforces the spatial definition of the street.
- The opposite, or south side, is more broken and spatial, articulating the major plan elements.
- At the west end, the building terminates in the Conservatory Performance Hall which engages with and helps define the piazza, presenting a formal entrance to this public space. The Performance Hall is linked to the school by a curved, indoor connection on the north or road side which contains the library and administrative offices. The Hall is detached from the school by a notch creating an open space on the south side. The connection between the steps and school is pinned by a tower which identifies the southside entrance plaza.
- The classrooms and studios are arranged around two square internal courts formed by cross axial arms which link the two primary classroom corridors. The courts are designed to create a quiet internal focus for the classrooms. A loggia on the street side repropotions the facade in a more classical composition by further organizing the elements of the facade to reflect the zoning of the plan.

- The east end of the building terminates with the Junior High School and gymnasium. Separation occurs between the music classrooms and the Junior High by a slight reduction in mass and scale. This eastern termination establishes a dialogue between the functional requirements of the gymnasium, junior high school and outdoor sports field. The south side of these facades are soft and subtle, articulating the components. This subtlety is reflected in the relationship created between the users of the amphitheatre, southside plaza and the sports field, inviting interaction between each of them. These two spaces, connected along the south side by walks, develop strong relationships at a pedestrian level with the building and the surrounding existing cityscape. The sports field was placed close to the building, drawing active participation from the gymnasium and classrooms.
- The site offered several restraints as to how the building was to be placed and its relation to the surrounding elements. The design which evolved draws from the characteristics of the local architecture.



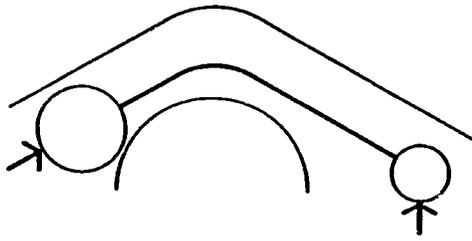
SITE
43A

43B

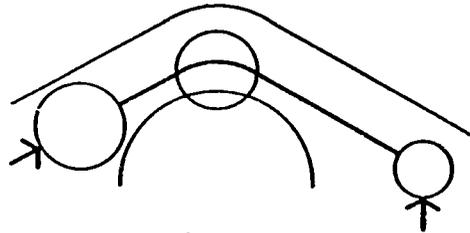
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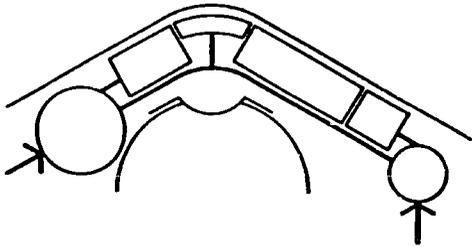
Comune Di Avellino



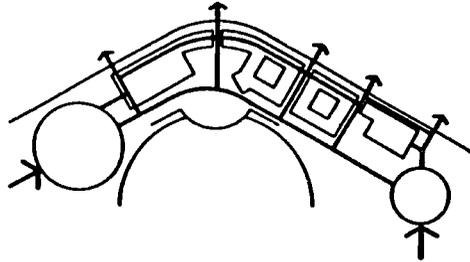
SITE ACCESS - PHYSICAL LINKAGE



PUBLIC SPACE RELATIONSHIP

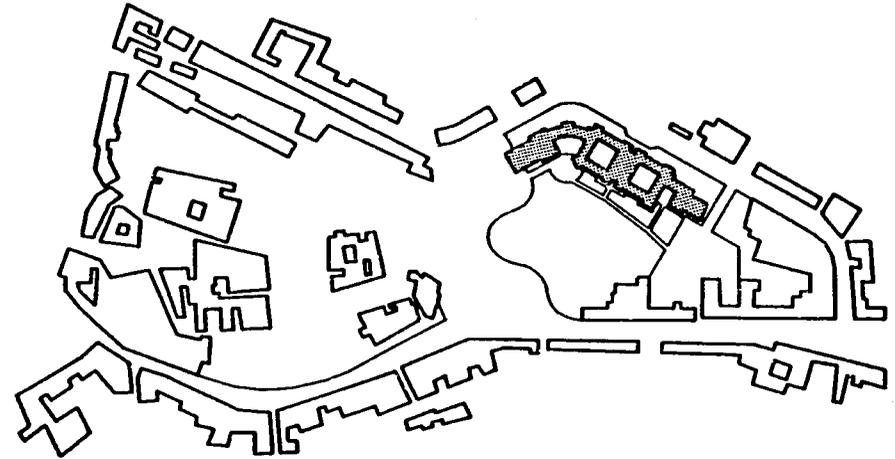


COMMUNITY/SCHOOL USE AREA

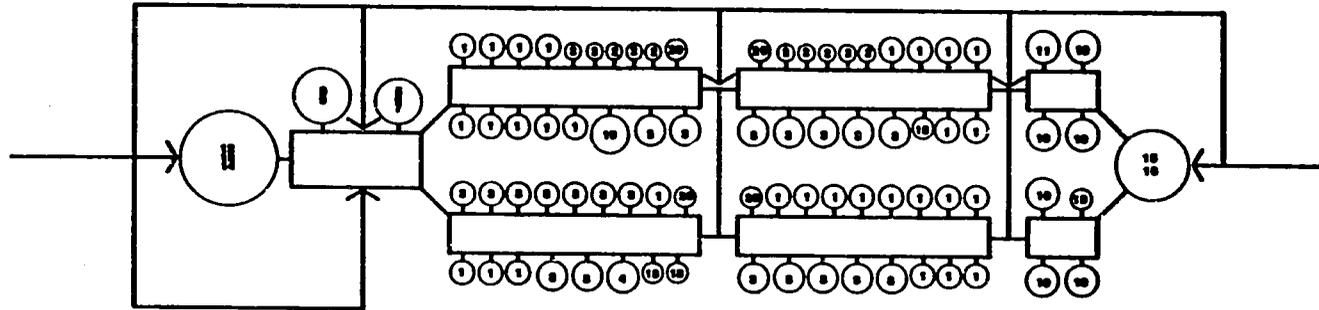


PENETRATION - CIRCULATION

CONCEPTUAL DIAGRAM



SITE PLAN



FLOW CHART

5-39

55

LEGEND

PRINCIPAL SUBJECT

- 1. Classroom
- 2. Music Studio

COMPLEMENTARY SUBJECT

- 3. Classroom
- 4. Special Classroom

COLLECTIVE ACTIVITIES

- 5. Library
- 6. Record Library
- 7. Concert Hall

COMPLEMENTARY ACTIVITIES

- 8. Professors' Lounge
- 9. Administration Offices

JR. HIGH SCHOOL

- 10. Classrooms
- 11. Professors' Lounge

AUDITORIUM

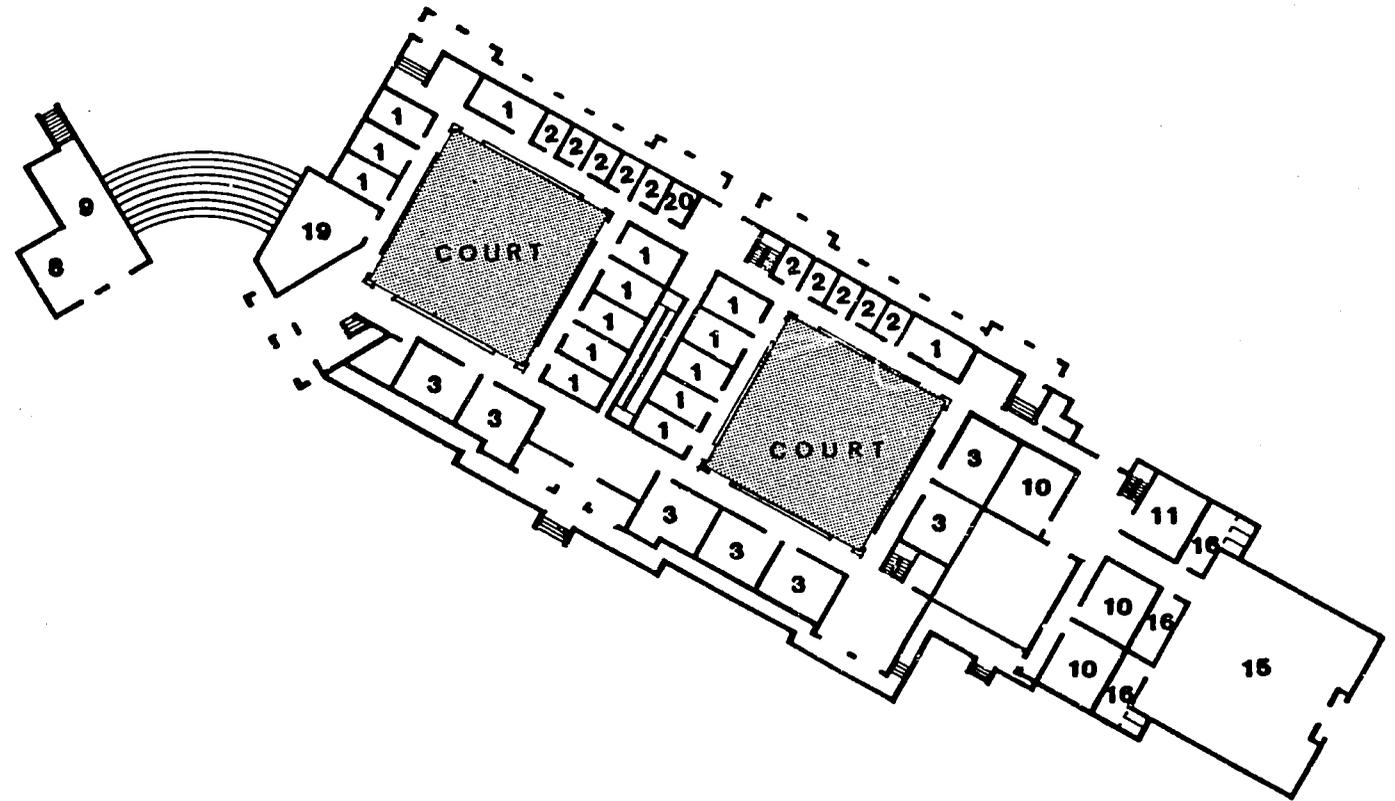
- 12. House
- 13. Entrance Lobby
- 14. Support Space

PHYSICAL EDUCATION ACTIVITIES

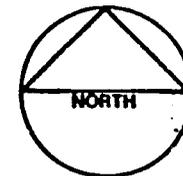
- 15. Gymnasium
- 16. Locker Room

SERVICE

- 17. Custodian's Apartment
- 18. Storage
- 19. Central Heating Plant
- 20. Restrooms



FIRST FLOOR PLAN 10 0 10

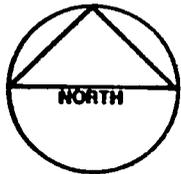
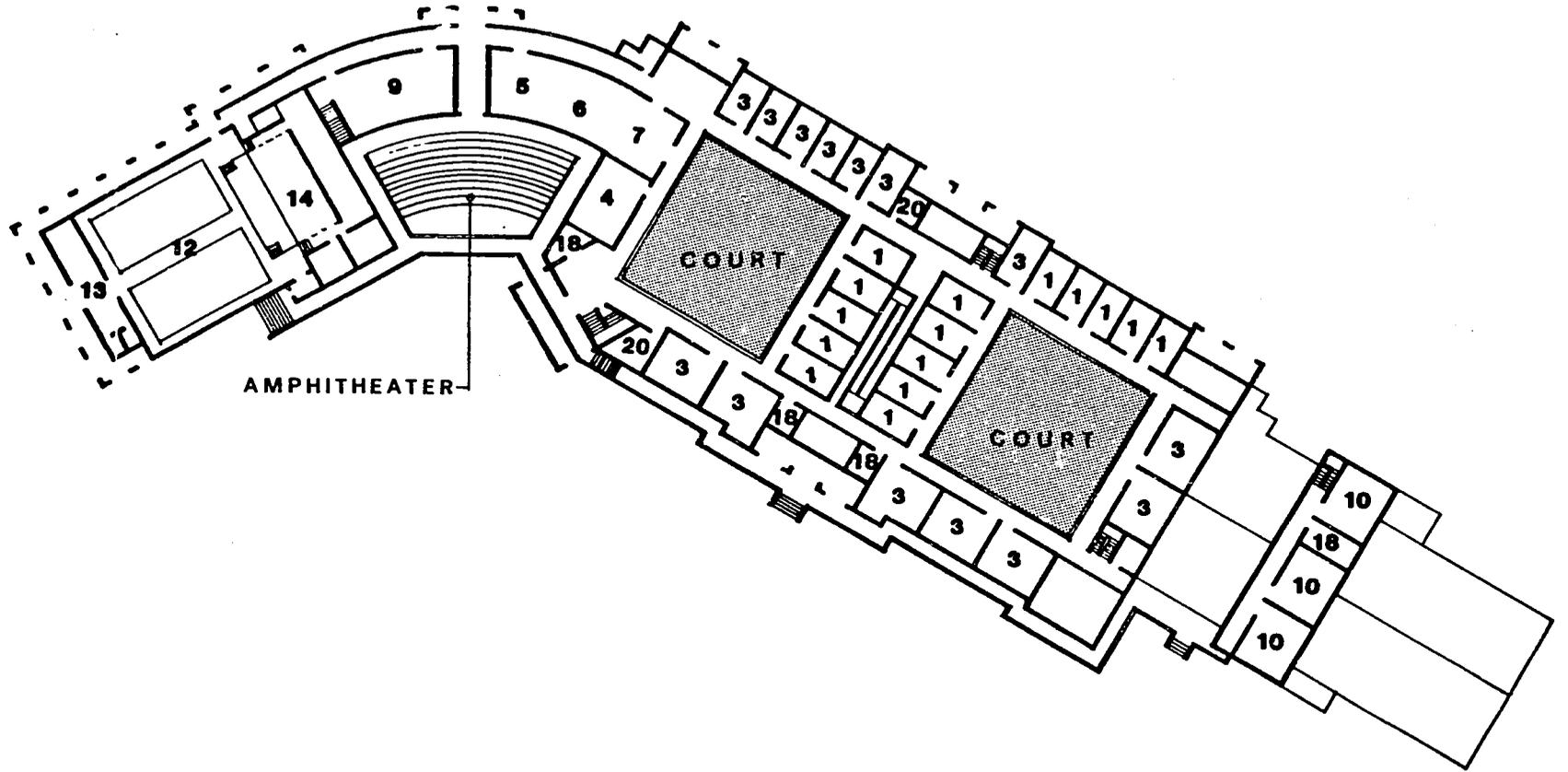


AVELLINO

5-40

9/6

5-41



SECOND FLOOR PLAN 10 0 10
METERS

AVELLINO

51



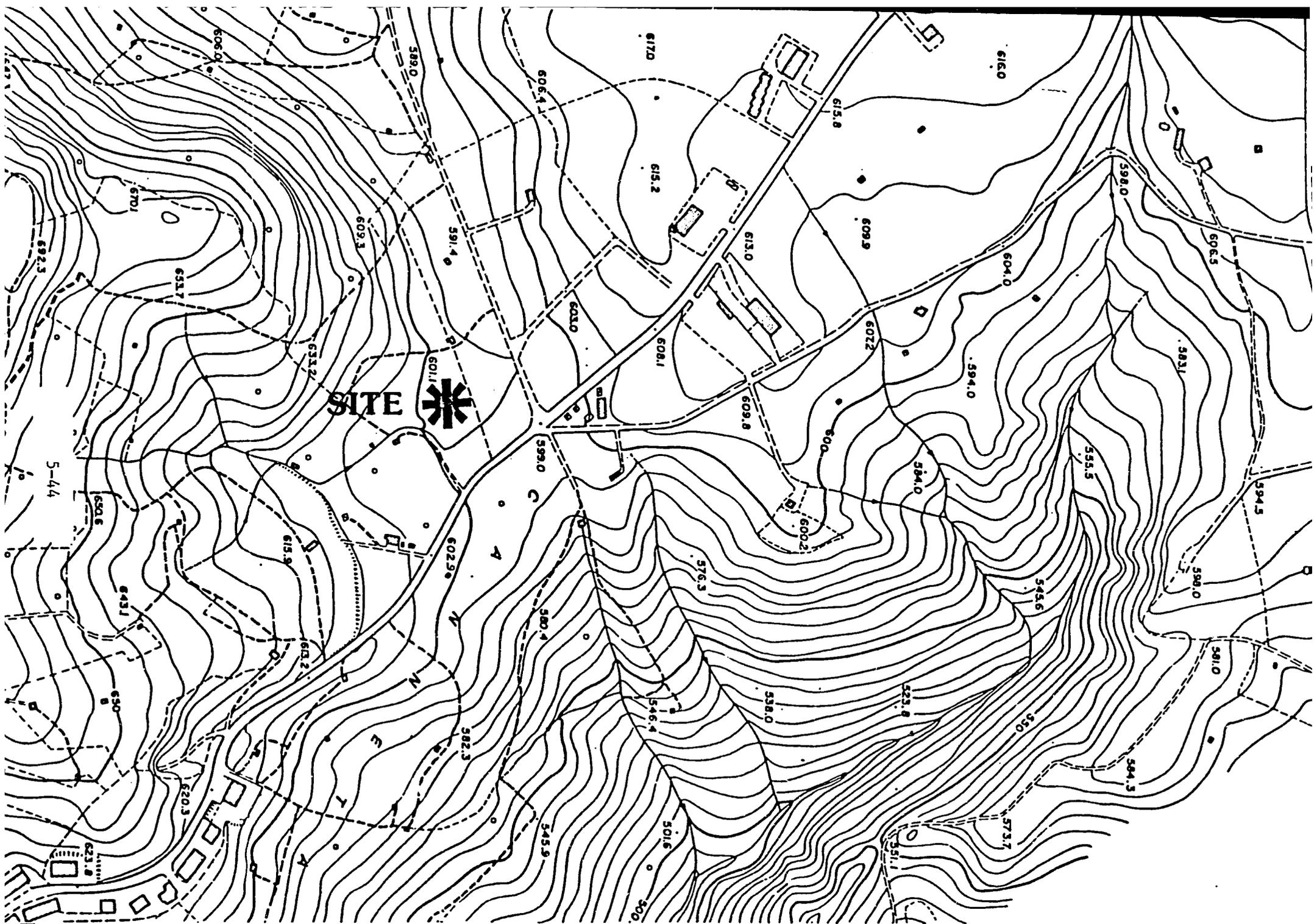
SIDE ELEVATION 10 0 10
METERS

5-42



LONGITUDINAL SECTION 10 0 10
METERS

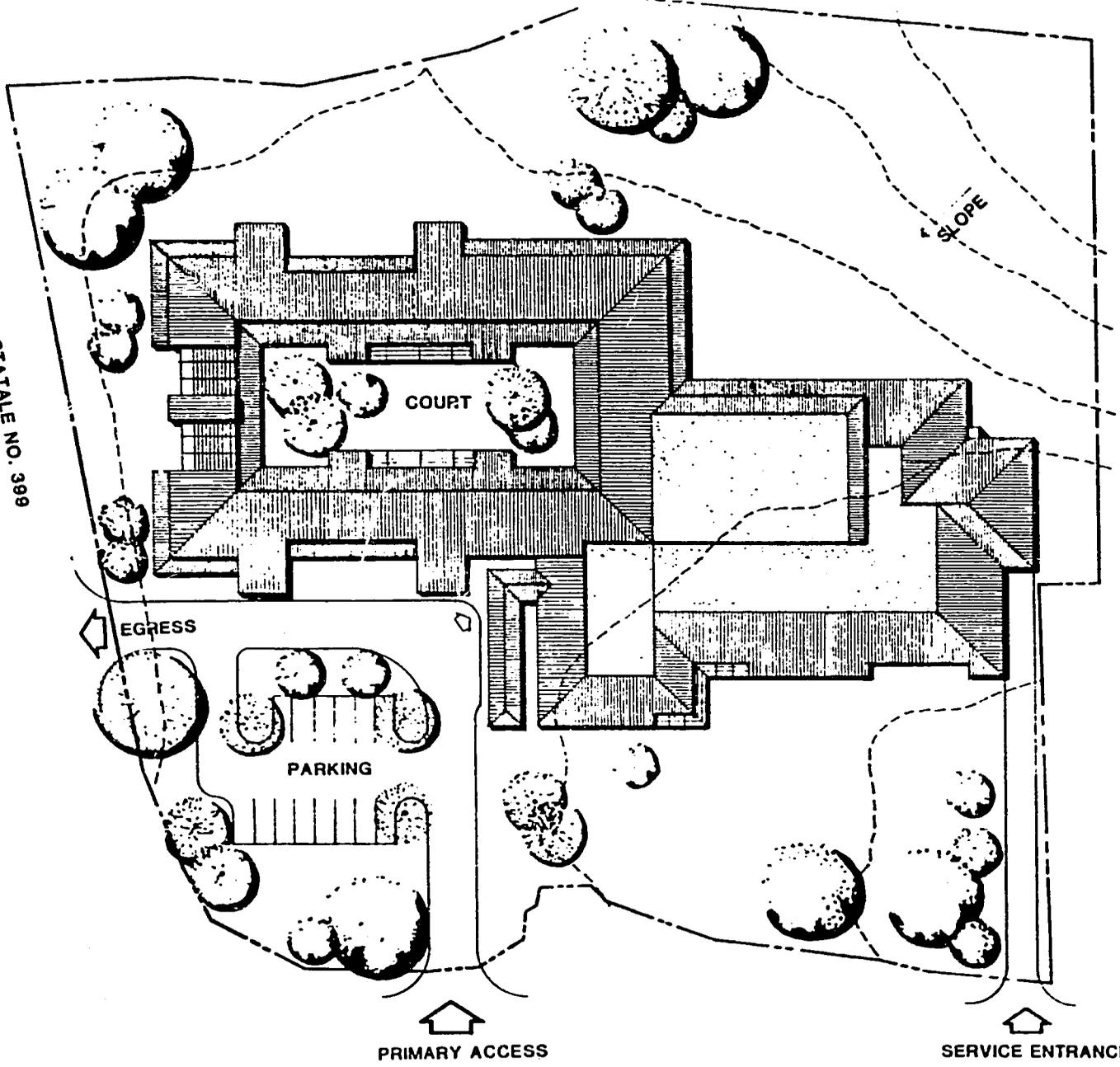
58



Comune Di Calitri

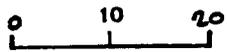
5-45

STRADA STATALE NO. 399



STRADA VICINALE PALUDE DI PITTOLI

SITE PLAN

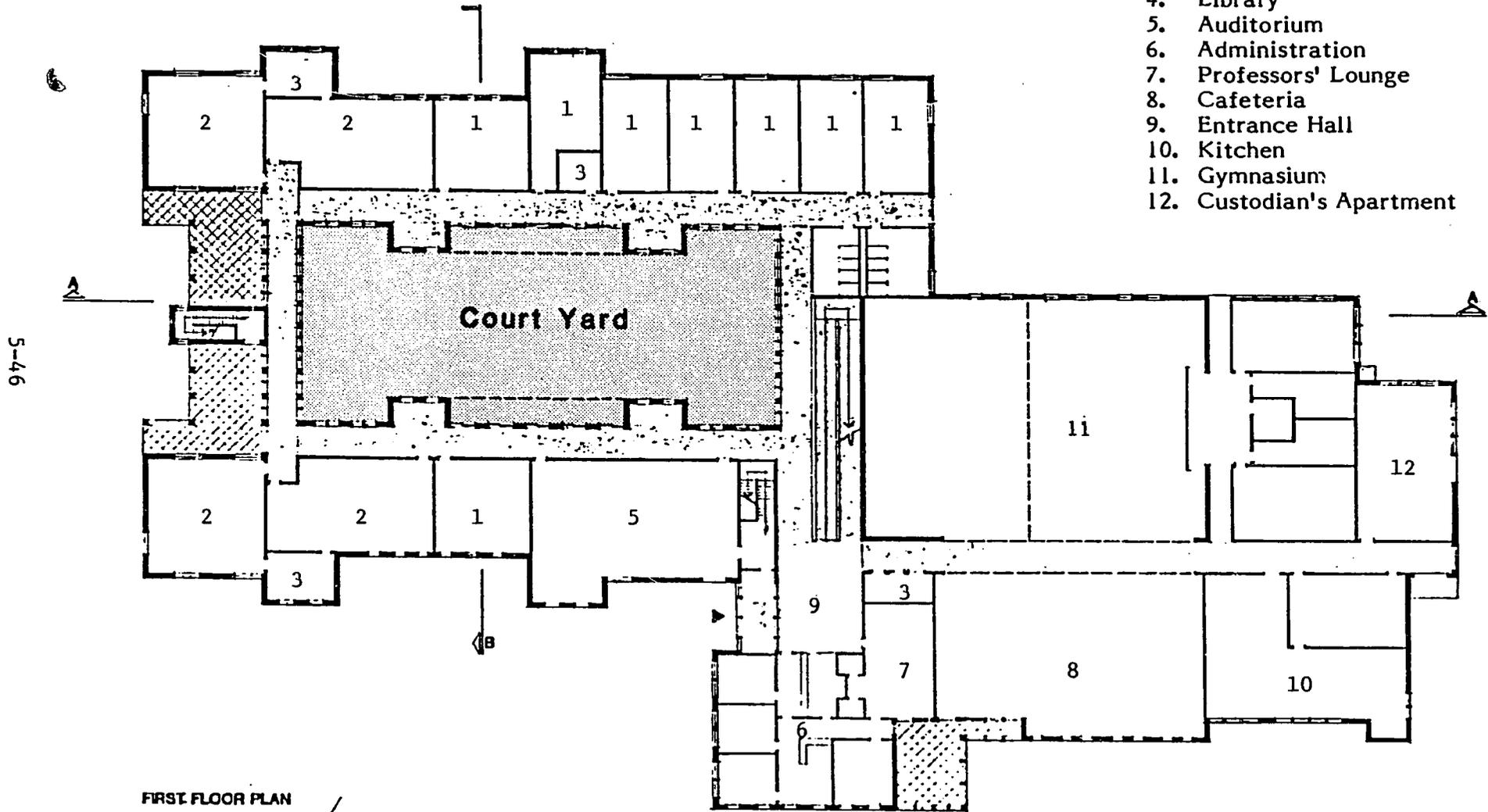


Calitri

61

LEGEND

- 1. Classroom
- 2. Laboratory
- 3. Administration Offices
- 4. Library
- 5. Auditorium
- 6. Administration
- 7. Professors' Lounge
- 8. Cafeteria
- 9. Entrance Hall
- 10. Kitchen
- 11. Gymnasium
- 12. Custodian's Apartment



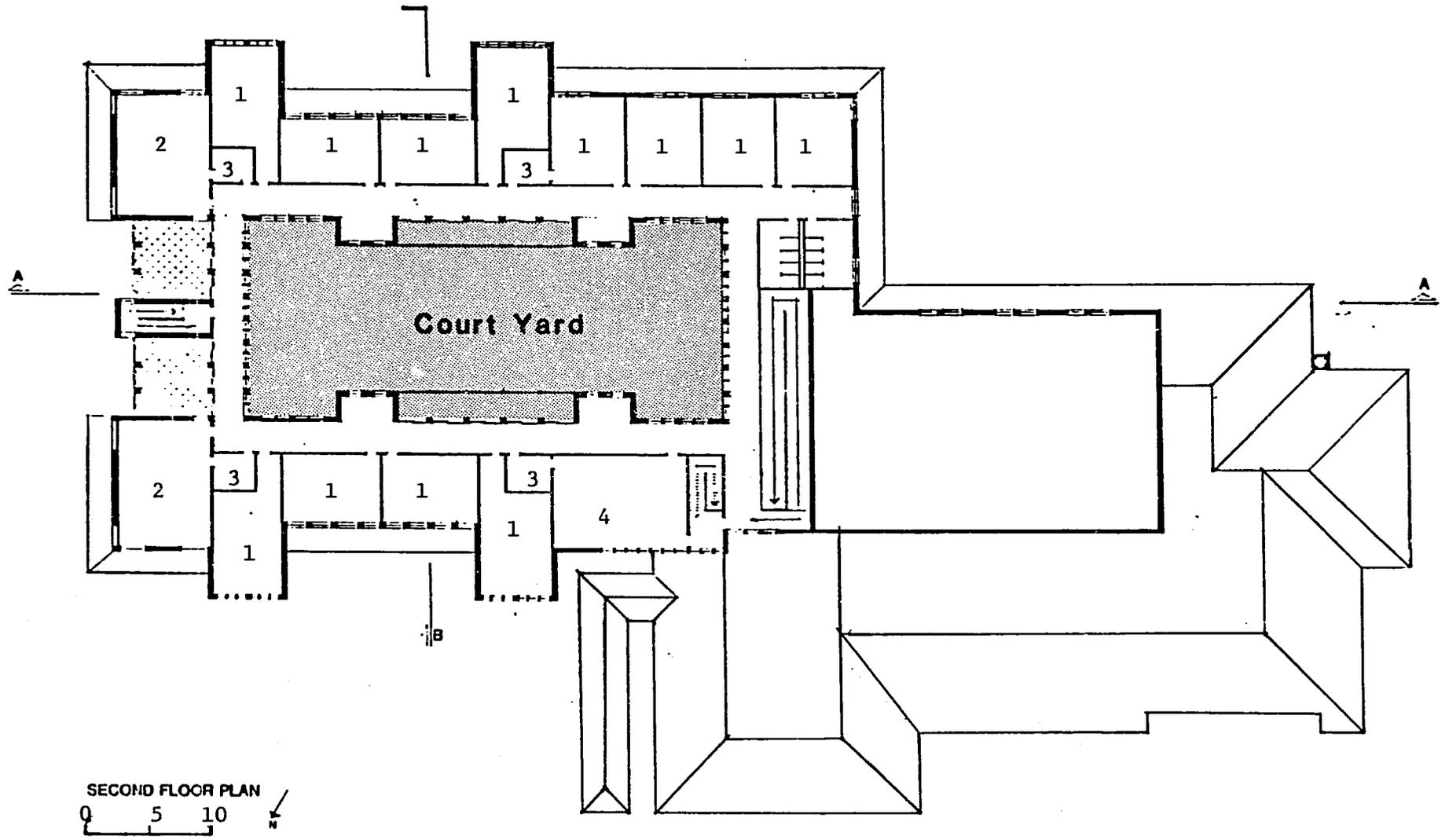
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FIRST FLOOR PLAN

0 5 10

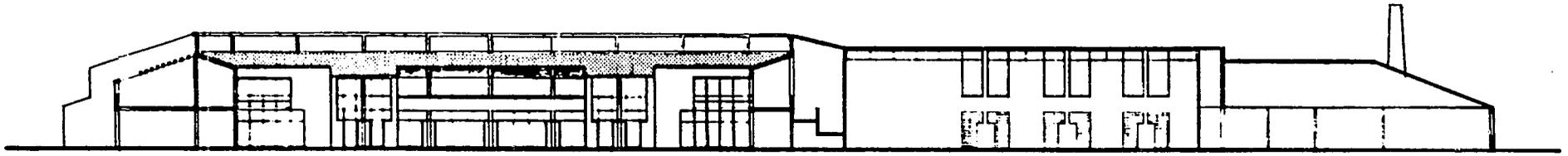
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5-47



SECOND FLOOR PLAN
0 5 10

63



SECTION A A 0 5 10

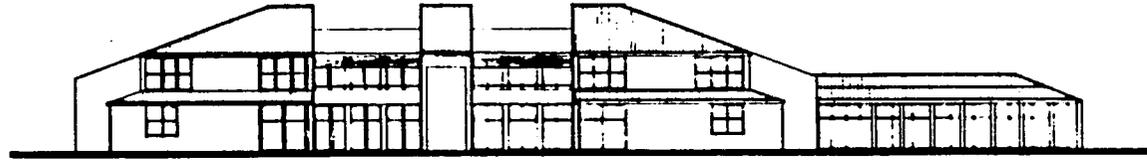
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NORTH ELEVATION 0 5 10

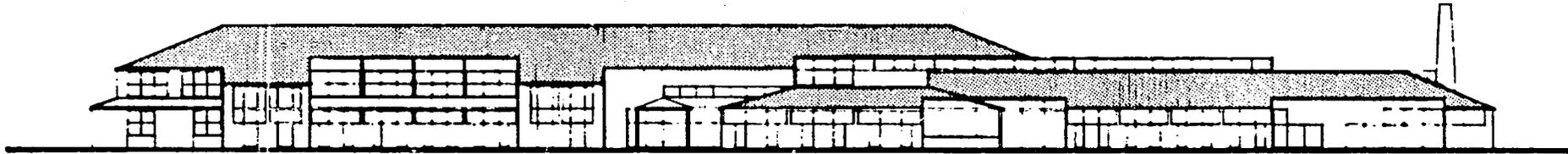
6/2

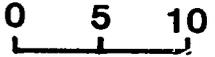
Calitri



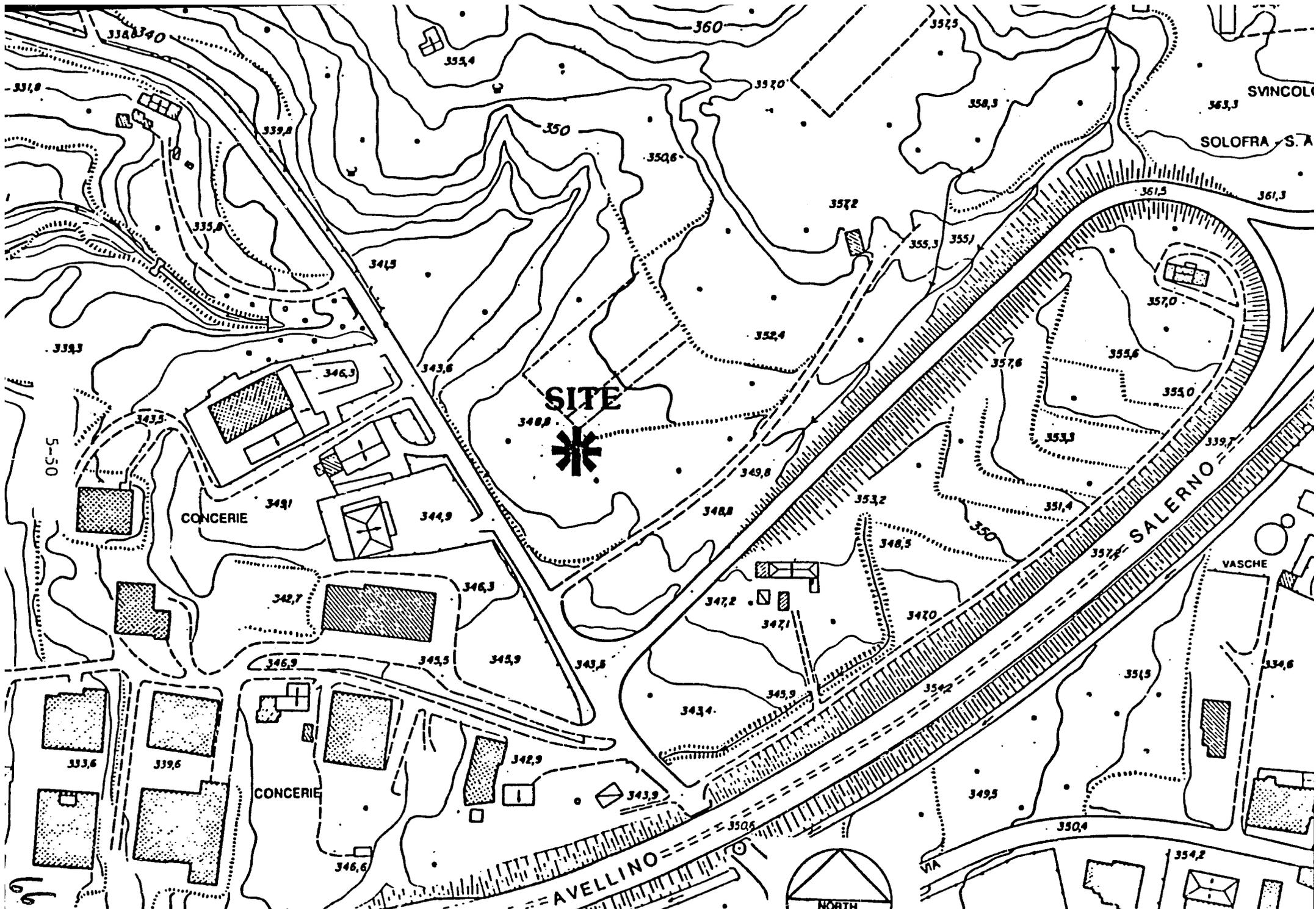
EAST ELEVATION 

5-49



NORTH ELEVATION 

63



Comune Di Solofra

LEGEND

INSTRUCTIONAL ACTIVITIES

1. Classroom
2. Natural Science
3. Chemistry Lab
4. Physics Lab
5. Technical Drawing
6. 2nd Year Workshop
7. Store Room
8. Tanning Technology
9. Technical Analysis
10. 3rd Year Chemistry Lab
11. Technical Office

COLLECTIVE ACTIVITIES

12. Auditorium
13. Library

COMPLEMENTARY ACTIVITIES

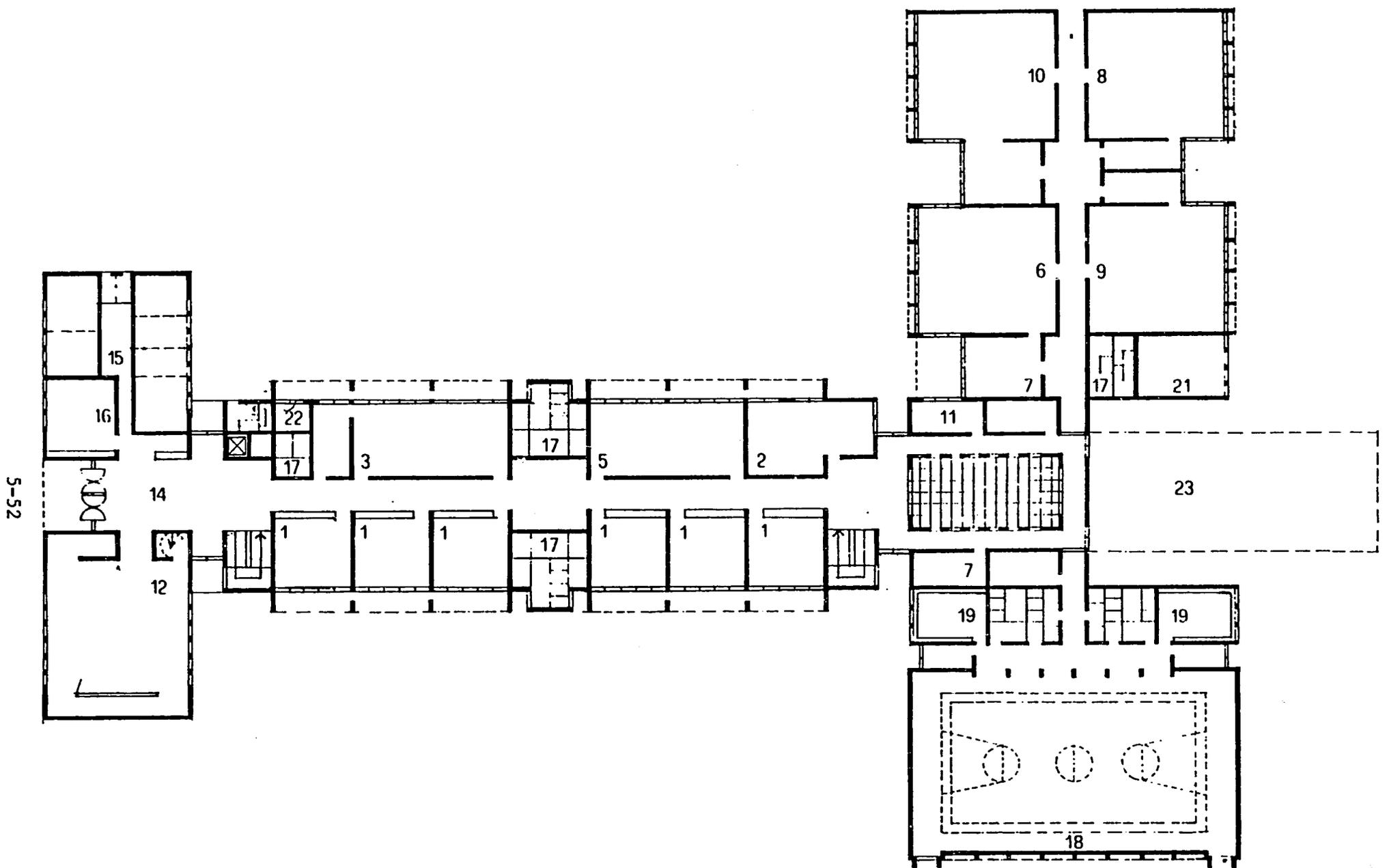
14. Entrance Lobby
15. Administration Offices
16. Professors' Lounge
17. Restrooms

PHYSICAL EDUCATION ACTIVITIES

18. Gymnasium
19. Gymnasium Locker Room

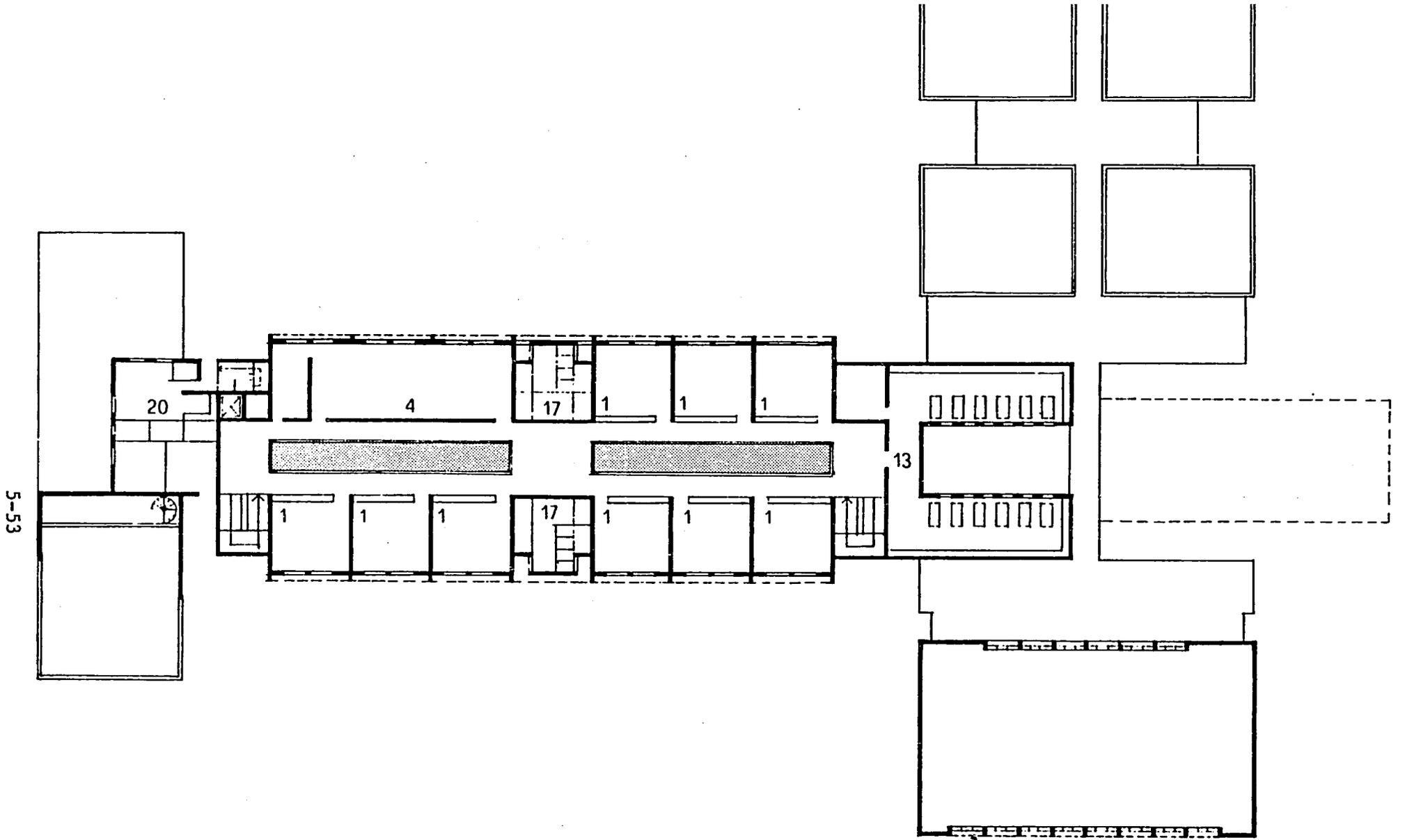
SERVICE

20. Custodian's Apartment
21. Central Heating Plant
22. Gas Storage
23. Expansion Area



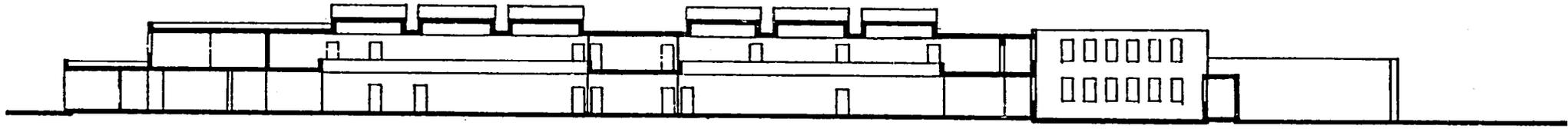
FIRST FLOOR

68



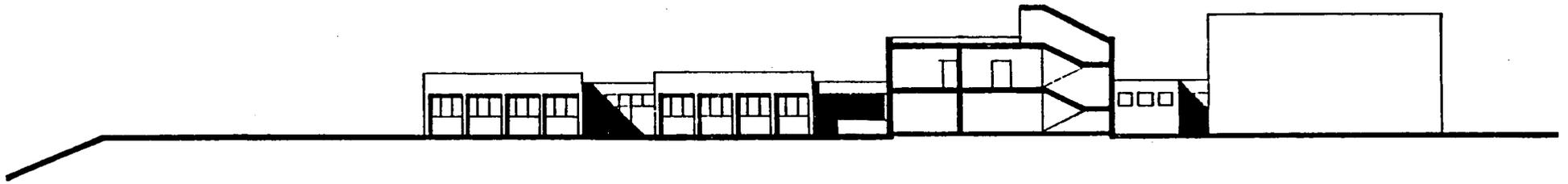
SECOND FLOOR

69



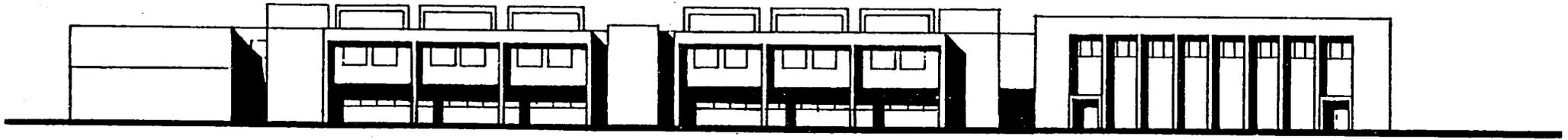
LONGITUDINAL SECTION

5-54



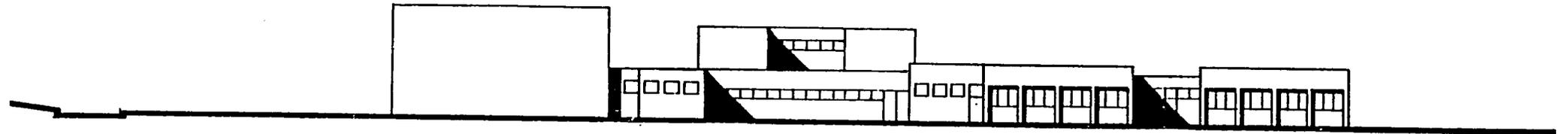
CROSS SECTION

10



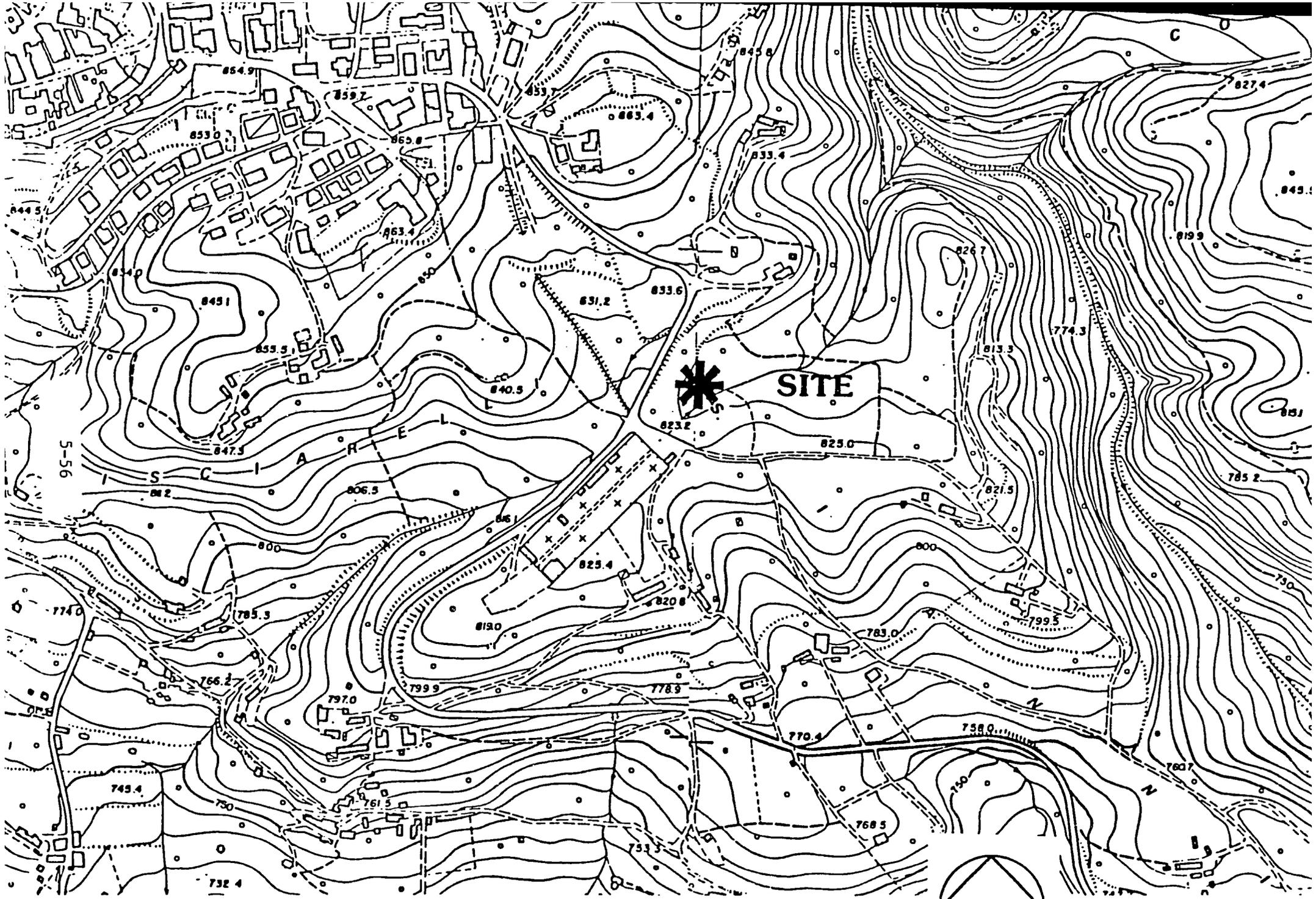
FRONT ELEVATION

5-55

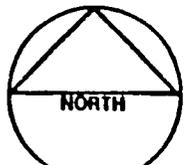


SIDE ELEVATION

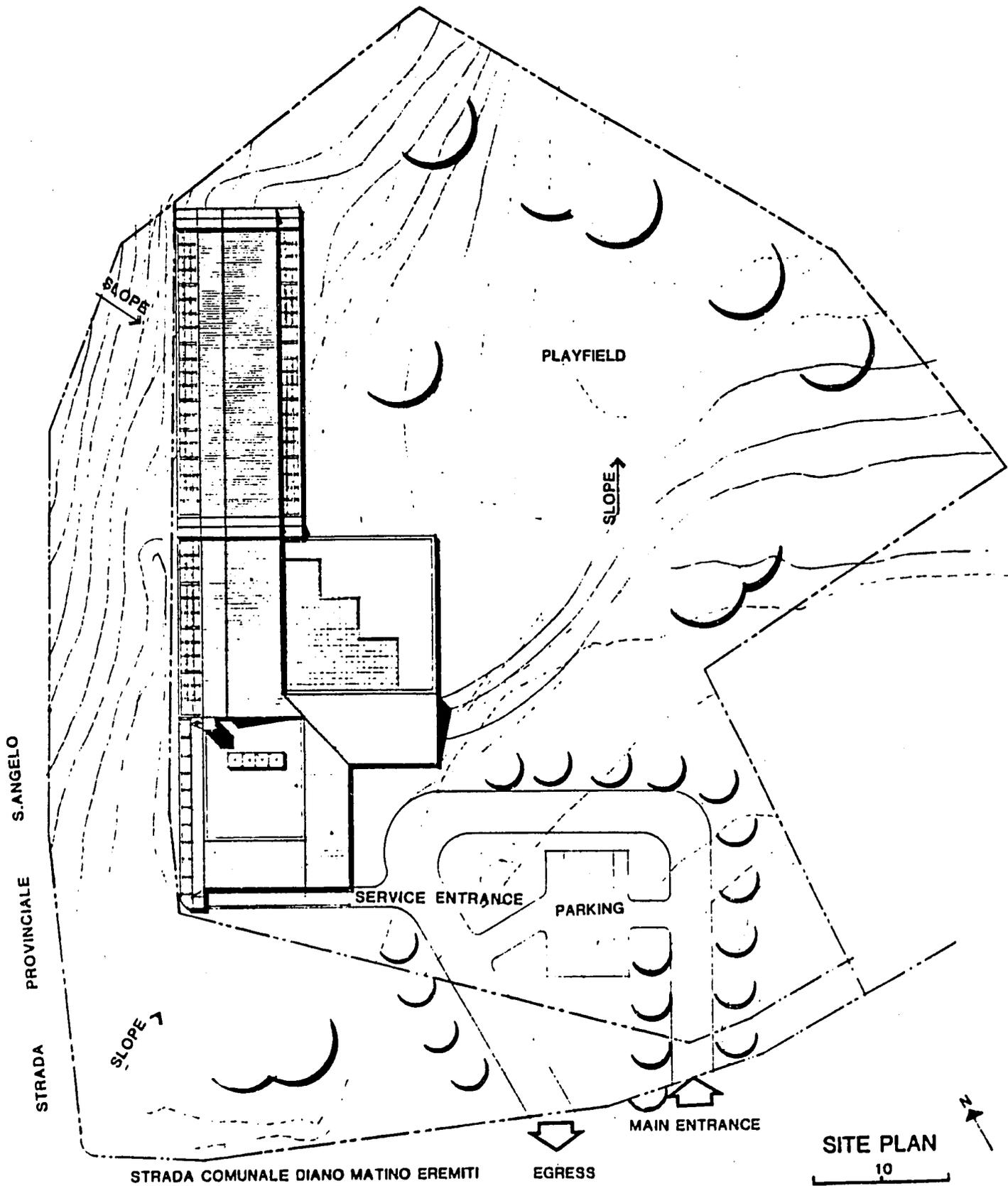
11



SITE

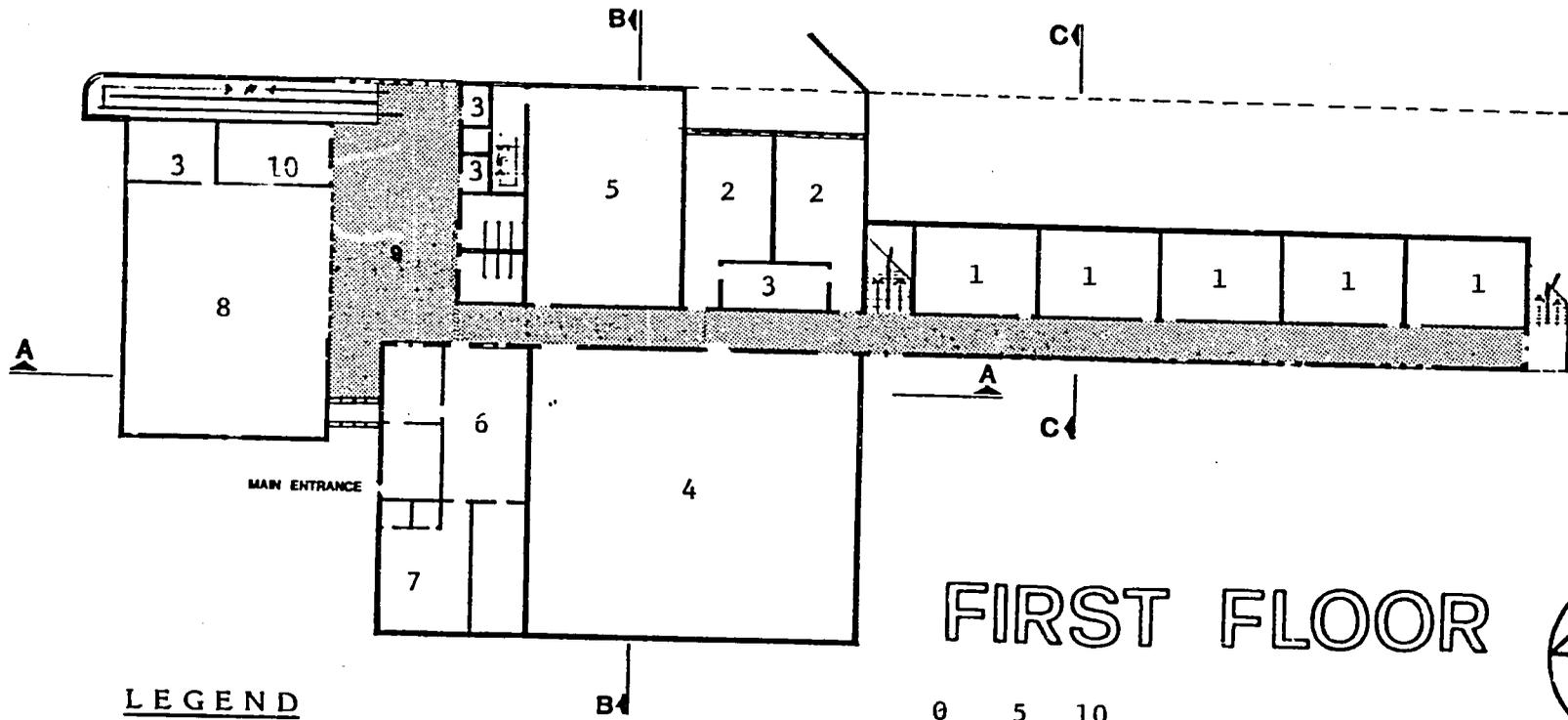


Comune Di Sant Angelo Dei Lombardi



73

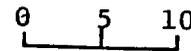
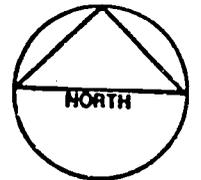
5-58



FIRST FLOOR

LEGEND

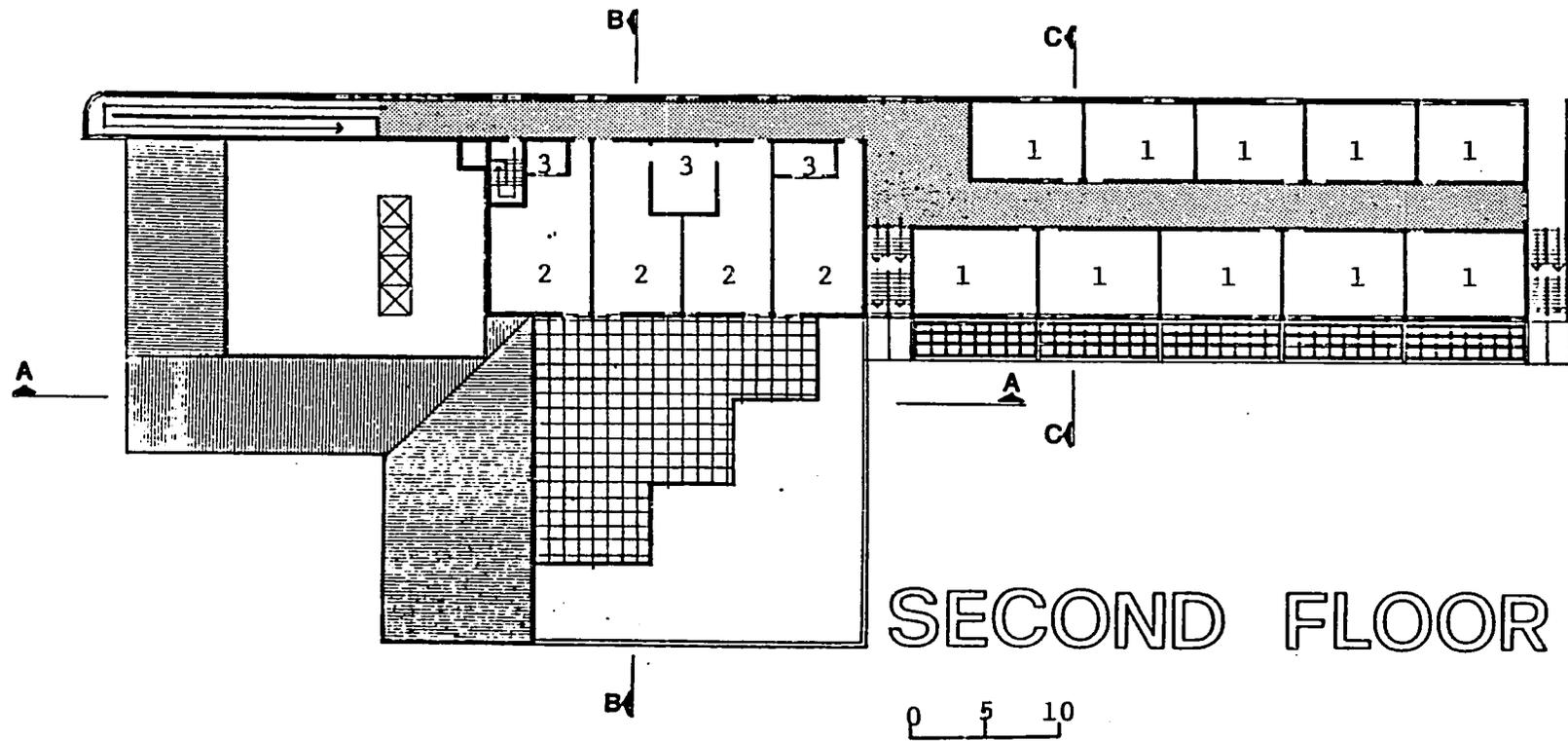
- 1. Classroom
- 2. Laboratory
- 3. Office
- 4. Gymnasium
- 5. Library
- 6. Professors' Lounge
- 7. Administration Offices
- 8. Auditorium
- 9. Entrance Lobby
- 10. Storage



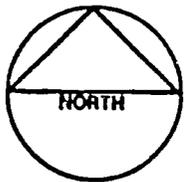
Sant Angelo Dei Lombardi

Handwritten mark resembling the number '14'.

5-59

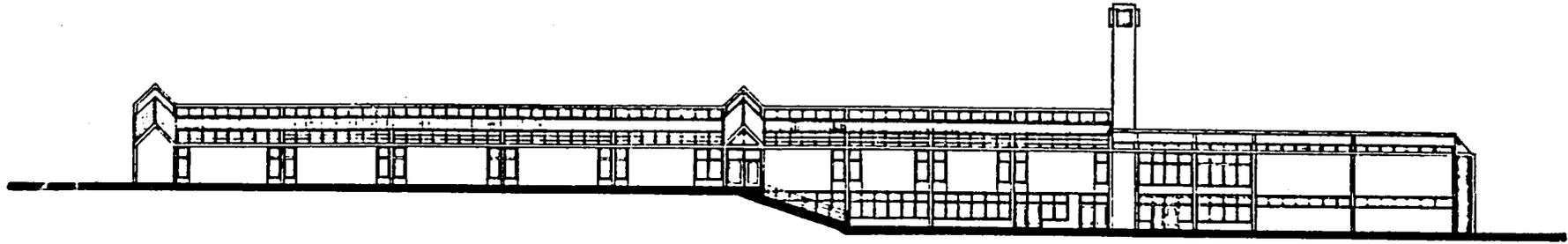


SECOND FLOOR

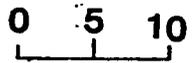


Sant Angelo Dei Lombardi

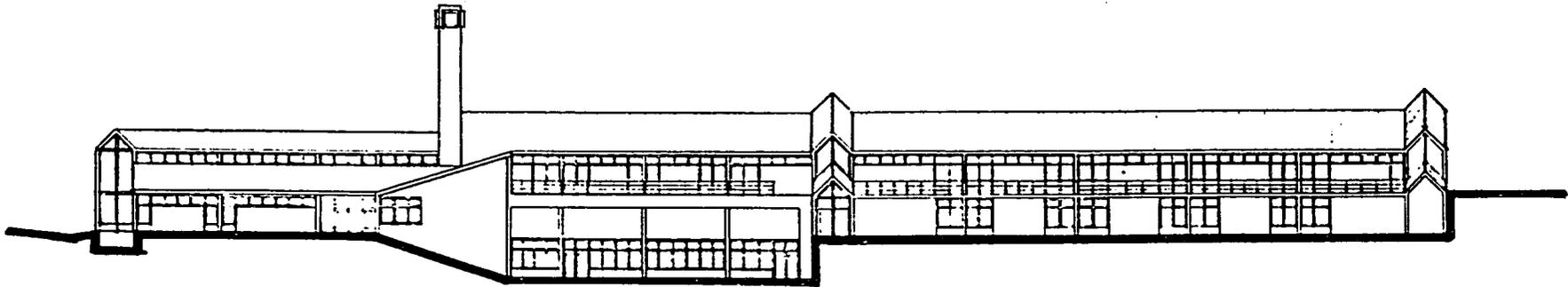
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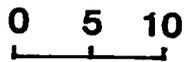
NORTH ELEVATION



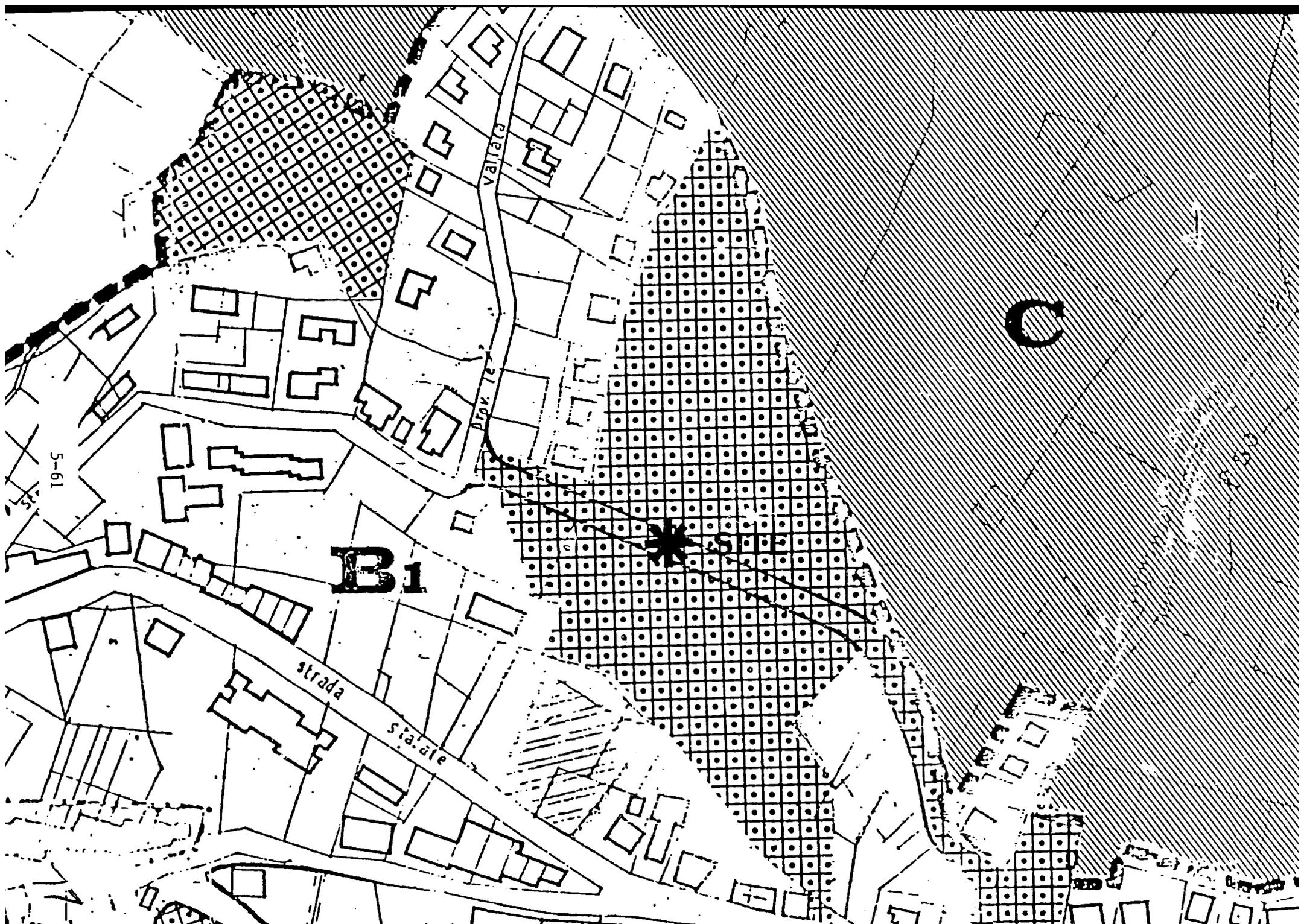
5-60



SOUTH ELEVATION



76



5-61

vallata
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B1

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C

Comune Di Vallata

LEGEND

INSTRUCTIONAL ACTIVITIES

- 1. Classroom
- 2. Physics Lab
- 3. Natural Science Lab
- 4. Chemistry Lab
- 5. Foreign Language Lab
- 6. Drafting Lab

COLLECTIVE ACTIVITIES

- 7. Auditorium
- 8. Library

COMPLEMENTARY ACTIVITIES

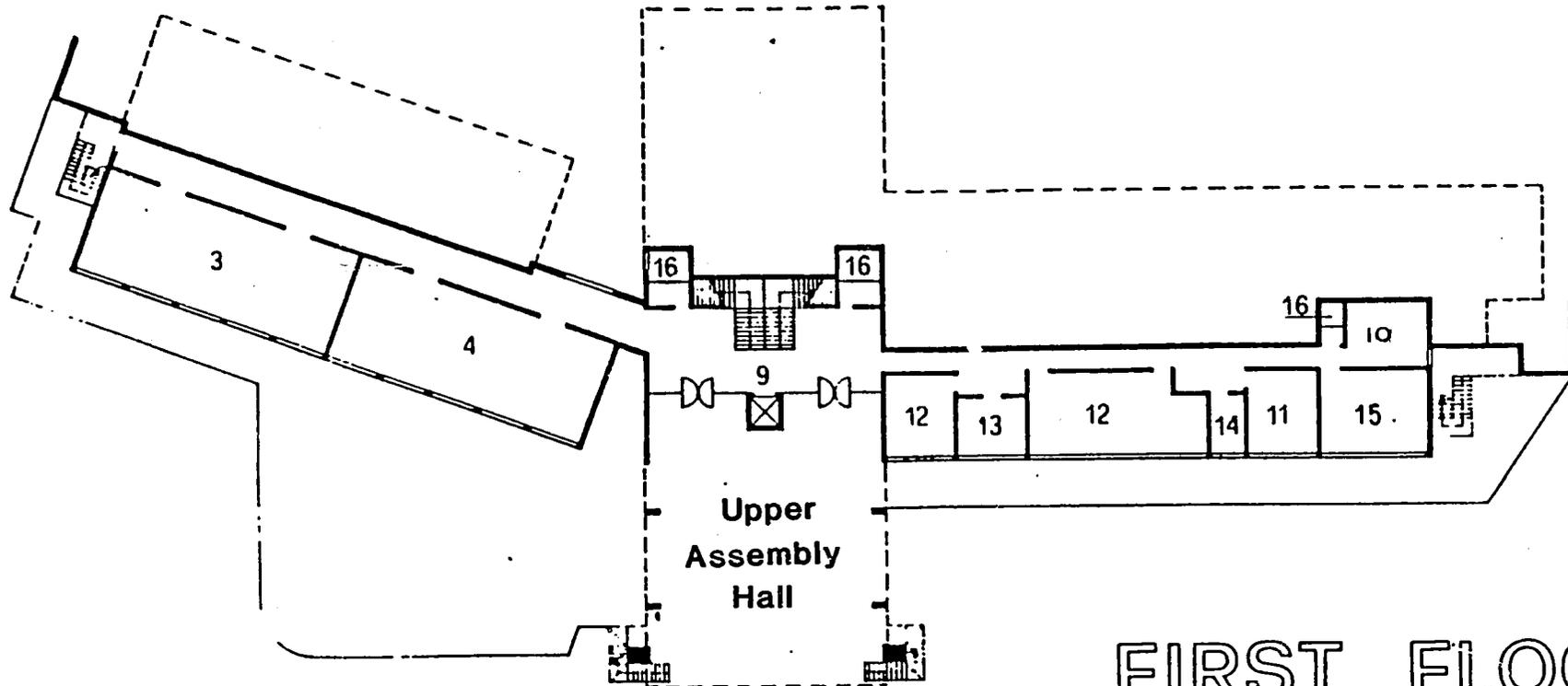
- 9. Entrance Lobby
- 10. Professors' Lounge
- 11. President's Office
- 12. Instructional Secretary
- 13. Administration Secretary
- 14. Archives-Reproduction Facilities
- 15. Storage
- 16. Restroom

PHYSICAL EDUCATION ACTIVITY

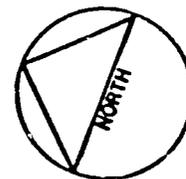
- 17. Gymnasium
- 18. Locker Room
- 19. Gymnasium Storage
- 20. Dispensary
- 21. Central Heating Plant

✓
8

5-63



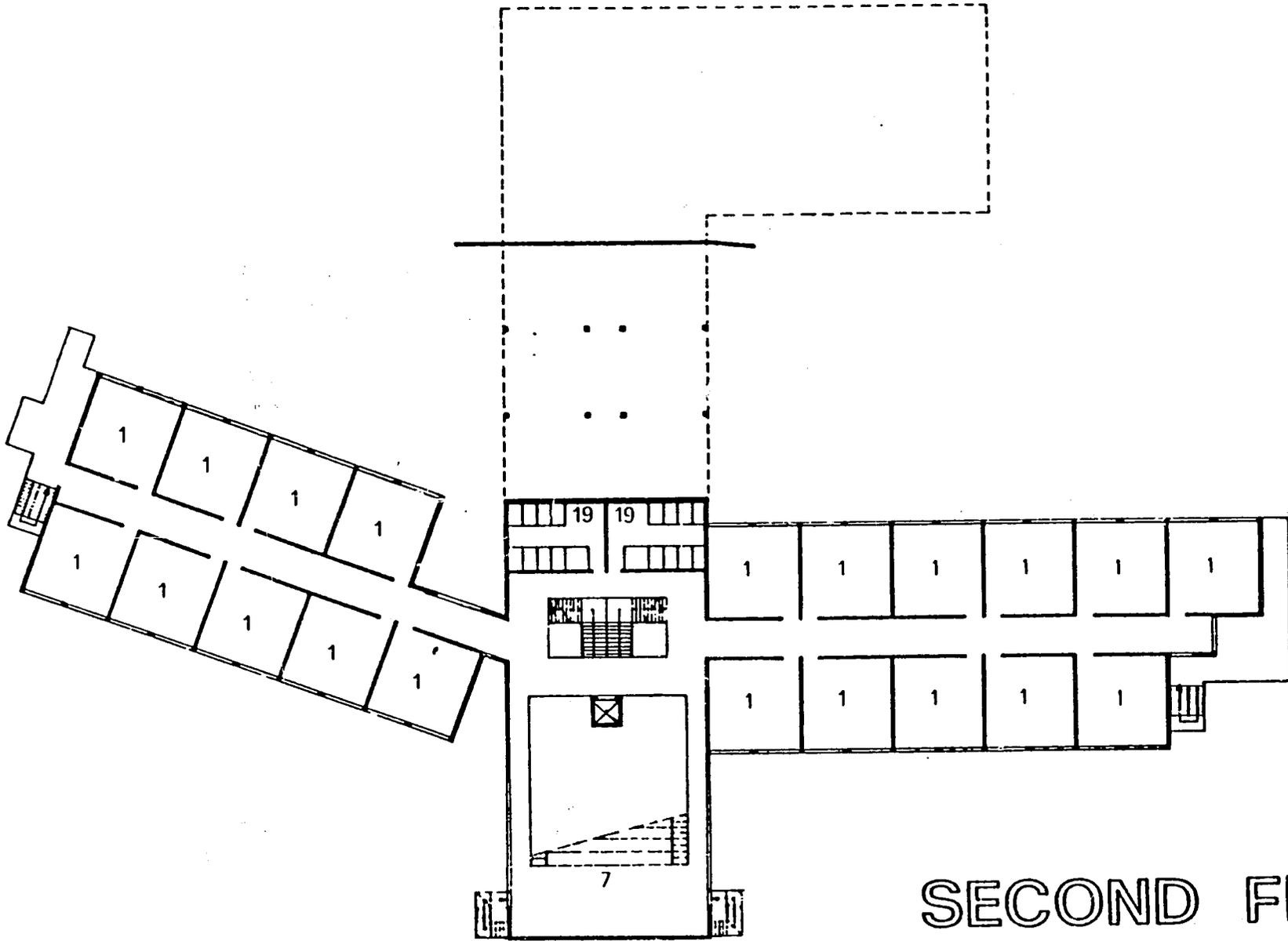
FIRST FLOOR



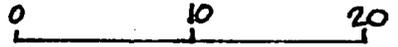
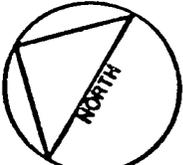
79

Vallata

5-64



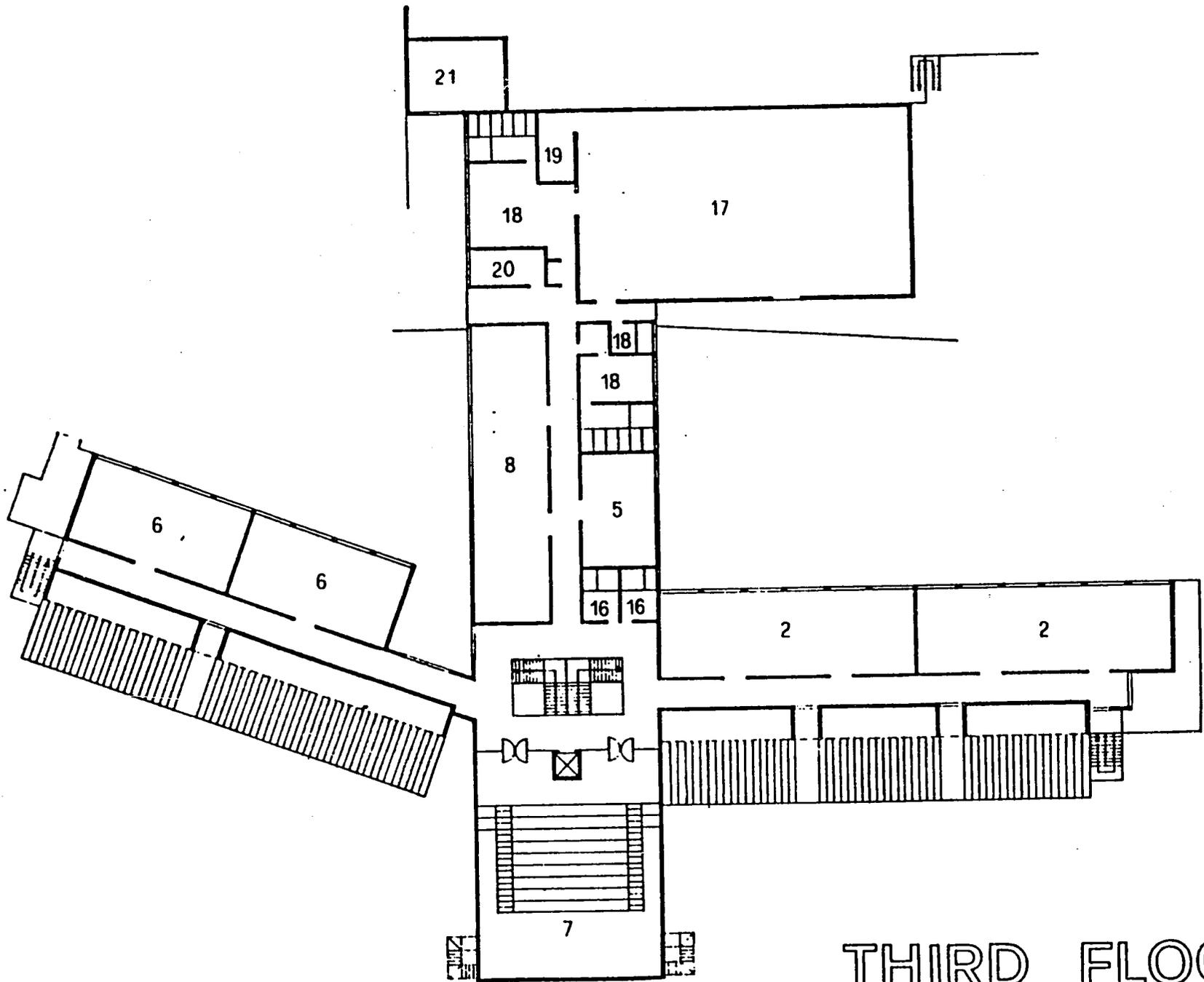
SECOND FLOOR



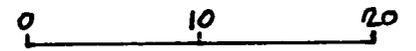
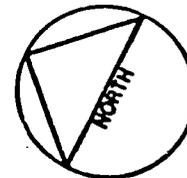
Vallata

40

5-65



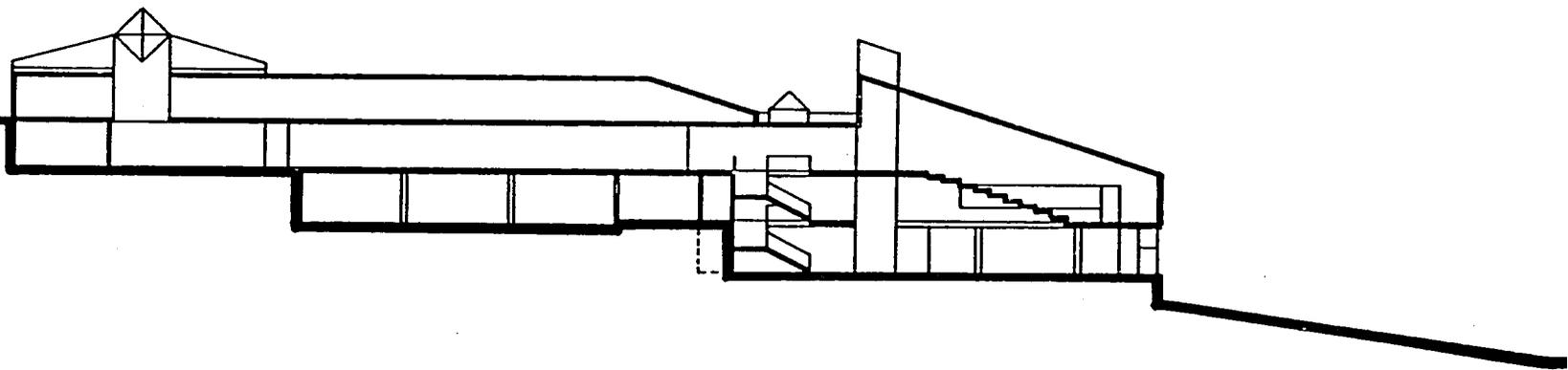
THIRD FLOOR



Vallata

81

5-66

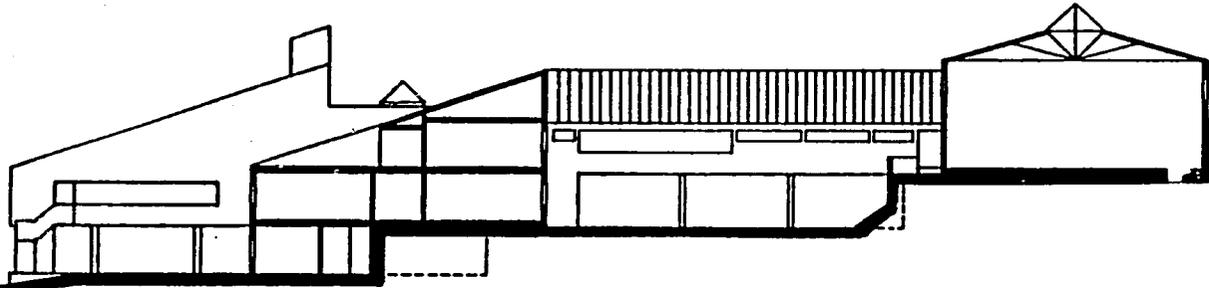


LONGITUDINAL SECTION

97

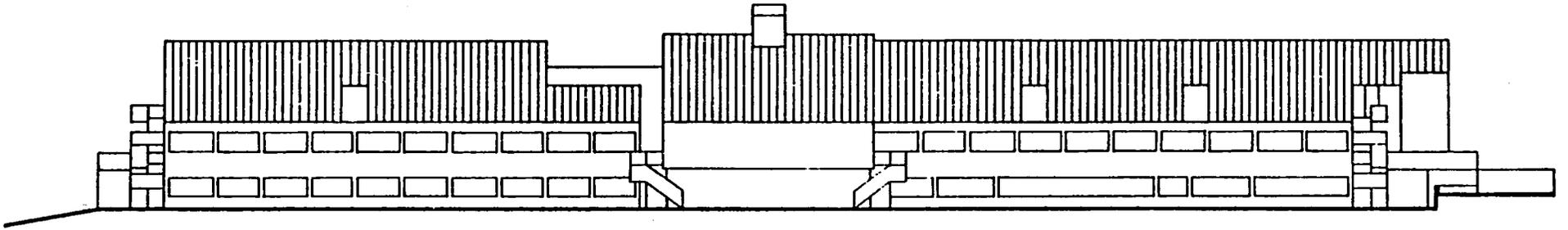
Vallata

5-67



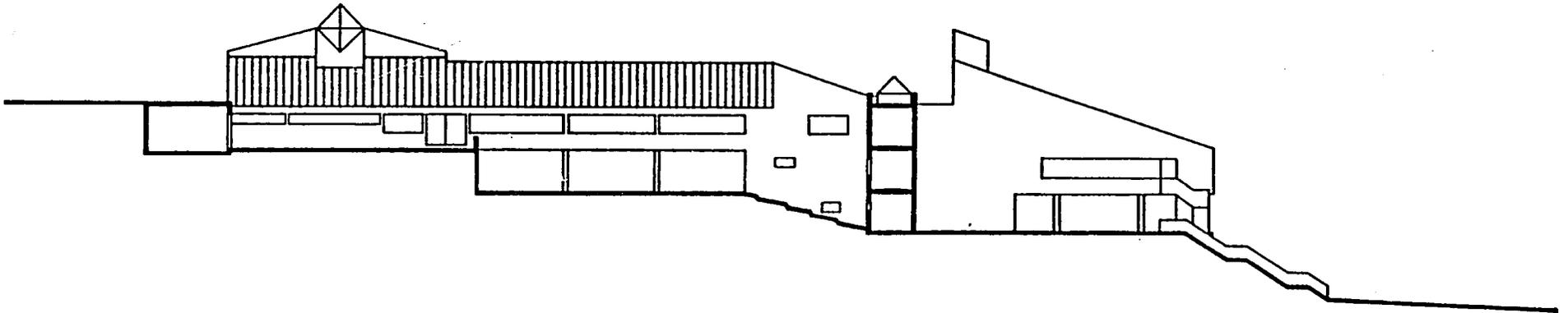
LONGITUDINAL SECTION

23



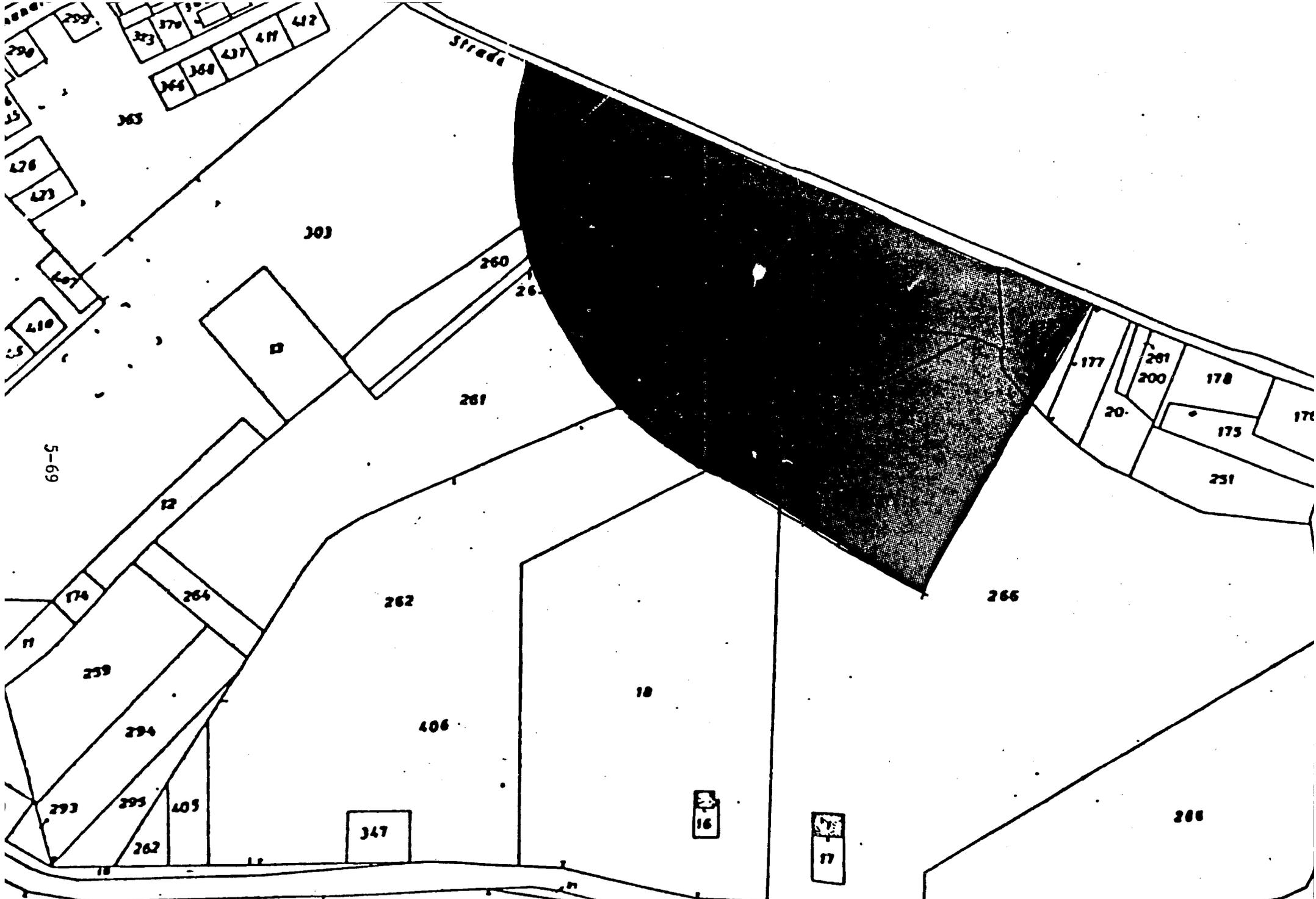
FRONT ELEVATION

5-68

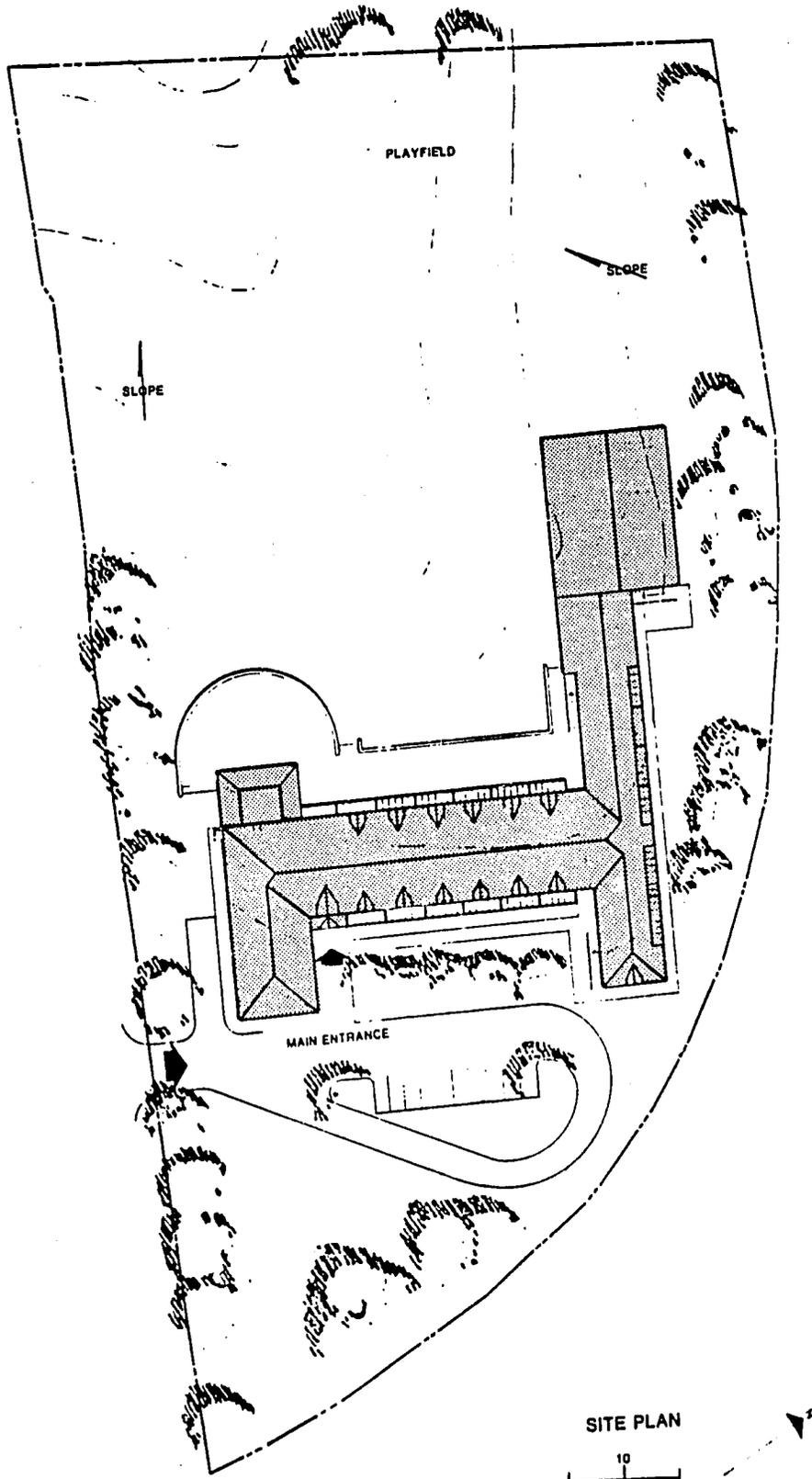


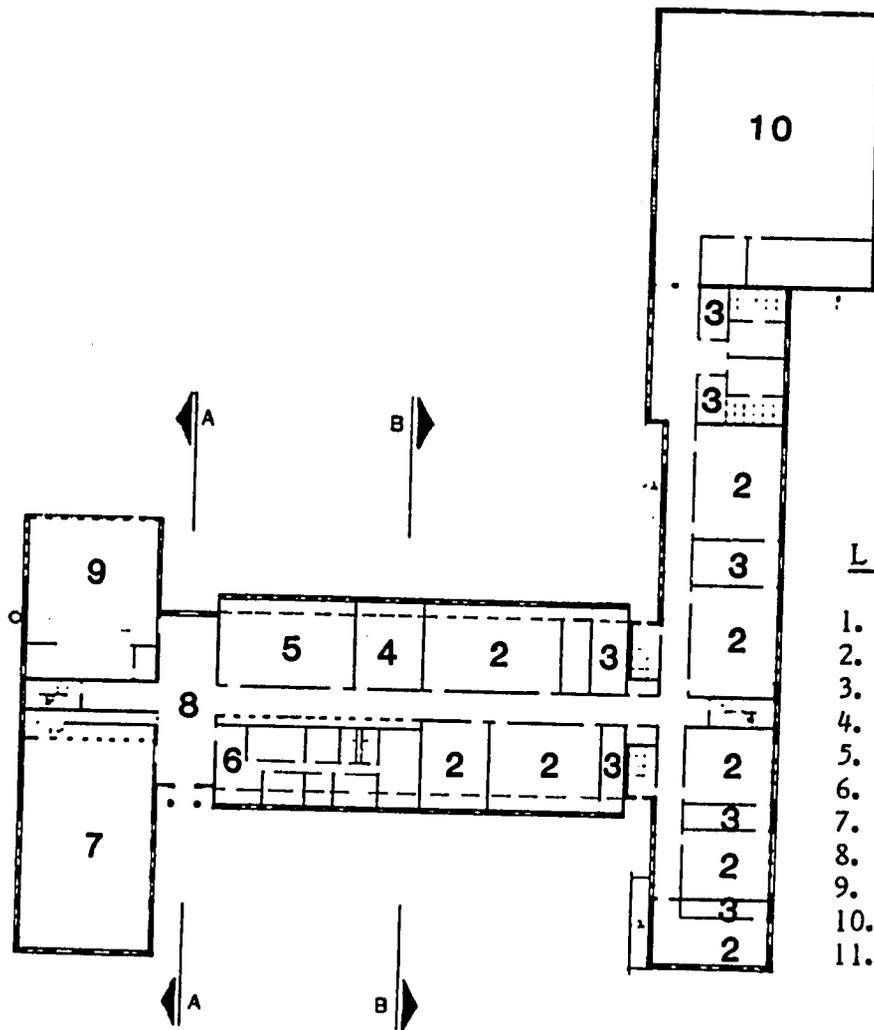
SIDE ELEVATION

OK



Comune Di Grottaminarda





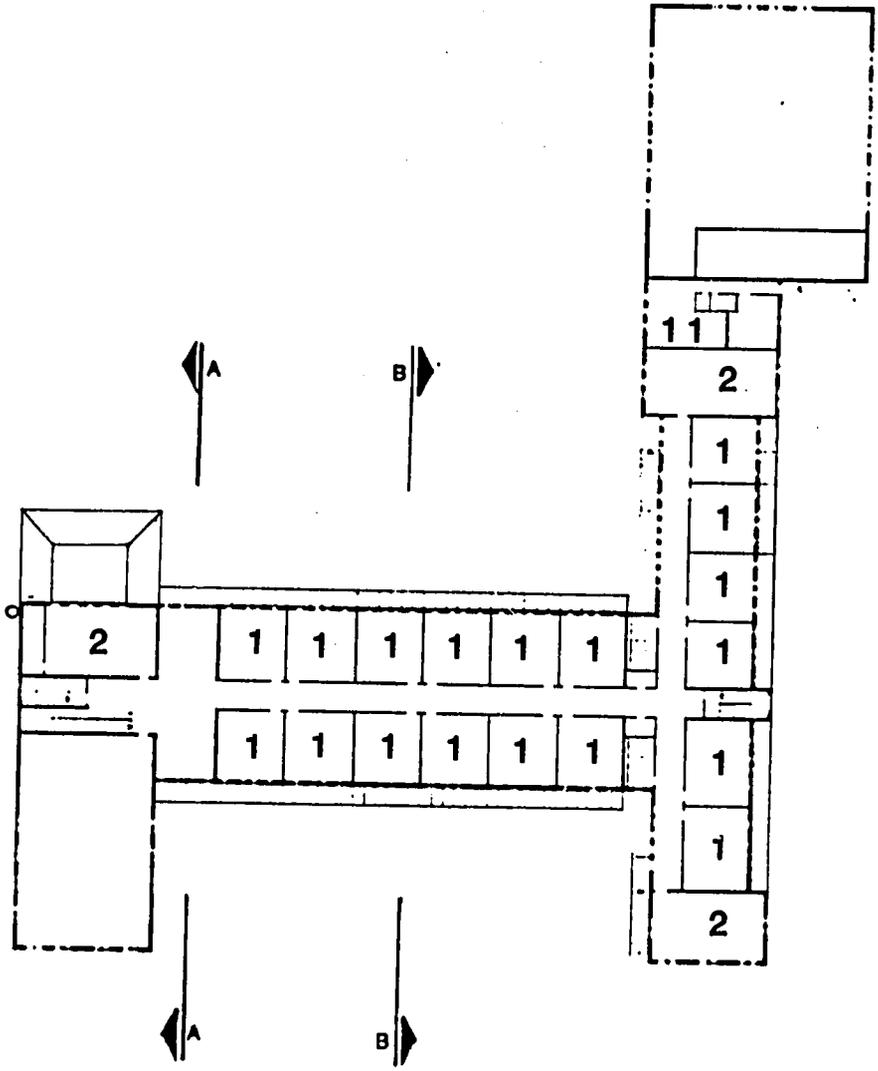
LEGEND

- 1. Classroom
- 2. Laboratory
- 3. Office
- 4. Professors' Lounge
- 5. Library
- 6. Administration
- 7. Auditorium
- 8. Entrance Lobby
- 9. Cafeteria
- 10. Gymnasium
- 11. Custodian's Apartment

LOWER LEVEL
10



87

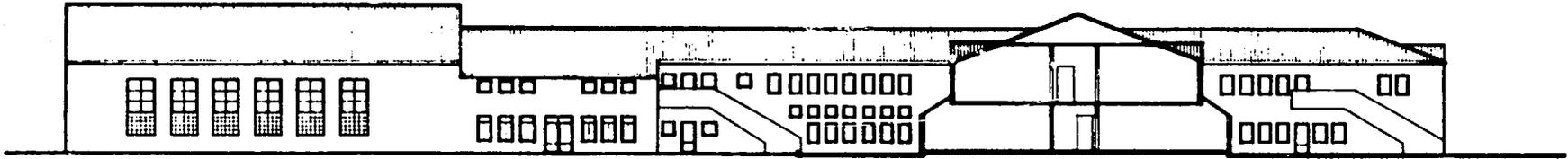


UPPER LEVEL .

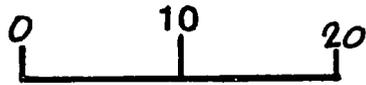
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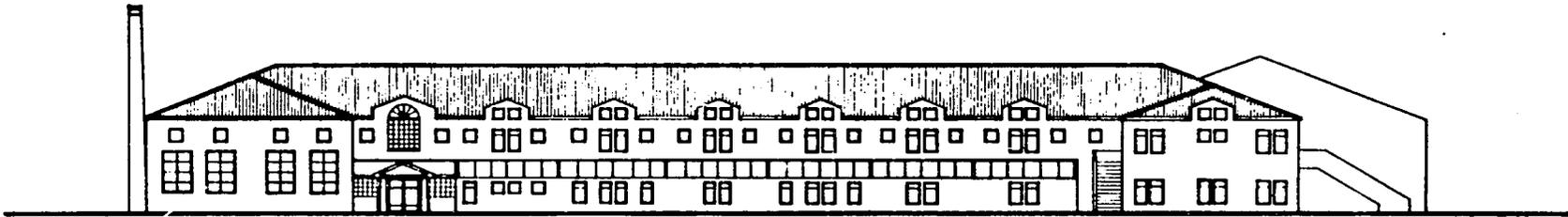
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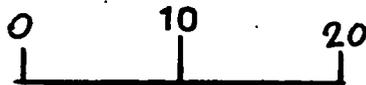
SECTION B B



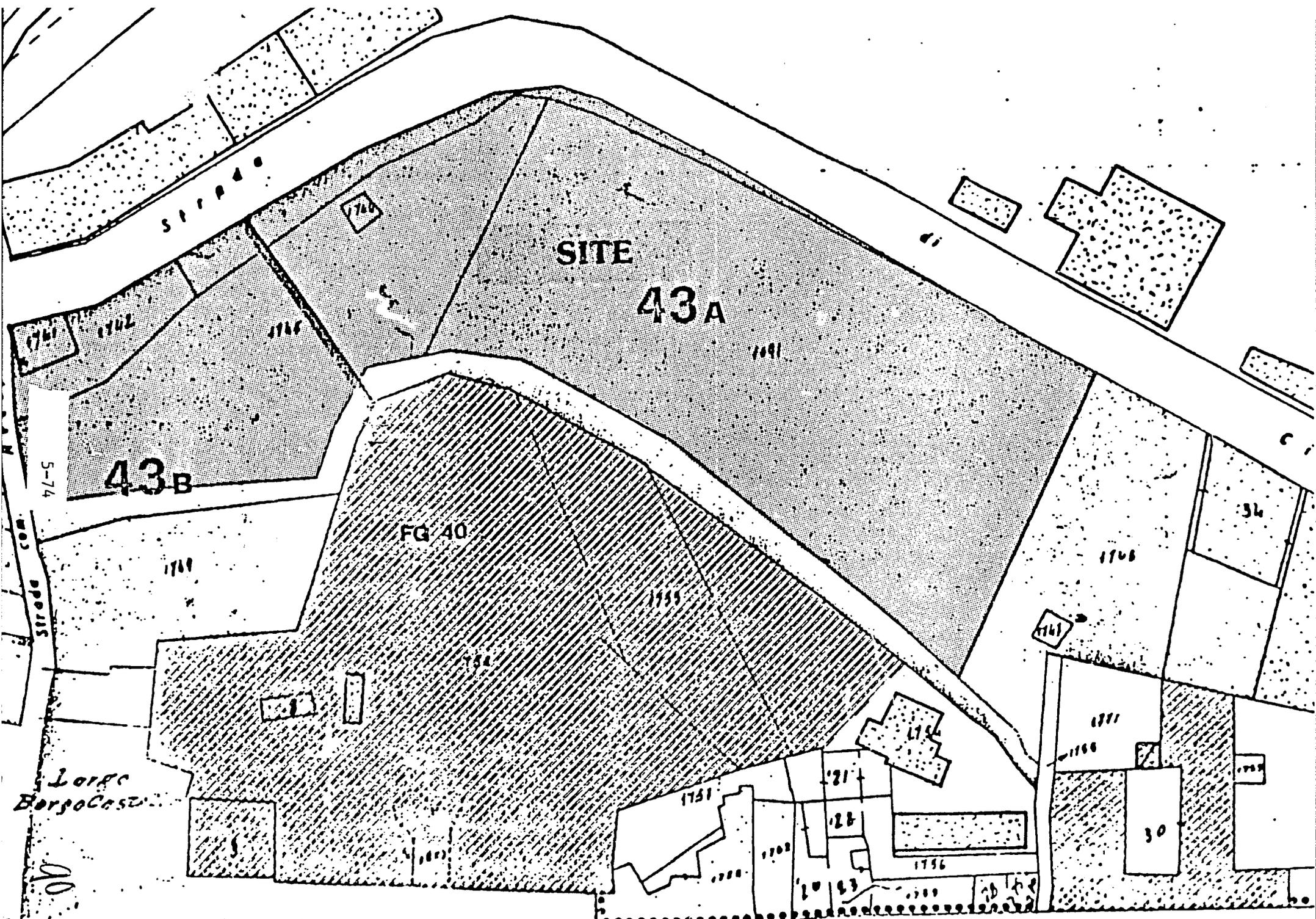
5-73



EAST ELEVATION

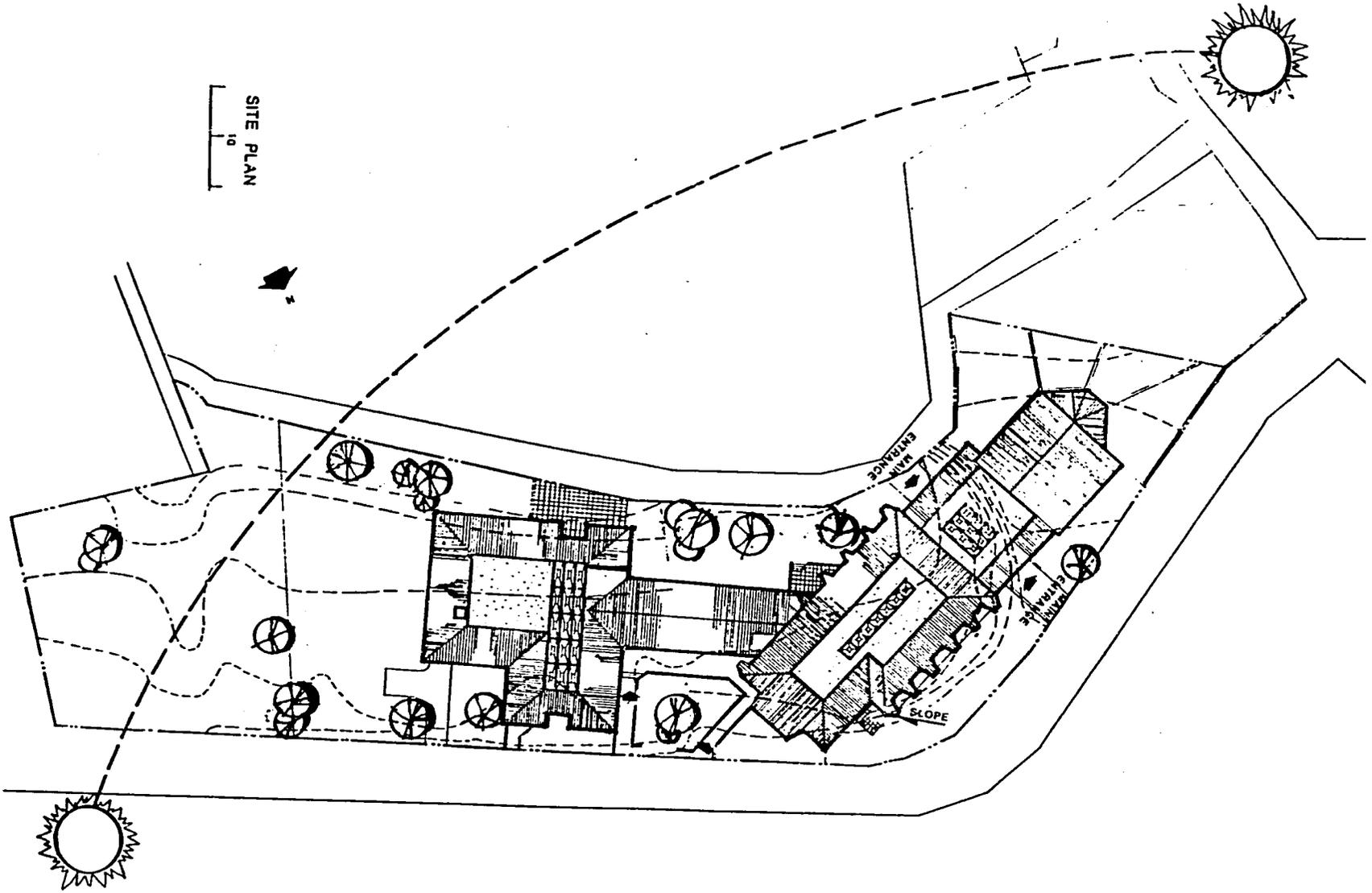


89



Comune Di Avellino

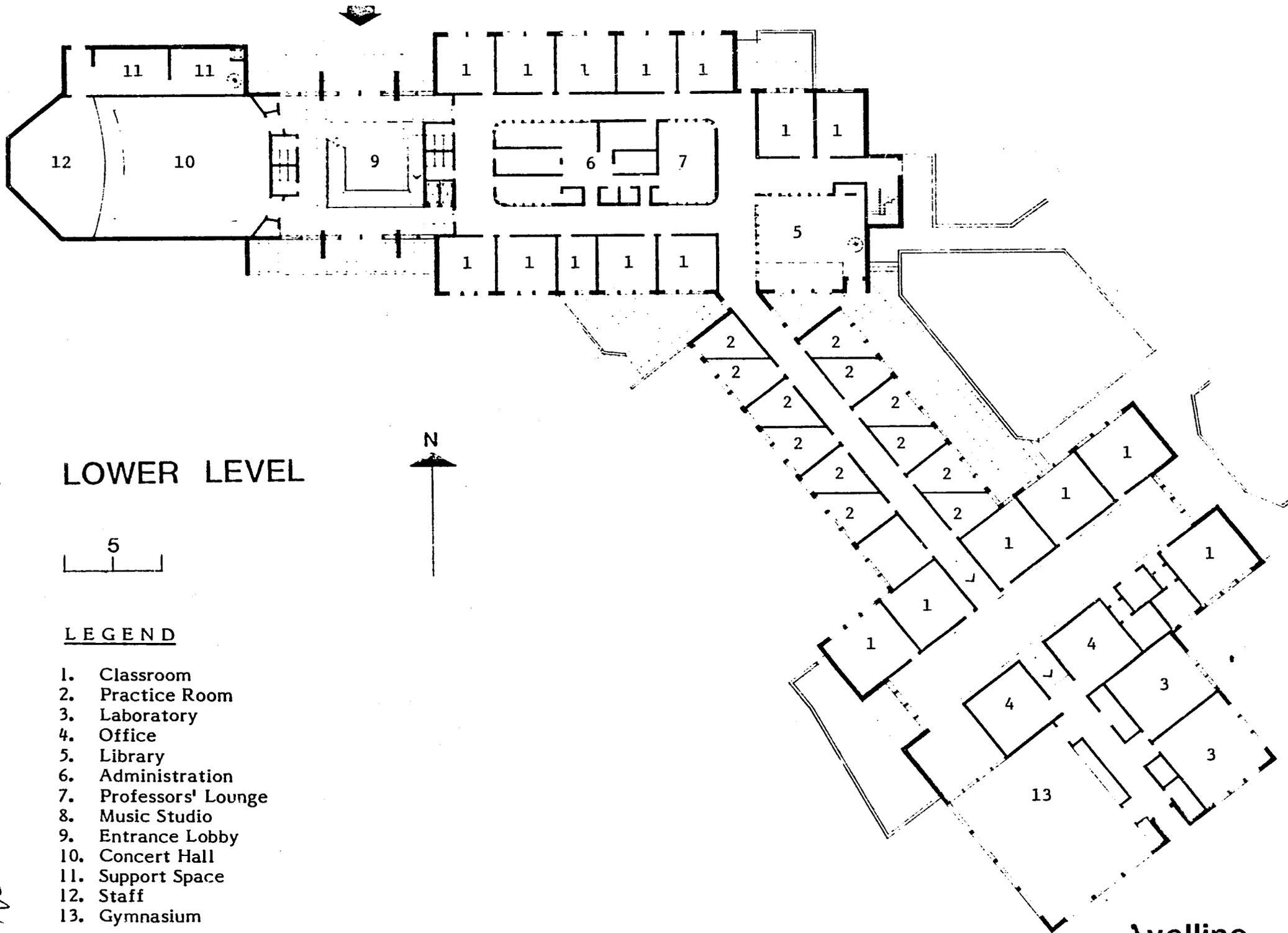
Avellino



SITE PLAN
10

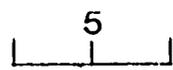
5-75

91



5-76

LOWER LEVEL

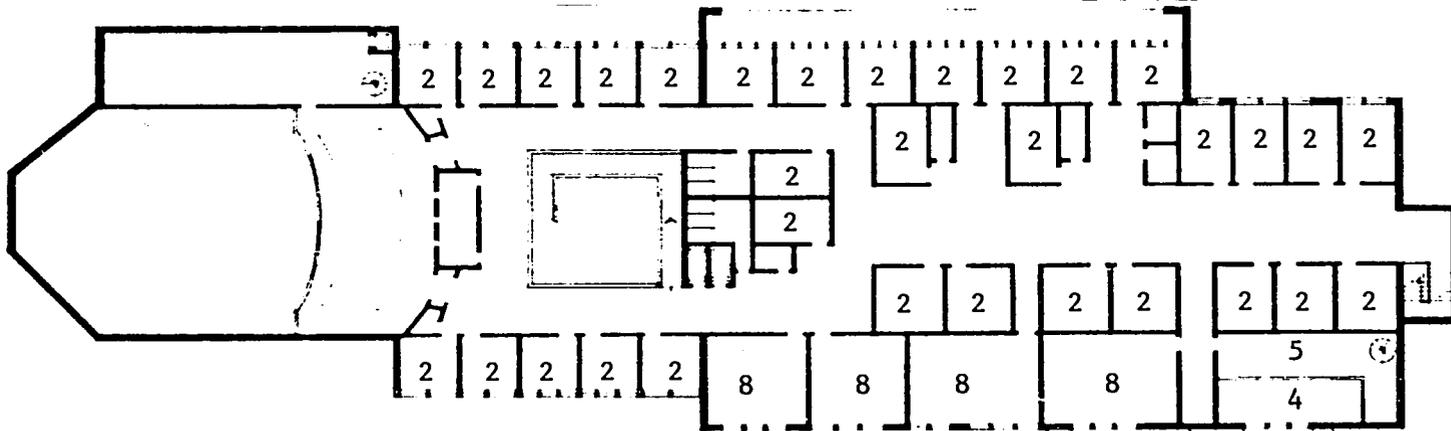


LEGEND

- 1. Classroom
- 2. Practice Room
- 3. Laboratory
- 4. Office
- 5. Library
- 6. Administration
- 7. Professors' Lounge
- 8. Music Studio
- 9. Entrance Lobby
- 10. Concert Hall
- 11. Support Space
- 12. Staff
- 13. Gymnasium

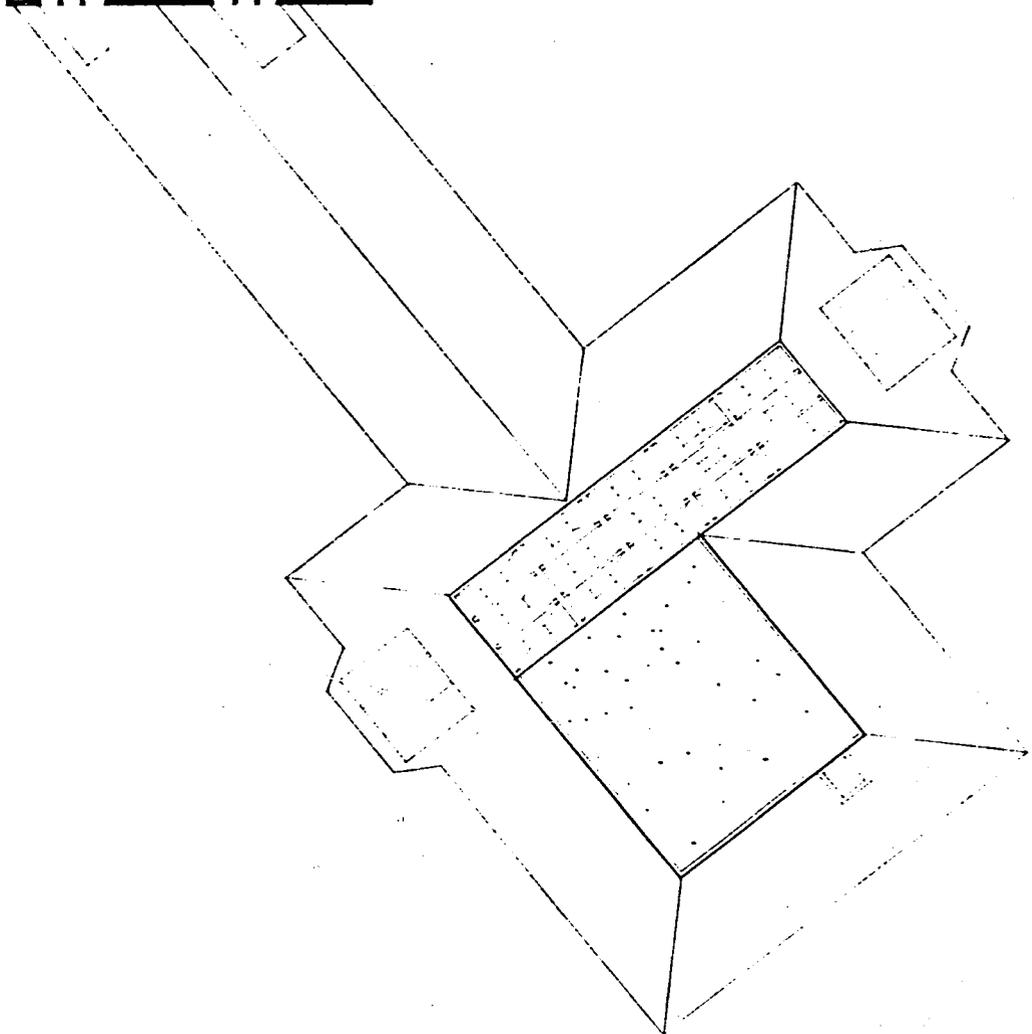
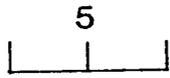
AV

Avellino



5-77

UPPER LEVEL

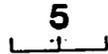


Avellino

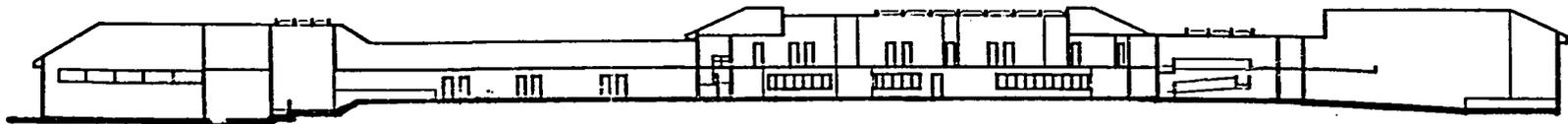
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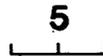
SOUTH ELEVATION



5-78



SECTION



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6. PRELIMINARY DESIGN PHASE

- A. After selection of final schematic designs by each of the local comune and acceptance by A.I.D., the architects immediately began work on the preliminary phase of the working drawings in two groups. Group One, consisting of Avellino, Calitri and Solofra, was scheduled for completion on 30 March 1982. Group Two, consisting of Grottaminarda, Sant' Angelo dei Lombardi and Vallata, was to be delivered on 29 April 1982.

Submittals for each school were in both English and Italian and consisted of the following:

- Relazione Descrittiva (Basis of Design): A report describing in detail the functional characteristics of the civil, architectural, structural, mechanical and electrical designs.
- "Capitolato Preliminare" (Preliminary Specification)
- "Stima Preliminare" (Preliminary Cost Estimate)

The following architectural and engineering drawings were submitted for each school:

- Surface and volume schedule
- Site plan @ 1:200
- First floor plan @ 1:100
- Second floor plan @ 1:100
- Roof plan @ 1:100
- Longitudinal and cross section @ 1:100
- Exterior elevations @ 1:100
- Sections and elevations details

Upon completion of preliminary plans, specifications and cost estimates, the contractor (P/JRB with Studio Castore) assisted A.I.D. in the presentation of the documents to the comuni officials for review and comment. This included reviews by the Italian Regional Education Board, Fire Marshal and Gene Civile for the "Regione", whose comments, along with those of A.I.D.'s, were then incorporated into the final design.

The following are the major comments incorporated in the design:

- Provide adequate fire exit stairs from the second levels for all the schools.
- Eliminate dead-end corridors
- Provide additional mounting and installation details for the solar panels.
- Coordinate and show all mechanical grill and vent openings on the architectural drawings.
- Clear height between finish floor and finish ceiling must be no less than 300 cm.
- All plans must adhere to the Italian law to provide a 90 cm. crawl space for all the schools.

7. CONSTRUCTION DOCUMENT PHASE

With all of the comments from the comuni and A.I.D./Naples officially received and incorporated into the design, P/JRB and Studio Castore proceeded with the full development of all working drawings in order to maintain the submission schedule of the first three schools to A.I.D. by 28 July 1982 and the submission of the remaining three schools by 28 October 1982. During this period a series of meetings were conducted to obtain all required permits and approvals. The people present were:

1. Dr. Giovanni Vincenti, Assessorato
Pubblica Istruzione ed Edilizia
Scolastica, Regione Campania
2. Genio Civile Regione (Structural Engineer)
3. Fire Marshall

All of the schools were designed to adhere to the following Italian building and legal requirements:

- Italian Law 1086 dated 5 November 1971
- Ministry of Public Works decree 30 May 1972
- Italian Law No. 64 (seismic code) 3 March 1975 with amendments of 22 September 1980 and 12 March 1981
- La Legislazione
La Tipologia Degli Edifici
Cap. III Edificio Scolastico: Caratteri General

In regard to earthquake resistance, the schools were to be designed for the most stringent of the Uniform Building Code (UBC), 1979 Edition, and/or the Italian Decrees and Norms. In certain instances where the design did not adhere to the more stringent UBC code due to the construction technology locally available, a careful review of the design was conducted by A.I.D./Naples' chief engineer and a resolution was to be made with the successful contractor in the field.

Submitted with each school as per contractual agreement were:

- construction drawings which included: civil drawings, architectural, structural, mechanical/electrical
- specifications
- structural, mechanical and electrical calculations
- final cost estimate
- I.F.B. package
- scale models for each school at 1:200

For detailed mechanical and electrical descriptions, refer to the "Basis of Design" submitted with each school during the preliminary phase.

With the submission of each package, letters of invitation to bid were sent by A.I.D./Naples to each prequalified contractor.

8. I.F.B., BID ANALYSIS AND AWARD RECOMMENDATIONS

With the submission of the construction documents to A.I.D./Naples, P/JRB and Studio Castore proceeded with the next contract phase, which was bid preparation and review.

As per contractual agreement with A.I.D., P/JRB's responsibility for this phase included the following:

- In cooperation with A.I.D., establish a bidder's list, advertise, hold required prebid conference and issue the Invitation for Bids.
- Receive and evaluate bids.
- Recommend awards.
- Assist in contract preparation.
- Furnish services necessary to assist A.I.D. in prequalification of prospective general construction contractors and establish strategy for bidding and/or negotiating construction contracts.

A. Prequalification of Italian Contractors

In accordance with prequalification criteria established by A.I.D./Naples, P/JRB evaluated the Prequalification Questionnaires and material submitted by Italian contractors. The following list was developed in consultation with A.I.D./Naples and representatives of the Blurock Partnership/Interplan and provided to A.I.D./Naples on April 6, 1982.

Prequalified Firms:

1.	Impresa Gec in Carmine Orabona	Napoli
2.	SACIEP SpA	Firenze-Napoli
3.	CO.ME.C.srl	Napoli
4.	Societa' Italiana Appalti SpA	Napoli
5.	Impresa Giovanni Maggio'	Caserta
6.	FEAL SpA	Milano-Roma
7.	R.D.B. SpA R.D.B. Sud	Piacenza-Salerno
8.	Pizzarotti	Milano-Roma
9.	IMCA srl	Napoli
10.	GE.CO.FER	Padova
11.	FACEP-IBC SpA	Verona
12.	Mucafer Cooperativa	Foggia
13.	Impresa Gaeta Tommaso	Solofra (Avellino)
14.	Tecnosider SpA	Roma
15.	Impresa Colodetto sas	Sacile (Pordenone)
16.	Italedil SpA	Roma
17.	Consorzio Coop. Costruzioni	Bologna-Napoli
18.	Conscoop	Forli-Napoli
19.	Fondedile	Napoli

20.	SOGECA	Napoli
21.	Latero Costruzioni	Napoli
22.	De Matteis	Avellino
23.	Volani	Rovereto-Roma
24.	Lovati & C.	Milano
25.	STEIAM SpA	Roma
26.	D'Agostino	Napoli
27.	SCIC SpA	Milano
28.	Delta Costruzioni sas	Napoli
29.	Vigilante Michele	Solofra (Avellino)
30.	T.R.N.	Metaponto Irpino

Non-Prequalified Firms:

1.	Impresa Costruzioni Ingg. F & G Orofino	Napoli
2.	ECAM Prefabbricati srl	Napoli
3.	Ingg. C & L De Benedictis sas	Napoli
4.	D.P.R. srl	Napoli
5.	CIAR SpA	Roma
6.	CO.ME.CO. srl	Napoli
7.	COAT Tecnimprese	Asti
8.	Cooperativa "La Nuova Rialto" srl	Napoli
9.	FACEP - S.I.S.	Verona
10.	CEAC	Napoli
11.	SEAL srl	Genova
12.	Impresa Luigi Napolitano srl	Nola (Napoli)
13.	Centro Progetti Speciali	Portici (Napoli)
14.	Alessandro Sorrentino	Napoli
15.	CO.GE.AP. SpA	Roma
16.	Ass. Edi. Mer. (C.S.I.)	Napoli
17.	C.M.S. SpA	Napoli
18.	Fratelli Lombardi Prefabbricati SpA	Milano-Roma
19.	FACEP - Renzo Marani sas	Verona

B. Bidding

Bids were received from pre-qualified contractors for each of the six sites, beginning with Sant'Angelo dei Lombardi and Calitri on October 8, 1982, followed by bids for the Avellino Music Conservatory on October 15, 1982. Bids for the final three schools--Solofra, Grottaminarda, and Vallata--were received on December 2, 1982.

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C. Construction Award Recommendations

Selections for each location were determined as follows:

1. Sant'Angelo dei Lombardi

Ten prequalified contractors submitted bids for this school. The low bid by GECO FER SPA was 2,162,000,000 Lire, 11.5 percent below architects' estimate. This bid was determined acceptable after considering the qualifications of the low bidder and the range of prices submitted by bidders 2 through 8, which graduated from 2,6333,000,000 to 3,298,000,000 Lire.

In analyzing the bid form from the low bidder, we found many substantial deviations from the architects' estimate in the payment categories. The GECO FER SPA bid appeared to be heavily weighted in the areas of earth movement, structural concrete, roofing/insulation and heating, while under-weighted in the categories of mobilization, exterior walls, plastering, flooring and interior finishes, ceilings and yardworks.

Based on the above analyses, P/JRB and Studio Castore recommended that AID enter into a fixed sum construction contract with GECO FER SPA in the amount of their bid after discussing the distribution of the payment categories as deemed appropriate. It was also recommended that a "Notice to Proceed" be issued as expeditiously as possible to accomplish as much as possible on site prior to the winter months.

2. Calitri

Eight prequalified contractors submitted bids. The low bid by CONSORZIO ARA COOPERATIVE DI PRODUZIONE E LAVORO was 3,400,000,000 Lire, 4 percent below the architects' estimate.

This bid was considered acceptable based on the qualifications of this bidder and the range of prices submitted by bidders 2 through 7, which graduated from 3,900,000,000 to 4,800,000,000 Lire.

In analyzing the low bidder's form, we found few deviations from our estimate, with the exception of the electrical work (1.3) and the mechanical work (1.4). The electrical work was approximately 35% above our estimate, while the mechanical work was 26% below our projection. A major variance of 42% occurred in the power plant and heating category (1.4.2). These variances were not seen as a major concern since they mostly compensated for each other. It was considered a possibility that the contractor look further at these three categories and make adjustments if appropriate.

Based on the above analysis, P/JRB and Studio Castore recommended that AID enter into a construction contract with CONSORZIO FRA COOPERATIVE DI PRODUZIONE E LAVORO for the Calitri School in the fixed sum amount of 3,495,000,000 Lire with expeditious issuance of the "Notice to Proceed" to maximize the use of the remaining pre-winter period.

3. Avellino

Ten prequalified firms submitted bids for this site. IMPRESA CARMINE ORABONA, with a bid of 5,055,000,000 Lire, was the second lowest bidder. This amount was 19.5% lower than architects' estimate and, in particular, 11.8% less than the minimum fluctuation level predicted. This bid compared with 4,623,000 Lire as the lowest, and third in line of 5,814,000,000 Lire.

Their estimates for civil works, e.g., foundations, structures and all finishings (1.2), resulted in lower estimates after analysis of various categories of work. The electrical and mechanical categories (1.3, 1.4) resulted higher than our estimates.

At a meeting held in Naples October 18, 1982, it was verified that the firm, when deciding upon their offer, had taken into consideration all the special finishings, e.g. standing finishes (windows, doors, etc.), roof and wall insulation, false ceilings, the individual characteristics of the foundations and the complexity of the auditorium (including the air conditioning installation). When checked, the metric quantities calculated by the firm for each category were found to be accurate.

IMPRESA CARMINE ORABONA declared that the prices on the whole were low, due to the type of organization being family-owned, their familiarization with the school's intended location, and the immediate procurement of materials. This proved to be an accurate method of analysis for the cost of each single category of work.

Based on the above considerations, it was determined that it would be advisable to request appropriate types of guarantees to be even higher than those foreseen in the contract should the contract be awarded for the price as bid.

4. Solofra

Six bids were received from prequalified firms, the lowest bid being 3,450,000,000 Lire from DIEGO S.P.A. COSTRUZIONI in joint venture with INGG. NERVI and BARTOLI S.P.A. Except for the two highest bidders, this price was in a narrow range of bidding, being 22% below the architects' estimate.

Their estimates for foundations (1.2.2), painting/ceilings/finishes (1.2.8), solar hot water system (1.2.9), yardworks and especially civil works (1.2.1) were greatly in excess of our estimates. Items for mobilization (1.1), structural (1.2.3), exterior walls (1.2.5) and electrical (1.3) were substantially lower.

This firm was a low bidder on the Avellino Music Conservatory project, but withdrew their bid due to evidence of a mistake in their pricing. There was also concern in connection with the validation of their joint venture agreement with the Nervi/Bartoli firm. Since their prequalification as a bidder was contingent on the association of the two firms, this was an important consideration.

After discussion, the agreed procedure was for the architects and AID to independently review with appropriate counsel the validity of the joint venture documents to determine if any irregularities existed in its formation. In addition, the architects were to review the Contractor's updated qualifications for the project, as well as discussing with the contractor the line item sums for work divisions which were greatly in variance with the prebid estimate.

5. Grottaminarda

Seven prequalified firms submitted bids. The low bid, received from COOPERATIVE MUCAFER S.C.R.L. for 3,750,000,000 Lire at 19% below architects' estimate was, except for the very highest bid, below a narrow range of bidders.

The contractor's estimates for foundations (1.2.2) and roofing/thermal categories (1.2.4) were markedly higher than architects' estimates, while civil works (1.2.1), structural (1.2.3), windows/doors/glazing (1.2.7), electrical (1.3), plumbing/mechanical (1.4) and landscaping (2.3) were substantially lower.

Although the firm had been prequalified as a bidder several months earlier and while there was no reason to believe that the firm should not be awarded the contract, it was suggested that further evaluation was necessary to determine their ability to handle this project concurrently with the Vallata school for which they were also low bidder. AID was advised that this firm had also been low bidder on the Picerno project (in Northern Italy) and subsequently withdrew their bid prior to award after they discovered they had made calculation errors. Recommendations were also made that the variances in assigned values of the work divisions (as mentioned above) be questioned.

6. Vallata

Seven prequalified firms submitted bids for Vallata. The low bid, by CO-OP MUCAFER S.C.R.L., was 3,450,000,000 Lire, 16% below architects' estimate. Except for the two highest bidders, this price was in a narrow range of bidding.

The contractor's estimates for yardwork (1.2.9) and particularly foundations (1.2.2) were considerably higher than architects' estimates. In the case of foundations, the contractor's line item was 113% over our estimate, suggesting front-end loading of the the contract costs. Some of this could be attributable to a transfer of structural items (1.2.3) to this category since that line item is 32% lower than architects' estimate. Roofing/thermal (1.2.4) is also considerably below our estimate, as is exterior walls (1.2.5), windows/doors/glazing (1.2.7), painting/ceiling/finishes (1.2.8) and plumbing/mechanical (1.4).

This firm's prior selection for the Grottaminarda award required the consideration of both projects together in determining their total performance strength.

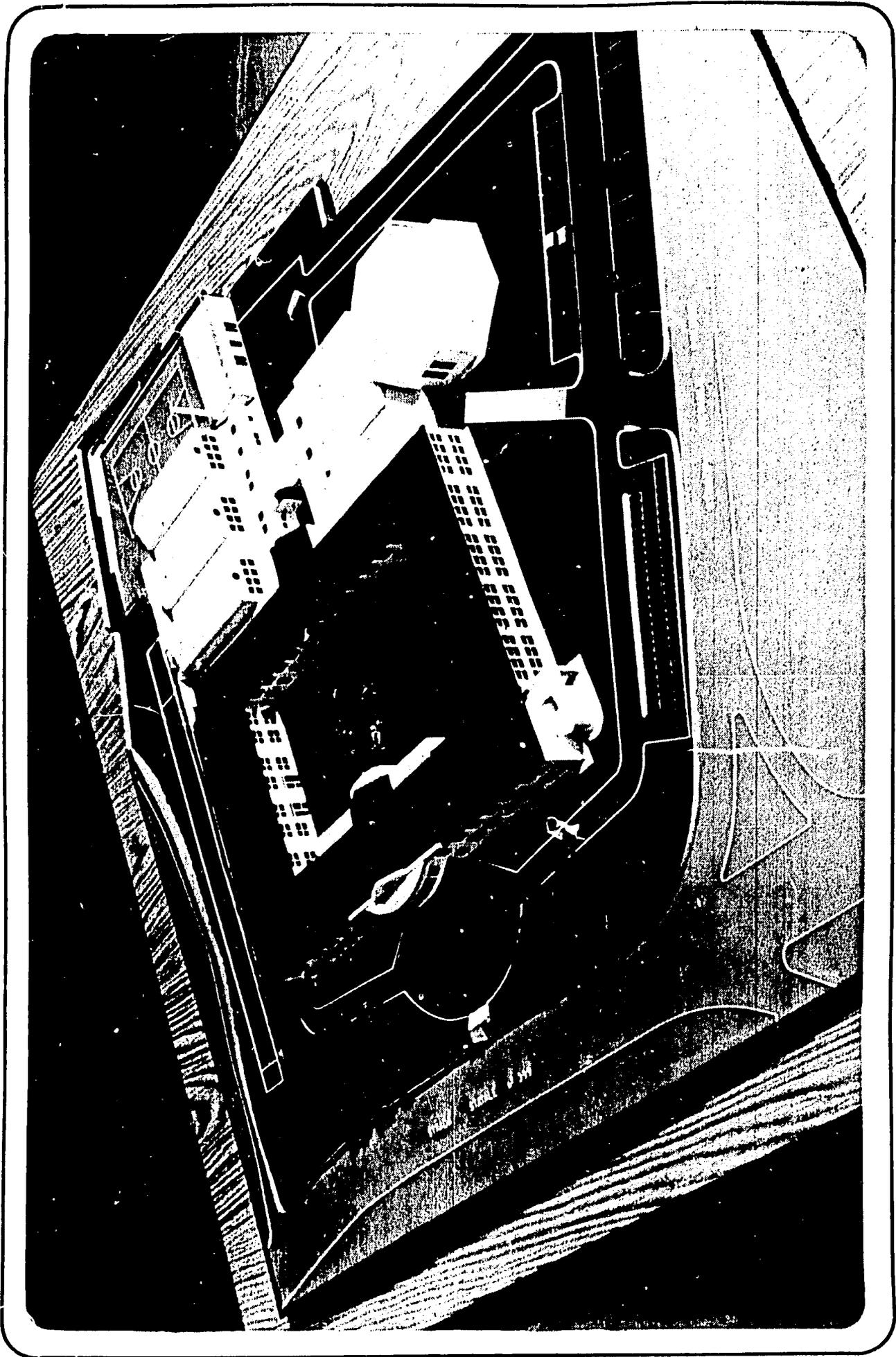
Photographs of models, complete bidders list and additional statistics for each school follow.

D. Summary of Final Bids with Architects' Estimates

	<u>Architects' Estimate (US \$)</u>	<u>Bid Amount (US \$)</u>	<u>Difference</u>
Calitri	\$ 2,699,259	\$ 2,588,889	- 4.0%
Avellino	4,648,659	3,744,000	-19.5%
Sant'Angelo Dei Lombardi	1,809,834	1,601,000	-11.5%
Grottaminarda	3,421,085	2,778,000	-19.0%
Solofra	3,306,160	2,556,000	-22.7%
Vallata	<u>3,047,569</u>	<u>2,556,000</u>	<u>-16.0%</u>
	\$18,932,566	\$15,823,889	-16.0%

Conversion of lire to dollars based on 1,350L per dollar.

The bid figures that were accepted for the six schools were well under the architects' estimate. The difference represents a cost reduction of 16% irrespective of the currency exchange rate. Only the corresponding dollar reduction would vary with exchange rate.



CALITRI - SENIOR HIGH SCHOOL

The four areas for grouping of the school center around the arts, languages, mathematics and human/social sciences. All classrooms orient to the exterior or inner courtyard, with the community use spaces segregated for separate access.

Major spaces consist of classrooms and laboratories, auditorium, gymnasium, administration, cafeteria with dining room, and outdoor playfields.

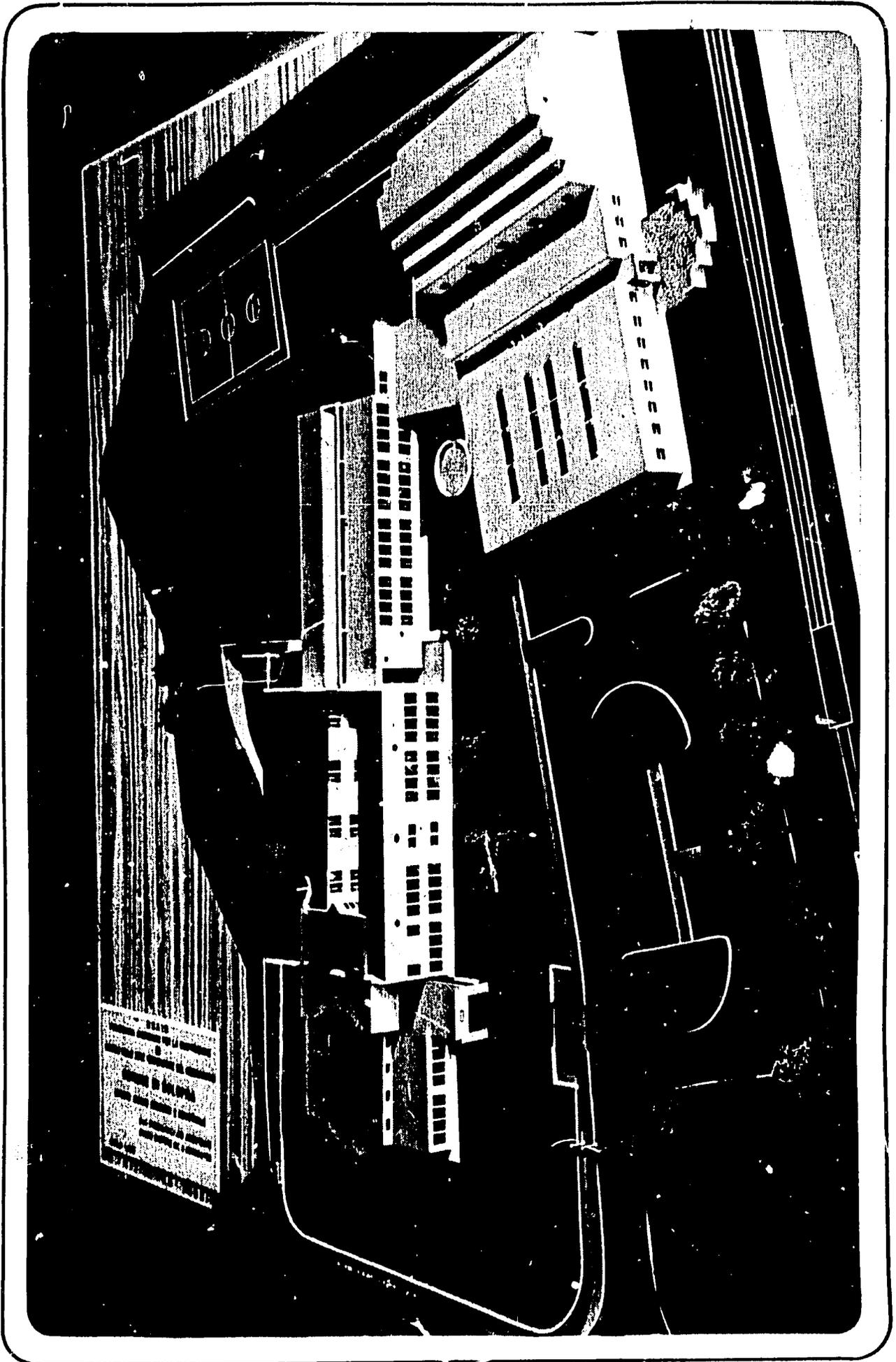
CAPACITY:	625 students
CLASSROOMS:	16
BID COST:	\$2,588,888
GROSS AREA:	61,900 sq. ft.
CONTRACTOR:	Consorzio Fra Cooperative Di Produzione E Lavoro, Forli-Napoli
CONSTRUCTION START:	October 1982
EXPECTED OCCUPANCY:	Spring 1985

CALITRI SCHOOL

A. Name of Bidder	B. Part III Sect. B Italian Lire	C. Amend No. 1 Rec'd	Bid Bond
1. Immobiliare Barletta	7,000,000,000	yes	yes
2. Cons Coop Conscoop Prod. Lavoro	3,495,000,000	yes	yes
3. Coop Mucafer scrl	4,463,000,000	yes	yes
4. Carmine Orabona	4,195,000,000	yes	yes
5. Iapicca Arcangelo	4,443,390,000	yes	yes
6. Feal SpA	3,900,000,000	yes	yes
7. Diego Costruzioni SpA	4,800,000,000	yes	yes
8. Ge.Co.Fer SpA	3,992,000,000	yes	yes
Architects' Estimate: 3,644,100,000 Lire			

8-10

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SOLOFRA - INDUSTRIAL CHEMICAL & CHEMICAL TANNING INSTITUTE

The double-track school program proposed for this institute offers vocational training in the industrial-chemistry field, and specifically in leather tanning. A full academic course offering of a conventional senior high school is also offered. Organized in a linear "L" shaped plan format, the building is functionally divided into three zones. The auditorium, library, administration unit and cluster of academic classrooms designed around an open court forms the first zone. Adjacent to it and separated by a stair lobby is a two-story grouping of laboratories connected by a ramp designed as an architectural feature. The third zone, comprised of the gym and workshop, is located at the extreme end of the school to acoustically isolate the anticipated noise and activity.

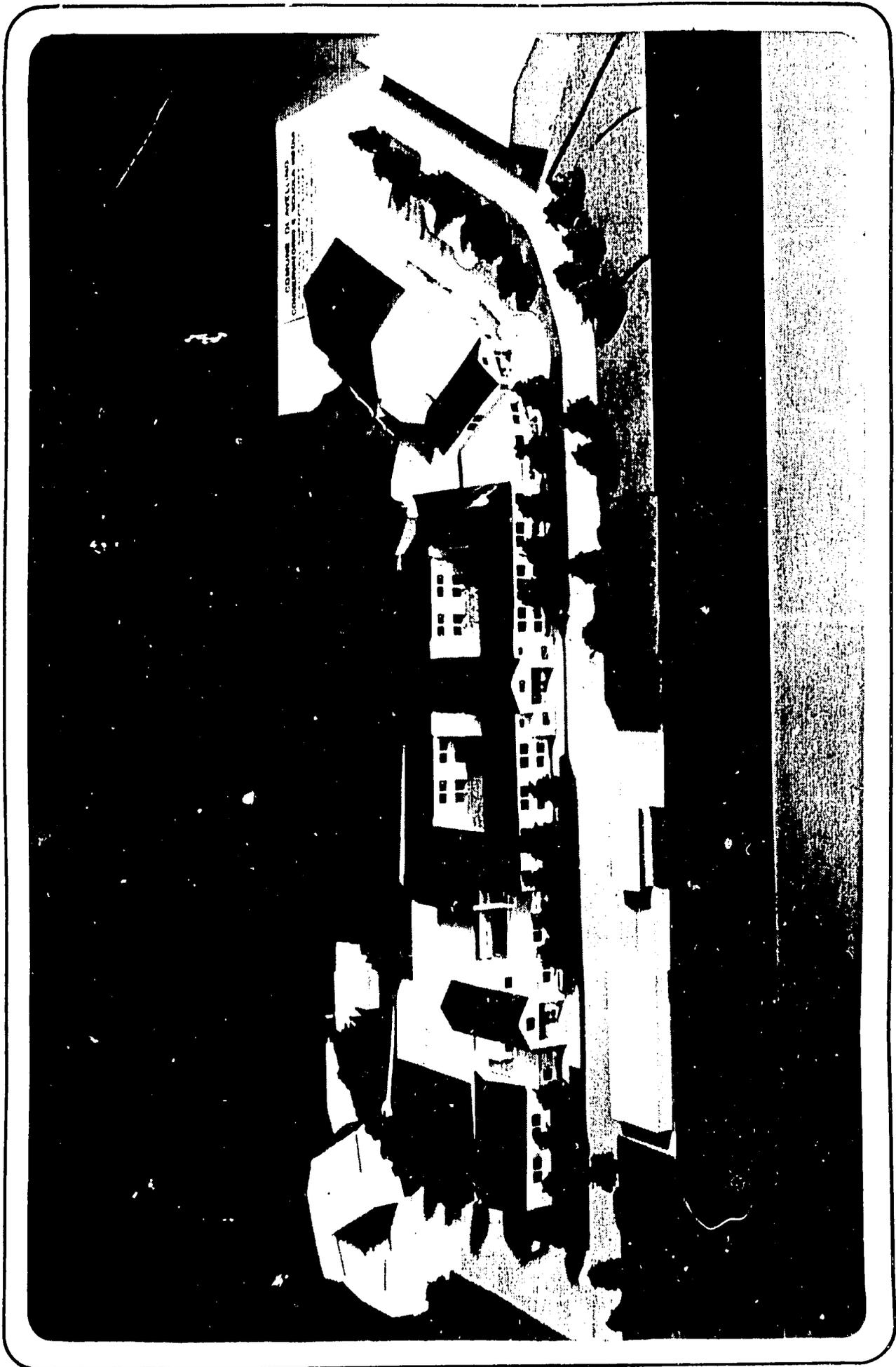
CAPACITY:	625 students
CLASSROOMS:	15
BID COST:	\$2,556,000
GROSS AREA:	58,557 sq. ft.
CONTRACTOR:	Diego S.p.A. Costruzioni
CONSTRUCTION START:	December 1982
EXPECTED OCCUPANCY:	Fall 1984

SOLOFRA SCHOOL

A. Name of Bidder	B. Part III Sect. B Italian Lire	C. Amend No. 1 Rec'd	Bid Bond
1. SIA	5,020,000,000	yes	yes
2. Rainone Costruzioni SpA	4,568,891,000	yes	yes
3. Gaeta Tommaso	3,889,580,000	yes	yes
4. Coop. Mucafer s.r.l.	3,720,000,000	yes	yes
5. Diego Costruzioni S.p.A.	3,450,000,000	yes	yes
6. Feal S.p.A.	3,959,000,000	yes	yes
Architects' Estimate: 4,463,316,000 Lire			

8-13

1/10



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AVELLINO - MUSIC CONSERVATORY AND JUNIOR HIGH SCHOOL

The site, an important link in the fabric of the old town, is located along a main traffic artery. Its historic importance is its proximity to a 15th Century castle which was only partially excavated at the initiation of construction activities. The educational program called for three distinct functional zones arranged along a curvilinear axis, which presses closely to the edge of the road. At the west end of the axis, defining the piazza, is the Conservatory Performance Hall creating the formal entrance to the public spaces. A curved indoor corridor connects the 480 seat Performance Hall with the studios and classrooms and contains the library and administration offices. Classrooms and studios are arranged around two square internal courts providing natural light and air to the interior, while providing outdoor space for the students. At the east end of the axis the building terminates with the junior high school and the gymnasium. An apartment is provided for an on-site caretaker.

Major spaces consist of concert hall, auditorium, music practice rooms, amphitheatre, classrooms, gymnasium, and outdoor playfields. Solar collector panels provide hot water heating.

CAPACITY:	625 students
CLASSROOMS/STUDIOS:	68
BID COST:	\$3,744,000
GROSS AREA:	64,615 sq. ft.
CONTRACTOR:	Impresa Carmine Orabona, Napoli
CONSTRUCTION START:	November 1982
EXPECTED OCCUPANCY:	Spring 1985

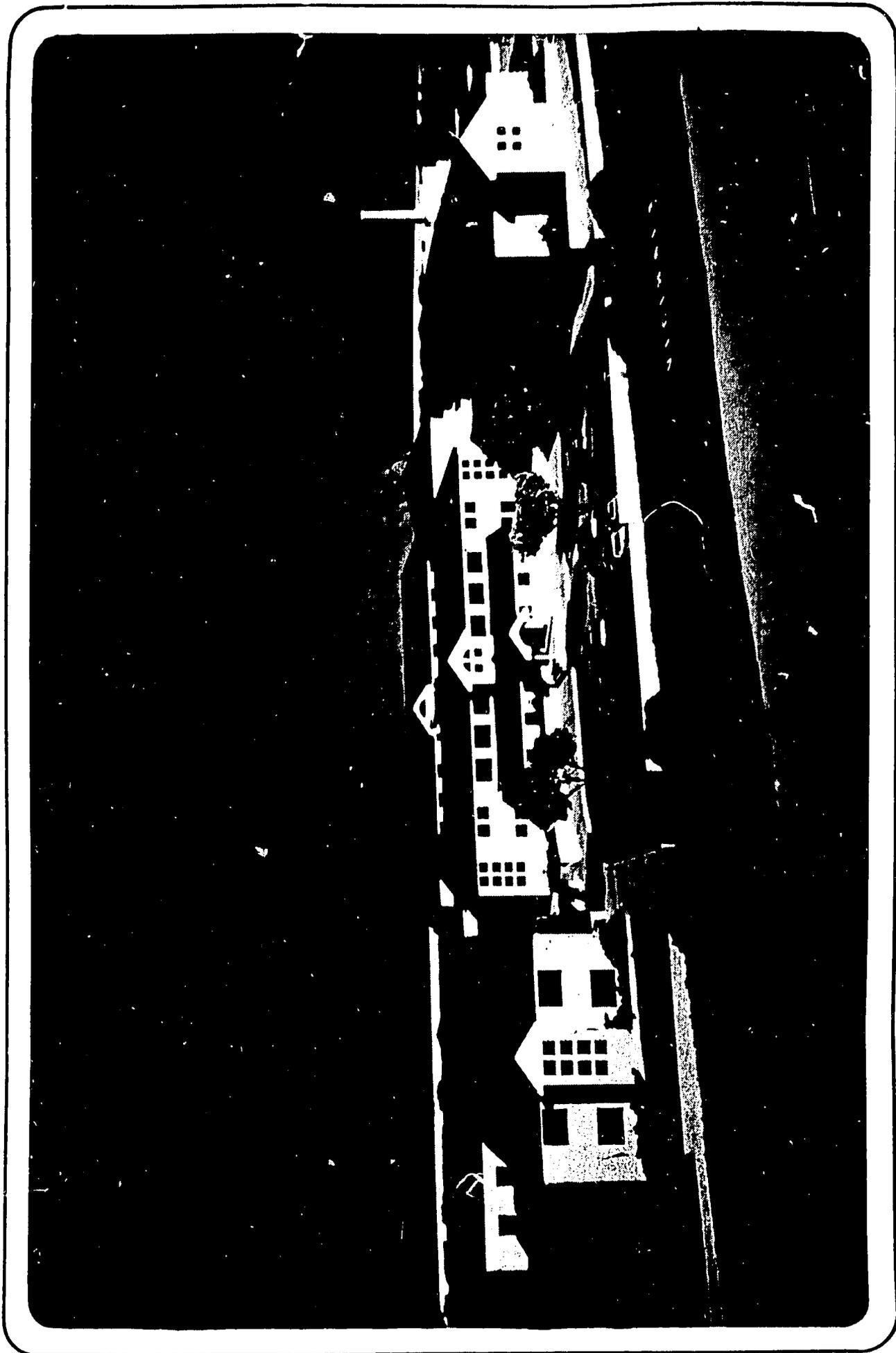
AVELLINO SCHOOL

A. Name of Bidder	B. Part III Sect. B Italian Lire	C. Amend No. 1 Rec'd	Bid Bond
1. Imca s.r.l.	6,948,000,000	yes	yes
2. Iapicca Arcangelo	5,999,000,000	yes	yes
3. Coop Mucafer s.r.l.	5,961,000,000	yes	yes
4. Rainone Costruzioni SpA	6,665,000,000	yes	yes
5. Impresa Carmine Orabona	5,055,000,000	yes	yes
6. Impresa Tommaso Gaeta	5,814,000,000	yes	yes
7. Ge.Co.Fer SpA	9,669,000,000	yes	yes
8. Di Maria Costruzioni SpA	9,800,000,000	yes	yes
9. Diego Costruzioni SpA	4,623,000,000	yes	yes
10. Feal SpA	6,290,000,000	yes	yes
Architects' Estimate: 6,275,690,000 Lire			

8-16



1/3



GROTTAMINARDA - ELECTRONIC TECHNICAL INSTITUTE

Grottaminarda, the largest of the six schools, is designed for the future expansion of its laboratories, and these expansion elements have been pre-sited to integrate with the initial stage of construction.

This school was programmed as a technically oriented academic center to allow students to pursue full general coursework, as well as specialization in the electronics field.

Major areas consist of academic classrooms, five electronic laboratories, auditorium, gymnasium, administration unit, cafeteria with dining room, and outdoor playfields. Solar collector panels were used to provide hot water heating.

The structural system consists of concrete shear walls on the perimeter and at selected interior locations with a cast-in-place reinforced concrete joist system for floor construction. The foundation is continuous along the perimeter, and loop bonded into the total structural framing system.

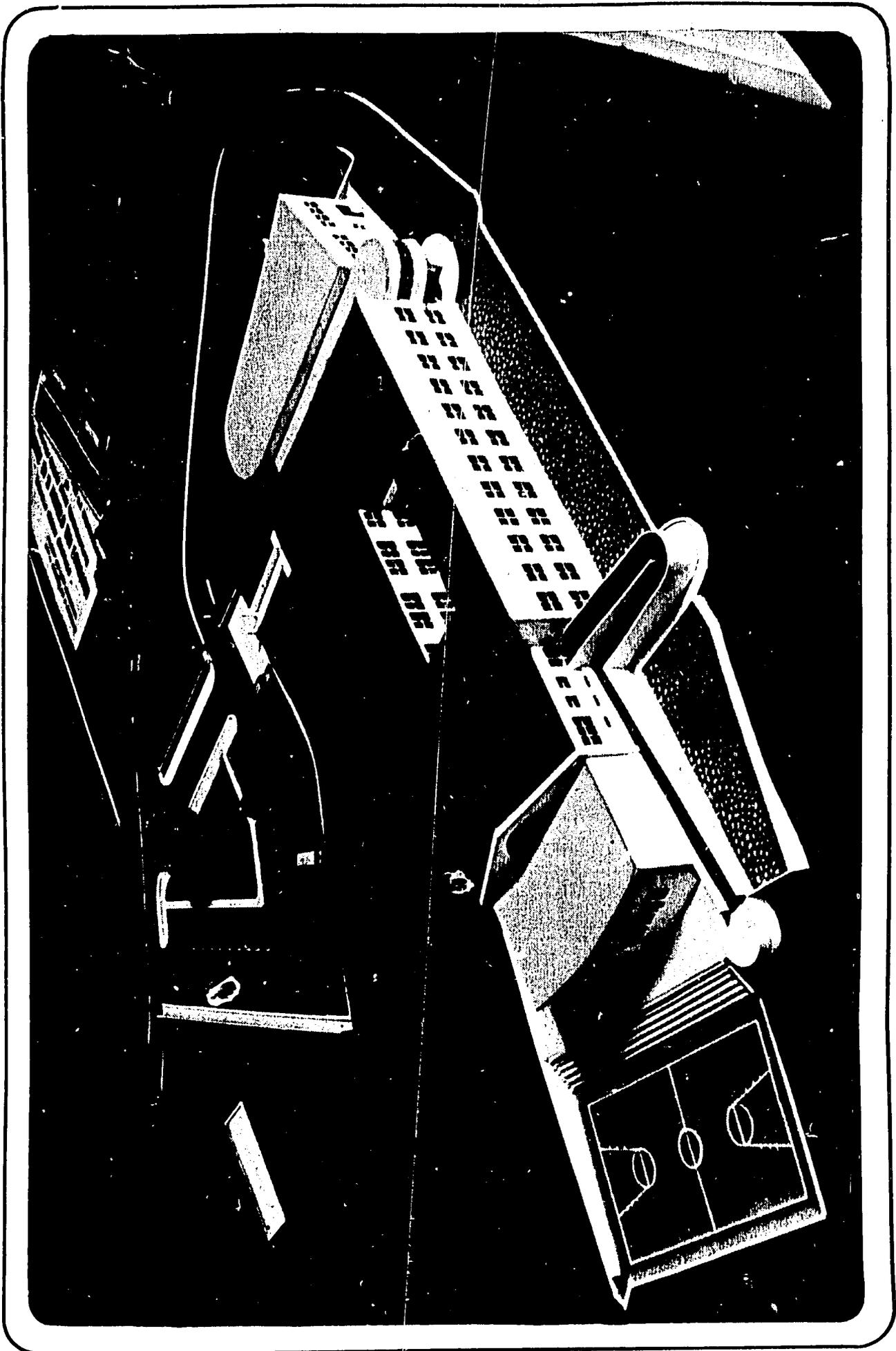
CAPACITY:	625 students
CLASSROOMS:	28 instructional spaces and electronics laboratories
BID COST:	\$2,778,000
GROSS AREA:	65,542 sq. ft.
CONTRACTOR:	Coop. MUCAFER Soc. s.r.l.
CONSTRUCTION START:	December 1982
EXPECTED OCCUPANCY:	Fall 1984

GROTTAMINARDA SCHOOL

A. Name of Bidder	B. Part III Sect. B Italian Lire	C. Amend No. 1 Rec'd	Bid Bond
1. Societa' Italiana Appalti	7,705,000,000	yes	yes
2. Imca s.r. l.	4,923,000,000	yes	yes
3. Conscoop	4,223,000,000	yes	yes
4. Ge. Co. Fer	4,489,000,000	yes	yes
5. Coop Mucafer s.r.l.	3,750,000,000	yes	yes
6. Feal S.p.A.	4,163,000,000	yes	yes
7. Diego Costruzioni S.p.A.	4,023,000,000	yes	yes
Architects' Estimate: 4,618,465,000 Lire			

8-19

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SANT' ANGELO DEI LOMBARDI - JUNIOR HIGH SCHOOL

This relatively small school addresses such important design issues as space flexibility and community relationship which will eventually enable the school to function as a community center.

The school will house a maximum of 450 students with 17 regular classrooms and 11 multi-use spaces and laboratories.

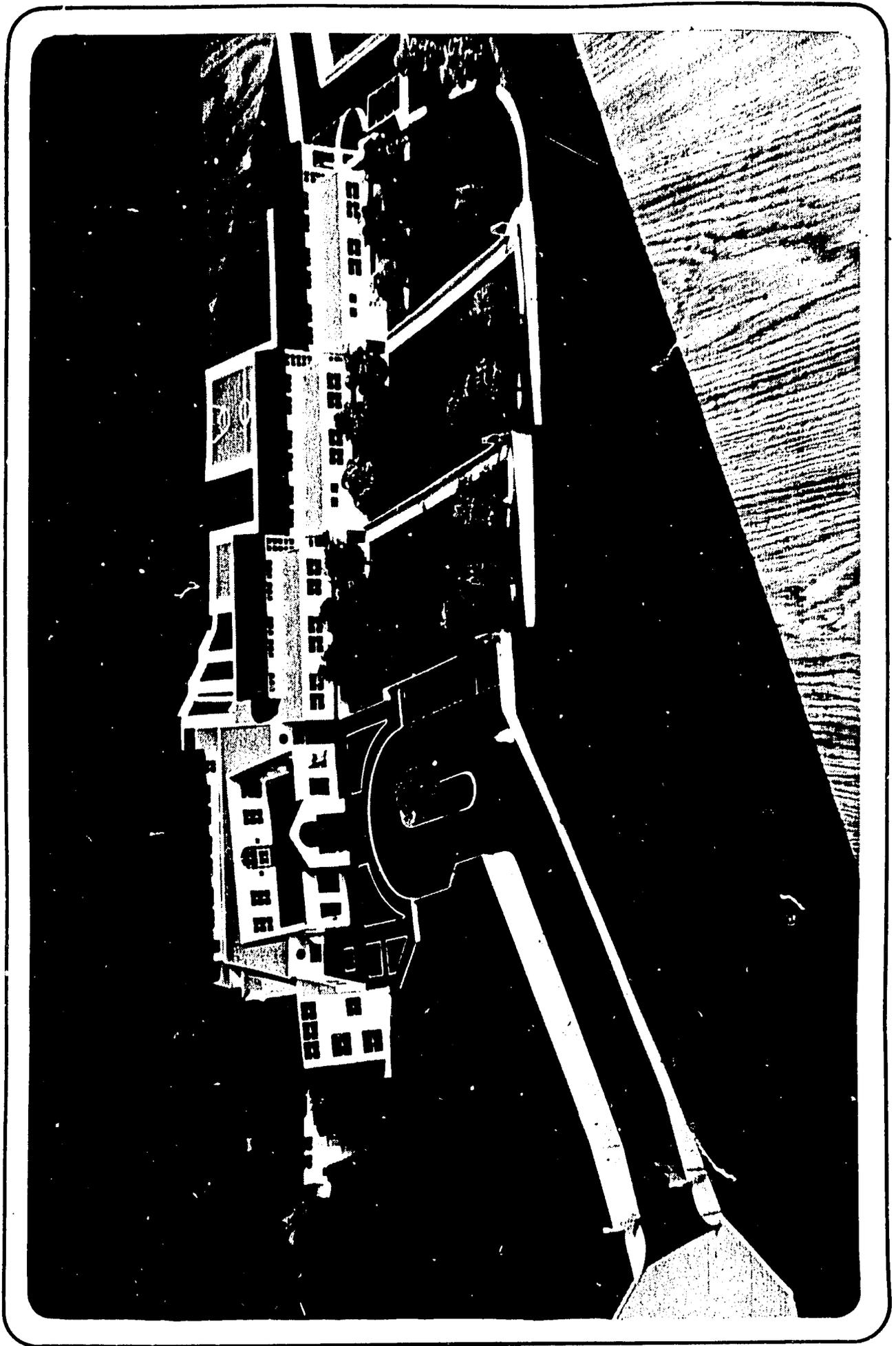
Major spaces consist of classrooms, laboratories, gymnasium, administration unit, auditorium and outdoor playfields. A curvilinear frame was used for the auditorium segment as a counterpoint to the formalistic two story design of the academic areas.

CAPACITY:	450 students
CLASSROOMS:	17
BID COST:	\$1,601,000
GROSS AREA:	34,625 sq. ft.
CONTRACTOR:	GE Co. Fer SpA, Padova
CONSTRUCTION START:	October 1982
EXPECTED OCCUPANCY:	Fall 1984

SANT'ANGELO DEI LOMBARDI SCHOOL

A. Name of Bidder	B. Part III Sect. B Italian Lire	C. Amend No. 1 Rec'd	Bid Bond
1. Cons Cooperative Costruzioni	3,298,000,000	yes	yes
2. Imca s.r.l.	3,163,000,000	yes	yes
3. Orabona Carmine	2,750,000,000	yes	yes
4. Impresa Giuseppe Barletta	4,000,000,000	yes	yes
5. Coop Mucafer scrl	2,892,000,000	yes	yes
6. Impresa Arcangelo Iapicca	3,115,539,000	yes	yes
7. Feal SpA	2,633,000,000	yes	yes
8. Diego Costruzioni SpA	2,989,000,000	yes	yes
9. Di Maria Costruzioni SpA	3,680,000,000	yes	yes
10. Ge.Co.Fer SpA	2,162,000,000	yes	yes

Architects' Estimate: 2,443,276,000 Lire



VALLATA - SENIOR HIGH SCHOOL

A steep site and a picturesque view of the hill town of Vallata are the elements that generated the conceptual design for this school. The main entrance to the school is through a central "cortile" from which the town of Vallata is framed by its colonnaded arched entrance, creating a visual dialogue between the city and the school. Defining the "cortile" are the auditorium, gym and administration spaces. Classrooms and laboratories are lineally arranged along either side of a large two-story circulation atrium. It penetrates the entire length of the school, organizing the spaces and flooding the interior of the school with natural light from its high clerestory.

CAPACITY:	625 students
CLASSROOMS:	25
BID COST:	\$2,555,556
GROSS AREA:	55,323 sq. ft.,
CONTRACTOR:	Coop MUCAFER Soc. Coop s.r.l.
CONSTRUCTION START:	December 1982
EXPECTED OCCUPANCY:	Fall 1984

VALLATA SCHOOL

A. Name of Bidder	B. Part III Sect. b Italian Lire	C. Amend No. 1 Rec'd	Bid Bond
1. IMCA s.r.l.	4,462,000,000	yes	yes
2. Conscoop	3,938,600,000	yes	yes
3. S.I.A.	5,782,000,000	yes	yes
4. Ge.Co.Fer	3,998,000,000	yes	yes
5. Coop Mucafer s.r.l.	3,450,000,000	yes	yes
6. Diego Costruzioni S.p.A.	3,610,000,000	yes	yes
7. Feal S.p.A.	4,037,000,000	yes	yes
Architects' Estimate: 4,114,218,000 Lire			

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REFERENCE TABLE OF PREVIOUSLY SUBMITTED DOCUMENTS

1. "Southern Italy Earthquake Resistant Schools U.S.A.I.D.
Report on first site visit conducted 14-17 July 1981".
2. Progress Report - 2
Southern Italy Earthquake Resistant Schools
Report on Site Visits 2 and 3 conducted 22 July and 28 August 1981.
3. "Comprehensive Report for Earthquake Resistant Schools in Southern
Italy U.S.A.I.D."
4. "Area and Cost Analysis of Schematic Design Solution - "A" and "B"
Groups".
5. "Basis of Design", "Outline Specifications" and "Preliminary Cost
Estimates" for each project.
6. "Preliminary Structural Engineering Report" for each project.
7. Construction Documents submitted:
Specifications
Civil, architectural, structural, mechanical, electrical and plumbing
construction drawings
Cost estimates
Structural Calculations
Invitation for Bids
8. Program Master Schedule
9. Bid Analyses and Architects Award Recommendations.
10. Monthly Progress Reports for period ending 15 December 1981 through
period ending 15 April 1983.



ITALIAN SCHOOLS - FINAL REPORT

AVELLINO CONSERVATORY
CALABRITTO SCHOOL
CALITRI HIGH SCHOOL
GROTTAMINARDA HIGH SCHOOL
SANT'ANGELO DEI LOMBARDI JUNIOR HIGH SCHOOL
SOLOFRA TECHNICAL INSTITUTE
VALLATA HIGH SCHOOL

This report summarizes the structural aspects of the design common to the above seven schools. While there are particular variations in individual site conditions, building types, allowable soil bearing pressures and general architectural requirements, the seven schools are all designed for similar levels of structural performance. As explicitly required by the AID Program, the schools possess a level of resistance to earthquakes superior to what is generally found in the area and are designed for the most stringent of the UBC and/or the Italian Decrees and Norms.

1. Drawings and specifications are written in Italian and follow Italian unification norms (UNI) rules, codes and all other applicable regulatory legislation. In particular, technical criteria for school designs take into account the following norms:
 - a. "Decreto ministeriale" dated December 18, 1975, and published on February 2, 1976, in the "Gazzetta Ufficiale" No. 29, and/or as subsequently revised.
 - b. Italian Law Number 373 dated April 30, 1976, and published on June 7, 1976, in the "Gazzetta Ufficiale" No. 148, and/or as subsequently revised. This Code regulates energy consumption and utilization.

2. In general, the Italian Building Code Seismic provisions have been considered in the process of structural design. Regardless of the level of intensity of the seismic zone, all school buildings have been designed in accordance with the norms relative to the highest intensity provided by the Italian Seismic Code, or equivalent to "first category" zone (seismic co-efficient S-12). Per AID's requirements, the norms of the Uniform Building Code, 1979 edition, have been applied as the UBC 1979 edition requires a level of earthquake resistance more stringent than the Italian Code.

DESIGN LOADS

VERTICAL

All building elements have been designed for the following uniform loads with provisions for any special conditions such as elevators, tanks, etc.

--for unused attics

150 Kg/m²

--for laboratories with light equipment

500 Kg/m²

--for laboratories with heavy equipment

1000 Kg/m²

--for gymnasiums

500 Kg/m²

--for used stairways and terraces

400 Kg/m²

--for all other areas

350 Kg/m²

SEISMIC

All structural elements have been designed to conform with the 1979 UBC forces computed as follows:

$V = ZIKCSW$ where:

V = lateral load due to earthquake forces

Z = zone factor = 1.0 maximum

I = Importance Factor = 1.50

K = 1.33 for shear wall buildings

CS = 0.14 maximum specified by Code

W = weight of structure and all permanent elements

MATERIALS

The structural system utilizes the following materials:

i) Reinforced Concrete

Columns	350 Kg/cm (5000 Psi)
Beams	290 Kg/cm (4000 Psi)
Supported Slabs	290 Kg/cm (4000 Psi)
Walls Above Grade	210 Kg/cm (3000 Psi)
Foundations	210 Kg/cm (3000 Psi)

ii) All Reinforcing Steel

2200 Kg/cm = 31,300 lbs/in

SUMMARY TABULATION CHART

<u>Name/Type</u>	<u>Area(Meter/Ft)</u>	<u>Cost (Lire/Dollar)*</u>	<u>Cost Per (Lire/M² Dollars/Ft²)</u>	<u>Date Bid</u>
1. School of Calitri Senior High School	5,750 sq. m. 61,900 sq. ft.	L 3,494,998,800 \$ 2,588,888	L 607,825.00/M ² \$ 41.82/f ²	8 October 1982
2. School of Avellino Music Conservatory	6,002 sq. m. 64,615 sq. ft.	L 5,054,400,000 \$ 3,744,000	L 842,119.00/M ² \$ 57.94/ft ²	15 October 1982
3. Sant' Angelo dei Lombardi Junior High School	3,216 sq. m. 34,625 sq. ft.	L 2,161,350,000 \$ 1,601,000	L 671,969.00/M ² \$ 46.23/ft ²	8 October 1982
4. School of Grottaminarda Industrial Electronics	6,088 sq. m. 65,542 sq. ft.	L 3,750,000,000 \$ 2,778,000	L 613,547.00/M ² \$ 40.00/ft ²	2 December 1982
5. School of Solofra Technical High School	5,440 sq. m. 58,557 sq. ft.	L 3,450,000,000 \$ 2,556,000	L 633,260.00/M ² \$ 41.45/ft ²	2 December 1982
6. School of Vallata Senior High School	5,139 sq. m. <u>55,323 sq. ft.</u>	L 3,450,000,000 <u>\$ 2,555,556</u>	L 689,035.00/M ² <u>\$ 45.09/ft²</u>	2 December 1982
 SIX SCHOOLS TOTAL:	 31,625 sq. m. 340,562 sq. ft.	 L 21,360,748,800 \$ 15,823,444	 L 4,057,755.00/M ² \$ 272.53/ft ²	

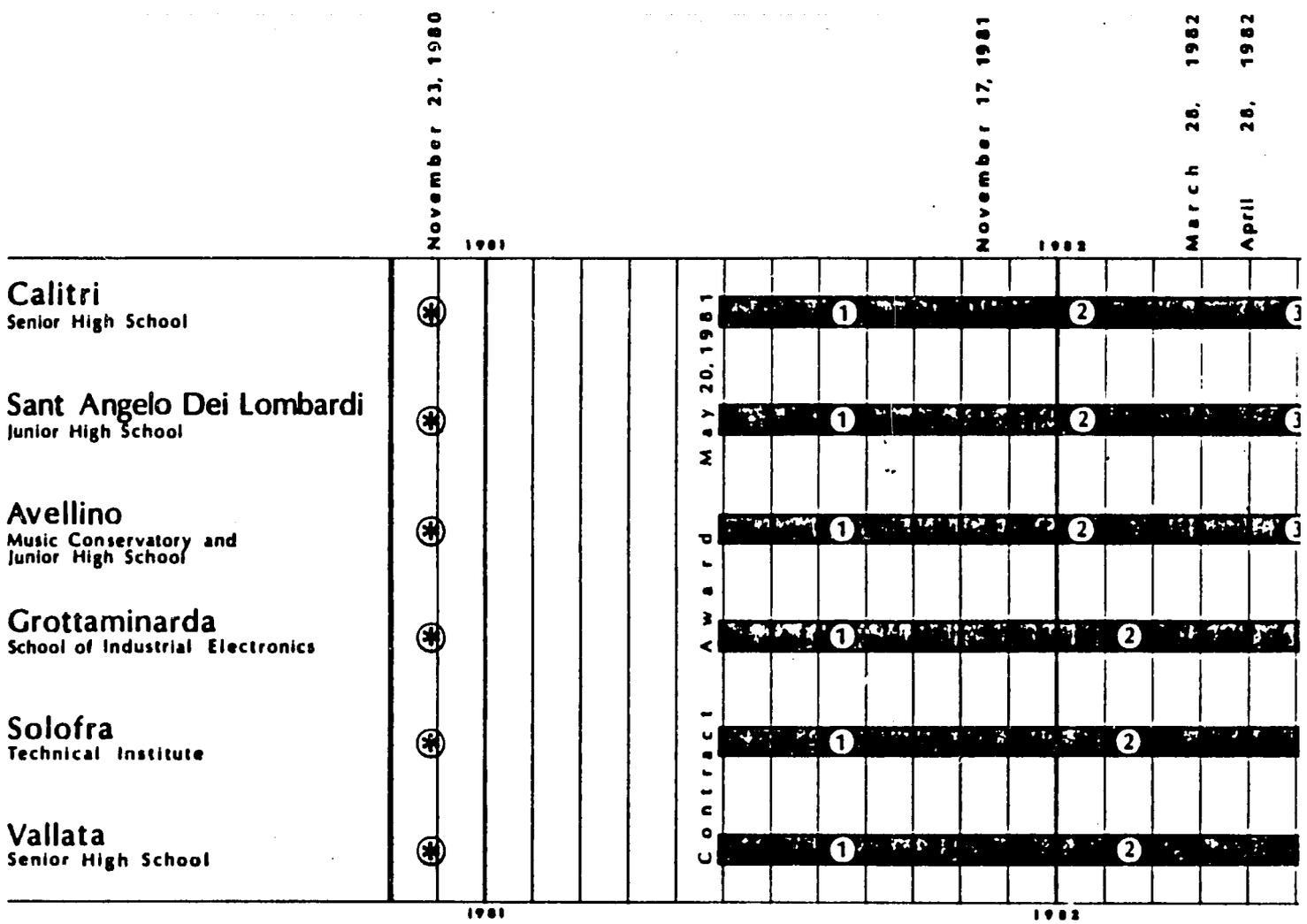
The average cost per lire/M² for the six schools equals L676,292.50 per square meter.
The average cost per dollar/ft² for the six schools equals \$45.42 per square foot.

*Exchange Rate @ 1350 lire/U.S. dollar.

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Southern
Contract Number



DESIGN PHASE (Contract)

- ⊛ Earthquake, November 23, 1980
- ① Pre Design Phase
- ② Preliminary Design Phase Presentation
- ③ Final Design Phase Contract Documents
- ④ Invitation to Bid
- ⑤ Bid Opening, Analysis and Recommendation

CONSTRUCTION PHASE (Not In Contract)

- ⑥ 18 and 24 Months Construction Phase

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Program Master Schedule

for the

thern Italy Earthquake Reconstruction Program

ict Number NEB-0001-C-00-1045-4

Project Number 145-81-01

