

Blacksburg Central - A New Middle School

by

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Master of Architecture

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Abstract

This thesis proposes that an architecture which supports centrality is a fundamental to the identity of schools. An organizational hierarchy is employed to structure movement and spatial necessities in relationship to a large gathering space. Flow emanates from this public central space into arterial hallways toward classrooms, ending in the small scale occupiable classroom windows or capillary hallway window nooks. Classrooms of a modern typology are structured around natural light and architectural elements. A proposal for a new Blacksburg Middle School is founded upon these parts: the concept of institutional central space; a nested spatial and circulatory scale progression; and a series of differentiated modern classrooms. Central to downtown Blacksburg, the new school would replace the now abandoned school building fronting Main Street, straddling Clay and Eheart streets.

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What Is Important in a School?

A central gathering space able to conveniently accommodate the entire student body is fundamental to a good school. A circulation should be organized to facilitate comfortable and rapid movement throughout the building. Classrooms should have ample natural light and airflow, and controllable artificial light. A well defined architectural element should also be prominent in each classroom. In this case a column serves as a place to catch light, hang objects or papers, provide a spacial boundary, and signify the structure. In response to natural light and airflow, a classroom should have a large window with a wide stool (sill) for plants, other objects, or students to sit. The architecture of differentiated classrooms should address the needs of different types of learning. Hallways should have natural light as well as spaces to stop and talk or reflect outside the flow of foot traffic. Here these needs are mutually served by a series of regular hallway window nooks. Finally, a school should offer outdoor structure and open spaces to sit and to play, that are open to and accessible to the broader community without automobiles.

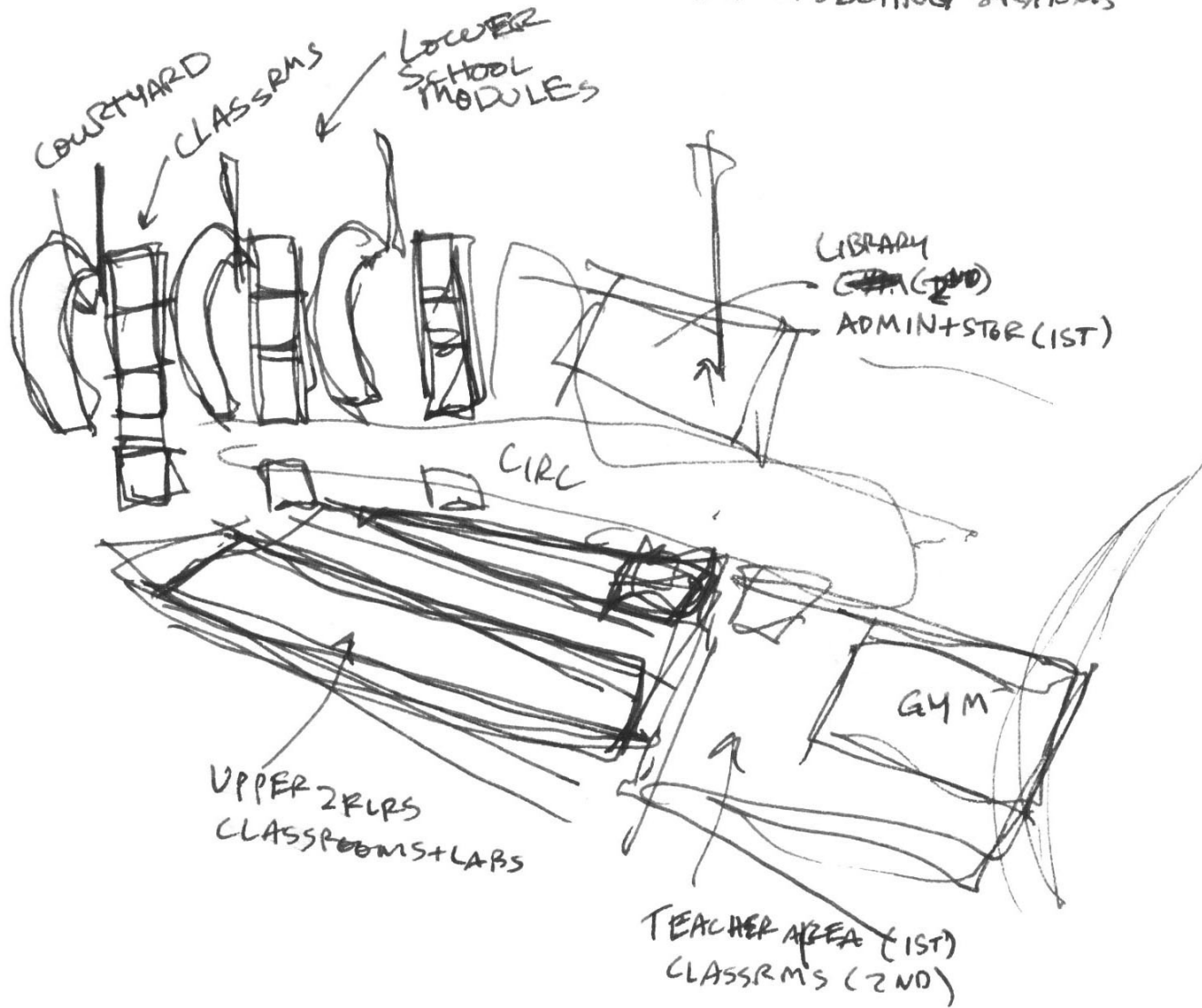
Case Studies

Six schools were chosen as subjects for preliminary research through browsing, reading, and recommendations. The projects were not chosen with an outcome in mind, merely to represent a range of well-designed schools. The result of each study was a rough diagram of the school and a short list of characteristic architectural decisions. This analysis formed the basis of the thesis, and several of the projects served as inspiration for some of the major design decisions.

DIAMOND RANCH
MORPHOSIS

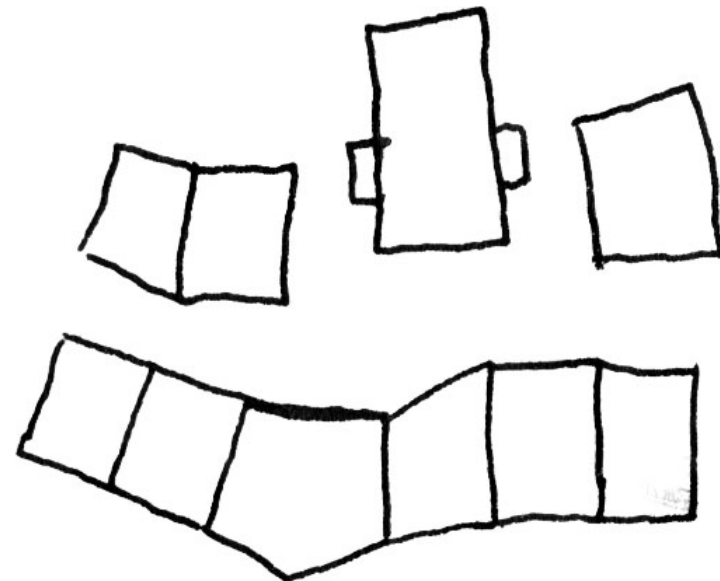
VARIES SOME WITH FLOOR LEVEL (3)

2 INTERSECTING SYSTEMS



Diamond Ranch High School
Morphosis

Despite an initial chaotic appearance, the school is simply an additive composition of elements. Several repeated modules, as well as some more unique spaces flank a large hallway with the apparent disorder of a medieval street.

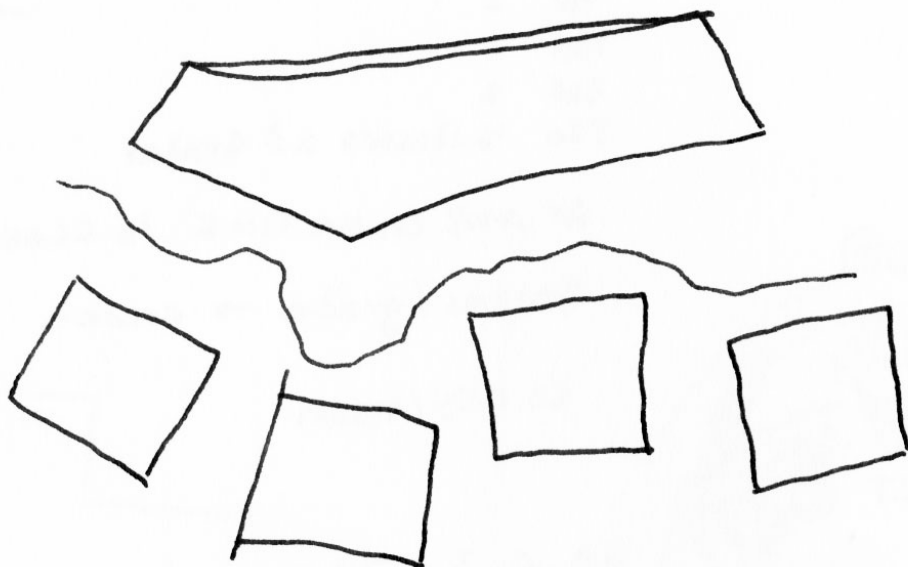
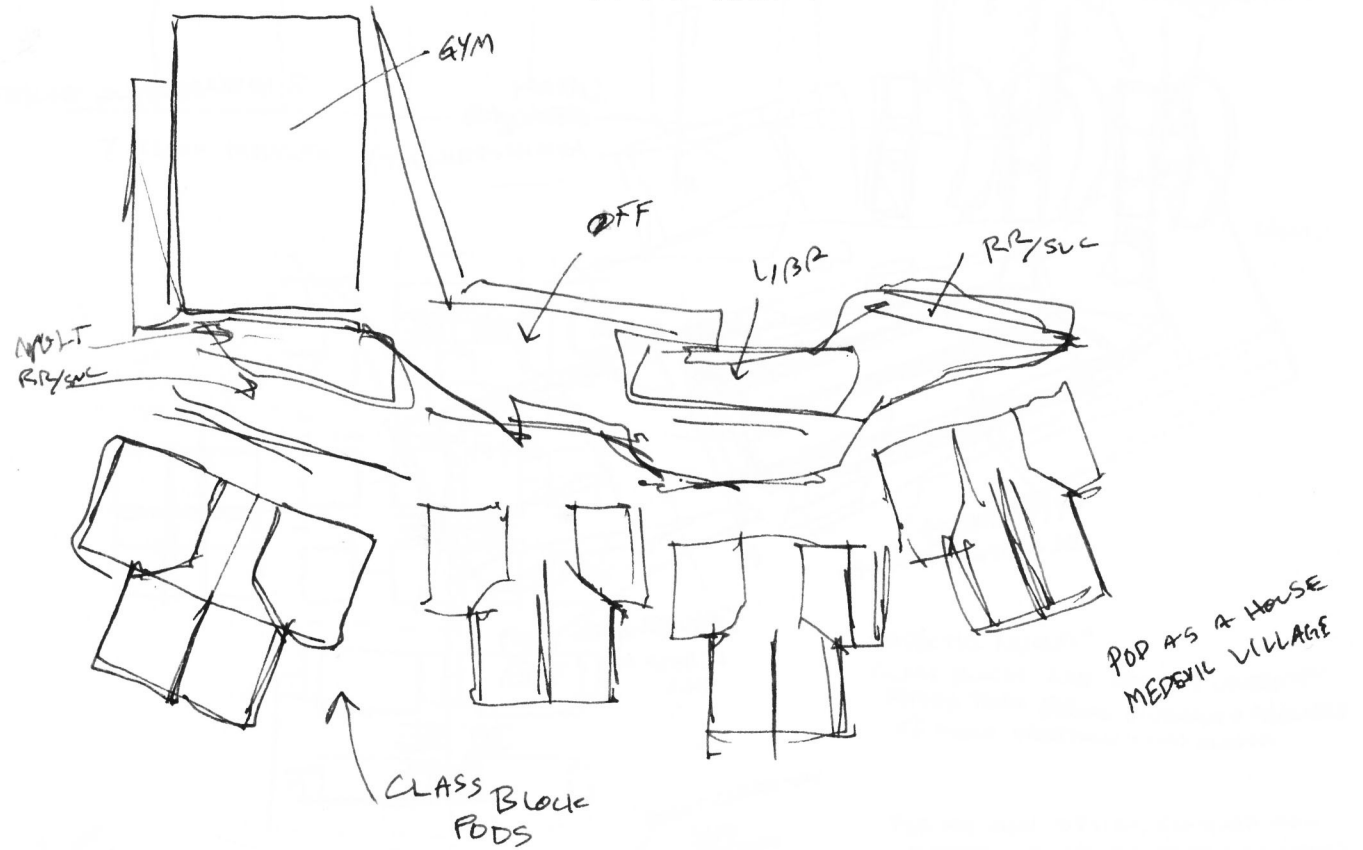


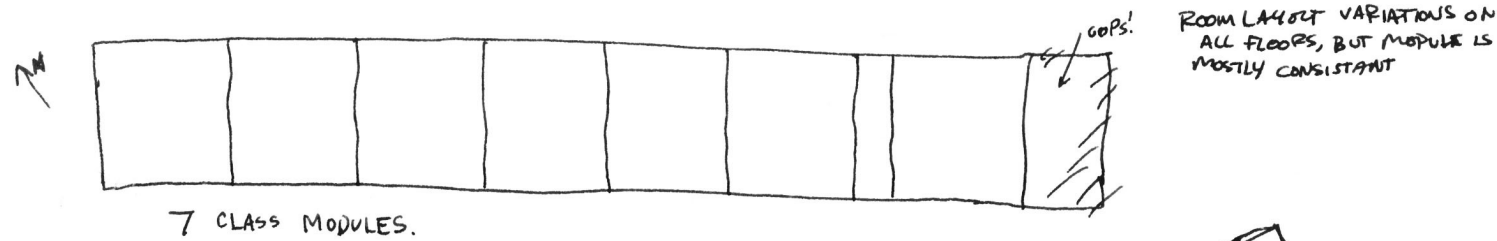
Strawberry Vale Elementary
Patkau Architects

A series of classroom pods or modules are organized along a meandering corridor. Rooms outside the basic classroom module are treated separately and occur on the opposite side of the hallway.

- CLASSROOMS
- LIBRARY
- GYM
- CAFETERIA
- AUDITORIUM
- ATHLETIC FIELDS??
- OFFICES
- SERVICE

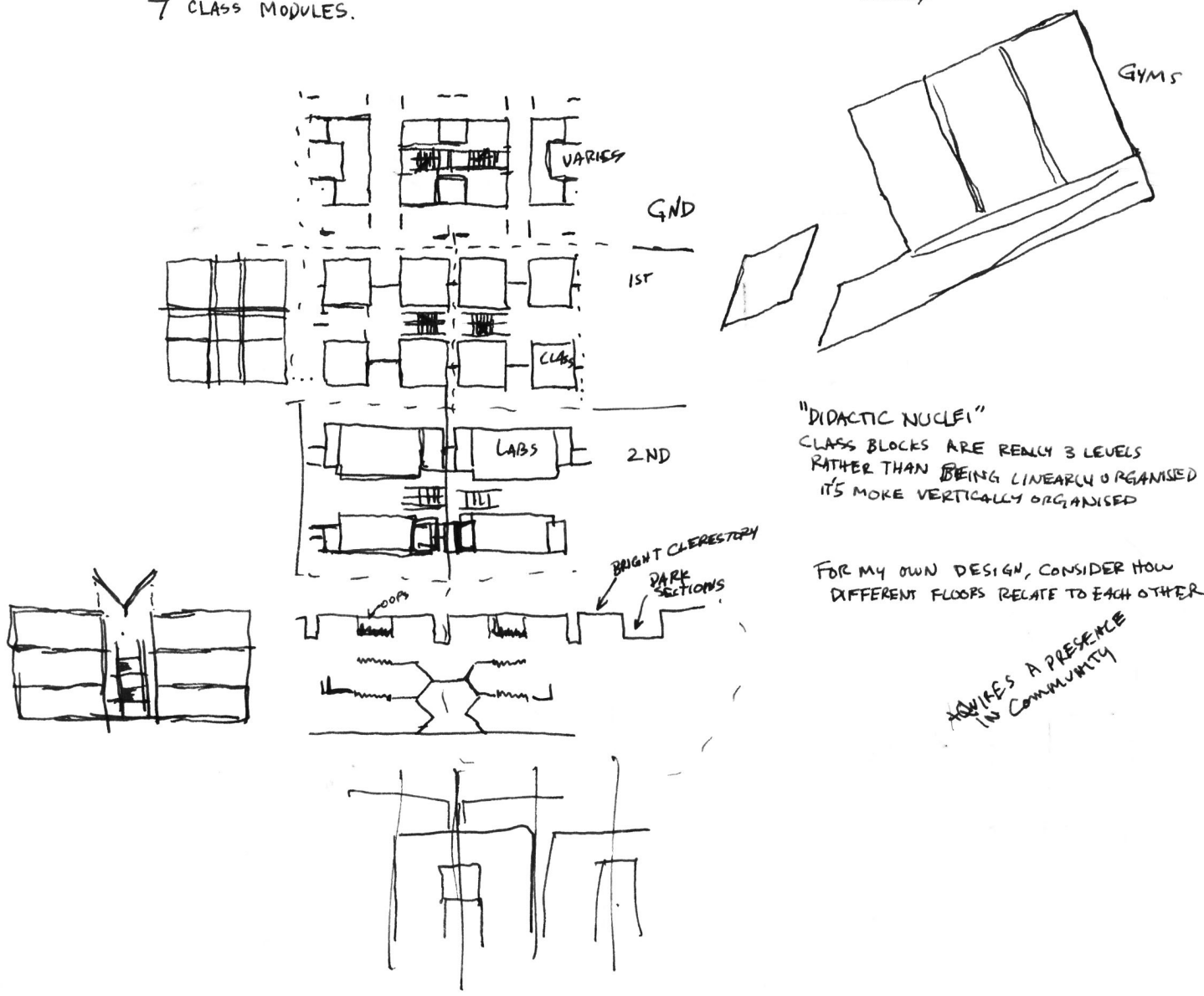
STRAWBERRY VALE
PATKAU ARCHITECTS





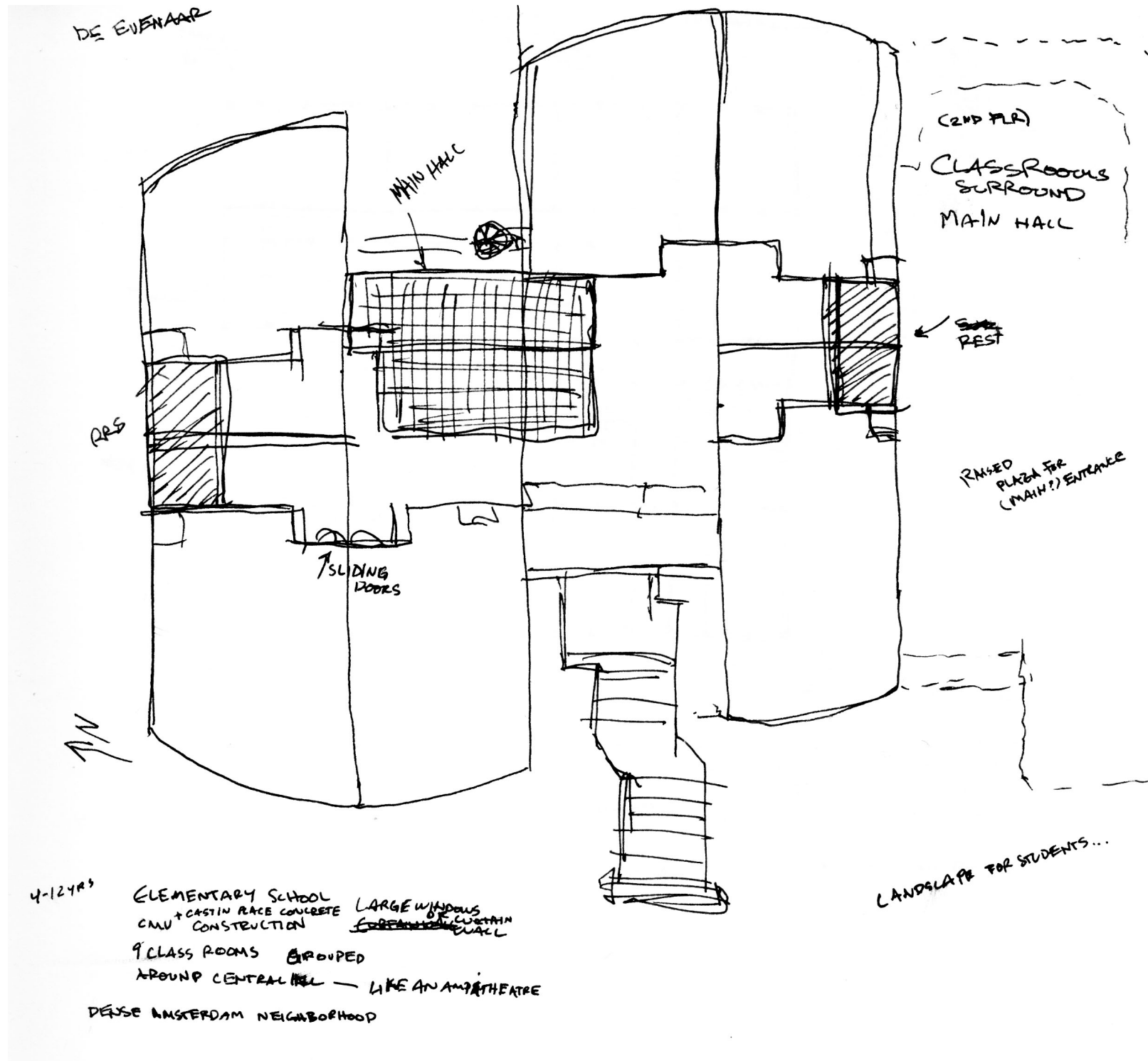
Morbio Inferiore Middle School
Mario Botta

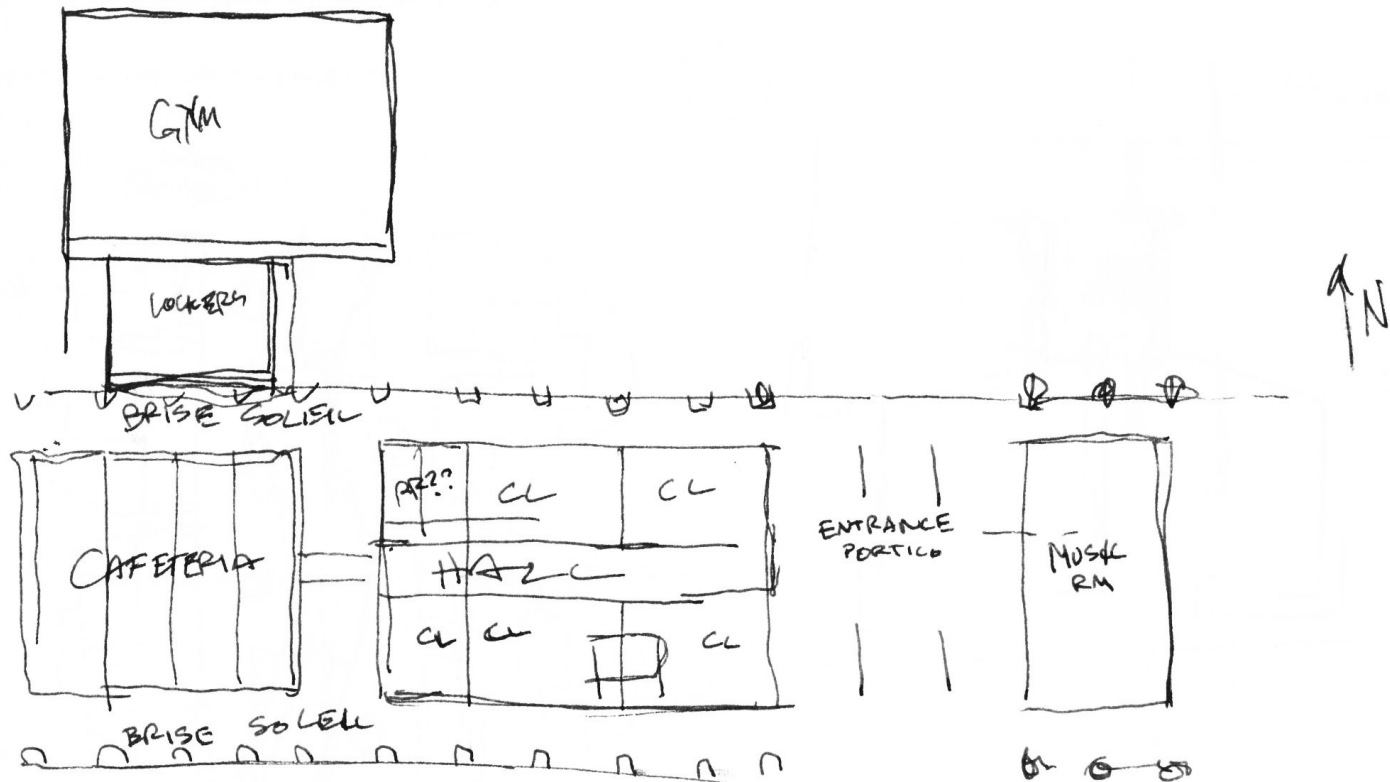
A series of classroom modules are repeated on a line across the site. Each module is vertically organized with different classroom typology on each floor. A central staircase divides the modules and allows daylight to pass from clerestory windows down to the first floor.



DeEvanaar Elementary School
Herman Hertzberger

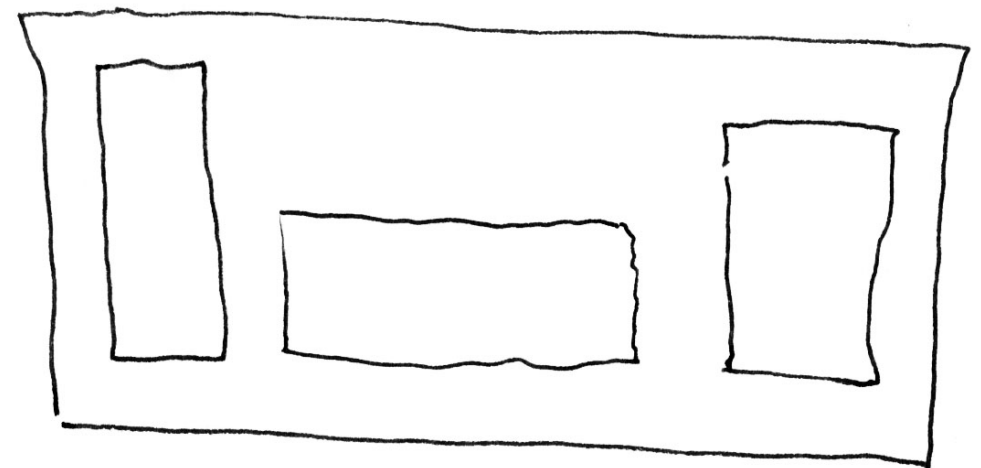
A central gathering space to accommodate the entire student body is at the center of the school. Classrooms are rotated and translated around the main hall, providing both legibility and spacial differentiation. Within the main hall, a step/seat provides seating and conveyance for the students.





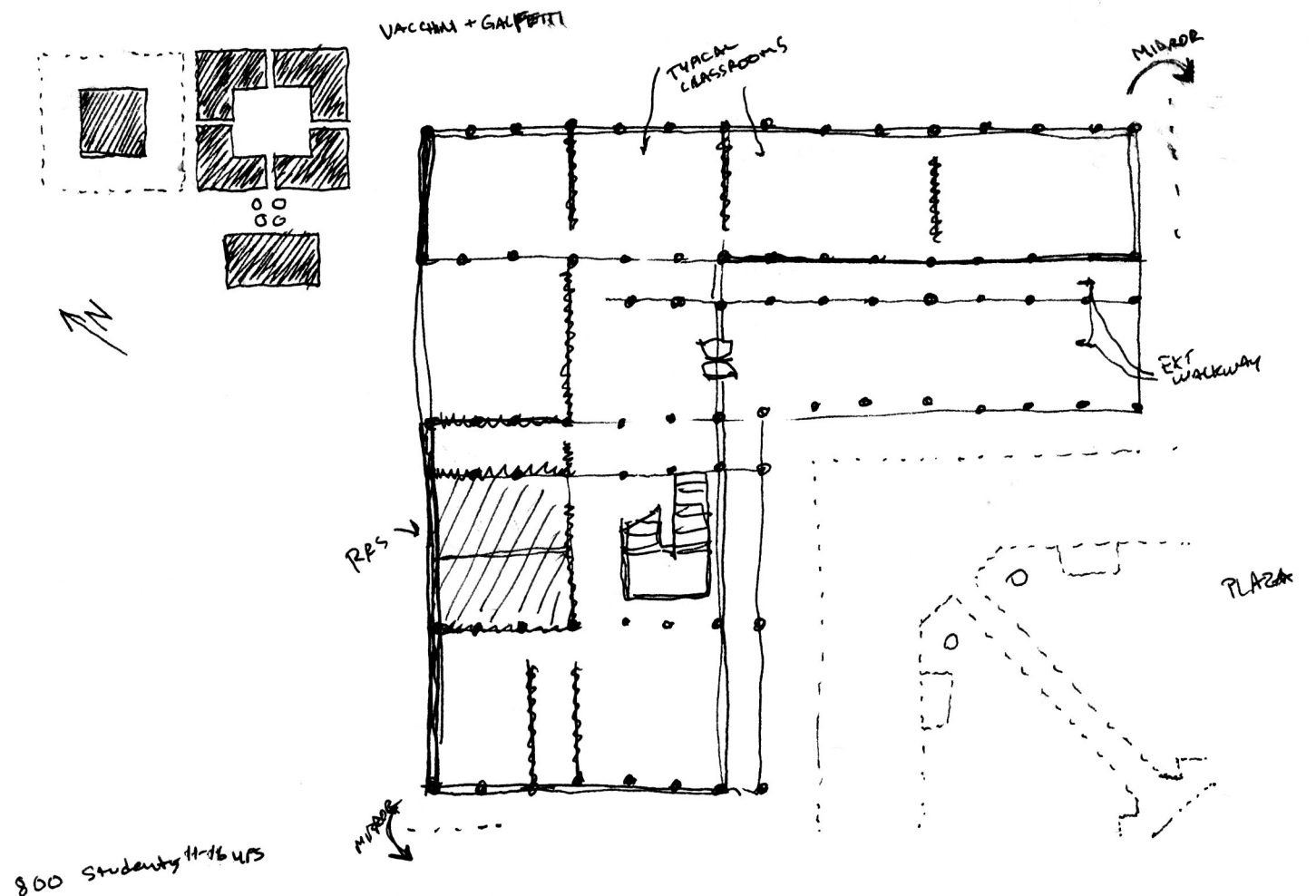
Sarasota Senior High
Paul Rudolph

A large roof spans the main addition to the school. The structural rhythm of the roof and the corresponding brise soleil dominate the architecture. Following this grid, small clerestory windows bring light into the hallway in the classroom wing.



Secondary School in Losone
 Livio Vacchini & Aurelio Galfetti

Four main classroom wings are organized around a square courtyard. Exposed steel structure provides a strong visible grid with open-air hallways lining the courtyard side. The school is formally reminiscent of an abstracted renaissance piazza.

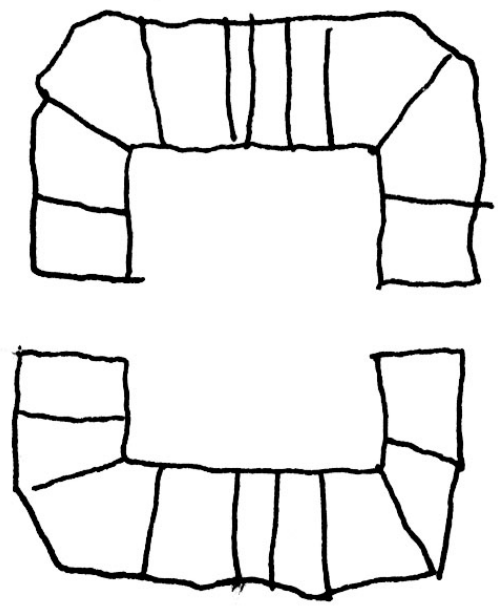


800 students + 16 UPS

GRID OF STEEL COLUMNS AND BEAMS DOMINATES THE ARCHITECTURE METAL OR GLASS INFILL PANELS

CLASSROOMS ORGANISED AROUND A CENTRAL COURTYARD

LARGE OPEN SITE IN LOSONE, NOT A DENSE NEIGHBORHOOD



Centrality

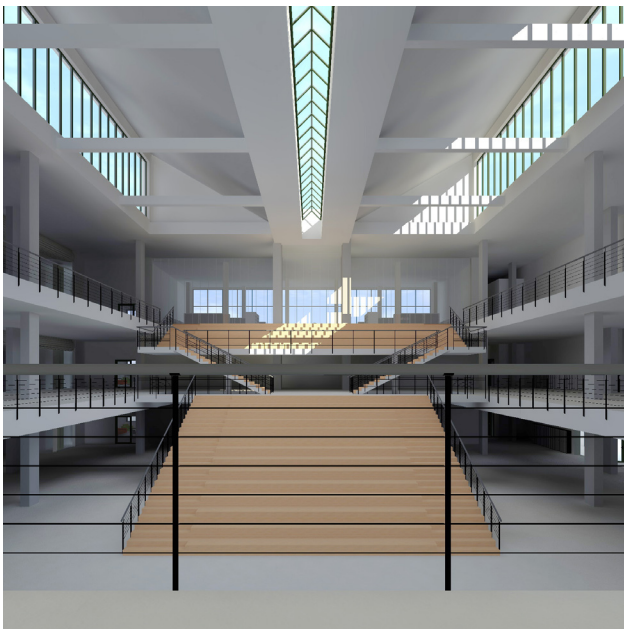
At the core of this proposal is the notion of centrality. The physical center of the school is also the social and circulatory center of the school. This three-story atrium space affronts both of the entrances, both of the classroom wings, the Gymnasium, the Library, and the Music room. Every student and teacher passes through the space multiple times throughout the day. It serves as a gathering space to accommodate the entire student body. A broad stair case rises from the middle of the first floor up to the third, with double-sized stairs providing assembly seating. Large clerestory windows running the length of the atrium provide ample natural light, and an opportunity to track the sun throughout the course of the day.





Nested Scale & Flux

Rather than a linear organization, a nesting of scales is the principal organizational basis of this school. The central space exists at the scale of the entire school and allows the passage of entire student body. This is a space of gathering and community. With the atrium as the heart of the school, the corridors branch off as a series of arteries from this heart. These accommodate heavy foot traffic, while acknowledging social tendencies to stop and talk with columns in the center of the halls that form eddies in the flow. Classrooms are differentiated in the hallways by their openings, with each classroom organ fulfilling a slightly different role. Finally hallway nooks and classroom windows form the capillaries to the circulatory system. They are small enough that only a few individuals could occupy the space and any flow would be slow. These are spaces of quiet and reflection.

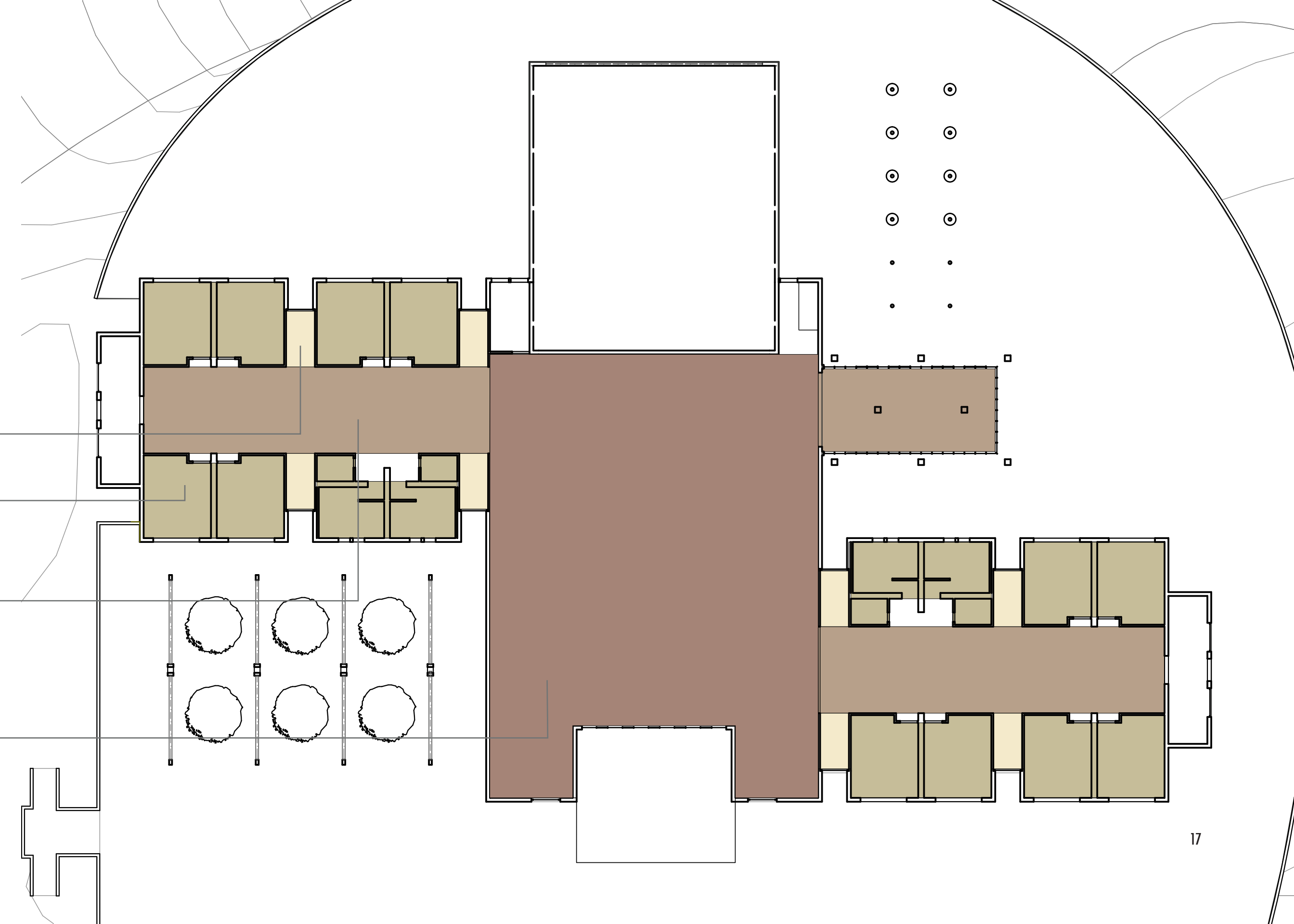


Nooks & Windows

Classrooms

Corridors

Central Atrium



Site

The site was chosen largely for its location in Downtown Blacksburg. The old Blacksburg Middle School site is an ideal location, adjacent to the 16 blocks - shown in light gray, and is convenient to residential neighborhoods. Proximity to residential neighborhoods is crucial for a school, as it facilitates safe walking and biking by the students. This decreases the need for busses and increases the potential health benefits for students by encouraging at least a minimum of daily exercise. This can also improve the vitality of the neighborhood by increasing pedestrian traffic. This project assumes the existing building is no longer there, and proposes a retaining wall with some modifications to the topography that form a plinth for the primary building. On the elevated plinth a stone-paved surface allows for access to the building from multiple directions and offers possibilities of recreation. Immediately outside the plinth, a driveway encloses the retaining wall and sweeps a prominent arc across the site.



Rounoke St

Lee St

Penn St

Wharton St

Church St

Washington St

S Main St

Draper Rd

Clay St

Miller St

Eheart St

Palmer Dr

Penn St

Mountain View Dr

Eakin St

Church St

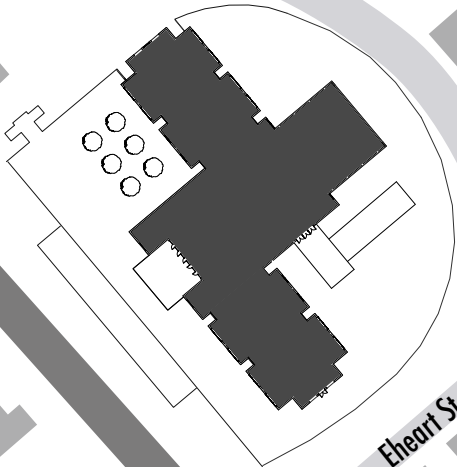
Hemlock Dr

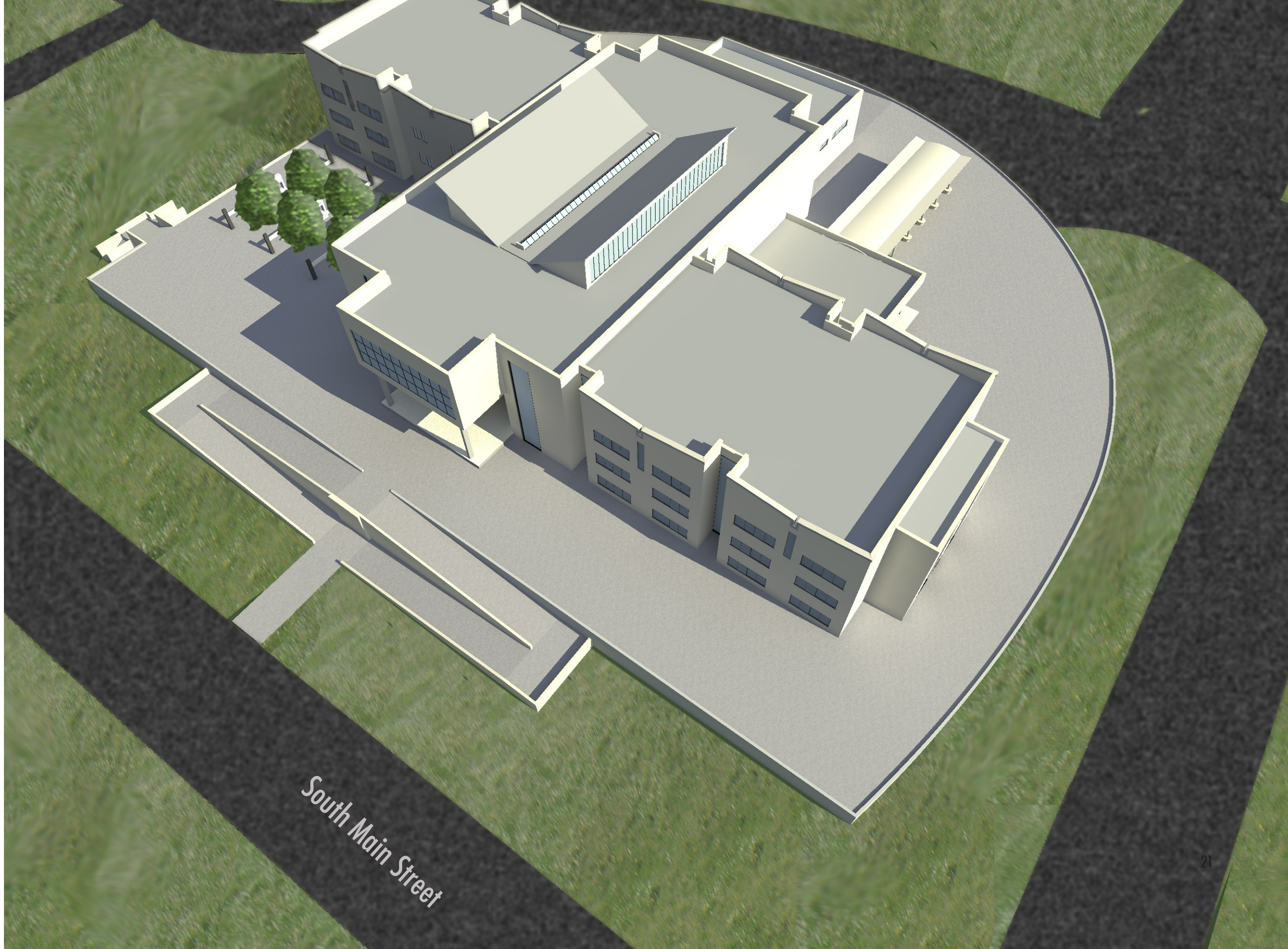
Upland Rd

Peston St

20

Harrell St



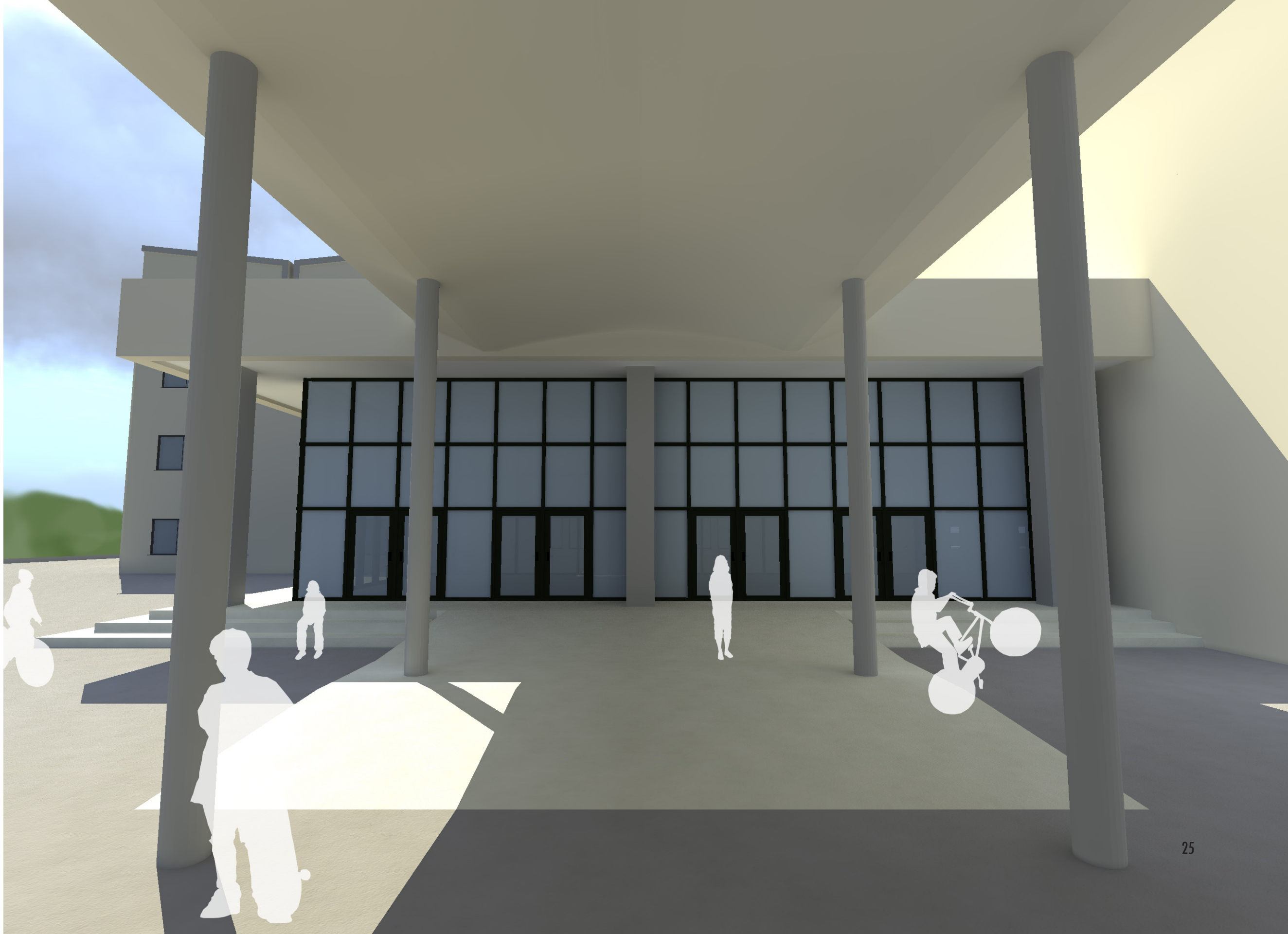


South Main Street



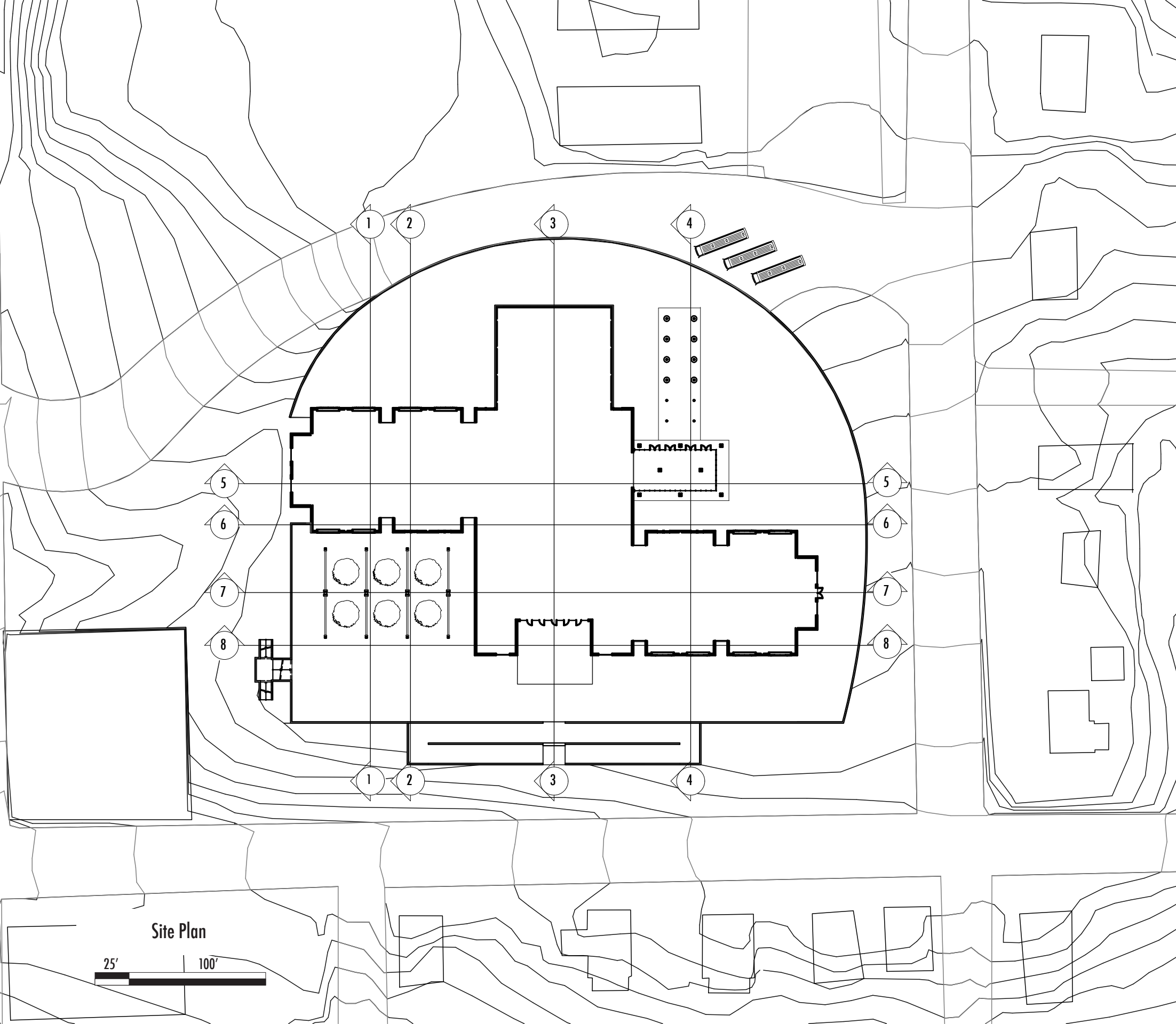
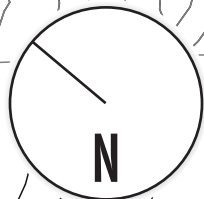






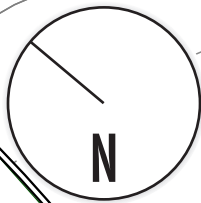
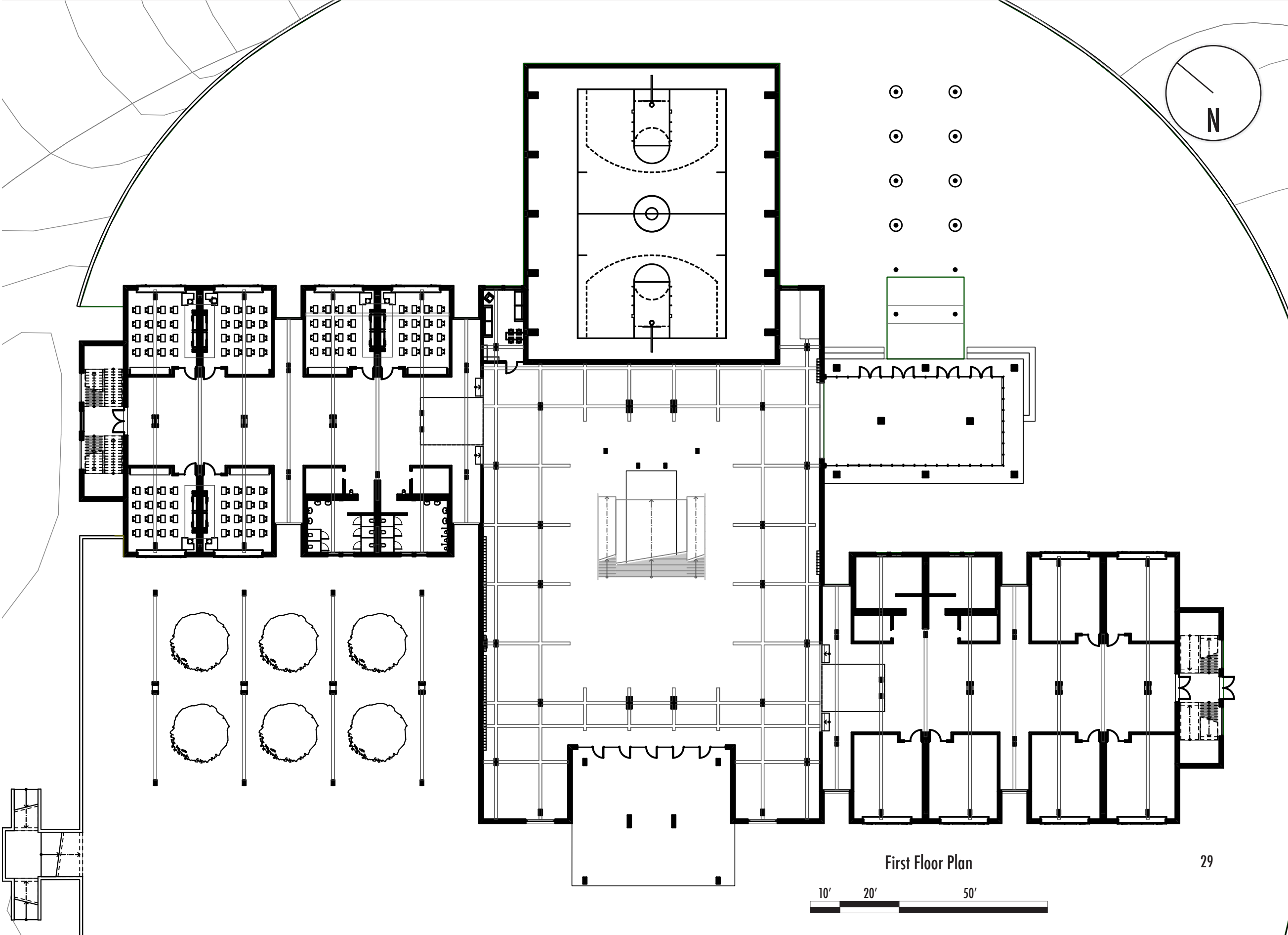
Floor Plans

All plan views are shown at $1/32'' = 1'$ except the site plan, which is shown at $1/75'' = 1'$. The left classroom wing is shown furnished, while the right is shown unfurnished, though both would be furnished. The reflected ceiling plans (RCP) for the second and third floors are included to show the location of artificial lighting fixtures and the hallway ceiling adornments.



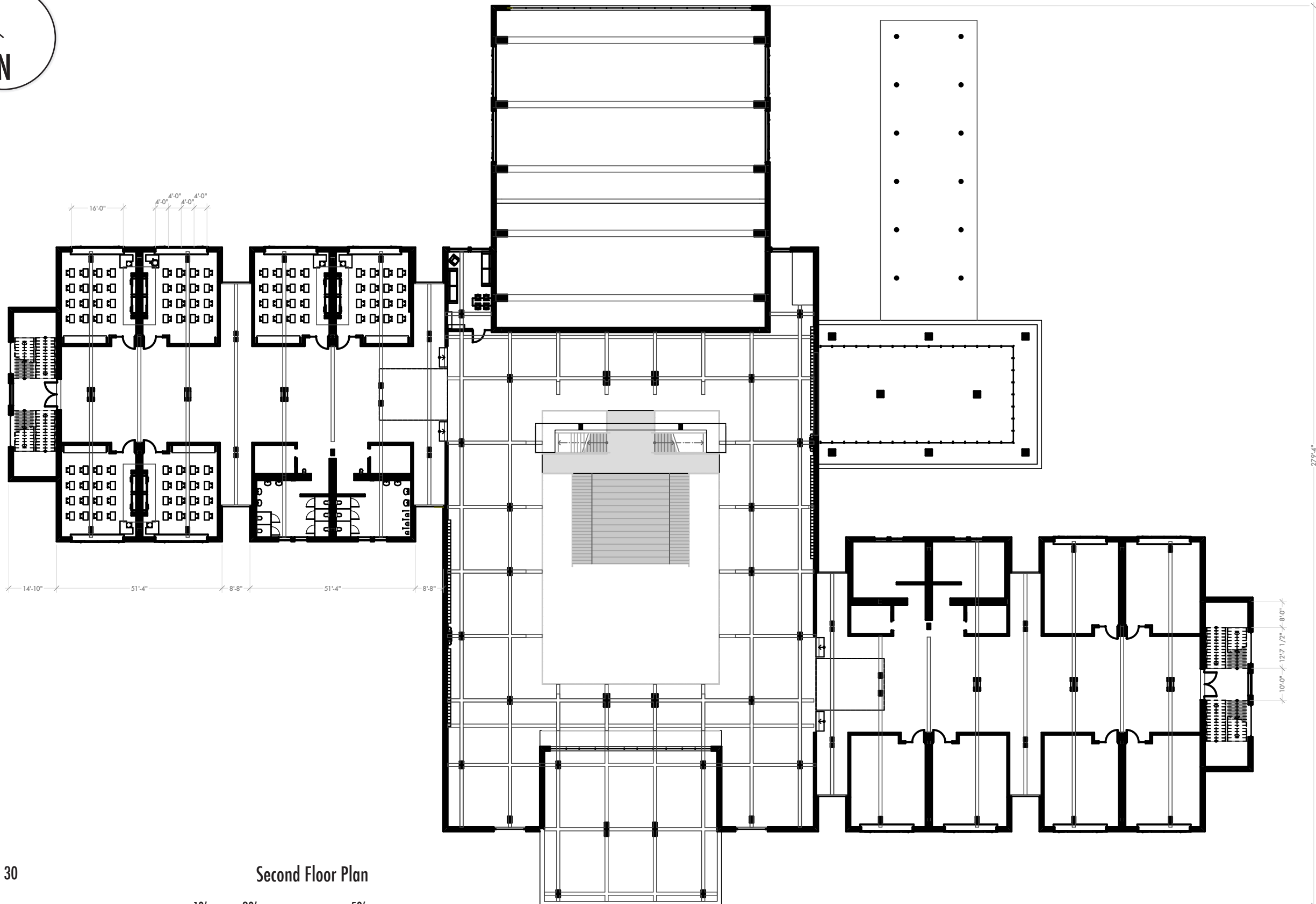
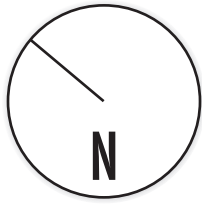
Site Plan

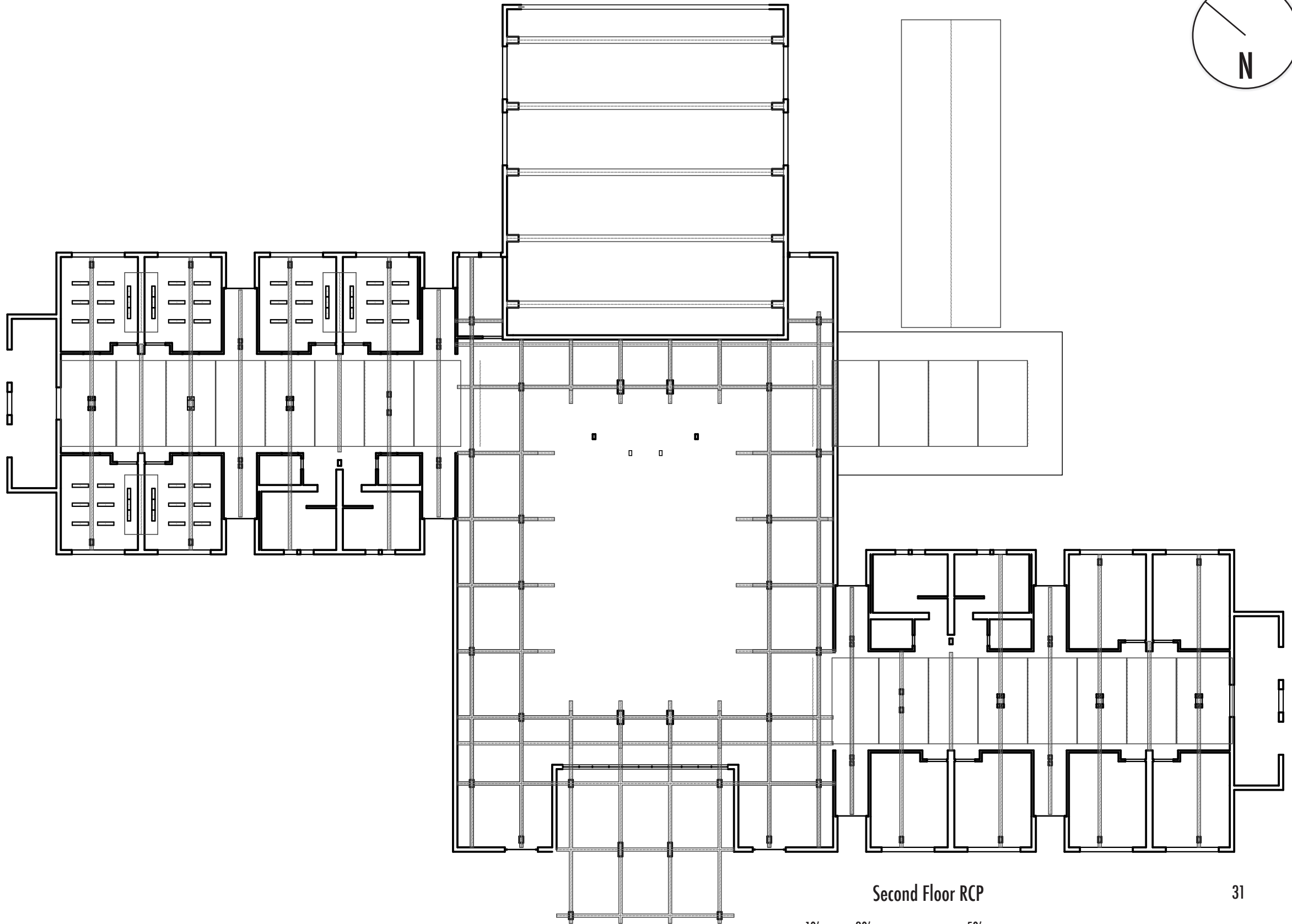
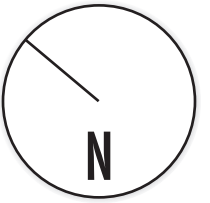




First Floor Plan

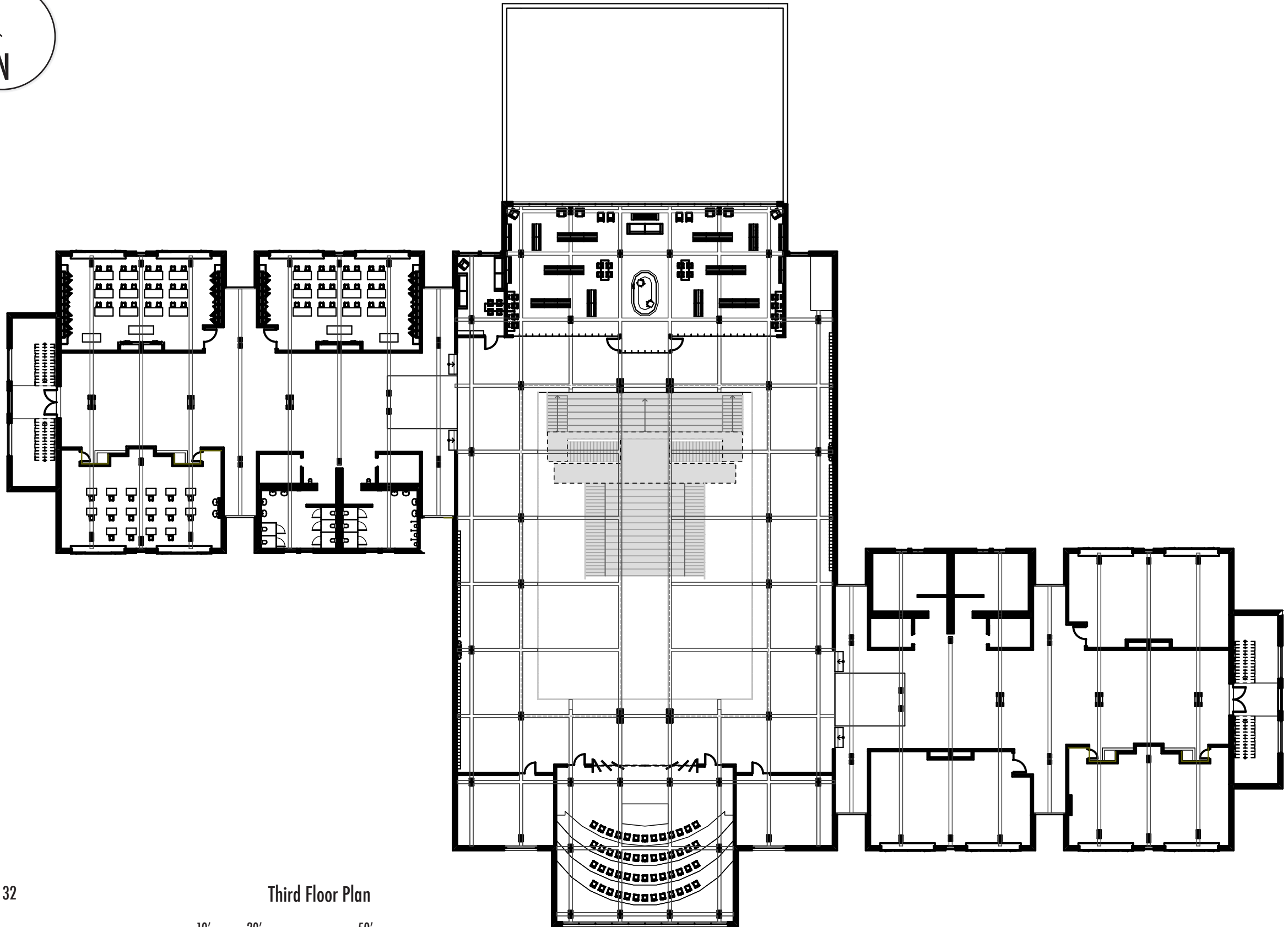
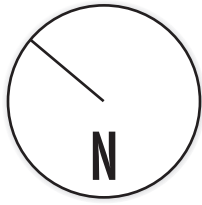






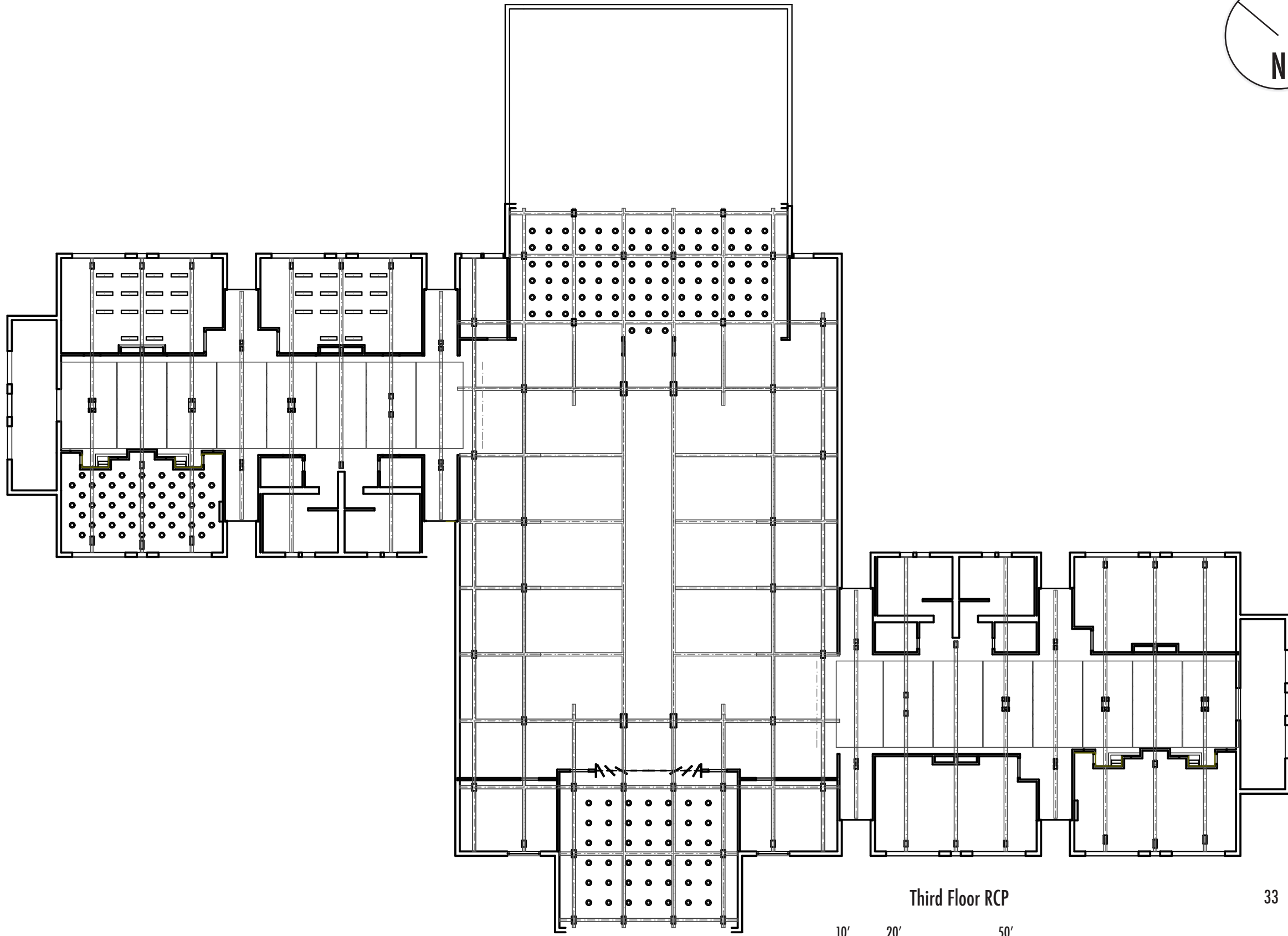
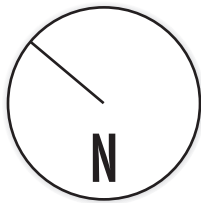
Second Floor RCP





Third Floor Plan



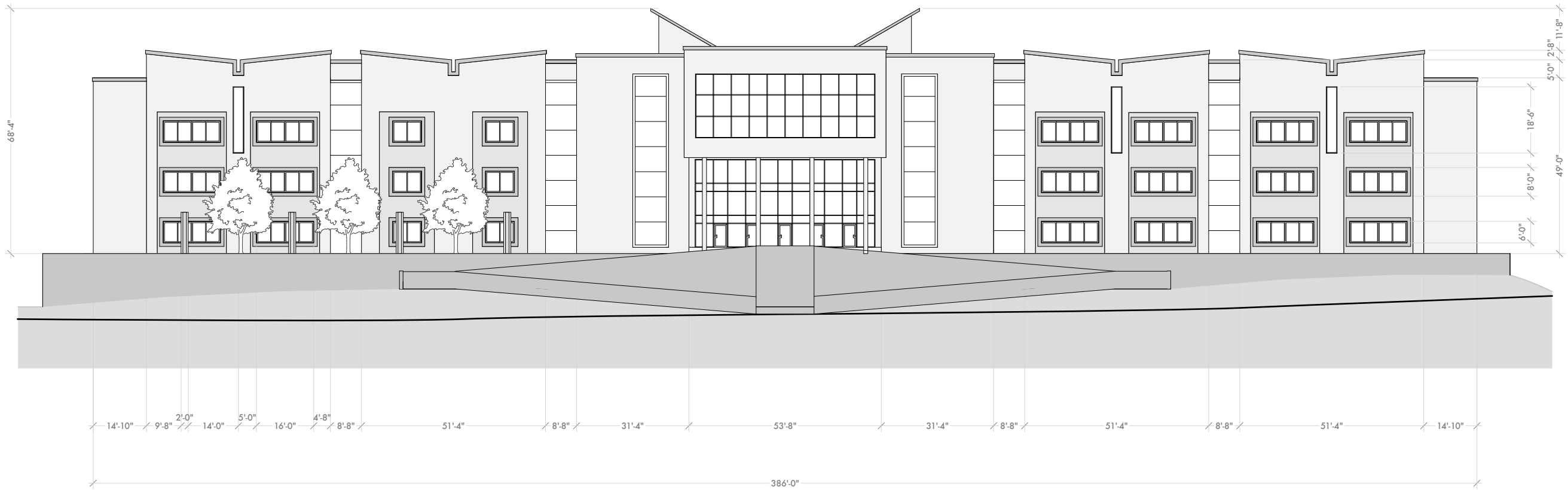
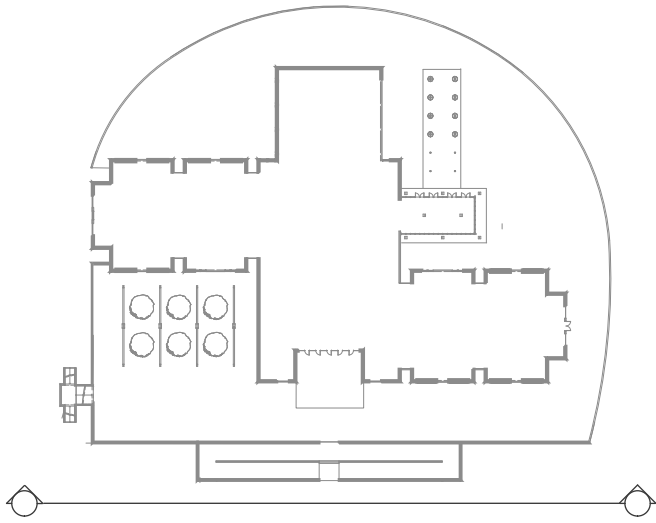


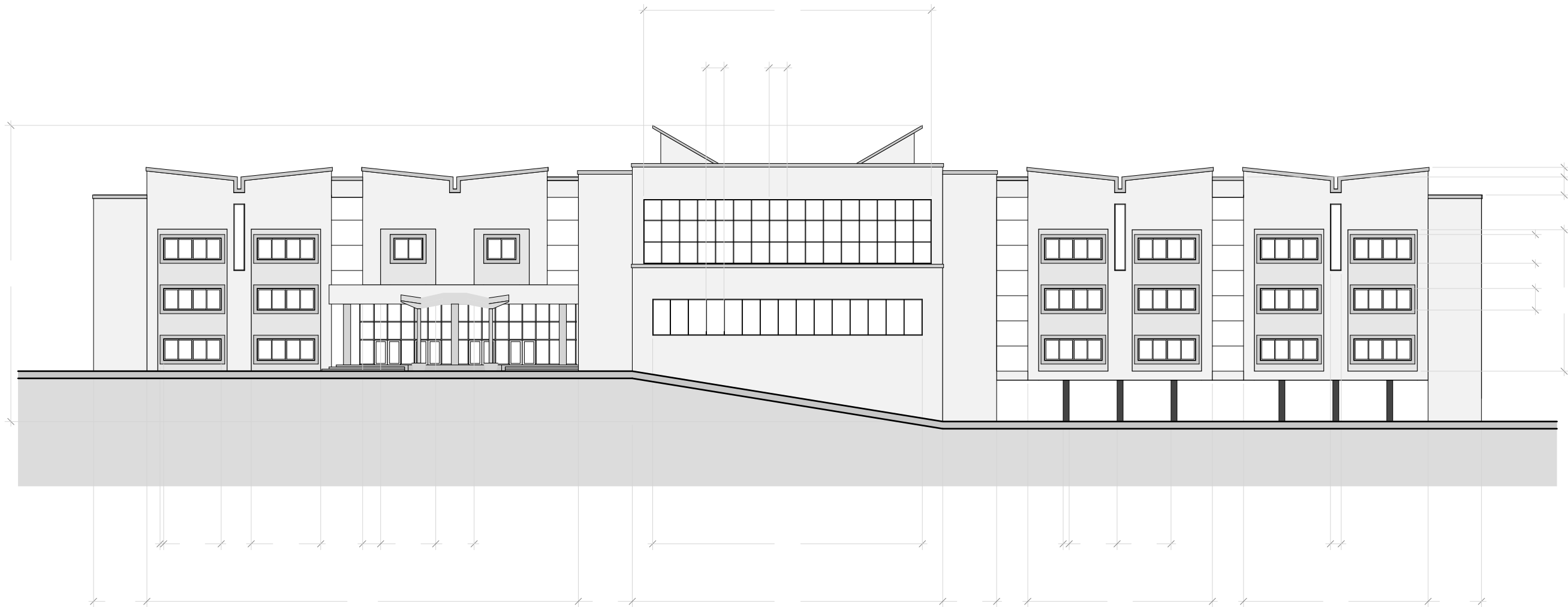
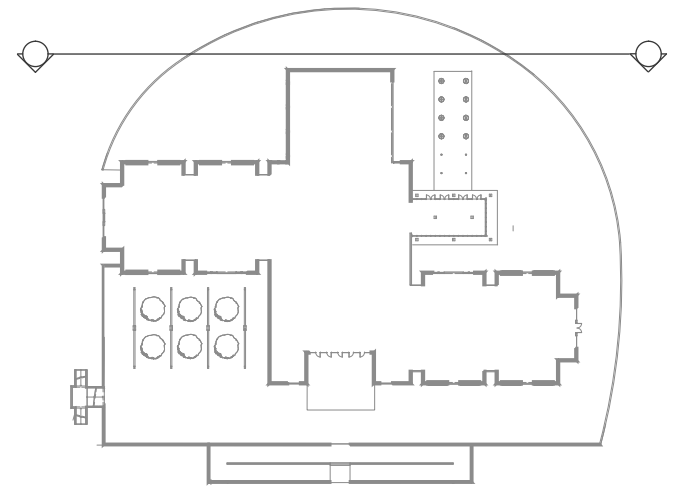
Third Floor RCP



Elevations

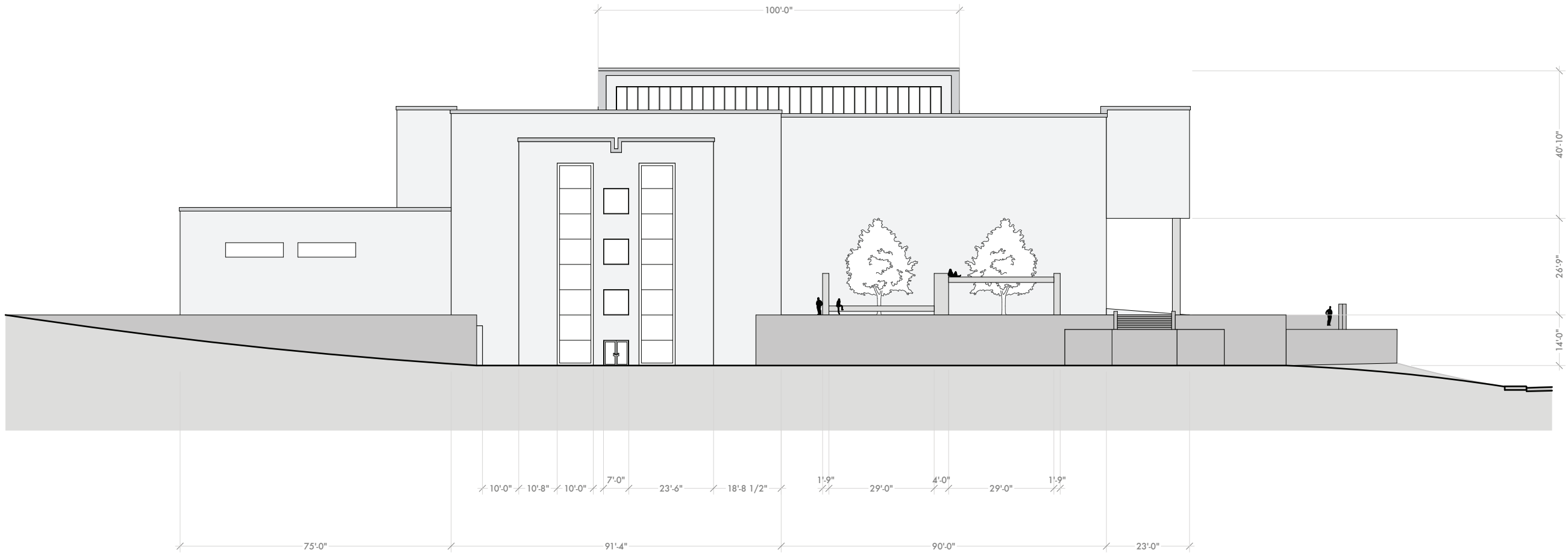
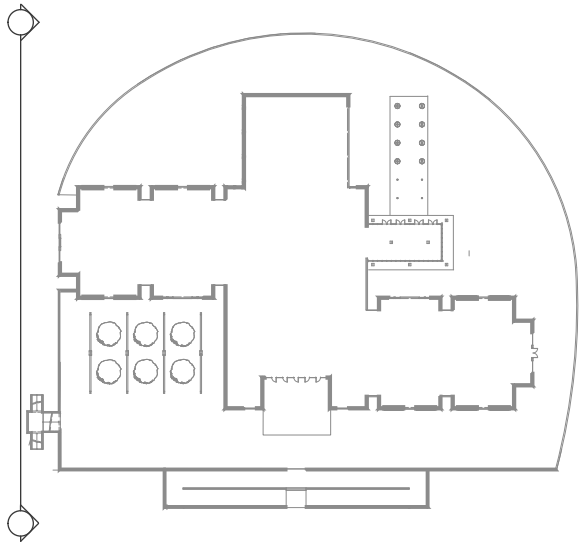
The elevation views give a slightly exaggerated view of the surfaces in order to highlight differences in protruding elements around the window openings and along the roof cornice (Main St. and Rear Elevtions). See the section arrows on the key plan for the orientation of the elevation. All elevations are shown at $1/32'' = 1'$ scale.





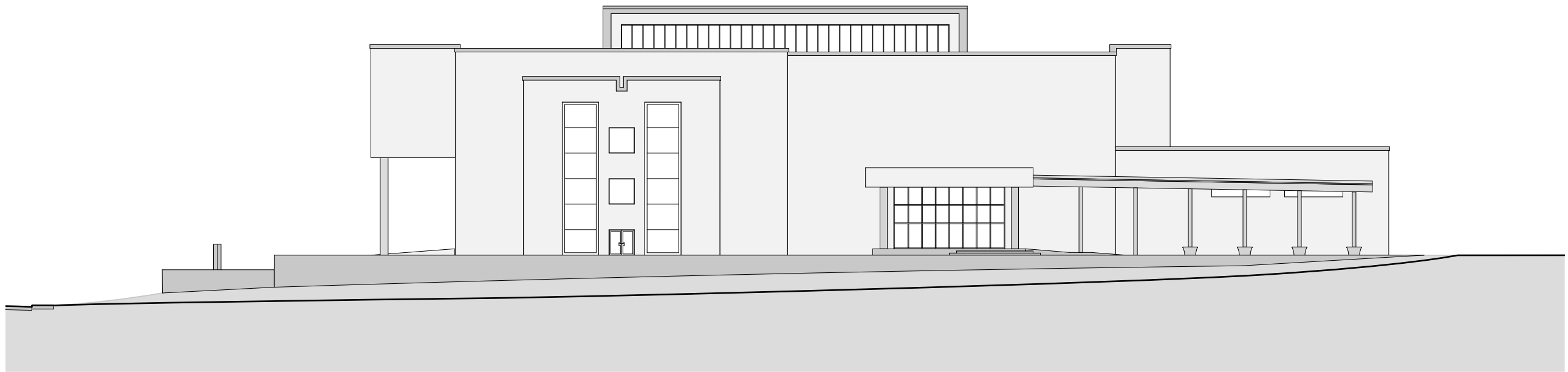
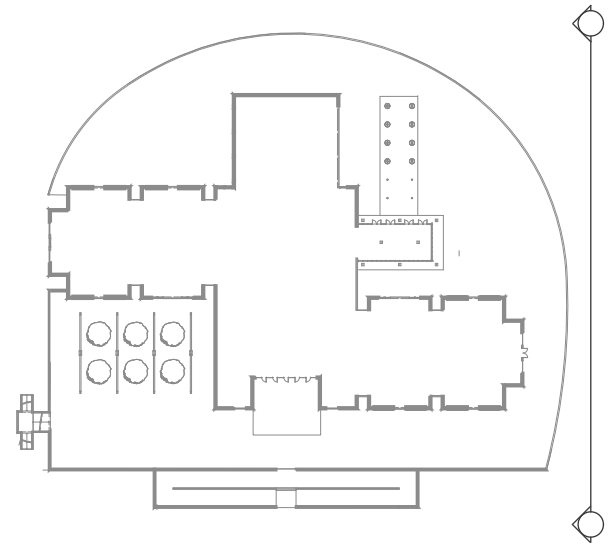
Rear Elevation





Clay St. Elevation



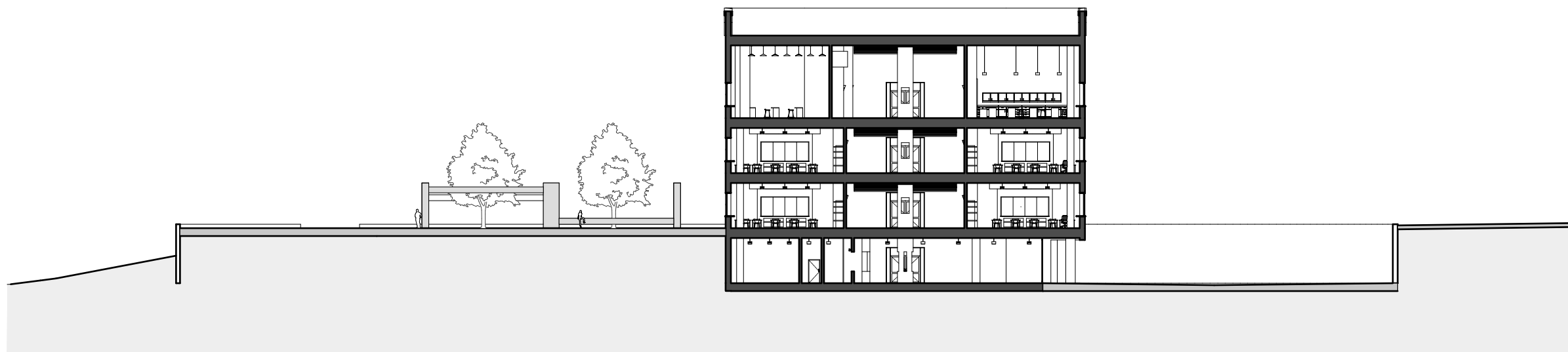
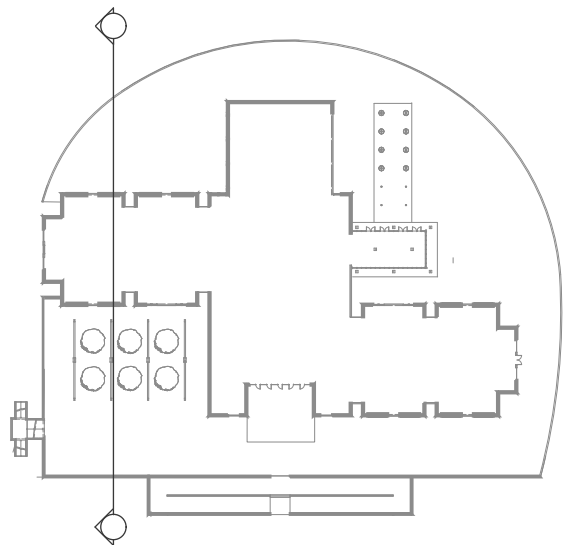


Eheart St. Elevation



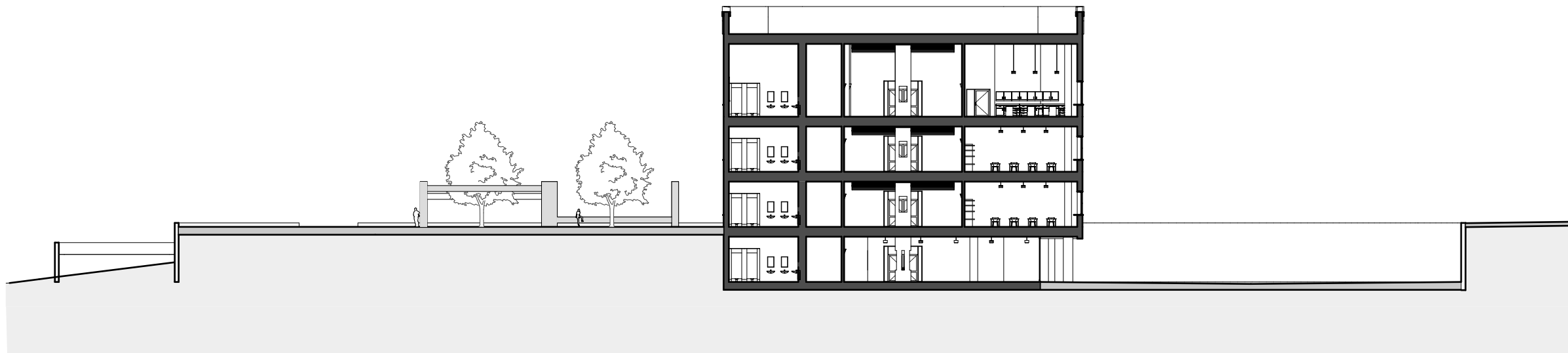
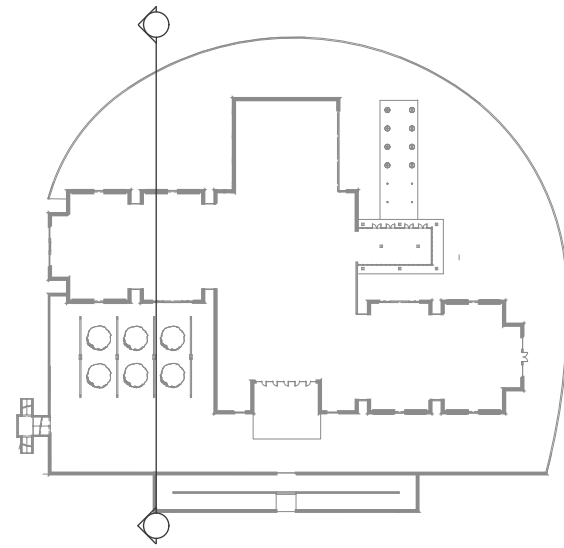
Sections

Sections 1-4 run parallel to Clay Street, and 5-8 run parallel to Main Street. Cuts have been chosen to clarify the classrooms (1,6,8), the restrooms (2,6), the atrium (3,4,5,6,7), the hallways (5,7), the rear entrance (4,5,6), the Main Street entrance (3,8), and the library, the music room, and the gym (3). Sections 3 and 7 are particularly important to understanding the role of the central atrium space, and 5 & 6 should further clarify the nesting of scales. All sections are shown at $1/32'' = 1'$ scale.



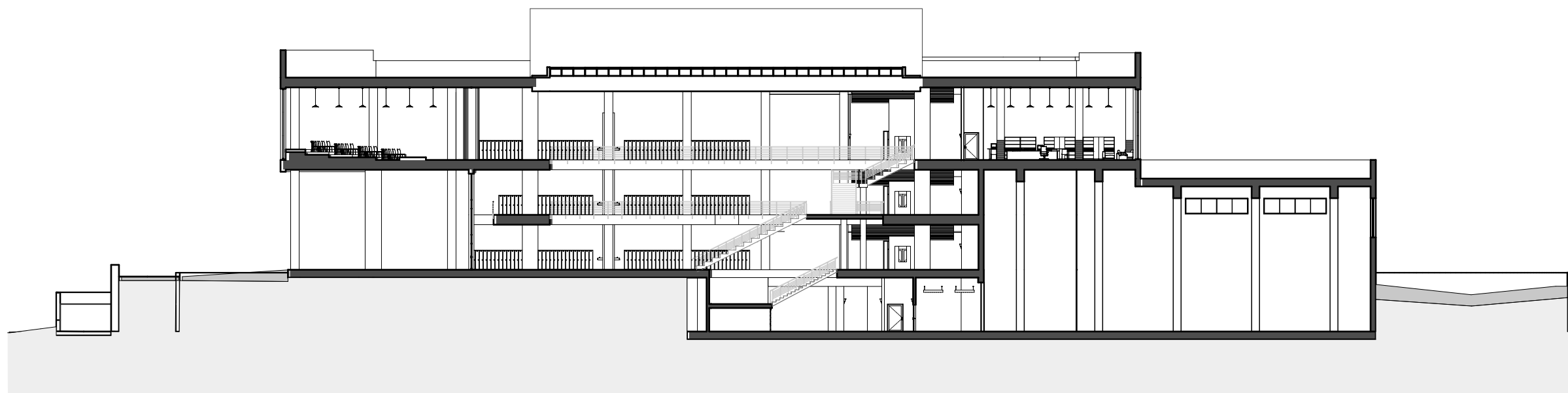
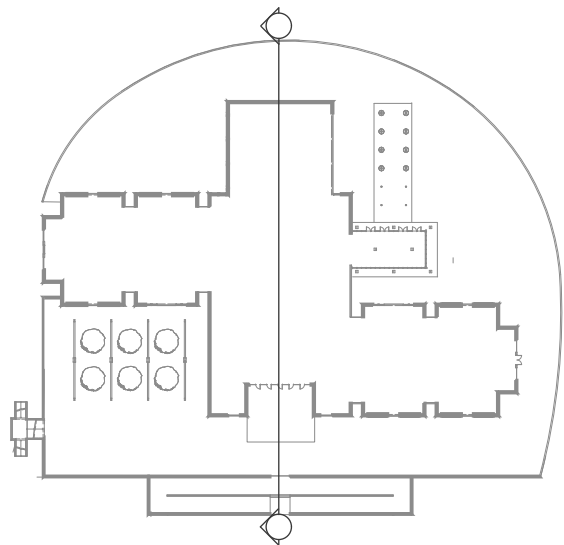
Section 1





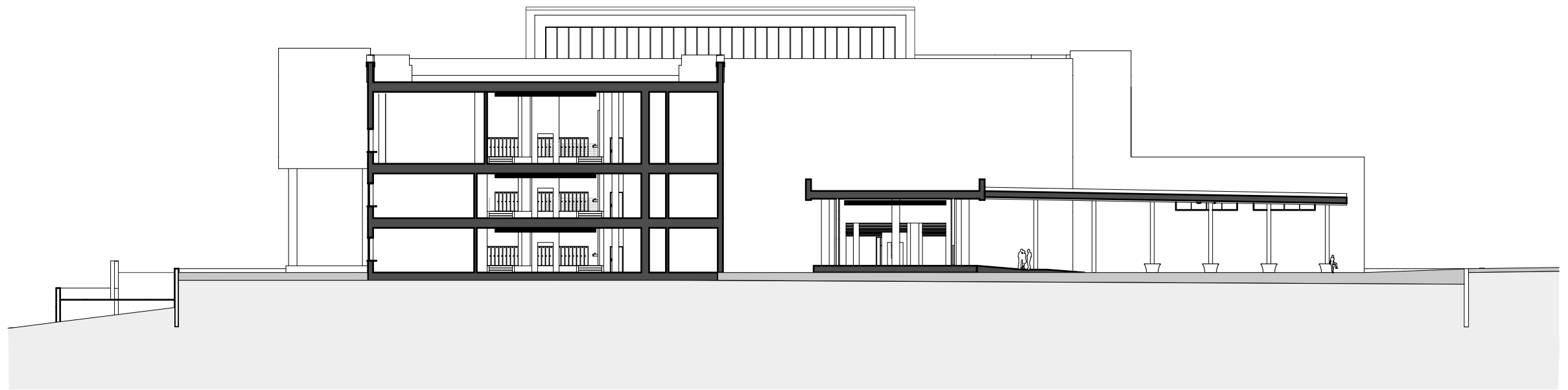
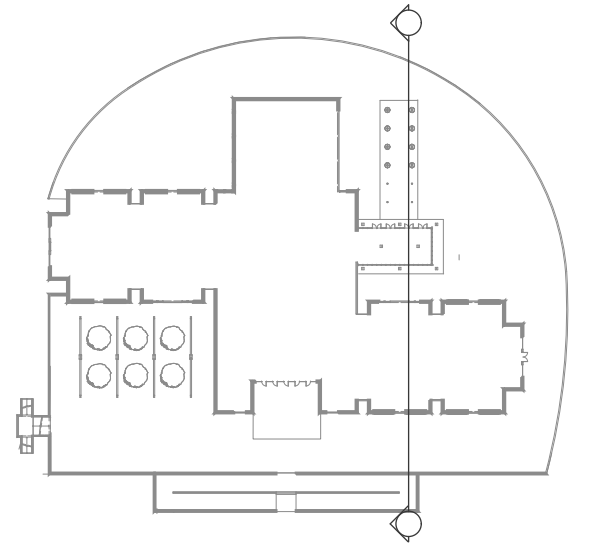
Section 2





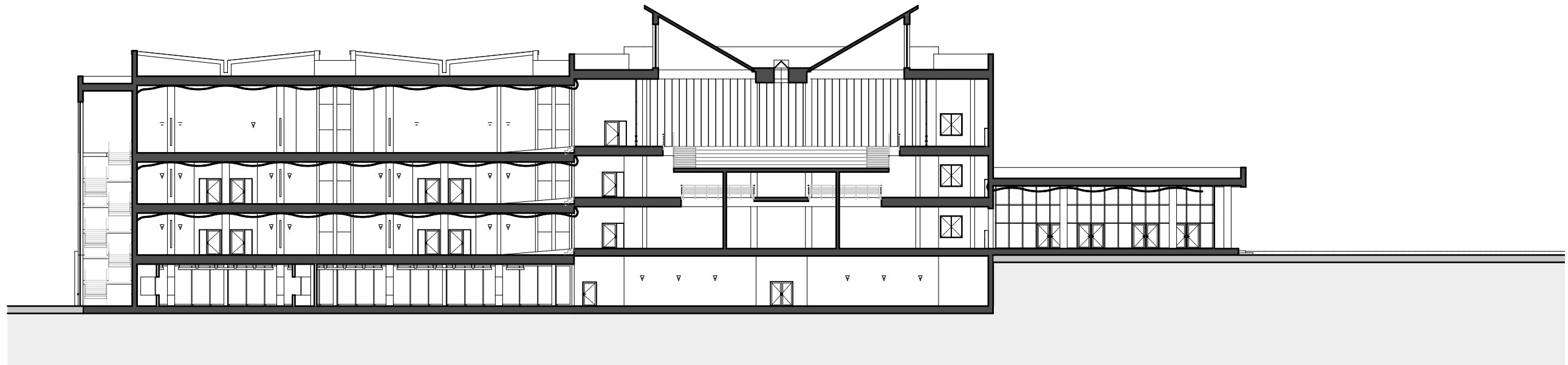
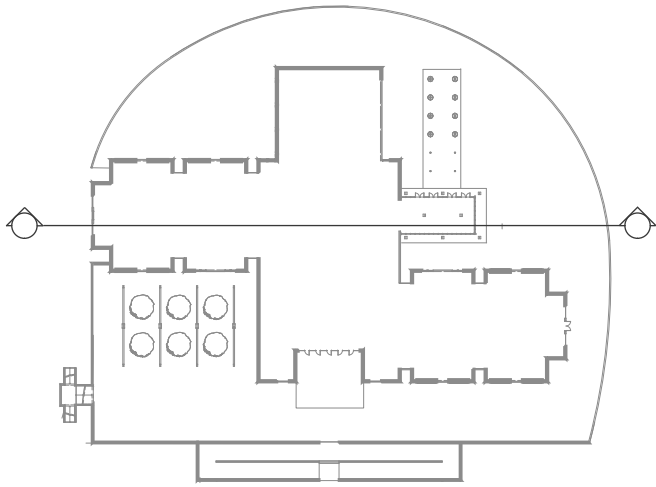
Section 3

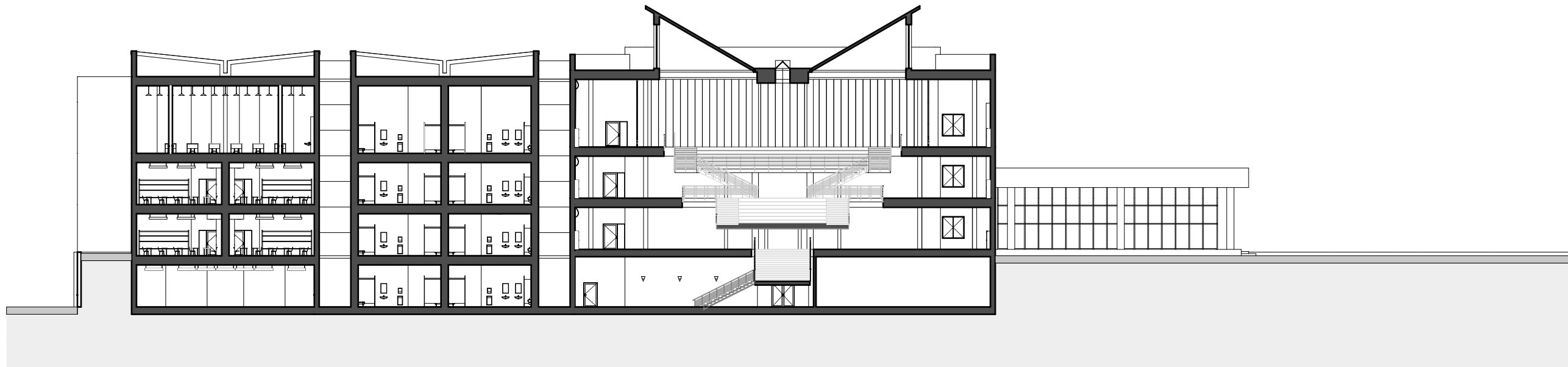
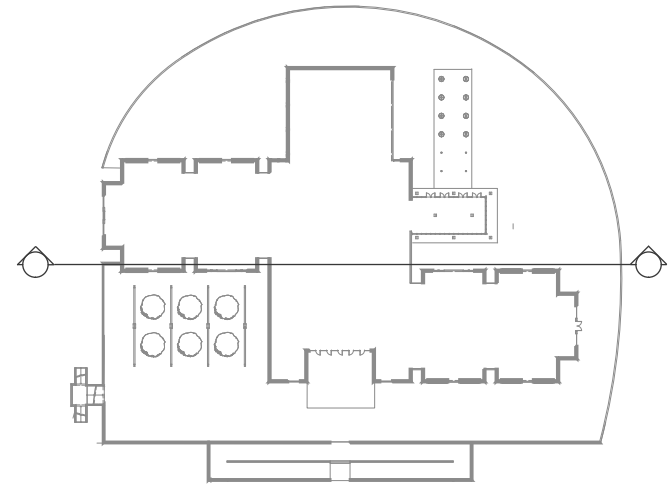




Section 4

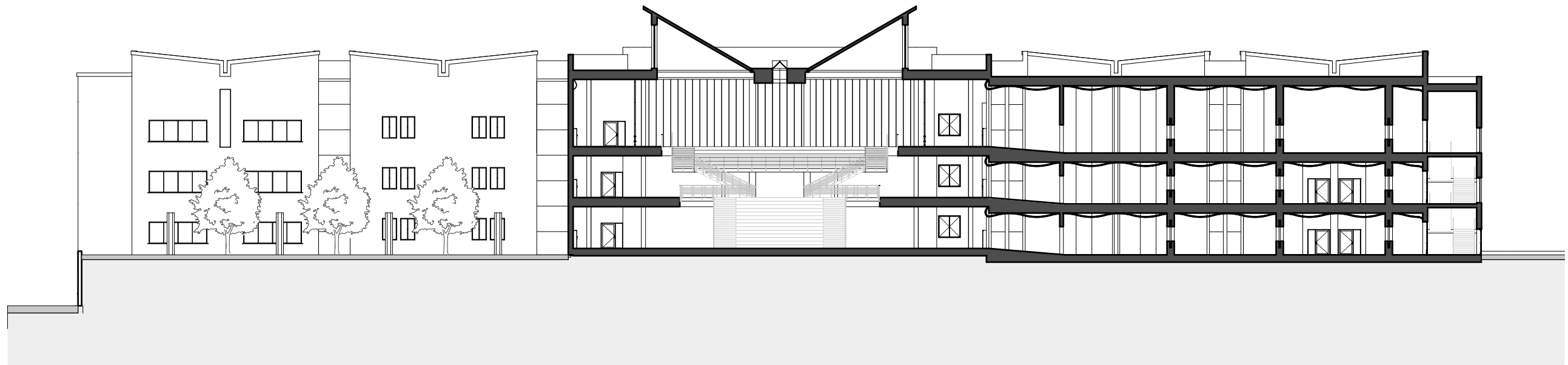
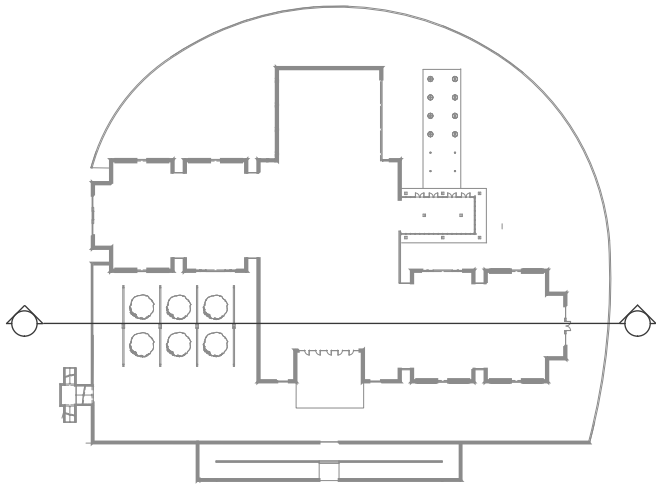


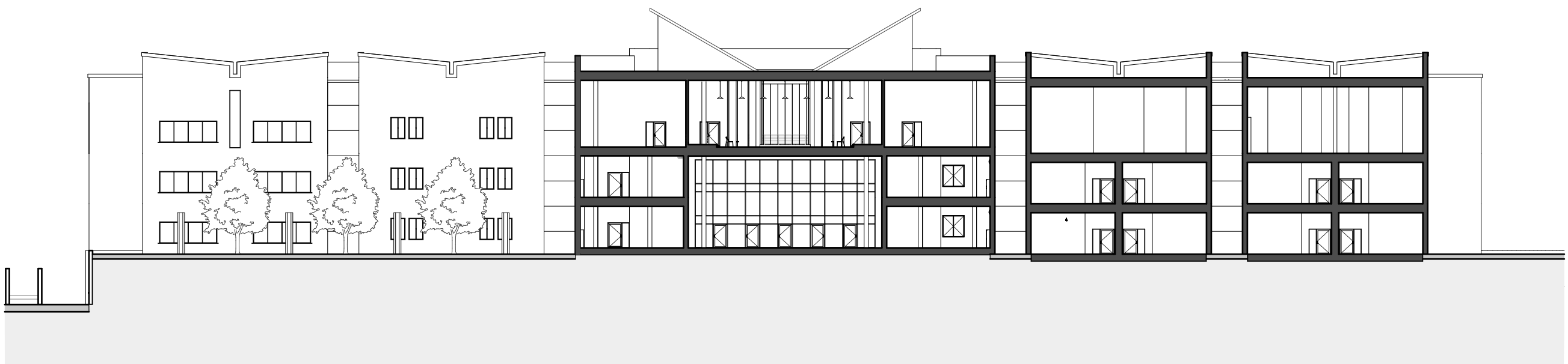
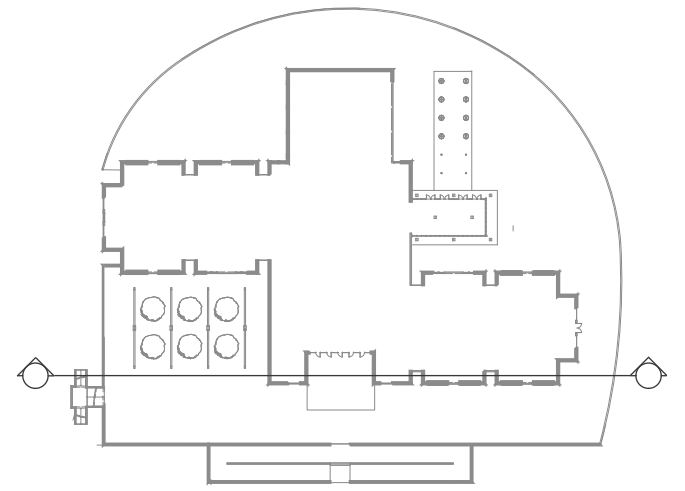




Section 6







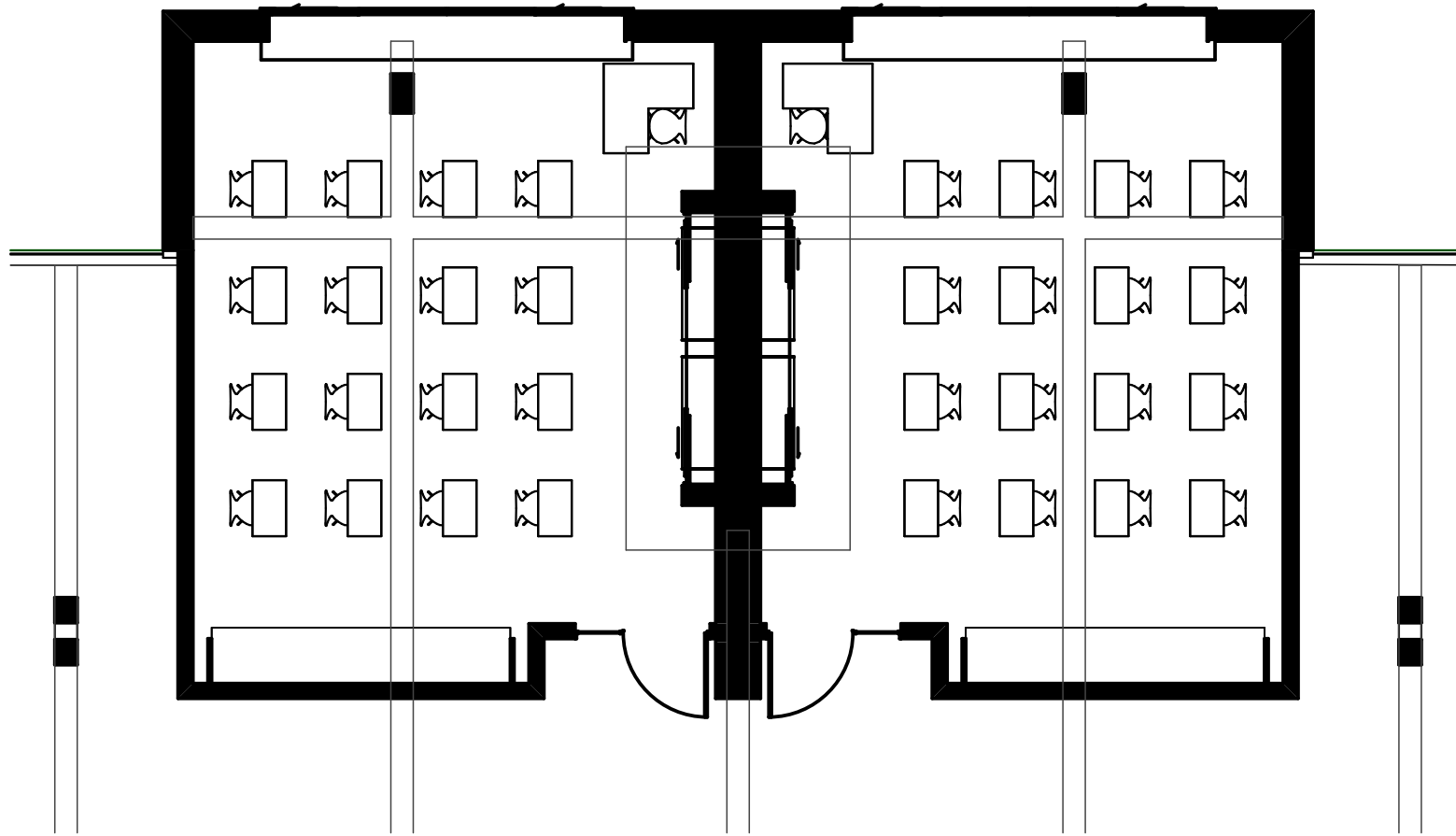
Section 8



Classroom Differentiation

With the central atrium as the heart, the classrooms become the organs of the school, each serving a different role. Five distinct classroom types are included: general classrooms, Arts classrooms, Sciences classrooms, a Music classroom, and a Library. In this section each of these is explored at a more legible scale. Additionally, a page is devoted to the fire stairs and the window openings of the classrooms.



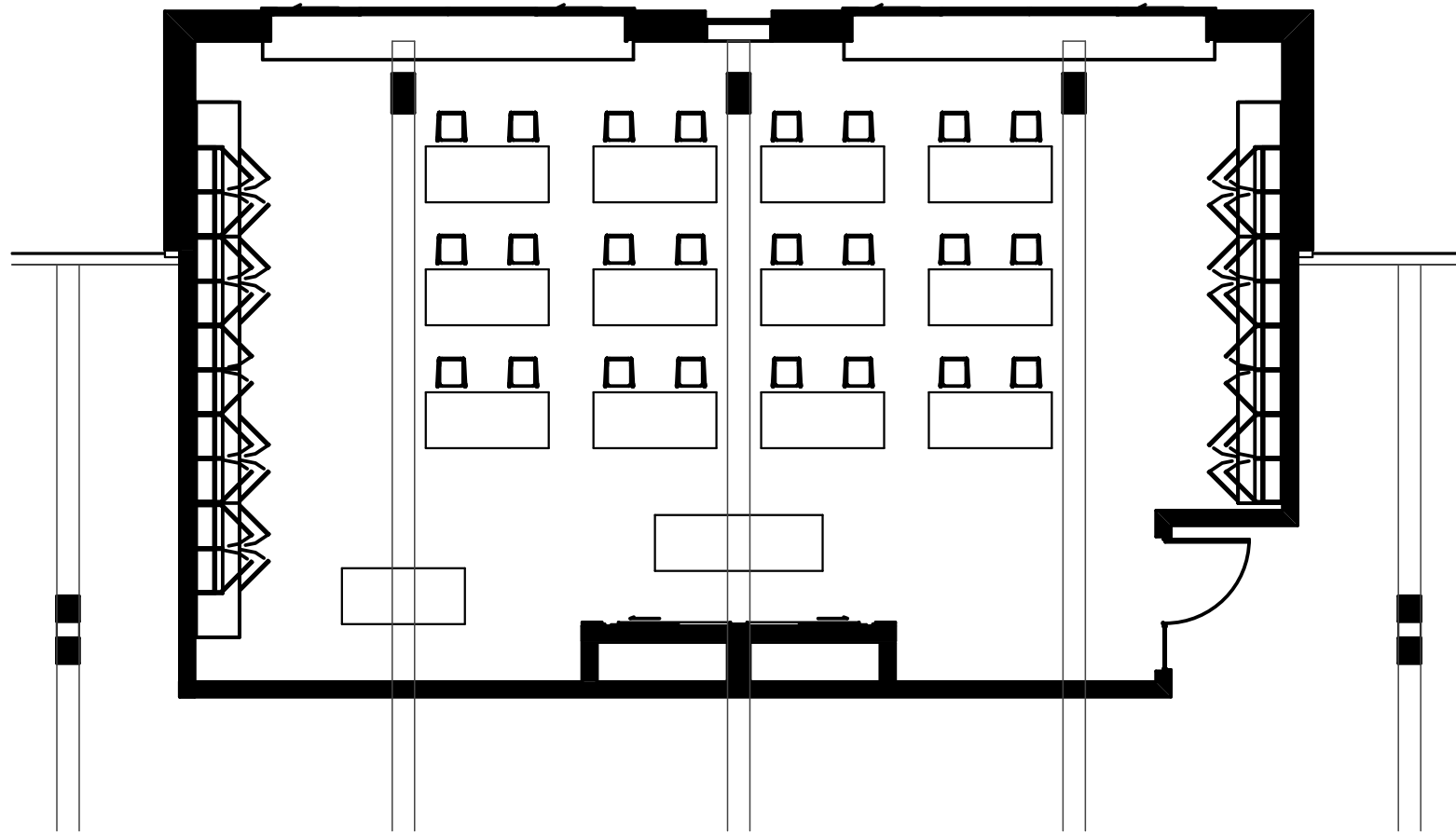


The basic classroom has one large window opening (16' wide, 6' tall) to provide ample natural light (and airflow), supplemented by controllable fluorescent lights. Students face a core wall that provides centralized functionality. Each classroom has a large concrete column in the middle of the window area to catch light and for their general enjoyment.

Basic Classroom





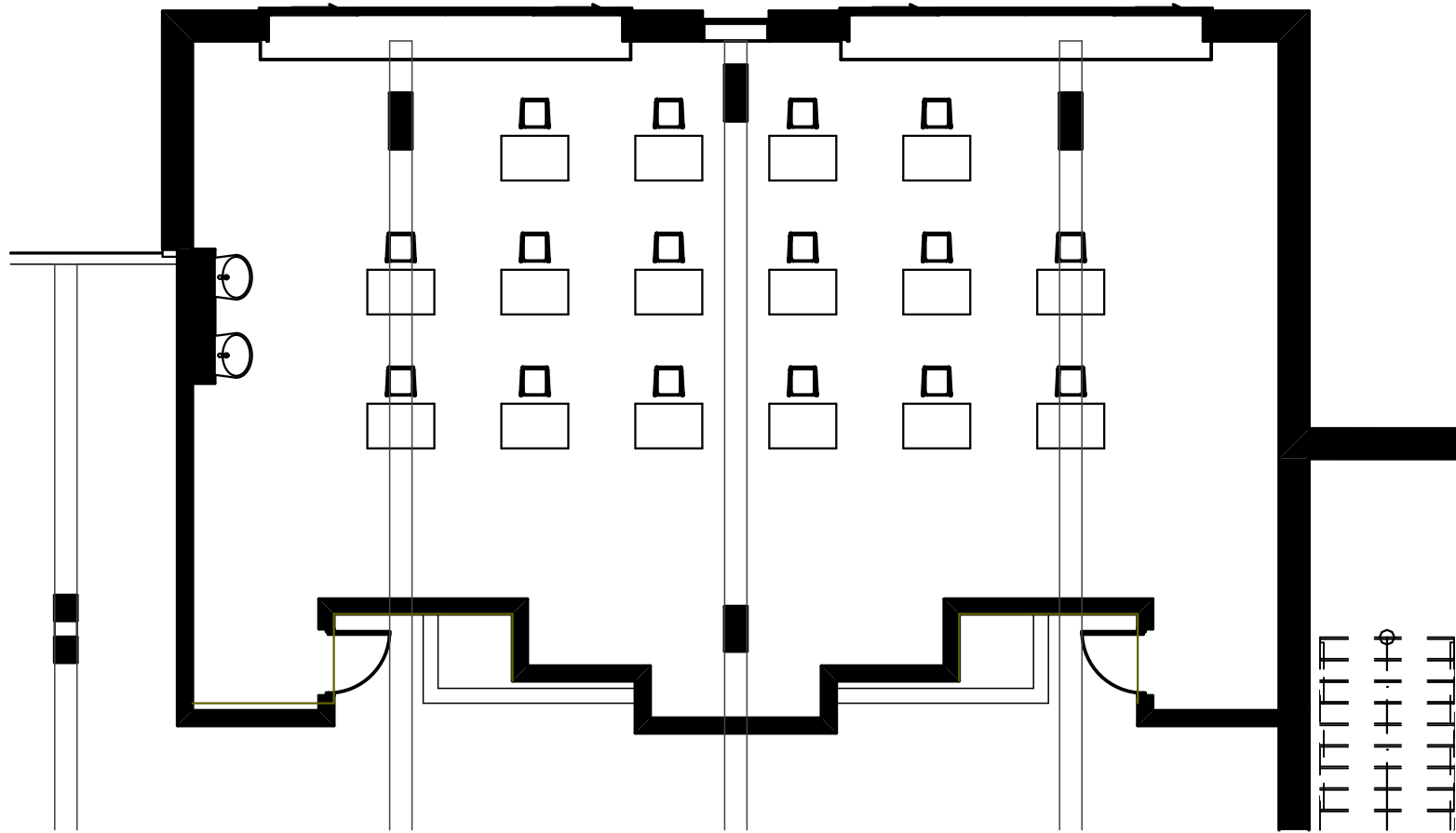


The science classrooms have twice the footprint of the basic classroom, as well as an extra-high 19' ceiling. Large cabinets line the side walls, and the primary lecture and demonstration area is furthest from the windows.

Science Classroom





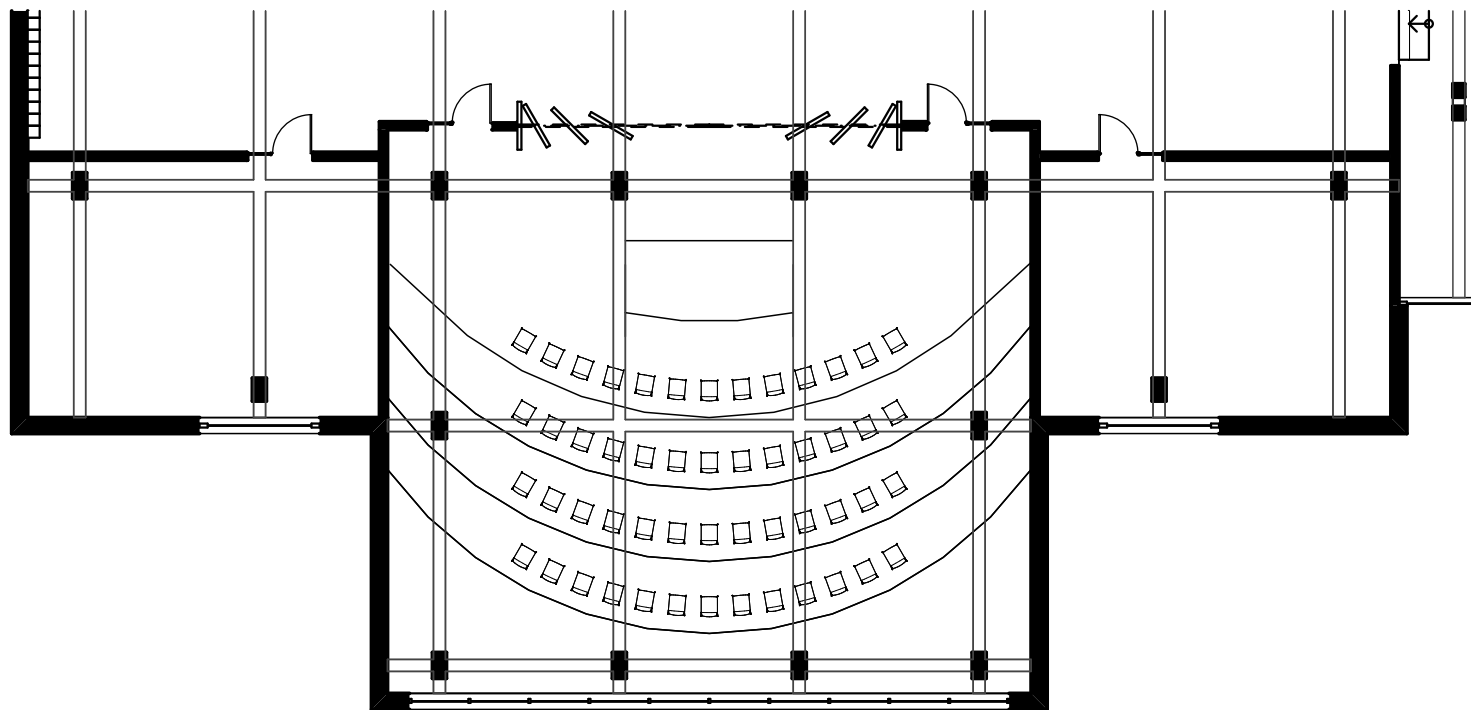


The Arts classrooms also have the double footprint and high ceilings. Students have individual studio-style desks facing a large faceted display wall with another column for further mounting needs. Round incandescent lights also form a visual grid as well as providing the supplemental light.

Arts Classroom





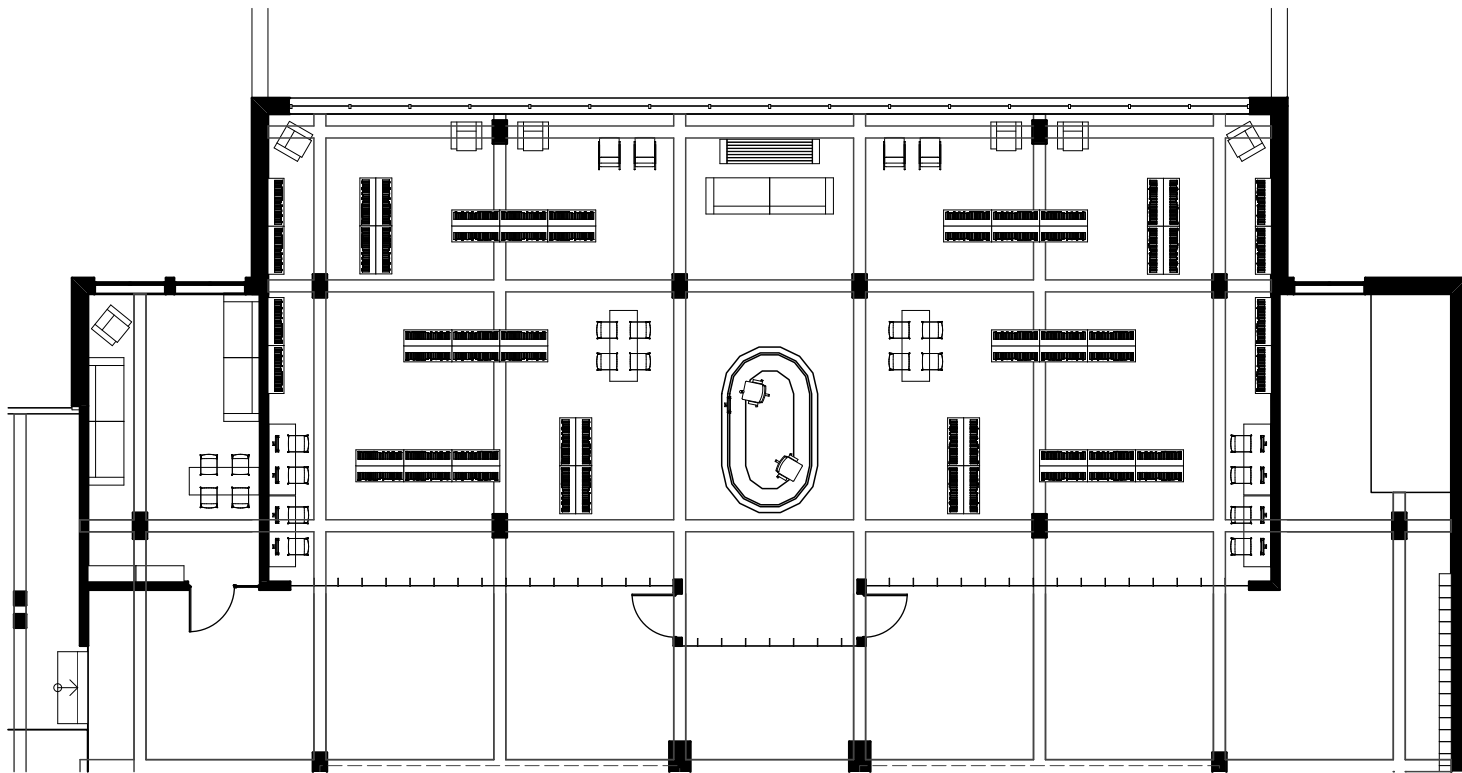


The music classroom exists outside the classroom module, above the Main Street entrance of the school. The floor is stepped and curved to focus the rows of students towards the conductor or instructor. One wall is a curtain wall, and the other is a folding wall that opens the room up to the atrium space. A room for instrument storage and an office flank the main room.

Music Classroom



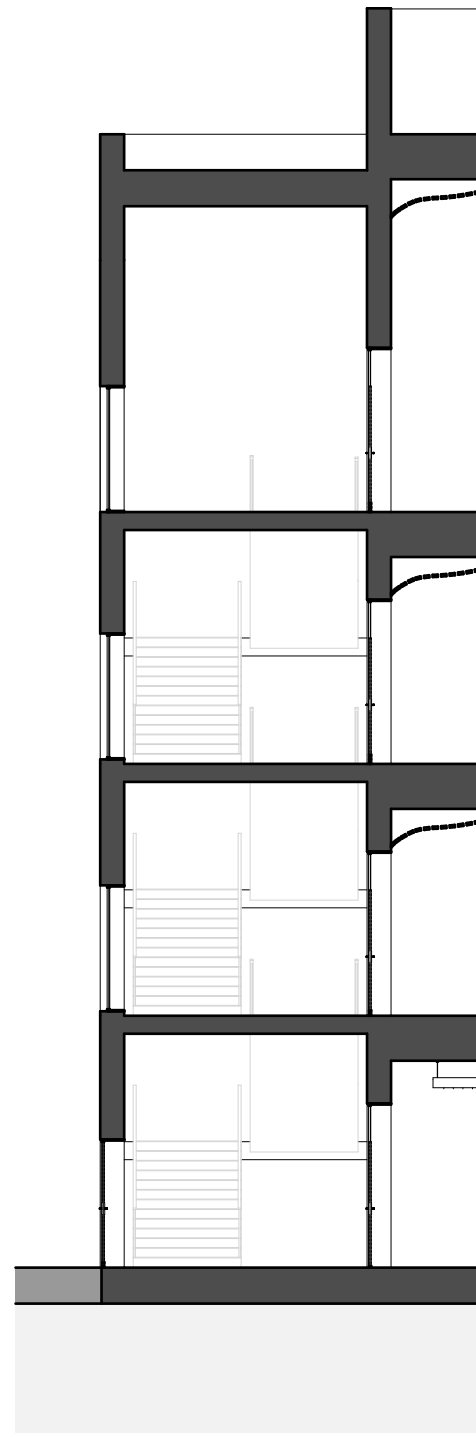
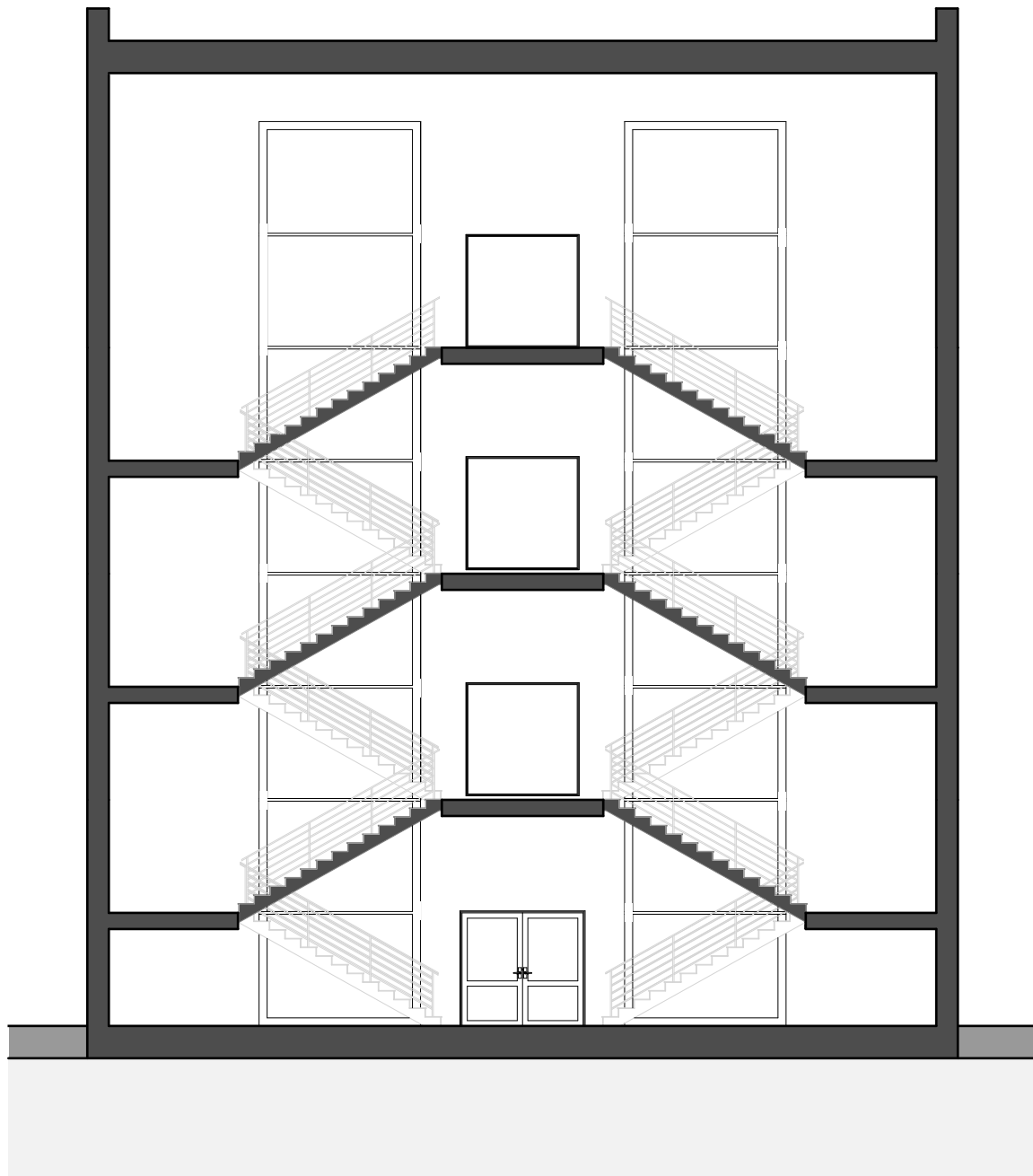




The library is one of the larger spaces of the school, including a wall of windows facing the athletic fields and the hills, as well as another window wall facing the central atrium space. The concrete columns are adorned up to the height of the bookshelves with a sheathing of wood. A variety of reading areas offer comfortable seating.

Library





Classroom windows offer a space for the individual as illustrated in the sectional detail below. A wooden stool (sill) is supported by a bent steel plate, easily capable of withstanding the weight of students, plants, books, etc. Also note the classroom column to the immediate left of the student

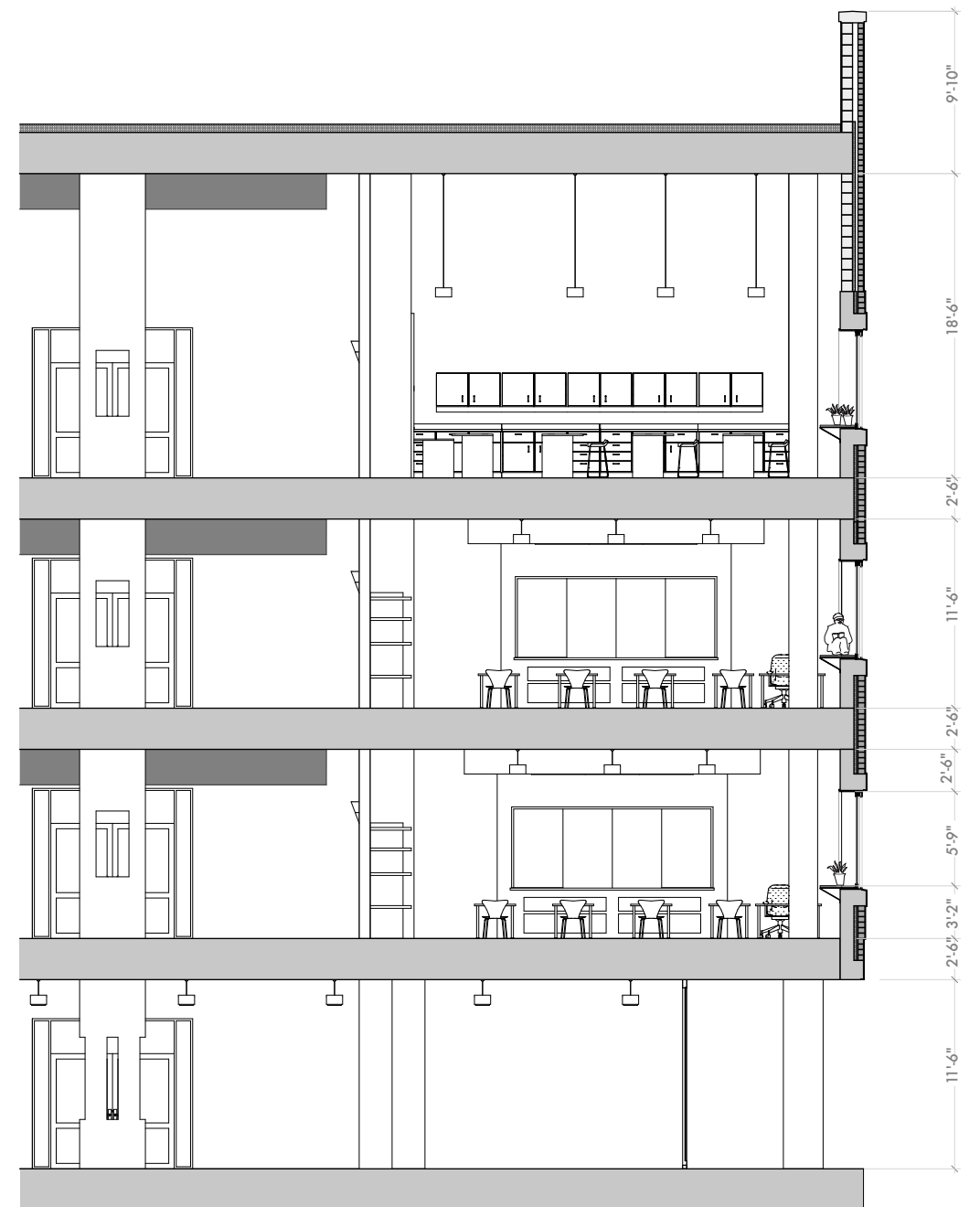


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All drawings, renderings, and sketches shown in this book were created by the author, Luke Stearns.