KELLOGG MIDDLE SCHOOL
PORTLAND PUBLIC SCHOOLS

SCHEMATIC DESIGN REPORT

KELLOGG MIDDLE SCHOOL
6909 SE POWELL BLVD
PORTLAND, OR 97206

OWNERS REVIEW DRAFT - 02/01/18
VOLUME 1 OF 2

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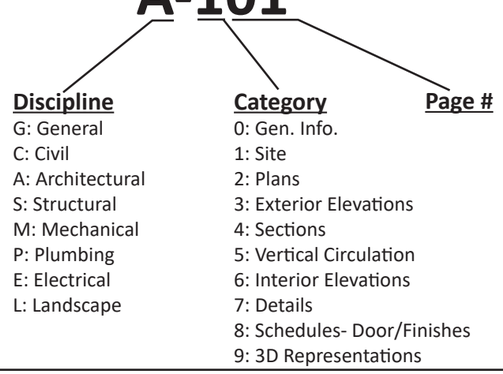

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Part 7 - Appendix

7.1 Room Data Sheets

Project Meeting Minutes and Memorandums provided as a separate attachment

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Part 1 - General Information

1.1 Executive Summary

	Net SF	Gross SF
Kellogg Middle School Building Area:	82,965	123,420 SF
Net to Gross Ratio:	48.76% = 40,455 SF	
Student Planning Capacity:	675 Students	
Maximum Student Capacity:	810 Students	

Kellogg Middle School (KMS) is a new teaching and learning facility on the existing 6.18 acre site on SE Powell Blvd. Portland Public Schools' (PPS) vision and the City of Portland's investment will be served by the school and the site's renewed design and function.

This Schematic Design report implements the refined Kellogg Middle School program and building design progress based on the input and direction from Portland Public Schools and the project's stakeholders. The report presents the project's current progress and it's associated cost analysis. This report is preceded by the Programming Report Version B dated November 20, 2017.

1.2 Project Process

An extensive analysis of the project was completed in March 2017 and provided to PPS and the project's interest groups in form of a report: Kellogg Middle School Due Diligence Report. PPS and the project's stakeholder's concluded that the design and construction of a new Kellogg Middle School would be the best option for it's prospective students and community stakeholders.

The basis of design and initial program was provided by Portland Public Schools.

- PPS Design Standards
- PPS Middle Schools Education Specifications

Since March of 2017, The Kellogg Middle School team has met with PPS representatives from the following groups:

- Office of School Modernization
- Kellogg Middle School Steering Committee
- Southeast Portland community's Design Advisory Group (DAG)
- Educational stakeholder groups including:
  - Athletics department
  - Transportation Department
  - Special Education Department
  - Security
  - Nutrition Services
  - Multicraft Finishes
  - Information Technology (IT)
  - Grounds
  - Facility and Asset Management - Planning
  - Facility and Asset Management - Mechanical, Electrical, Plumbing
  - Office of Teaching and Learning (OTL), which is then broken down into smaller groups called Teachers on Special Assignments, including:
    - Special Education
    - Arts
    - Library/Media Center
    - Mathematics
    - Science/STEAM
    - Social Studies
    - Athletics

Project goals refinement, a diversity of site and building design options, and an updated PPS Middle School Education Specifications has been reviewed and approved by these same stakeholders (see Chp 2.1 for updated PPS Ed Spec Program). The current Kellogg Middle School Design has been a result of the collaboration between stakeholders an the project's design team.

1.3 Project Scope

DEMOLITION OF EXISTING BUILDING

The new Kellogg Middle School replaces the existing buildings which was open and operational for nearly 100 years. Deconstructing the existing buildings allows many of these historical materials and building elements to be salvaged and reused in the new school. Every effort is being taken to ensure that the existing buildings are deconstructed responsibly. This means that materials that are hazardous are abated as to not contaminate surrounding elements. Materials that are not salvageable or may not hold any historic value are to be recycled. Many existing trees are being protected through demo and construction. The site will be designed and prepared to restore the northwest regional and natural habitat as well as receive a new, state of the art facility that promotes the health, wellness, and sparks an excitement to learn and engage with one another.

NEW BUILDING CONSTRUCTION

The new site and building will draw from thoughtful and studied design concepts which aim to produce sustainable and responsible facilities that become a model for Portland Public Schools, the city of Portland, and a part of the fabric of the community. The new building will utilize salvaged materials from demolition, and is planned to be a LEED certified building that will serve students, faculty, and the community.

LEED

LEED is a green building certification program that recognizes sustainable building strategies and practices. To receive LEED certification, projects must satisfy prerequisites and earn points to achieve different levels of certification. There are four levels of certification; LEED Certified is achieved by completing 40-49 points, LEED Silver is achieved with 50-59 points, LEED Gold is achieved with 60-79 points, and LEED Platinum is a building that has achieved 80 or more points. Per the PPS Design Guidelines & Standards, this project will be designed to meet LEED Gold standards. By integrating technical and living systems, the new Kellogg Middle School can achieve high levels of building performance, human performance, and environmental benefits. The building will also be a teaching tool for the youth with a monitor displaying the buildings performance and signage highlighting sustainable features throughout the building.

DAYLIGHTING / ORIENTATION

Meeting and exceeding the LEED daylighting credit, EQc7, is informing the floor plan, section, and façade of the building. Maximizing daylighting within the classrooms, offices, activity spaces, and meeting spaces will promote a healthy and strong connection to the outdoor spaces.

The Classroom wings of the building are oriented on an E-W Axis with all classrooms facing north or south. This allows these core spaces to take advantage of natural daylighting while reducing heat gains and glare from morning and afternoon sun. Natural daylighting of interior spaces and views of the outside has also been shown to create more welcoming, encouraging environments and can lead to improved test scores. The use of free, natural daylighting also reduces the need for electric lighting, which in turn reduces demand on cooling systems and decreases energy use.

Due to the restricted size of the site, the remainder of the building is located to the North of the classroom wings. While this orientation is not ideal for daylighting, several strategies will be employed to make these spaces comfortable and welcoming. A sawtooth roof system will be utilized in the gymnasium to allow natural, northern light deep into the space. Windows in the commons will face south and east, and will be outfitted with interior and exterior shading devices to control morning glare while still allowing ample daylight into the space. .

To further supplement the orientation of the building and improve daylighting, windows will be equipped with exterior shading devices and interior light shelves.

LEED and other sustainable practices will also be incorporated into the overall site design. The project will focus on the restoring and preserving the natural habitat on the site, and controlling and treating water runoff. Plantings will primarily be native adapted, and drought tolerant. On-site bioswales will collect and treat water runoff. Light-colored roofing and site materials will be selected to reduce the project's impact on the heat island effect.

BIOPHILIC DESIGN

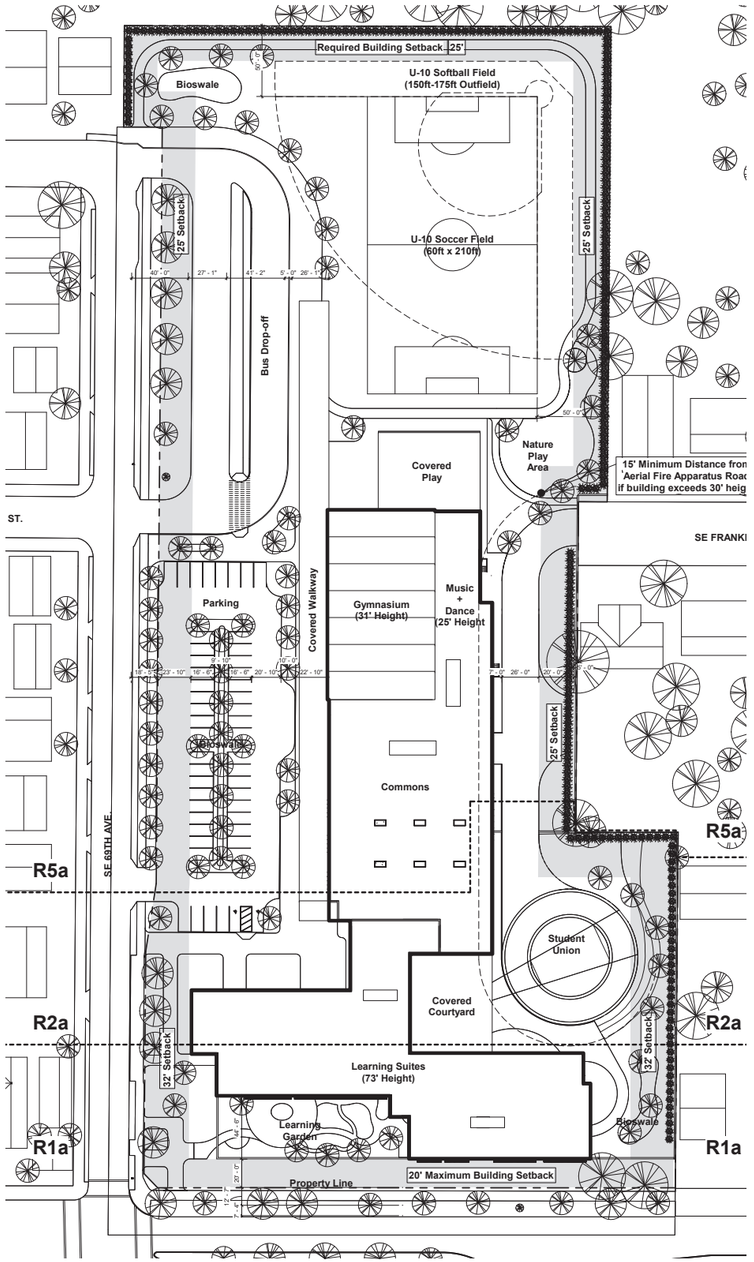
Biophilic design is the study and close consideration of nature including its habitat, elements, and materials then allowing these concepts to inform the architecture. The goal is to create a healthy and beautiful built environment which connects the inhabitants with the natural site as well as promotes wellness and development. After careful study it is widely believed that biophilic design promotes creativity, improves cognitive function, reduces stress, and can even expedite healing. What better opportunity to create a harbor of health and wellness, a place that sparks and curates curiosity than a new, urban school? Six individual concepts of Biophilic Design are identified further in 2.2.3

1.4 Project Goals

Portland Public Schools' mission is to prepare every student for college, a career, and to be an active community member regardless of race, income, or zip code. Every student, every teacher, every school succeeding.
The Kellogg Middle School project aims to meet and exceed these expectations by meeting the following project goals:

LEARNING ENVIRONMENTS

- Accessible to all students, teachers, and visitors.
- Diversity in learning spaces and occupants
- Equity to everyone
- Provide an experiential atmosphere
- Use the latest technology available
- Promote physical fitness for the occupants
- Focus on student performance



TITLE 33 - PLANNING AND ZONING - BUILDING SETBACKS

IDENTITY
- Serve the community
- Be inclusive
- Promote equality
- Be inviting
- Sustainable
- Future minded

FLEXIBILITY
- Design adaptable spaces
- Provide spaces for community use
- Create spaces for after school programs
- Create neighborhood partnerships
- Prepare for future growth
- Focus on student security
- Provide extended learning spaces
- Design 21st century learning environments

ENVIRONMENT AND HEALTH
- Design an energy efficient middle school
- Provide natural lighting
- High performance building
- Provide natural ventilation
- Resiliency
- Promote outside learning

1.5 Code Analysis

This code analysis summary is based on the State of Oregon and City of Portland's current adopted codes, amendments, and regulations.

- Use and Occupancy: Educational Group E
- City of Portland Zoning Designations: R1a, R2a, R5a
- Construction Type: II-A, Fully sprinklered per NFPA 13
- Allowable Stories: 4 Stories (4 stories proposed)
- Allowable Building Height (Institutional Development Standards in Residential Zones)
  - R1a, R2a: 75 ft maximum height (73 feet proposed)
  - R5a: 50 ft maximum height (31 feet proposed)
- Total Allowable Building Area: 336,267 SF (123,420 SF proposed)
  - Total Allowable area per story: 84,067 SF (51,694 SF ground floor)
- Building setback Requirements
  - Maximum front setback (SW Powell Blvd. property line): 20 ft for 50% of the length of the ground level street-facing facade or per Condition Use / Impact Mitigation Plan Reviews
  - Minimum setback (rear and side setbacks): 32 ft
  - 1 ft for every 2 ft of building height (building height ~ 64 ft)
- Landscaping Requirements
  - South and West: L1 General Landscaping. Primarily ground cover plants and trees.
  - North and East (residential adjacencies): L3 High Screen Landscaping. Uses high screen shrubs (6' tall) to provide physical and visual separation between uses or development.
- Parking
  - Based on Schools Use Category
  - 34 stalls minimum (1 stall per classroom)
  - 51 stalls maximum (1.5 stalls per classroom)
  - 50 stalls proposed
  - 2 Accessible Stalls required/proposed
  - 1 Van Accessible Stall required/proposed
  - 1 Access Aisle required/proposed
- Bicycle Parking
  - Minimum Required Bicycle Parking Spaces (Grades 6 - 12): Long-term - 4/classroom = 136 Short-term = none required
- Plumbing Fixture Count

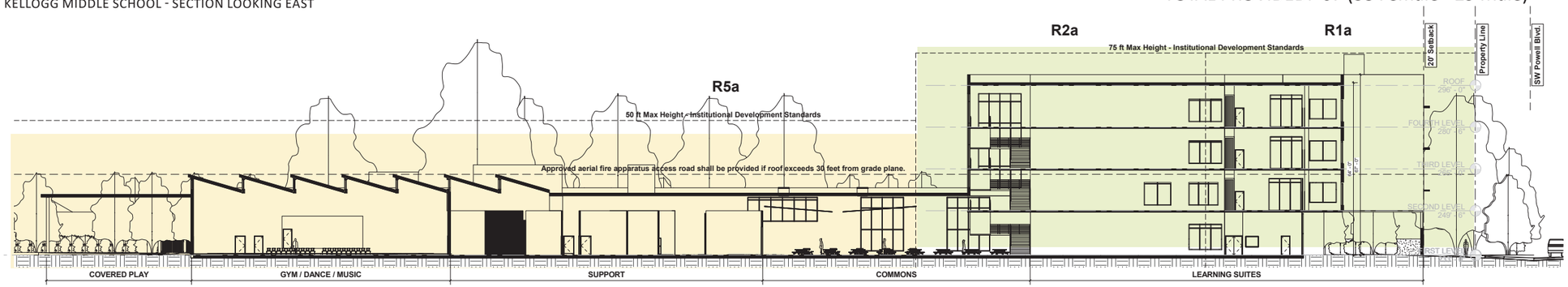
  Gym - Commons as Assembly Spaces
  - 1st Floor Required: 25 (15 Female - 10 Male)

  Gym - Commons - Extended Learning as Ancillary
  - 1st Floor Required: 18 (10 Female - 8 Male)
  - 2nd - 4th Floor Required per floor: 10 (5F - 5M)

    TOTAL REQUIRED: 55 (30 Female - 25 Male)
  - 1st Floor Provided: 28 (17 Female - 11 Male)
  - 1st Floor Provided: 28 (17 Female - 11 Male)
  - 2nd - 4th Floor Provided: 13 (7F - 6M)

    TOTAL PROVIDED: 67 (38 Female - 29 Male)

KELLOGG MIDDLE SCHOOL - SECTION LOOKING EAST



TITLE 33 - PLANNING AND ZONING - BUILDING HEIGHT

- Notes
  - Minimum and maximum parking requirements are subject to Conditional Use or Impact Mitigation Plan review.
  - 5 Spaces or 5% of parking spaces on site, which ever is less, must be reserved for carpool use before 9:00 am on weekdays
  - At least 45 SF of interior landscaped area must be provided for each parking space.
  - Loading: 2 loading spaces meeting Standard A are required. These are provided at the dock service area.
  - Standard A: Loading space must be at least 35 ft long, 10 ft wide, and have a clearance of 13 ft.
  - For sites located less than 1500 ft from a transit station or less than 500 ft from a transit station or less than 500 ft from a transit street with 20-minute peak hour service, the minimum parking requirement standards of this subsection apply.

AERIAL FIRE APPARATUS ROAD

- Buildings exceeding 30’ in height require a 26’ wide aerial fire apparatus road and minimum 15’ distance from building.
  - Kellogg Middle School exceeds 30 feet in height (total height is 64 feet).
  - Kellogg Middle School will meet both criteria.

1.6 Existing Conditions

DEMOLITION

Kellogg Middle School has not been used as a school facility by PPS since 2007. During this time, the District has performed limited maintenance on the grounds which were maintained for neighborhood use. In 2015, the site was assessed and deficiencies were documented. In 2017, a study was conducted comparing a renovation of the existing school to a full replacement of the existing school to bring it up to current PPS Educational Standards. The comparison concluded with a decision to demolish the existing middle school.

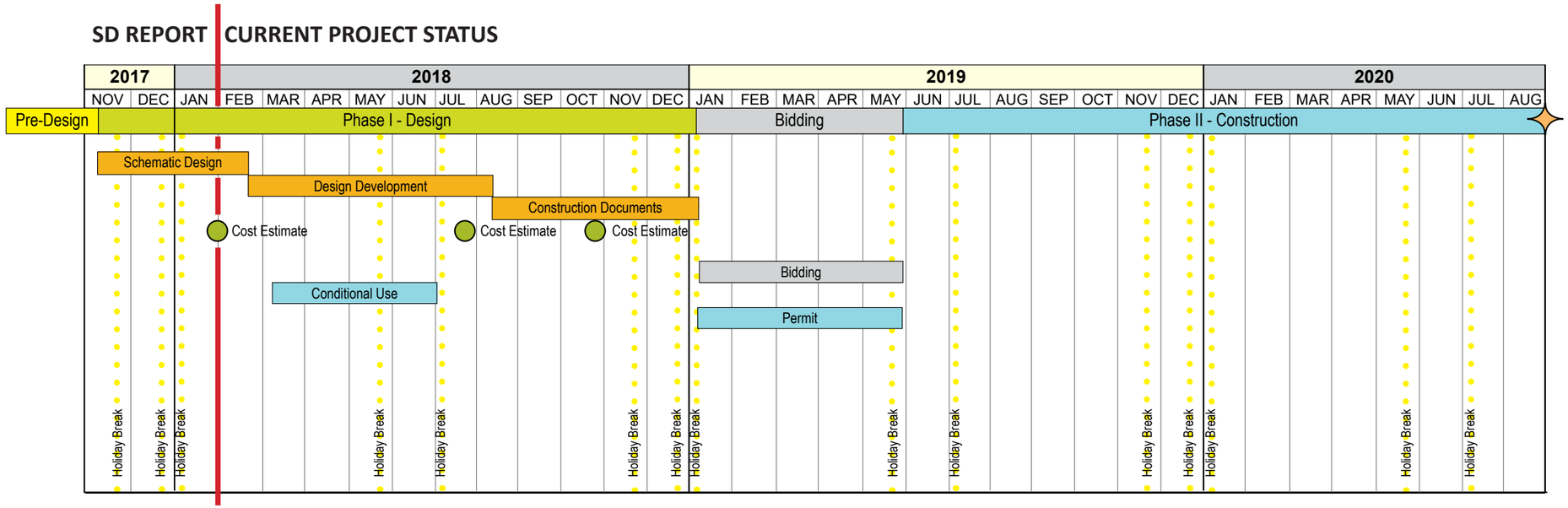
The demolition of the existing school is scheduled to begin in February of 2018 and end in July. Various materials for the original middle school will be salvaged for reuse in the new Kellogg Middle School. Various demolition materials will be separated and recycled after a local deconstruction company salvages other building materials for local re-use and resale. All of these divert the amount of material sent to the landfill.

1.7 Project Schedule

This graphic project schedule simplifies the design and construction processes to provide a project overview. The Design Development phase will follow Schematic Design as the Conditional Use Review process will begin with the City of Portland. The next cost estimate will be at the 90% DD milestone and the final cost estimate will be provided at 50% CD.

The construction schedule allows a year and a half of construction with the completion date in summer 2020. By completing the project at this time, the District gains the benefit of occupying the building early to move in and install furnishings and train staff in the new facility before the start of a new school year in the fall.

SD REPORT | CURRENT PROJECT STATUS



KELLOGG MIDDLE SCHOOL - PROJECT SCHEDULE

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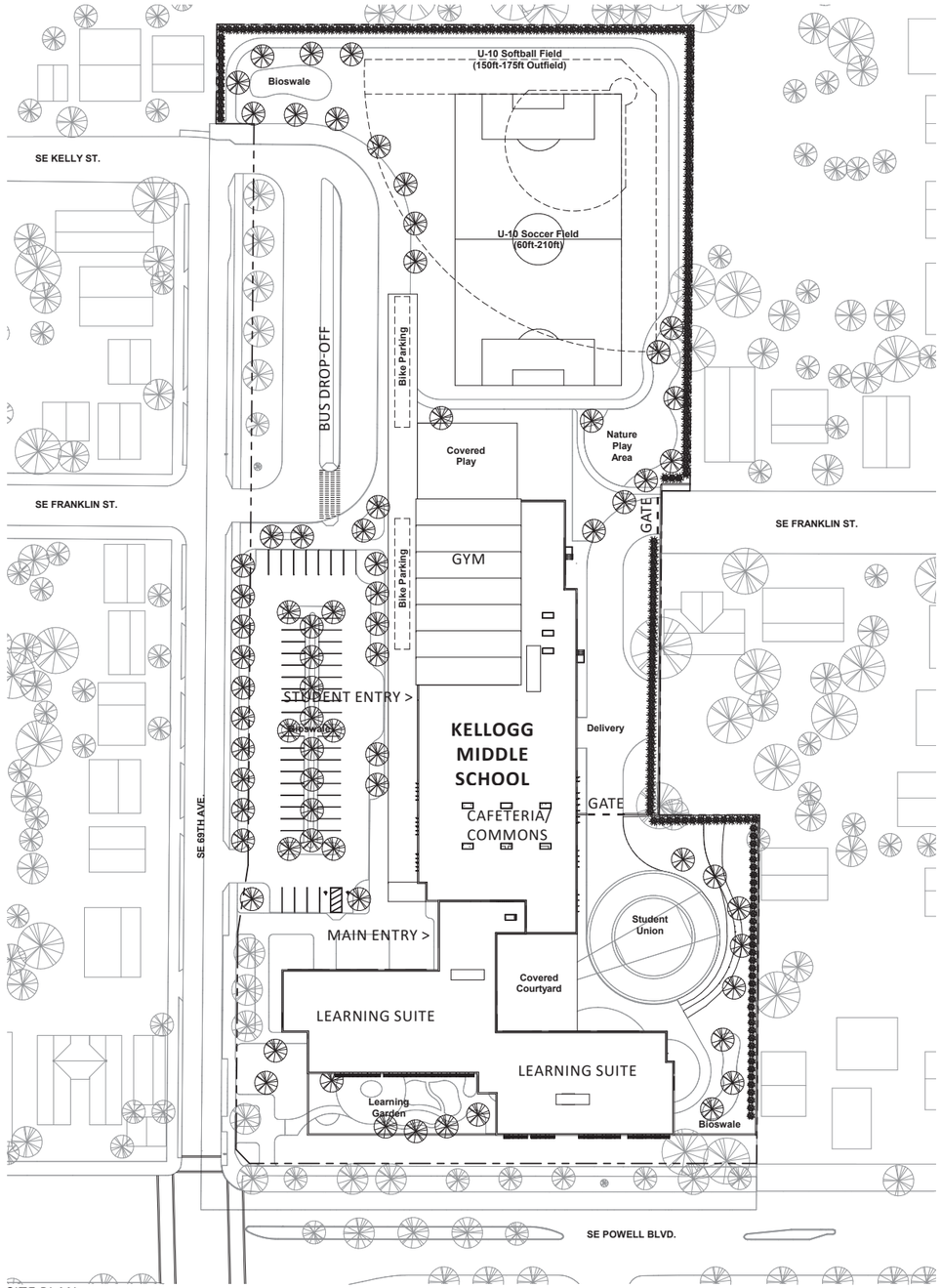


SITE PLAN

Part 2 - Basis of Design

2.1 Site Narrative

Kellogg Middle School east wing of the learning suites is located 20 feet from SE Powell Blvd. to meet the City of Portland Planning and Zoning maximum setback requirements at a Transit Street. This setback distance is required for 50% of the length of the ground level street-facing facade. The west wing of the learning suites is able to be setback 70 feet creating an outdoor gathering space for the building adjacent to the STEAM and Art classroom. General classrooms are arranged in the learning suites located on the second through fourth floors of the classroom wing along Powell Blvd. (See Architectural Narrative). This 4 story classroom wing acts as a barrier along SE Powell Blvd., protecting the interior of the site where the school is accessed and connected to the neighborhood. As the building moves north into the site and neighborhood community, its scale lowers as well The northern portions of the building are between one and two stories. The location of the gymnasium, kitchen, and cafeteria/commons allow direct access to the adjacent fields, nature play areas, and the interior student union courtyard.

An emergency vehicle route is required from SE Franklin St. to access the east portion of the school. This route will also be used for deliveries, trucks and service vehicles preventing them from crossing the site where student activity is located. The emergency vehicle turnaround function as an outdoor gathering and play space providing multiple uses.

BUILDING SETBACK

- West Setback = 32 feet (1/2 the building height required)
- East Setback = 60 feet (1/2 the building height required)
- North Setback = 342 feet (1/2 the building height required)
- South/Front setback: 20 feet (20 foot maximum required)

Following the demolition of the existing school, the Kellogg Middle School site will be graded and seeded to prepare for new building and landscaping. Numerous existing trees will be protected and remain through construction completion of the Kellogg replacement. Carefully integrated into the new Kellogg design, multiple on-site bioswales will be used for storm water runoff from the parking lot, bus drop-off, and student union courtyard. The bioswales will provide an opportunity for students to learn about natural systems for removing pollutants from storm water. New landscaping between the neighboring properties and around the building will consist of native, drought tolerant plants and planted per city requirements. (See Landscape Narrative)

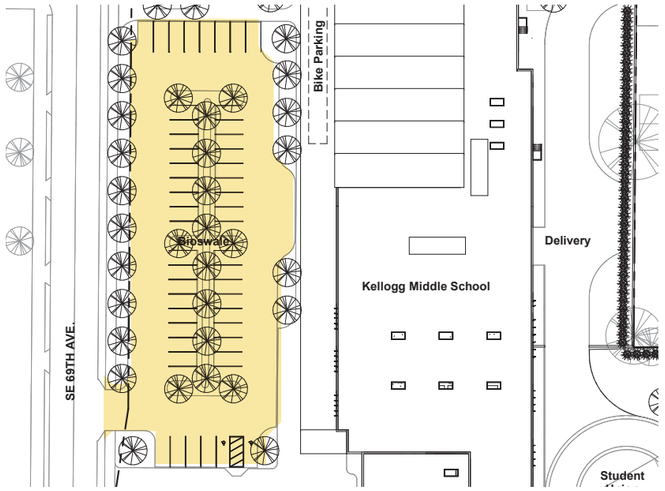
LANDSCAPE REQUIREMENTS

- North and East property line (Residential Lots): L3 High Screen
- South and West property line (SE 69th Ave. & SE Powell Blvd.): L1 General Landscaping

Site Access - Non Emergency

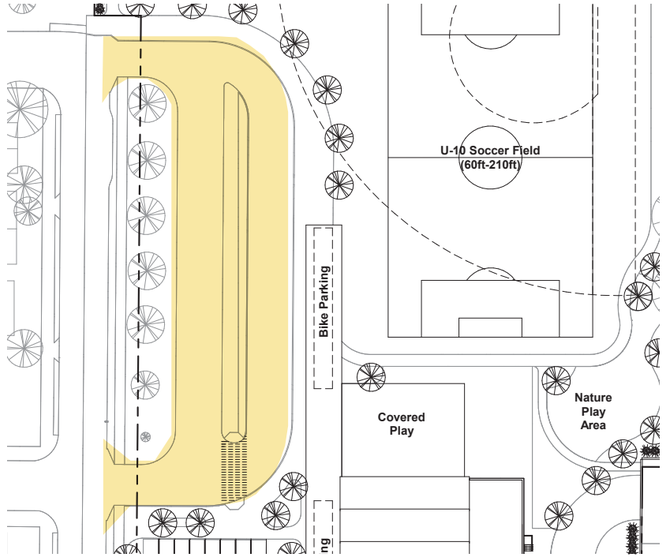
Access to Kellogg Middle School for students, faculty, and parents will be provided with a school parking zone and parent drop-off separated from the bus drop-off zone as well as pedestrian and bicycle pathways. All zones will have separate access points for safe and secure entry to school grounds.

PARKING



- One way access from SE 69th Ave
- 50 parking stalls, including 2 ADA parking stalls, with 1 van accessible space, (located on the south end of the lot, nearest the main entry) provided for faculty and visitors
  - 2010 ADA Standards: Chapter 2 - Table 208.2
  - Note: 3 ADA parking will be required if parking count exceeds 50 (51 to 75).
- Adjacent bioswale for parking runoff water treatment
- Special needs bus drop off zone adjacent to main entry
- Covered parent pick-up/drop-off provided
- Parking visible from administration offices

BUS DROP-OFF



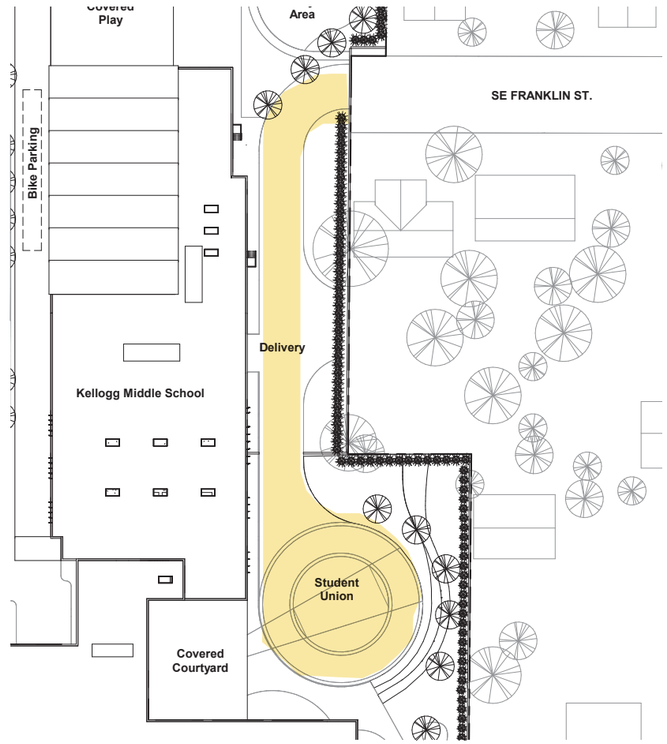
- One way access from SE 69th Ave
- Dual student loading zone with a safe, marked, student crossing
- Zone accommodates 8 - 40 foot school buses and 2 small school buses
- Adjacent bioswale for bus drop-off runoff water treatment
- Covered unloading/loading area provided
- Bus drop-off visible from administration offices

PEDESTRIAN AND BIKE ACCESS

- Separate pedestrian and bicycle pathway access from SE 69th Ave and SE Franklin St
- Multiple covered bike parking areas visible from administration offices

Emergency and Service Access

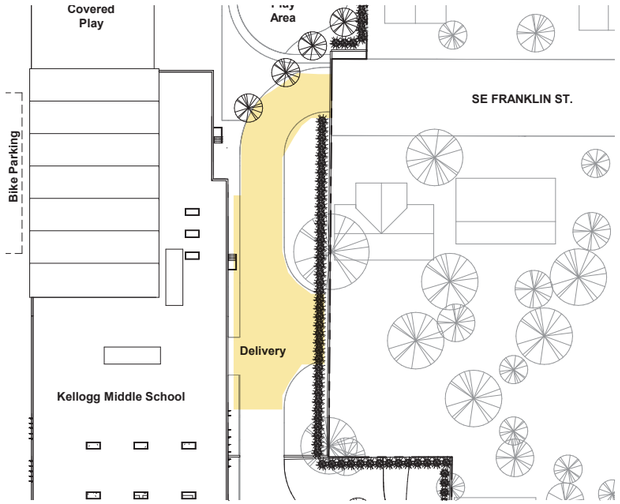
Emergency access to Kellogg Middle School is provided along SE Powell Blvd, SE 69th Ave, and a fire apparatus access road from SE Franklin Ave. Service deliveries and garbage pick-up access is provided from SE Franklin Ave. Small deliveries to the main office will have access through SE 69th Ave using the parking drop-off zone.



FIRE EMERGENCY ACCESS

- 26 feet wide fire apparatus access road
- 96 feet diameter turnaround cul-de-sac
  - Cul-de-sac doubles as Student Union during regular school hours
  - Clear of physical obstructions
  - 26 feet wide gate used to secure Student Union

DELIVERY

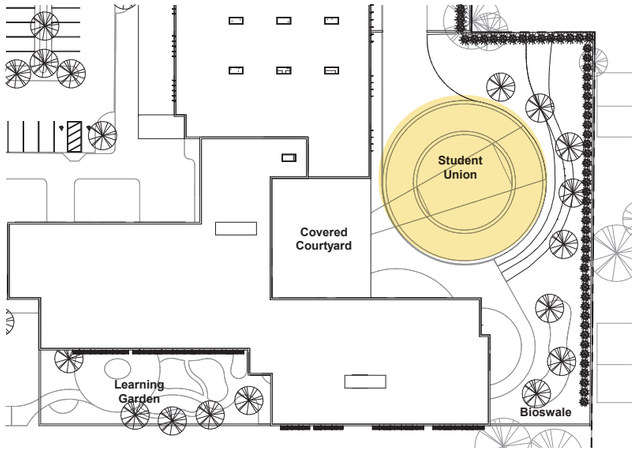


- 26 feet wide fire apparatus road used as access to receiving and building storage area
- Dedicated waiting area available for large delivery trucks
- Daily deliveries
  - 24’ truck
  - Freezer Supplies
  - Nutrition
  - Custodial
  - General Supplies
- Garbage pick-up 2 times per week
  - 36’ front load truck
  - Three 5-yard containers

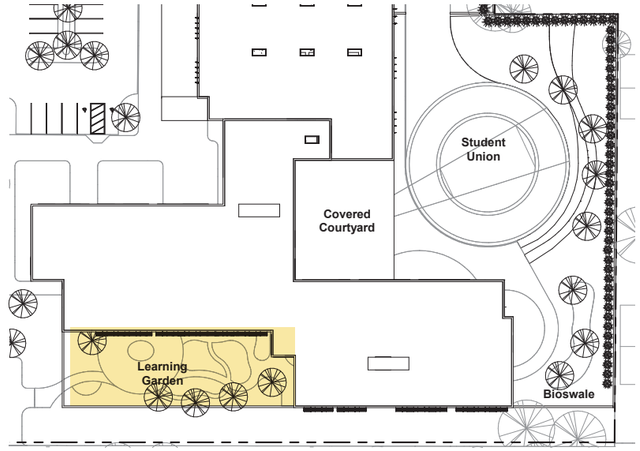
Learning Courtyards

The design promotes outdoor learning by creating and sheltering two learning courtyards. Fences bound along Powell to the south and property lines to the east, west, and south. These courtyards will only be accessible from the school in order to create a safe and comfortable learning atmosphere. The courtyards will include active and passive learning strategies to inspire and spark student curiosity whether they are utilized during class time or recess.

STUDENT UNION (EAST COURTYARD)



- (see 2.4, Landscape narrative)
- multiple gathering and types of gathering spaces conducive to instruction, play, and exploration.
- infuse curriculum into site features such as paving, seating, bioswales/rain gardens, (etc.)
- connection or extension of the cafeteria / commons.



LEARNING GARDEN (SOUTH-WEST COURTYARD)

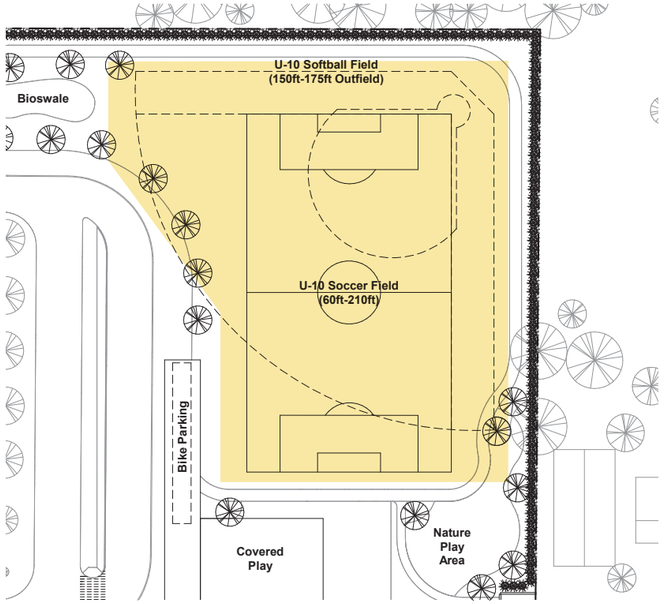
- (see 2.4, Landscape narrative)
- multiple gathering and types of gathering spaces conducive to instruction, play, and exploration.
- opportunity to create STEAM-related gathering moments at rainwater harvesting tank, bioswales/ rain gardens, green energy stations, (etc.)
- connection or extension of the STEAM and Art classrooms.

Playing Field and Nature Play

An outdoor play field and nature play area are located North of Kellogg Middle School. These are bounded by residential perimeter to the north and east and by the main school building to the South. These boundaries and separation from Powell and 69th will provide a protected outdoor playing area during school hours that is visible by school staff and faculty. It will also provide a safe destination for community use after school hours. The fields are at the furthest point from SE Powell Blvd., reducing noise and pollution concerns.

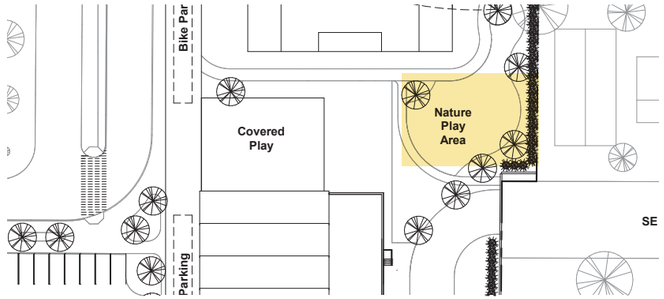
FIELDS

- Turf field (base design)
- Field dimensions:
  - Soccer field: U-10 (60'x210')
  - Softball field: 150'-170' Outfield
- 50 foot required field setback from neighboring residences' property line. Per Title 33, Planning and Zoning (33.279.040 Development Standards) from adjacent residential properties
- High Screen (L3) 6' high landscaping (or masonry wall) will provide privacy and safety
- Walking trail and bench seating around the field



NATURE PLAY

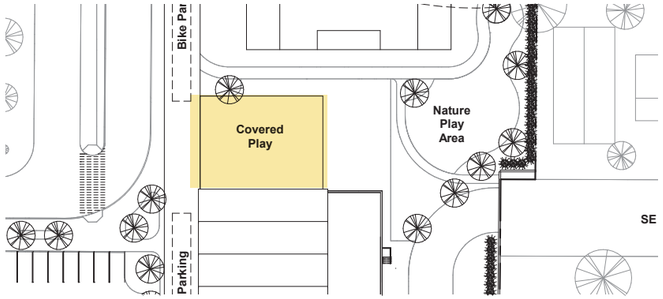
- Artificial turf to provide accessibility to all students and community members
- Climbing boulders, log climbing structure, and interactive play equipment



NATURE PLAYGROUND UTILIZES ELEMENTS SUCH AS LOGS AND BOULDERS FOR RECREATION

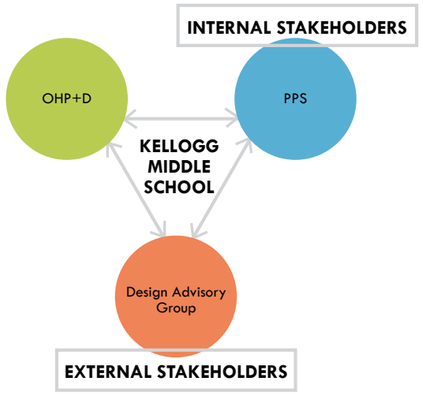
COVERED PLAY AREA / AUXILIARY GYM (ALTERNATE)

- Two half-court basketball play area (4,000sf)
- Cover Play Area (Base Design):
  - Covered/open-air canopy area to protect from rain and sun
  - Designed to allow for future enclosure
- Auxiliary Gym (Alternate):
  - Enclose covered play area shown with walls and windows
  - Full mechanical system
  - Athletic flooring



2.2 Architectural Narrative

Kellogg Middle School is an opportunity to envision and realize the future of teaching and learning in Portland Public Schools. The goal of the new learning facility is to address and serve the District's objectives and maximize the public's investment. Throughout the Schematic Design process, internal and external stakeholders have advised the design through District standards and feedback during the design process.



STAKEHOLDER ENGAGEMENT

KELLOGG MIDDLE SCHOOL STAKEHOLDER ENGAGEMENT

Input from the OHP+D design team, Portland Public School District members such as the Office of Teaching and Learning (OTL), and community members, such as the Design Advisory Group (DAG) have aided in determining a strategic approach to discovering the values by which Kellogg is being built. The Eco Charrette organized by Green Building Services embodies the spirit of the project, with the goal of having a resilient building that the community will embrace.

KELLOGG INTERNAL STAKEHOLDERS - PPS FOCUS GROUPS

The direction provided by the projects stakeholders has been filtered through the following lenses to align the school architecture with valuable design concepts:

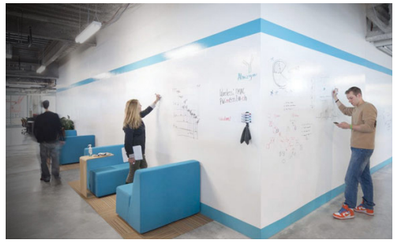
BUILDING AS CURRICULUM

Kellogg Middle School will serve as a learning tool for student education and engagement. The concept of the building as curriculum means that the structure itself, including exterior space, doubles a a potential place for learning, both in and outside the classroom.

The site incorporates a variety of learning opportunities for students. Outdoors, the Student Union west courtyard has been designed to the Fibonacci Golden Rectangle, providing a spacial orientation to mimic patterns found in nature, adding a scientific and mathematical element that can be incorporated into many class curriculums. The Student Union also provides additional learning opportunities, such as physically incorporating the Golden Rectangle as a mural into the courtyard pavement, and the Golden Ratio is demonstrated in an organic mural in the truck turnaround space.

The site includes additional learning opportunities: steel bands inset into the pavement and engraved with poetry, integrated seatwalls in the landscape that serve as amphitheater style instruction space, hydraulic sculptures that demonstrate energy capture, and placards inset into the pavement with educational facts about the sustainability of the site and building systems. The Outdoor Learning Garden south courtyard includes a covered teaching area that can double as a stage, with an art wall, solar powered pavers on the sidewalk, a rainwater harvesting tank, greenwall, kinetic energy bikes, wind turbines, and nature playground.

The interior of the building will provide a variety of different spaces to accommodate different learning styles and curriculum requirements. Extended learning spaces allow for flexibility in teaching and let students get out of the traditional classroom and into a more collaborative, creative environment. Plaques and wayfinding signage will incorporate this theme throughout the building, providing facts to students about the building, including sustainability and features of the building itself. The walls in the classrooms will be writable surfaces, serving creativity and student brainstorming. The displacement ventilation system can teach students about energy, the light shelves can teach about daylighting and science, and the central learning stair in the commons provides an additional learning environment.

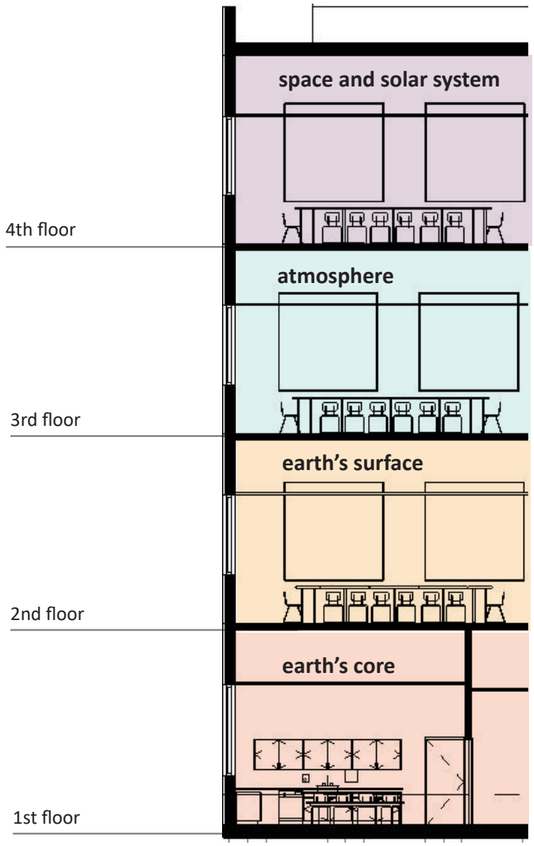


WAYFINDING

Part of the Building as Curriculum elements that are featured in Kellogg will be the strategic use of educational elements in wayfinding. There are three main ways Kellogg will utilize wayfinding techniques to educate students: throughout levels, within program elements, and in circulation.

Levels

Natural scale will be reflected in building stories, with floors identified from ground level to 4th story in association with thematic elements such as earths core to atmosphere to space, land masses such as plains to plateaus to mountains, or animals such as sea creatures to land animals to birds. Utilizing themes such as these gives students an opportunity to learn at every corner, as well as tangible elements that inspire realistic comparisons.



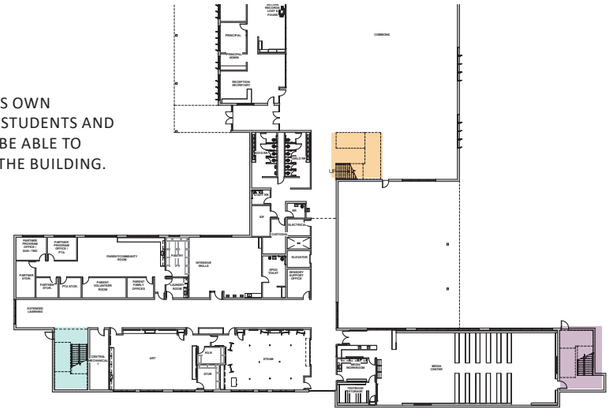
Circulation

Students will be able to identify where they are in the building using strategic use of color in circulation elements such as stairs and corridors. Successful use of color will be able to guide students throughout the space and allow development of sensory perception, memory association, and matching.

Program Elements

Classrooms will utilize clever signage to identify subjects being taught, as well as interrelationships between associated spaces. A student will know when they step into a science classroom, a mathematics classroom, or exploratory classroom based on strategic aesthetic coordination. This provides a sense of identity and feeling of place in every classroom.

EACH STAIR WILL HAVE ITS OWN IDENTIFIABLE COLOR, SO STUDENTS AND STAFF CAN WILL ALWAYS BE ABLE TO ORIENT THEMSELVES TO THE BUILDING.

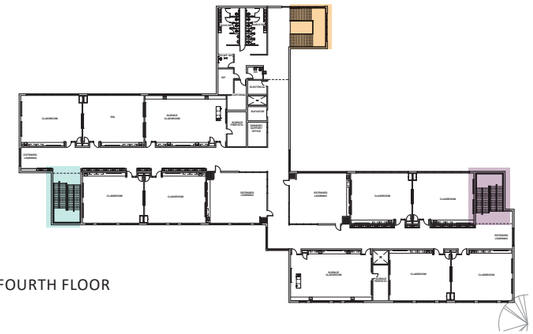


FIRST FLOOR

THIRD FLOOR

GRAPHIC SIGNAGE HELPS IDENTIFY LEARNING S

SECOND FLOOR



FOURTH FLOOR

THE BUILDING ARCHITECTURE AND SYSTEMS

The result of the stakeholder input and the design concepts is a school building that engages students, teachers, and the community through its form, orientation, systems, and materials.

MASSING AND STRUCTURE

The school's massing is expressed as a scale shift and a structural system transition from the street frontage on SE Powell Blvd. back to the residential scale at the play fields. The scale and location of the 4 story tower along SE Powell Blvd responds to the developing context of the city by establishing a presence along SE Powell Blvd. The scale diminishes as the building mass integrates into the neighborhood scale along SE 69th Ave.

These two disparate scales are best served through two distinct structural systems:

- Tilt up system for the double height single story mass
- Steel Braced Frame Structure for the 4 story tower mass

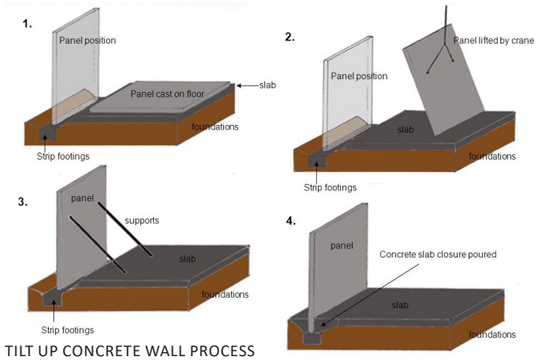
The tilt up system consists of a steel framed structure with concrete walls. The steel frame is made up of steel columns with steel girders supporting open web steel trusses.
The advantages of tilt up construction are:

- Construction cost savings
- Construction schedule compression
- Safe construction method
- Durability
- Custom aesthetics through formliner textures and patterns, stains, paint, sand blasted or painted

The steel braced frame structure is made up of steel columns, girders, and beams with multiple brace frames to resist lateral (seismic and wind) loads.

The advantages of steel braced frame construction are:

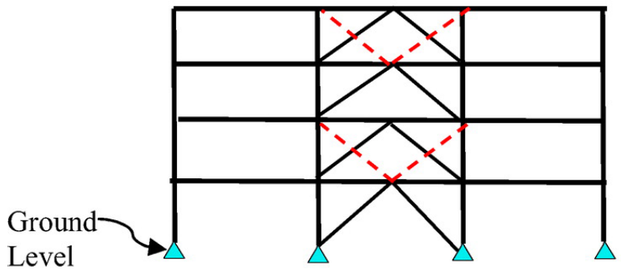
- Seismic performance
- Economical
- Ease to erect
- Design flexibility for placement



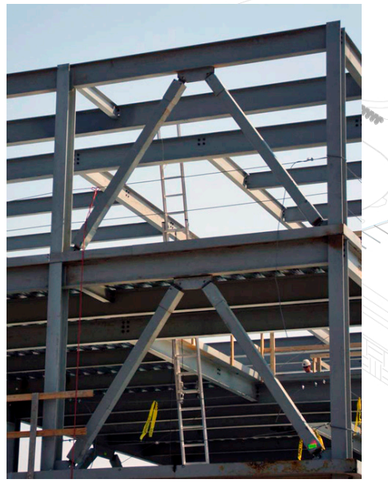
TILT UP CONCRETE WALL PROCESS

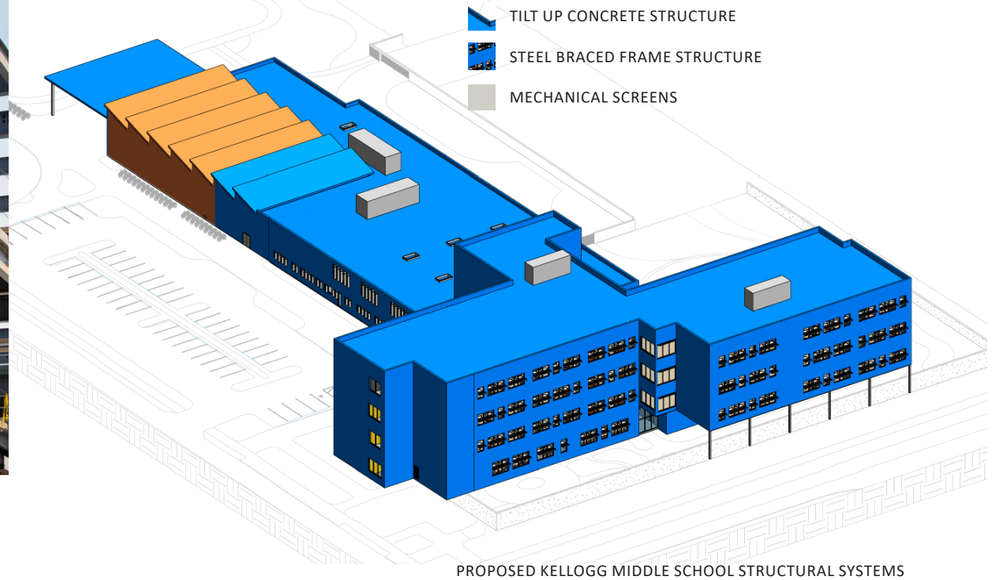

TILT UP CONCRETE WALL LIFTING


TILT UP CONCRETE WALL BRACING



BRACE FRAME DIAGRAM


BRACED FRAME STRUCTURAL SYSTEM



PROPOSED KELLOGG MIDDLE SCHOOL STRUCTURAL SYSTEMS

KELLOGG MIDDLE SCHOOL
PORTLAND PUBLIC SCHOOL DISTRICT
02/01/18

Daylighting and Orientation

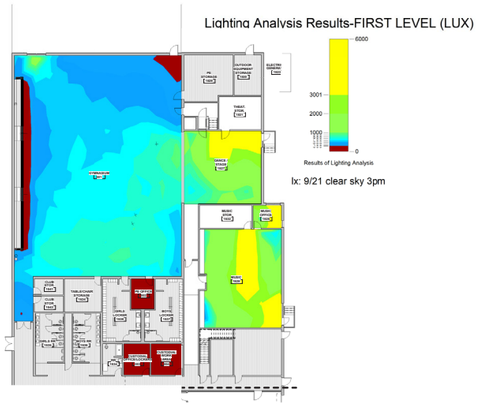
The building has been deliberately oriented to achieve maximum daylighting since it is proven that daylit classrooms improve student performance and health. The East-West orientation of the school's learning environments maximize daylighting opportunities for southern sun. The current design provides optimal daylighting in the regularly occupied areas of the school.

The single story portions of the school require different daylighting strategies due to the lack of southern exposure. The main occupied spaces in this portion of the building are the gymnasium, music room, dance room, and the commons. The gymnasium will be daylit utilizing north and west facing clerestory windows within the sawtooth roof structure. The commons and music rooms will rely on skylights and large windows facing south and east. In the west-facing administration spaces, top lighting strategies such as skylights or solar tubes will need to be utilized to provide adequate daylight levels.

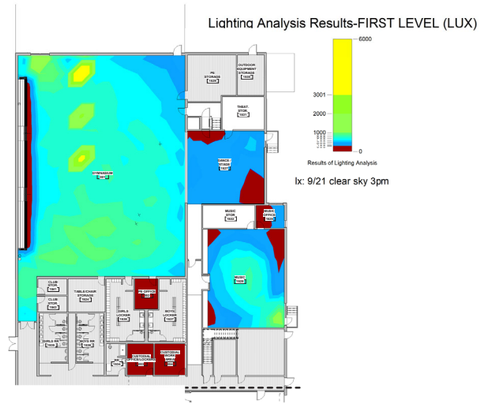
To comply with LEED v4 option 2, all regularly occupied spaces must meet prescribed daylighting levels of at least 300 lux, but no brighter than 3,000 lux, at both 9AM and 3PM on the equinox. For 1 point, 75% of the total floor area of the spaces must meet the threshold; 2 points are awarded if 90% of the floor area meets the threshold. Compliance with this requirement is demonstrated through computer modeling simulations. Currently, the Learning Suite, Dance, Music and Gym spaces are landing within the 1 point threshold. The strategies described above are being evaluated to provide the best lighting solutions in the Commons, Kitchen and Administration, in order for the project to earn the LEED point(s).

The following diagrams illustrate the current daylighting results for a typical learning suite floor and the gymnasium. The areas shown in the blue-green range represent the ideal lighting level. Those red are below the threshold (too dark), while the areas in yellow are above (too bright). The rooms that are white are not required to comply with the daylighting requirements, as they are not considered regularly occupied spaces.

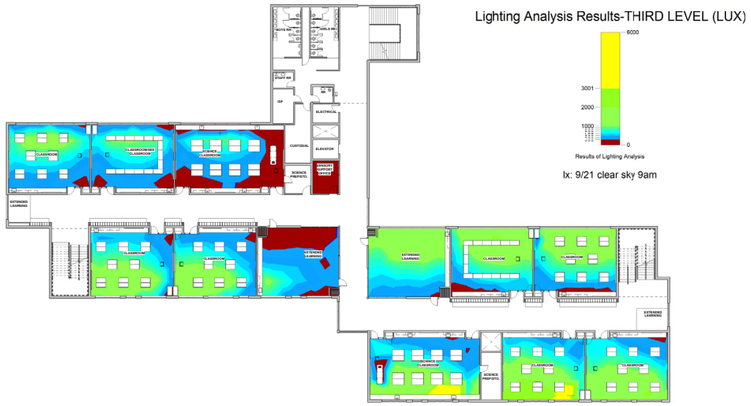
The school's orientation and massing creates views of Mt. Tabor to the north, Kelly Butte to the east, Mt. Scott to the southeast and out through the street trees along SE Powell Blvd. and across the treetops in the Foster-Powell neighborhood to the south and towards downtown Portland and the South Tabor neighborhood to the west.



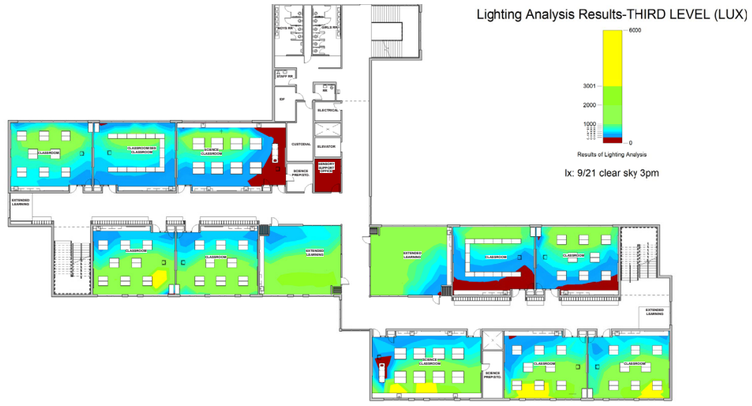
DAYLIGHT ANALYSIS RESULTS - GYM / MUSIC / DANCE @ 9:00 AM



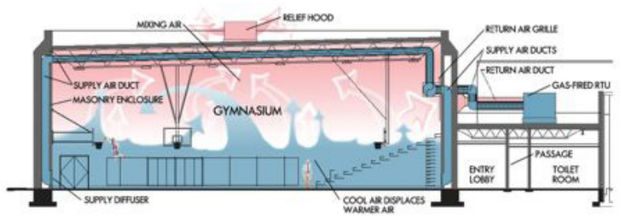
DAYLIGHT ANALYSIS RESULTS - GYM / MUSIC / DANCE @ 3:00 PM



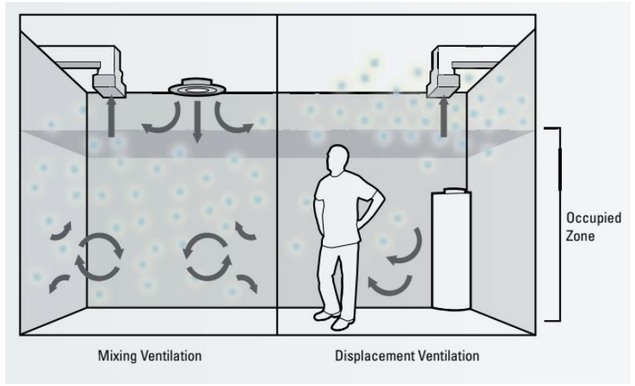
DAYLIGHT ANALYSIS RESULTS - CLASSROOM SUITE LEVEL 3 @ 9:00 AM



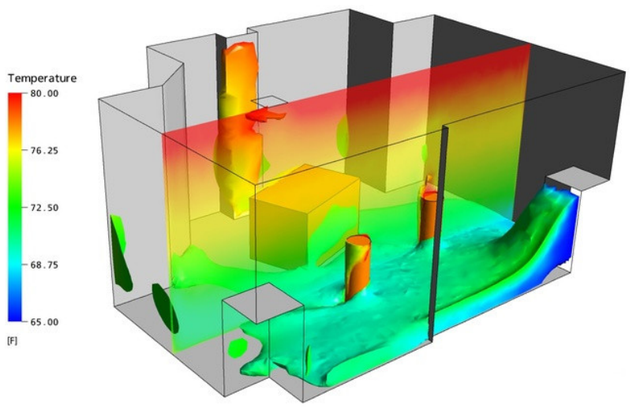
DAYLIGHT ANALYSIS RESULTS - CLASSROOM SUITE LEVEL 3 @ 3:00 PM



DISPLACEMENT VENTILATION PRINCIPALS IN A GYMNASIUM



DISPLACEMENT VENTILATION VS. TRADITIONAL OVERHEAD MIXING SYSTEMS



AIR STRATIFICATION IN A DISPLACEMENT VENTILATION SYSTEM

VIEW OF MT. TABOR TO THE NORTH FROM EXISTING GYMNASIUM ROOF

VIEW OF KELLY BUTTE TO THE EAST FROM THE EXISTING SCHOOL ROOF

VIEW OF MT. SCOTT TO THE SOUTHEAST FROM THE EXISTING SCHOOL ROOF

Mechanical System
A displacement ventilation system is the preferred mechanical system to meet the energy efficient, thermal comfort, and indoor air quality goals for the school. This system is based on the principal of thermal buoyancy (hot air rises above cold air due to it's lower density). The system provides high temperature, low velocity supply air.

The benefits of displacement ventilation are:

- Improved thermal comfort by suppling air that is 65-68°F as opposed to the 55°F of a conventional air mixing system.
- Improved energy efficiency by only conditioning the first six feet of a space (the occupied zone)
- Improved indoor air quality – hot air is not mixed back into the occupied zone, it is exhausted at the ceiling
- Quiet low velocity supply air improves acoustics and thermal comfort

Displacement ventilation systems which are also referred as "stratified air distribution systems" work on the principle of thermal buoyancy – hot air due to lower density rises above the cold air. Stratified distribution systems are becoming popular due to their ability to provide better indoor air quality with low energy demand. Stratified air distribution systems come mainly in two flavors – traditional displacement ventilation (TDV) systems and the under floor air distribution (UFAD) systems. This presentation will cover the basics of stratified air distribution systems and discuss various design and operational parameters that affect their performance

Natural / Passive Ventilation
Passive ventilation utilizes natural forces and fans to push air around and ventilate a space. Kellogg considers buoyancy-driven displacement ventilation as a potential option for Kellogg corridors, using student bodies themselves to push air throughout the space and create movement of air. Utilizing natural ventilation for the corridors by eliminating the mechanical cooling system would reduce first cost and provide long term utility savings by reducing the required cooling energy in this area.

2.2.1 Sustainability

One of the requirements of Portland Public School district, and a main feature of Kellogg Middle School design is the focus on sustainability. Kellogg will be designed to achieve LEED Gold in accordance with LEED v4 for Schools. Besides reaching the required point to achieve a LEED Gold certification, Kellogg Middle School will also demonstrate a variety of other sustainable design practices, such as the goal of Net Zero Energy.

NET ZERO - CARBON NEUTRAL DESIGN
The concept of Carbon Neutral Design states there is no release of carbon dioxide into the atmosphere in any form, specifically through offsetting emissions or providing a natural energy source to power the building. This is known as the Living Building Challenge or 2030 Challenge, and is identified as a sustainability metric goal by Portland Public School District. Achieving this goal within the project budget through design, partnerships, and creativity would set a new standard for future district projects.

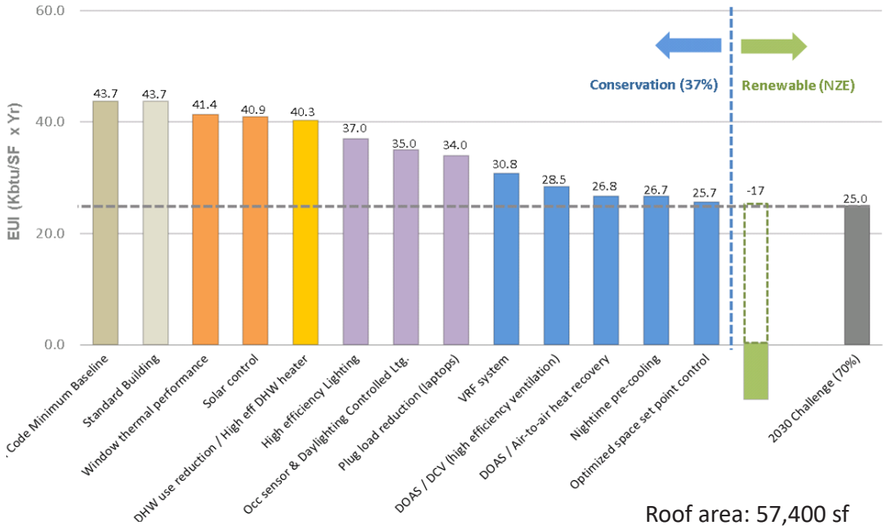
Since 2000, when local emissions hit their highest levels, Multnomah County's emissions have declined after the US set goals for reductions. Among other factors, these reductions include a combination of:

- Improved efficiency in buildings, appliances, and vehicles
- A shift to power-carbon energy sources
- More walking, biking, and transit
- Reduced methane emissions from landfills and more recycling

In 2013, total local carbon emissions for Multnomah County were 14% below 1990 levels, which is equal to a reduction of 35% per person, nearly 20% better than the national average. In the United States, buildings account for a 41% of total energy usage, 72% of total electricity, and 28% of total carbon dioxide emissions. It is our responsibility to design buildings that take less of a toll, if not zero toll or positive impact, on our environment.

A building certified as Net Zero is based on actual building performance data, measured in kBTU/SF/Year, totaled as Energy Use Intensity (EUI). The US average EUI for schools is 65 kBTU/SF/Yr. The average EUI for Portland Public Schools is 49.8 kBTU/SF/Yr. To meet current Oregon Energy Code, Kellogg needs to have an EUI of 43.7 kBTU/SF/Yr. However, if Kellogg wants to accomplish a Net Zero carbon emissions, it would need to be designed to a EUI of 22.8 kBTU/SF, over 50% below the PPS average. To accomplish this, Kellogg would need to run on renewable energy sources. The graph identifies the many ways Kellogg can incorporate energy saving utilities in its design in order to accomplish Net Zero.

The current roof area of Kellogg is 57,400 SF. It would require 75% coverage with solar panels to offset energy demands.



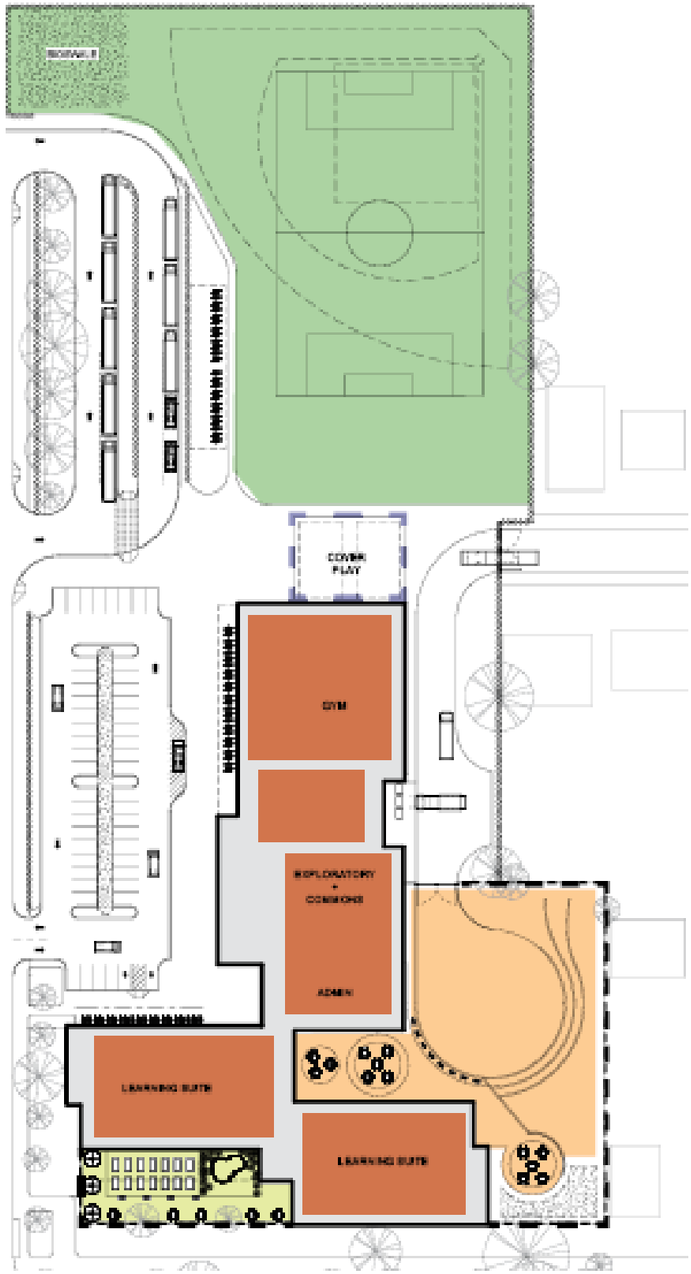
The next steps needed to continue to reach towards a NZE building include exploring partnerships with utility companies such as Portland General Electric and searching for incentives for utilizing solar power and panels.

Roof area: 57,400 sf
Solar panels: 75% coverage
ARRAY SIZE: 43,050 SF

Array output: 2,295,344 kBTU
Building:100,412 sf

2,295,344 kBTU / 100,412 ft2 = 22.8 kBTU/ft2/yr

= solar panel areas



2.2.2 Programming Spaces

KELLOGG MIDDLE SCHOOL PROGRAM

The current PPS Middle School Educational Specifications was used during the Programming and Pre-Design phase as a basis for exploring the building site and footprint, program, space requirements, and critical adjacencies for Kellogg Middle School. Schematic Design concepts were developed from this information to create purposeful flow between spaces which produce smart relationships and efficient adjacencies. The Schematic Design floor plans developed for Kellogg Middle School were created considering daily life of both students and staff, considering PPS curriculum, student habits, community engagement, and spacial relationships..

The program for Kellogg Middle School resulted from vetting by District representatives from 12 Focus Groups and 8 teaching and learning disciplines during the Programming phase (See Programming Report for additional information). The program spaces for Schematic Design have been confirmed by the Kellogg Middle School Steering Committee and the school board as well as presented to the External Stakeholders of the Design Advisory Group (DAG) for feedback and discussion. The outcome of this process has resulted in a flexible, adaptable program that accommodates future student enrollment growth and educational spaces that have multiple functions creating space and use efficiency.

Per Kellogg Middle School stakeholder, Steering Committee, and school board recommendations, the following program spaces have been removed from the Kellogg Middle School Program.

- Computer Lab
  - 980 SF

Per Kellogg Middle School internal stakeholder, Steering Committee, and deign requirements the following program spaces or additions to existing spaces have been added to the Kellogg Middle School program in either the programming or schematic design phases as scope increases. The party responsible for the added program is indicated in parenthesis. All scope adds that diverge from the PPS Middle School Educational Specifications are indicated in RED in the Kellogg Program on the following pages.

- ESL Classroom (PPS OTL)
  - Added 80 SF
- Science Prep Room (PPS OTL)
  - 2 at 150 SF each
- Science Storage (PPS OTL)
  - 2 at 64 SF each
- Student Lockers (KMS Steering Committee)
  - Added 665 SF
- Theater Storage (PPS OTL)
  - 250 SF
- Media Center (Architect)
  - Added 260 SF
- Athletics Table/Chair Storage (PPS OTL)
  - 200 SF
- Reception/Secretary (KMS Steering Committee)
  - Added 100 SF
- Principal's Administrator (PPS OTL)
  - 100 SF
- Learning Center (PPS OTL)
  - Added 180 SF
- Sensory Support Office (PPS SPED)
  - 3 at 150 SF each
- Wellness Room (PPS SPED)
  - 200 SF
- Social Emotional Skills room (PPS SPED)
  - 980 SF
- Special needs toilet (PPS SPED)
  - Added 80 SF
- Parent/Community Room (PPS OTL)
  - Added 120 SF
- Cafeteria / Commons (PPS OTL)
  - Added 1,580 SF (6,080 SF total)
- Kitchen (Kitchen Consultant)
  - Added 120 SF
- Servery (PPS OTL)
  - Added 315 SF (1,215 sf total)
- Restroom with shower (PPS OTL)
  - 100 SF
- Staff Restroom (KMS Steering Committee)
  - 4 at 65 SF each (260 SF total)
  - 1 per learning suite/floor
- Boys toilet room (Architect/Code)
  - 250 SF
  - Added 150 SF
- Girls toilet room (Architect/Code)
  - 250 SF
  - Added 150 SF
- IDF room (Electrical Engineer)
  - 85 SF
- Main Electrical Room (Electrical Engineer)
  - Added 200 SF
- Electrical room (Electrical Engineer)
  - 4 at 85 SF each (340 SF)

TOTAL ADDED AREA = 7,893 SF

The detailed space program is provided on the following pages.

KELLOGG MIDDLE SCHOOL
PORTLAND PUBLIC SCHOOL DISTRICT
02/01/18

		Kellogg Middle School Program					Notes
Room Type	Room Name	Qty	Cap.	Unit / student	Unit (SF)	Area (ASF)	
Classrooms	Classroom	22	30	32.7	980	21,560	A,B
	ESL Classroom	1	15	65.3	900	900	C
Scope Add	ESL Classroom ADD	1			80	80	1,Q
	Science Classroom	5	30	43.3	1,300	6,500	
	Science Prep	1			150	150	
Scope Add	Science Prep	2			150	300	2,Q
	Science Storage	1			64	64	
Scope Add	Science Storage	2			64	128	2,Q
	Extended Learning Area	6	30	33.3	1,000	6,000	D
	Student Lockers	3			190	570	
Scope Add	Student Lockers ADD	1			665	665	W
Preferred	Conference Room	1			200	200	
Subtotal ASF						**37,117**	
Exploratory	Music (Band & Choir) Rm	1			1,400	1,400	E
	Music Office	1			120	120	
	Art	1			1,200	1,200	
	Art Storage	1			120	120	
Preferred	STEAM Lab	1			1,200	1,200	F
Preferred	Kiln Room	1			100	100	
Preferred	Dance	1			980	980	G,H
Preferred	Music/instrument Storage	1			120	120	
Scope Add	Theater Storage	1			250	250	Q
Subtotal ASF						**5,490**	
Media/Technology	Media Center	1			1,650	1,650	
Preferred	Media Center ADD	1			1,550	1,550	3
Scope Add	Media Center ADD	1			260	260	X
	Media Workroom	1			200	200	
	Textbook Storage	1			200	200	23
Subtotal ASF						**3,860**	
Athletics	Gym	1	60	113	6,800	6,800	
	Athletics Storage	2			200	400	
	Club Storage	3			80	240	
	PE Office	1			120	120	
	Boy's Locker Room	1			800	800	
	Girl's Locker Room	1			800	800	
Scope Add	Table/Chair Storage	1			200	200	4,Q
Subtotal ASF						**9,360**	

		Kellogg Middle School Program					Notes
Room Type	Room Name	Qty	Cap.	Unit / student	Unit (SF)	Area (ASF)	
Athletics	Gym	1	60	113	6,800	6,800	
	Athletics Storage	2			200	400	
	Club Storage	3			80	240	
	PE Office	1			120	120	
	Boy's Locker Room	1			800	800	
	Girl's Locker Room	1			800	800	
Scope Add	Table/Chair Storage	1			200	200	4,Q
Subtotal ASF						**9,360**	
Administration	Reception/Secretary	1			450	450	
Scope Add	Reception/Secretary ADD	1			100	100	P
	Health Room/Toilet	1			200	200	
	Principal's Office	1			180	180	
Scope Add	Principal's Administrator	1			100	100	Q
	Assist. Princ. Office	1			120	120	
	Workroom/Mail	1			350	350	
	Staff Room	1			500	500	
	Conference Room	1			180	180	
Preferred	Conference Room ADD	1			20	20	6
	Restroom	2			45	90	
Preferred	Restroom ADD	2			19	38	7
	Lost & Found	1			50	50	
Preferred	Records Office	1			150	150	J
Subtotal ASF						**2,528**	
Counseling	Counselor's Office	2			120	240	
	Record Storage	1			100	100	
	Mediation/Tutorial Room	1			120	120	
Preferred	Conference Room	1			200	200	
Subtotal ASF						**660**	
Special Education	Learning Center	1			800	800	K
Scope Add	Learning Center ADD	1			180	180	8,Q
Scope Add	Sensory Sup/Offices	3			150	450	9,R
Scope Add	Wellness Room	1			200	200	R
Scope Add	Social Emotional Skills Rm	1			980	980	R
	Special Needs Toilet	1			120	120	
Scope Add	Special Needs Toilet ADD	1			80	80	R
Preferred	Sensory Support Room	1			150	150	
Preferred	Intensive Skills Room	1			980	980	L
Subtotal ASF						**3,940**	23
Community Support	Parent/Volunteer Room	1			200	200	
	Parent/Community Room	1			800	800	M
Scope Add	Parent/Comm Room ADD	1			120	120	10,Q
	Parent/Family Offices	1			120	120	
Subtotal ASF						**1,240**	

Room Type	Room Name	Kellogg Middle School Program Qty	Cap.	Unit / student	Unit (SF)	Area (ASF)	Notes
Cafeteria/Commons	Cafeteria	1	283	15	4,250	4,250	
Preferred	Cafeteria ADD	1	17	15	250	250	11
Scope Add	Cafeteria ADD	1	105	15	1,580	1,580	12
	Kitchen	1			800	800	
Scope Add	Kitchen ADD	1			120	120	S
	Dishwashing	1			250	250	
	Kitchen Freezer/Cooler	1			140	140	
	Kitchen Office/Alcove	1			60	60	
	Servery	1			900	900	
Scope Add	Servery ADD	1			315	315	13
	Kitchen Staff Lockers	1			20	20	
Preferred	Kitchen Staff Lockers ADD	1			80	80	14
	Kitchen Restroom	1			45	45	
Preferred	Kitchen Restroom ADD	1			19	19	15
	Table/Chair Storage	1			200	200	
	Kitchen Storage	1			150	150	
Subtotal ASF						**9,179**	
Community/Partner	Partner Program Office	2			150	300	16
	Pantry	1			200	200	
Preferred	Partner Prog. Stor/Office	4			88	350	17
Preferred	Laundry Room	1			100	100	18
Subtotal ASF						**950**	
Building Support	Restrooms	6			45	270	
Scope Add	Restroom with shower	1			100	100	Q
Scope Add	Staff Restrooms	4			65	260	P
	Toilets - Boys	3			200	600	
Scope Add	Toilets - Boys ADD	3			50	150	T
Scope Add	Toilets - Boys	1			250	250	T
	Toilets - Girls	3			200	600	
Scope Add	Toilets - Girls ADD	3			50	150	T
Scope Add	Toilets - Girls	1			250	250	T
	Custodial Rooms	4			100	400	
	Custodial Office/Lockers	1			150	150	
	Materials Storage	1			350	350	
	Custodial Storage	1			350	350	
	Building Stor./Receiving	1			650	650	
	MDF Room	1			160	160	
	IDF Rooms	3			80	240	
Preferred	IDF Rooms ADD	3			20	60	20
Scope Add	IDF Room	1			85	85	S
	Main Electrical Room	1			180	180	
Preferred	Main Electrical Room ADD	1			20	20	21
Scope Add	Main Electrical Room ADD	1			200	200	S
Scope Add	Electrical Room	4			85	340	S
	Central Mechanical Room	1			600	600	
Preferred	Central Mechanical ADD	1			200	200	22
Preferred	Custodial Work Area	1			180	180	
Preferred	Electrical Generator Room	1			200	200	N
Preferred	Outdoor Equipment Stor.	1			200	200	
Subtotal ASF						**7,195**	

Room Type	Room Name	Kellogg Middle School Program Qty	Cap.	Unit / student	Unit (SF)	Area (ASF)	Notes
Kellogg MS Program Total -REQUIRED AREA						66,279	
Kellogg MS Program Total -PREFERRED AREA						7,347	
Kellogg MS Program Total -SCOPE ADD AREA						7,893	
Total KMS Program Net Square Footage						**81,519**	
Kellogg MS Program - SD Modeling Deviation Total (~1.8%)						1,446	V
Total KMS SD Net Square Footage in REVIT MODEL						**82,965**	
Net to Gross Ratio 48.7% - (New construction walls, corridors, and circulation areas)						40,455	U
TOTAL MIDDLE SCHOOL PROGRAM GROSS SQUARE FOOTAGE						**123,420**	

SEE SEPARATE KELLOGG MS SITE PROGRAM SPREADSHEET FOR SITE REQUIREMENTS

Notes:

A "Specialist" classroom functions such as Title I, Reading, and Math to be accommodated in "Extended Learning" areas
B Self-contained classrooms that deliver science curriculum for grades 6-8 need to be large enough to provide the additional sinks,
C Room should be divisible into two smaller classrooms
D One Commons/Extended Learning Area @ 1,500 SF required per classroom type (grades 6,7,8). Two per classroom type @ 1,000
E Music room should incorporate instrument storage if not built separately
F Dance Room with stage to be elevated 18-30 inches above adjacent gymnasium; separate with acoustic/operable wall that opens to gymnasium; stage to provide space for dance
G Science Technology Engineering Arts and Math (STEAM) lab equipped to accommodate science curriculum as well as fabrication
H Dance is part of the core program.
J Records Office reprogrammed out of Educational Specifications provided Records Storage space per OTL direction
K *Number of Learning Centers dependent on SPED population within school; (1) 800 SF Learning Center required; additional Learning Centers may be smaller, min. of 600 SF*
L *Intensive Skills room dependent on the needs of the student population*
M *Includes Clothes Closet storage area*
N *Can be located outside building if site conditions allow; inside building preferred*

P *Scope Add per Kellogg Steering Committee direction*
Q *Scope Add per PPS OTL direction*
R *Scope Add per PPS Special Education direction*
S *Scope Add per Electrical Engineer/Kitchen consultant direction*
T *Scope Add per current building code requirements*
U *The Net to Gross ratio has been increased to 48.76% from the 29% provided in the PPS Middle School Educational Specifications to align with previous PPS projects*
V *Square footages currently in the REVIT model contain overages in multiple rooms to provide spatial alignment*
W *Programming for lockers includes 2'-0" clear space in front of lockers.*
X *Media Center increased to conform to the building's footprint*
1 *80 sf added to ESL to provide future flexibility per OTL direction*
2 *(2) Science Prep and (2) Science Storage spaces added - One provided for each floor per OTL direction*
3 *3,200 sf Media Center preferred per Educational Specifications*
4 *200 sf added for chair storage to accommodate a capacity of 800 for a performance in the gymnasium per OTL direction*
5 *200 sf added for theater storage to accommodate the stage performances in the gymnasium per OTL direction*
6 *200 sf Conference Room preferred per Educational Specifications*
7 *64 sf single user preferred and gender neutral restrooms required per Educational Specifications*
8 *180 sf added to Learning Center to provide future flexibility per OTL direction*
9 *(3) additional Sensory Support Room/Offices added - One provided for each floor per OTL direction*
10 *120 sf Clothes Closet provided in Educational Specifications added to Parent / Community Room per OTL direction - Secure storage provided for Clothes Closet storage*
11 *4,500 sf Cafeteria and two lunch periods preferred per Educational Specifications*
12 *1,580 SF added to meet Educational Specifications preferred two lunch periods for an 810 student enrollment*
13 *315 sf added to meet Educational Specifications preferred two lunch periods for an 810 student enrollment*
14 *100 sf for staff lockers preferred per Educational Specifications*
15 *64 sf single user, gender neutral Kitchen Restroom preferred*
16 *(1) 150 sf Partner Program Office reprogrammed out the Educational Specifications preferred After School Instructional Space (500 sf) per OTL direction*
17 *(4) Additional 88 sf Partner Program Storage / Offices reprogrammed out of Educational Specifications preferred After School Instructional Space (500 sf) per OTL direction*
18 *100 sf Laundry Room reprogrammed out of Educational Specifications preferred Pantry space addition (100 sf) per OTL direction*
19 *180 sf MDF Room preferred per Educational Specifications*
20 *(3) 100 sf IDF Rooms preferred per Educational Specifications*
21 *200 sf Electrical Room preferred per Educational Specifications*
22 *800 sf Central Mechanical Room preferred per Educational Specifications*
23 *Textbook storage room has capacity for approximately 5,000 textbooks which is half of the anticipated storage space needed based on PPS provided requirements (Mt. Tabor - 9,154 textbooks at 10 books per linear foot - This space was re-programmed from Conference/Group Study provided in Ed Spec*

The following preferred spaces and area increases to required spaces (Add) in the 2015 Educational Specifications were removed during the Pre-Design/Programming phase per OTL direction: Practice Rooms, Student Project Storage, Media Office, Boy's and Girls Locker Room (Add), PE Office (Add), Flex Office, Principal's Office (Add), Asst. Princ. Office (Add), Itinerant Offices (Add), Parent/Family Office (Add), Stage, Stage Storage, Kitchen Office (Add), After School Instruction, Concessions, Restrooms (Add), Custodial Rooms (Add), Custodial Office (Add), Materials Storage (Add), Custodial Storage (Add), Building Storage (Add)

The following spaces were removed from the Kellogg Program during the SD phase: Computer Lab

FLOOR PLAN CONCEPT

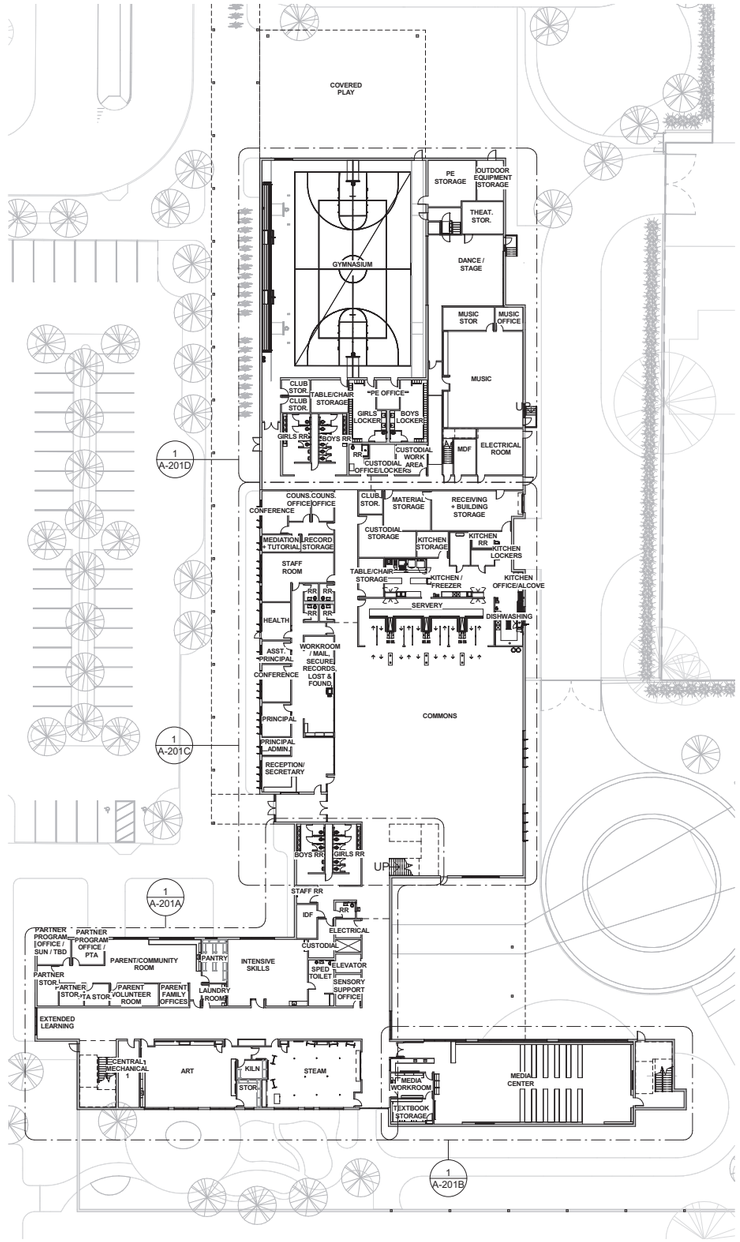
The floor plan repeats itself in the 4 story Learning Suites wing. The 4-story Powell wing provides a buffer to the remaining site. The double height ground level spreads out to the north, inviting students and the community to the school and its grounds. The repetitive 2nd, 3rd, and 4th floors are separated into two learning suites per floor to potentially accommodate each grade level and the fluctuating student population. The ground level includes the shared spaces of the gymnasium, the commons, the media center, the exploratory learning classrooms (Music, Art, Dance, STEAM), and the performance and community spaces that welcome engagement with the community.

The Kellogg Middle School floor plan layout focuses on the following concepts:

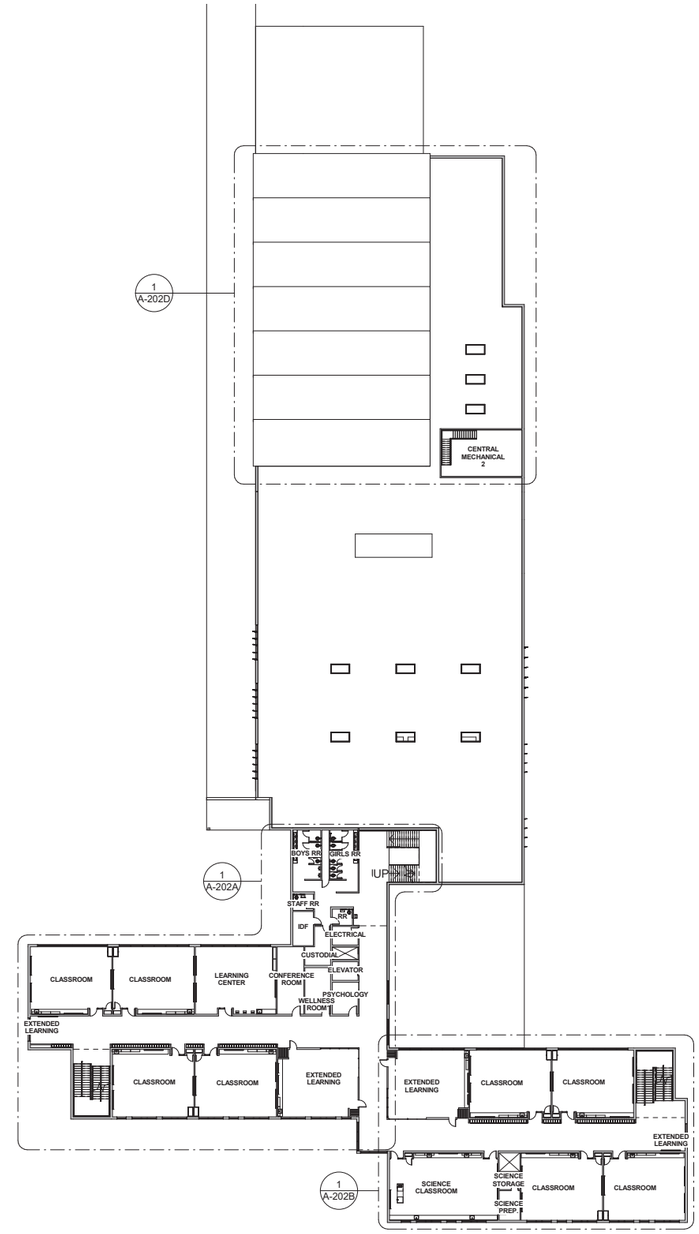
- Program Adjacencies
- Student Circulation
- Security/access control

PROGRAM ADJACENCIES

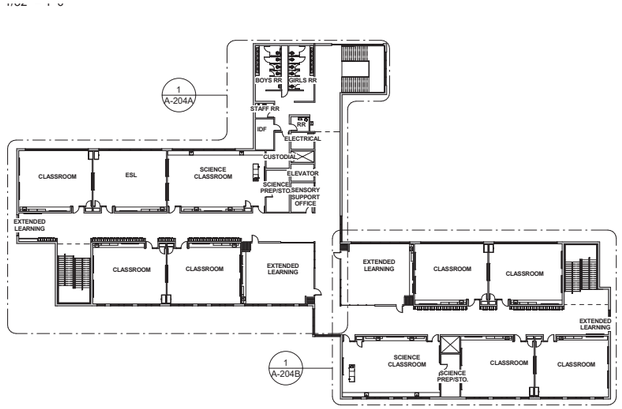
Program adjacencies are arranged keeping in mind student collaboration, sound, student monitoring, and faculty/staff accessibility. The new middle school is divided into 3 main zones: learning suites, shared commons, and gymnasium/ performing arts. These zones are subdivided into smaller program sections, which are described in the remainder of this chapter.



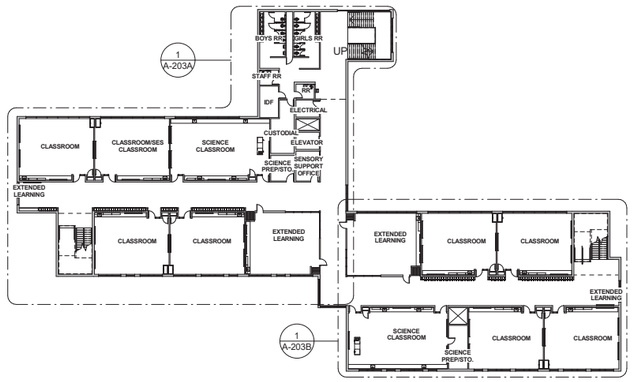
FIRST FLOOR



SECOND FLOOR



THIRD FLOOR



FOURTH FLOOR

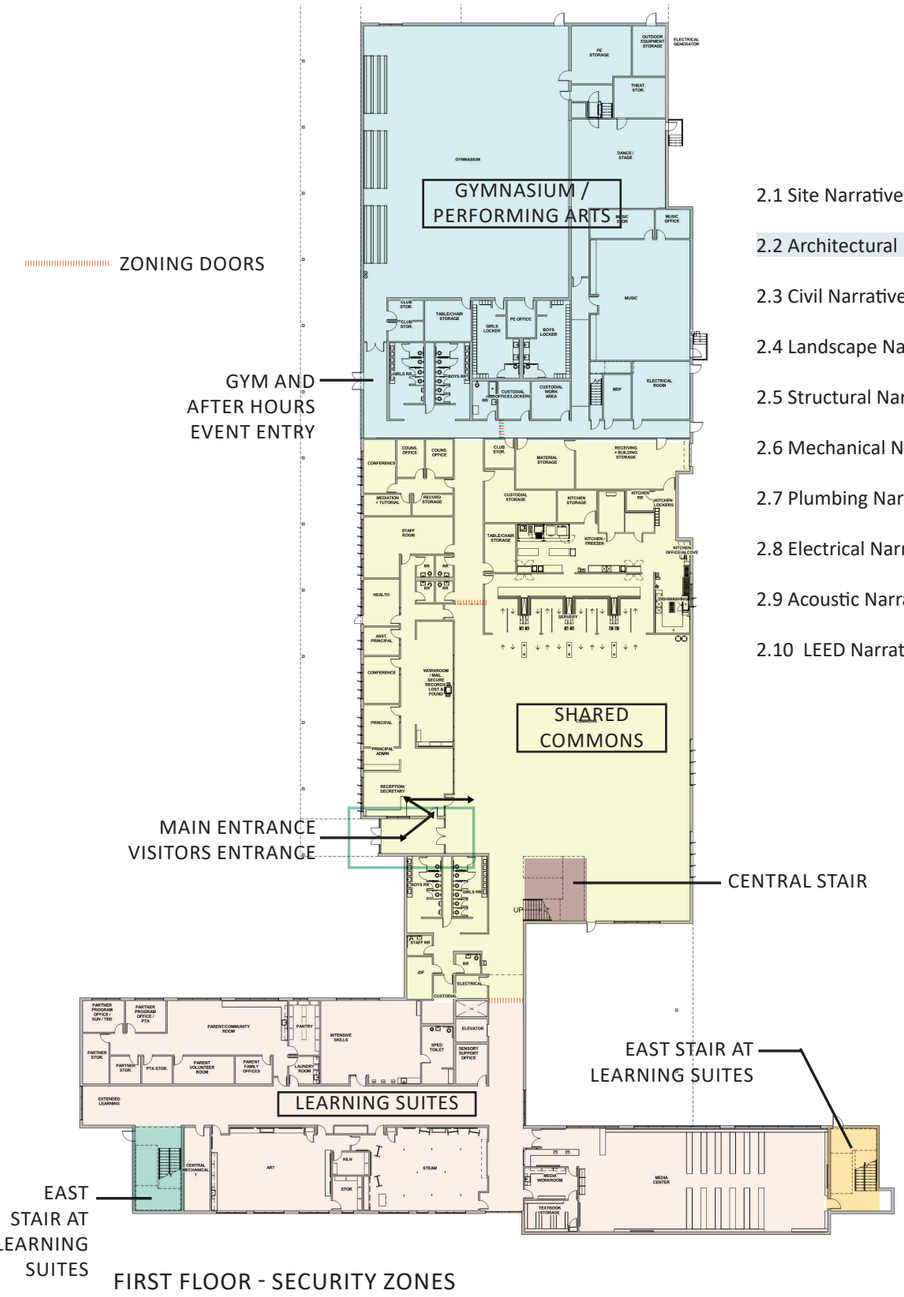
SECURITY/ACCESS CONTROL

Access to the school is fully controlled by providing one single entry point adjacent to the main office. The main entry is located adjacent to the school's parking lot, bus drop-off path, and parent pick-up zone on the west side of the new middles school. This vantage point also allows the administration area to monitor these high-traffic areas. Visitors will have to check in from an entry vestibule before being allowed into the school. The gym doors will be monitored during use for arrival and release of students. All other doors will be locked at all times.

Security and access control is achieved by dividing the three main program zones using security doors. These security doors will be located at the interception of the learning suites and shared commons corridors as well as at the interception of the shared commons and gymnasium corridors. These doors can remain open during a regular school day, or, they can be closed and locked depending on the use of the after-school activities in the middle school. At locations which are not highly visible, security cameras are a highly effective tool in monitoring activity of students, faculty, and visitors.

Security strategies include:

- Administration will monitor all students, faculty, and visitors through secure vestibule and check-in at reception desk
- All visitors will have to circulate through the administration before gaining entrance to the school
- Utilizing card readers at secure doors to restrict access
- Control visibility at glazing with operable shades or blinds
- Zoning the building with security doors/gates to restrict access to portions of the building
- Fencing and anti-climb systems at outdoor areas and courtyards
- Installing cameras to monitor school and grounds



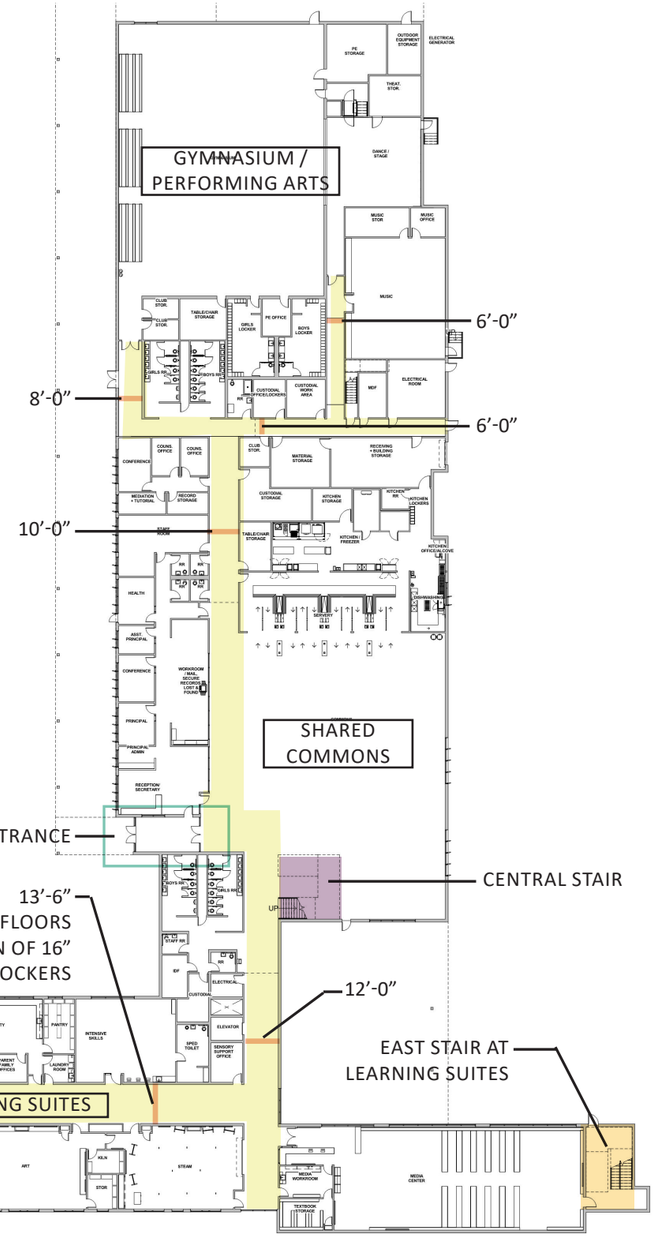
FIRST FLOOR - SECURITY ZONES

STUDENT CIRCULATION

Student circulation uses a main north-south corridor on the ground floor. The main corridor connects and branches off into an east-west corridor on the north and south end of the floor plan. The north horizontal corridor connects the rooms within the gymnasium zone. The south horizontal corridor connects the rooms within the learning tower zone. A central stairway serves as a vertical anchoring connection from the shared commons area to the 4 floor levels in the learning tower. An east set and west set of stairways in the learning suites are used as vertical connections between floors, as well as emergency evacuation routes.

MAIN CIRCULATION CORRIDOR

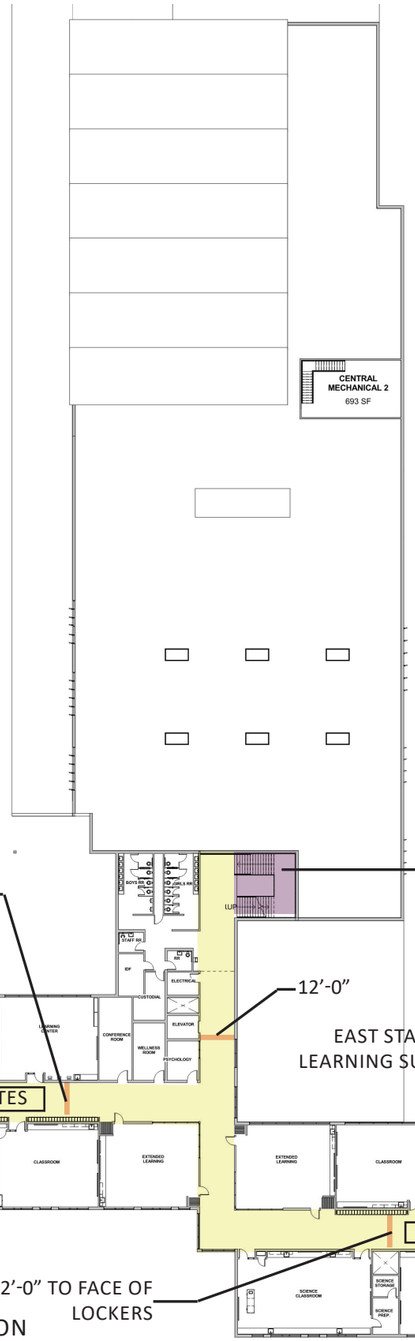
XX'-XX" CORRIDOR WIDTH



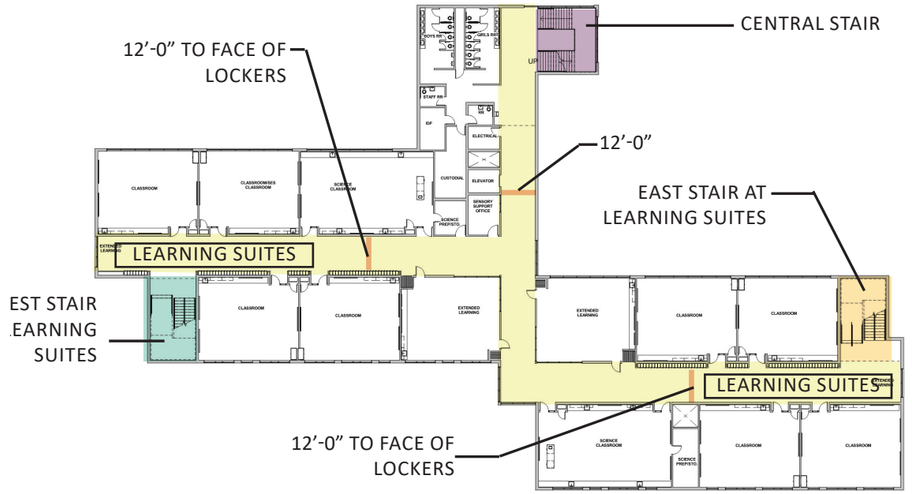
FIRST FLOOR - CIRCULATION

MAIN CIRCULATION CORRIDOR

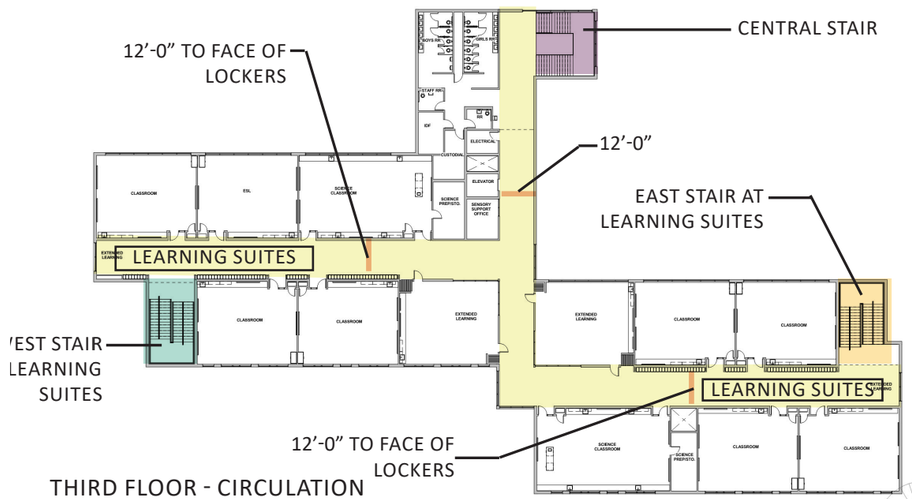
XX'-XX" CORRIDOR WIDTH



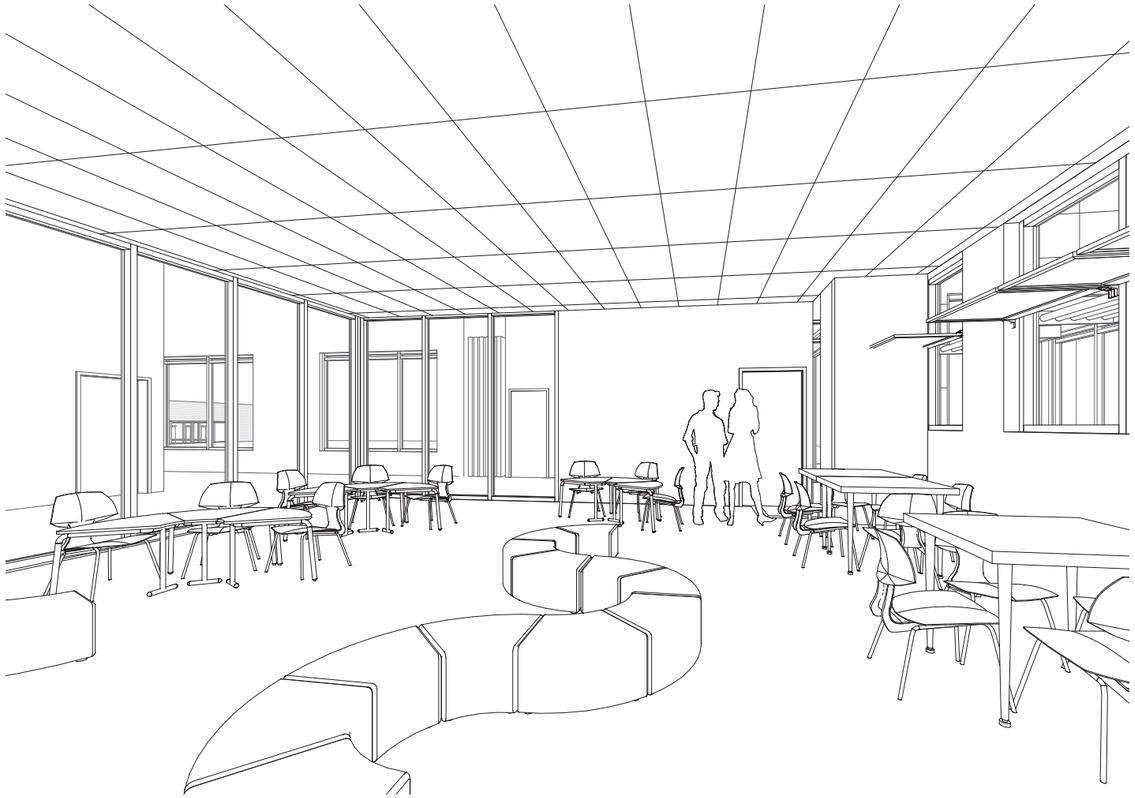
SECOND FLOOR - CIRCULATION

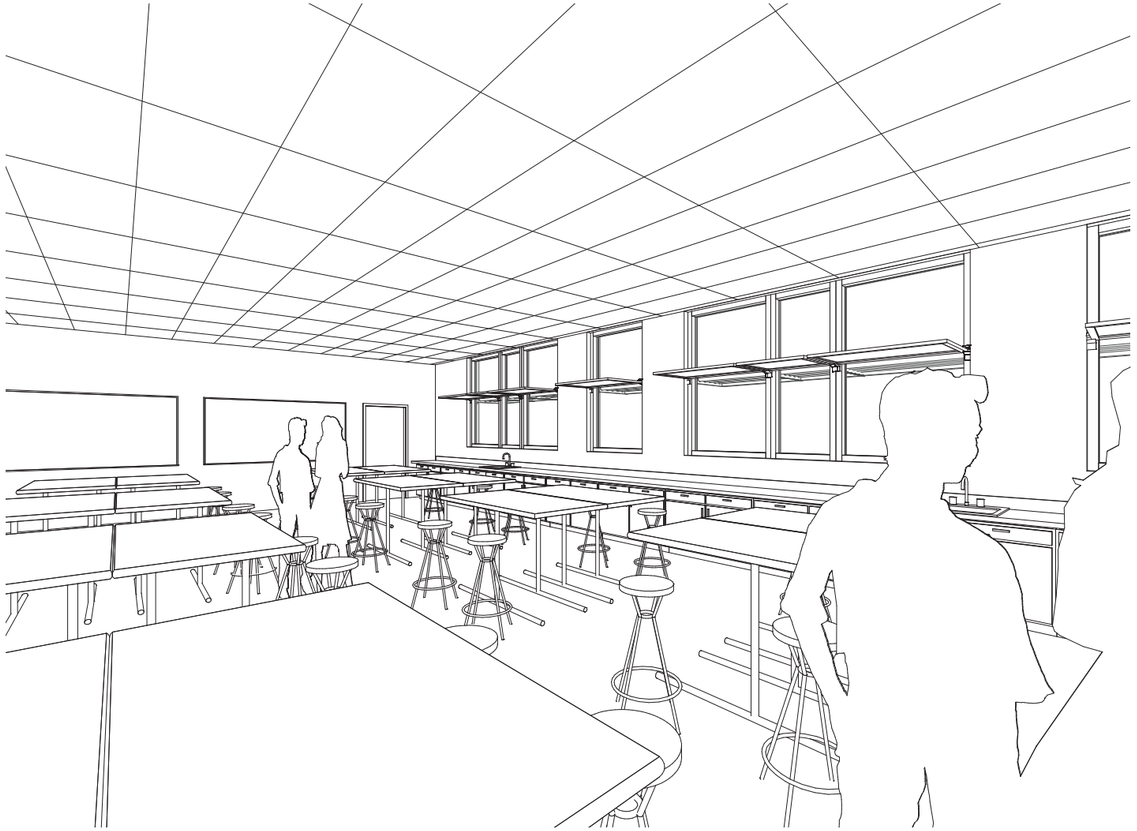


FOURTH FLOOR - CIRCULATION



THIRD FLOOR - CIRCULATION

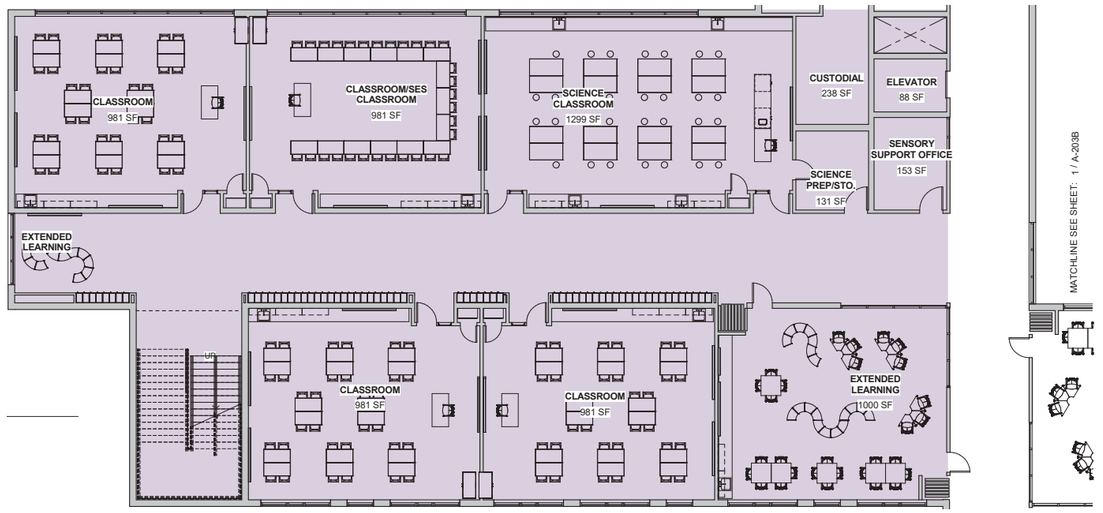




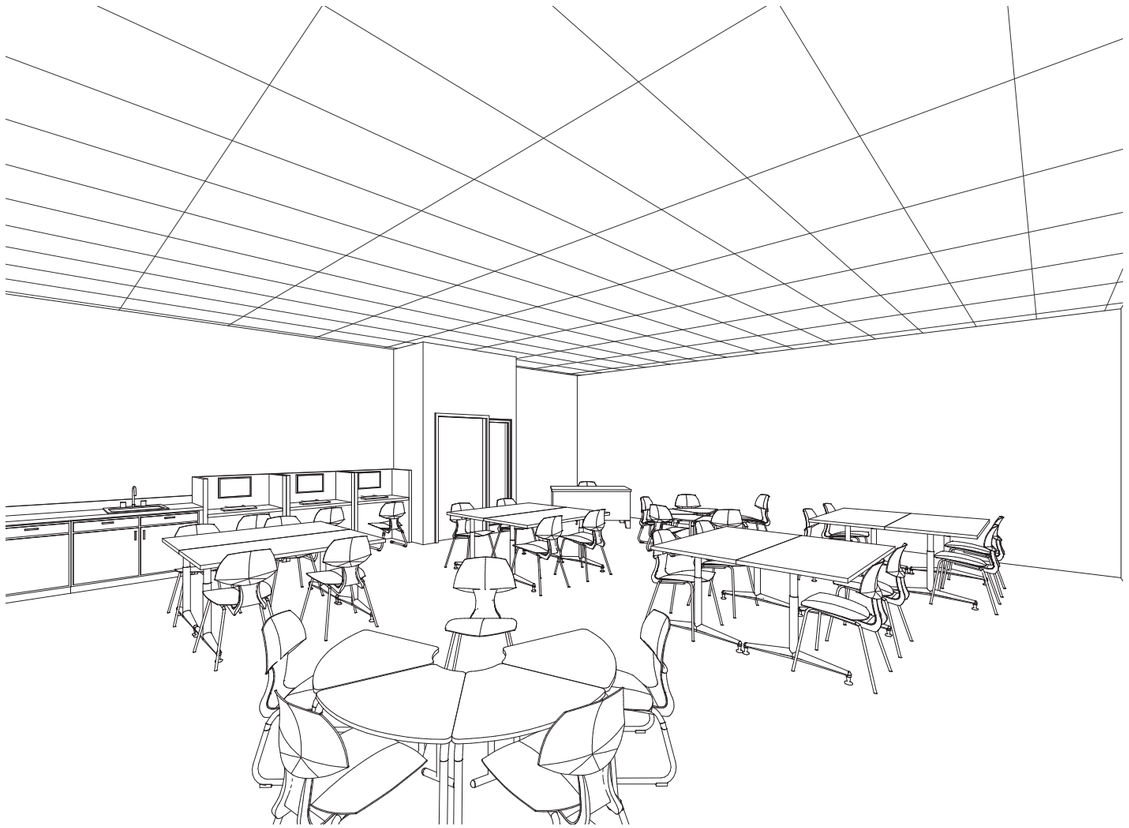
LEARNING SUITES

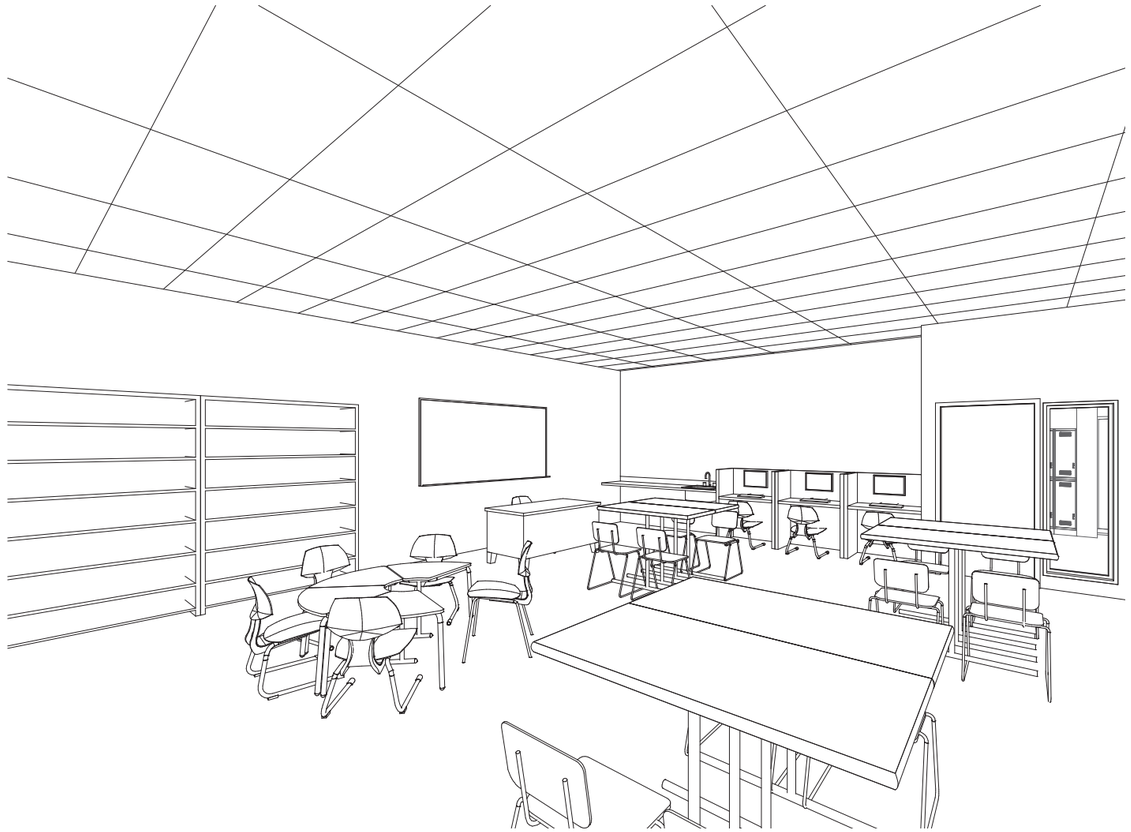
As part of a collaborative learning environment, the classrooms are grouped into two Learning Suites per floor level (Floors 2 to 4). The typical Learning Suite is composed of four classrooms, one science classroom, and one extended learning flexible space. A Special Education room (Learning Center) is located on the second floor where a science classroom is located on the third and fourth floors to integrate special education into the general school population. These all maintain a programmatic adjacency to enhance collaboration between spaces. The extended learning space in each suite serves as a connection and flexible shared space for both learning suites. These spaces can be checked-out daily by teachers to accommodate flexible teaching methods. Learning Suite goals that were implemented during Schematic Design include:

- Accommodate 30 students per classroom
  - 1 sink with counter per classroom
- Accommodate 32 students per science classroom
  - 4 sinks with counter per science classroom
  - Access to preparation and science storage room
- Accommodate large and small group of students in the extended learning spaces
  - Operable partition walls to open up space to corridor and adjacent extended learning spaces
- Furniture for flexible seating and teaching arrangements
- Teacher storage in each classroom
- Natural lighting to create a dynamic learning environment
- Consistent lighting throughout the suites
- Visibility to corridor provides passive student supervision
- Display wall, Marker boards
- Wide corridors allow fast and easy circulation between classrooms
- Stairwell at end of each learning suite connects the different floor levels and provides safe discharge from school in case of an emergency.



THIRD FLOOR - WEST LEARNING SUITE

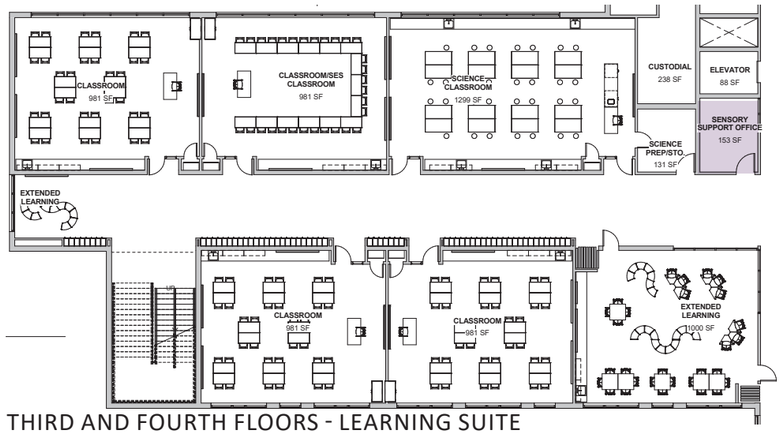




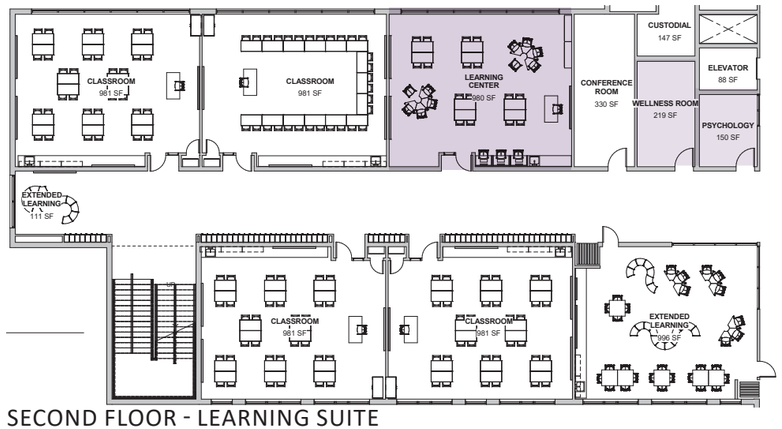
SPECIAL EDUCATION

Special Education classrooms are integrated throughout the learning suites as part of an inclusive and equitable learning environment at Kellogg Middle School. The Special Education support rooms and offices are provided to aid the integration of the program with Kellogg Middle School by providing flexible spaces on each floor. The Special Education goals that were implemented during Schematic Design include:

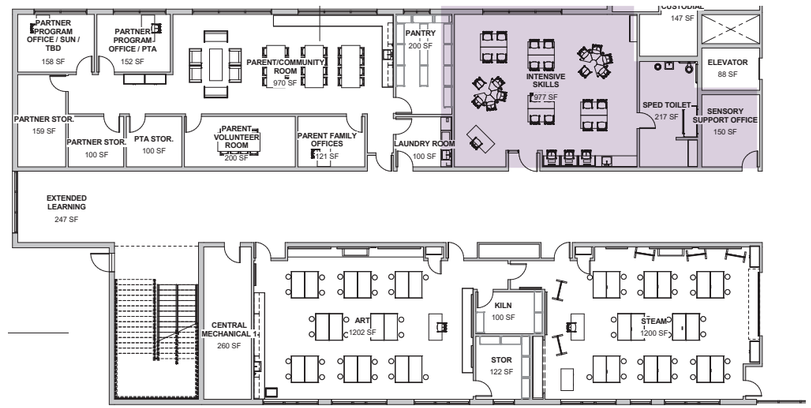
- The ground level Intensive Skills classroom is centrally located where all school functions converge
  - Support students with learning needs that impact their participation in the general curriculum
  - Assistive technology and assistive support
  - Accessible fixtures
  - Dedicated exterior access adjacent to bus drop-off and main entrance
  - Dedicated ADA accessible restroom and changing room
- The Learning Center on the second floor is centrally located within a Learning Suite to integrate students into the general school population
  - Supports students in academic and social-emotional areas
  - Same size as a general classroom to maximize flexibility
  - Multiple use room with distinct zones
- Natural lighting to create dynamic learning environments
- Furniture for flexible seating and teaching arrangements
- Teacher storage
- Visibility to corridor provides passive student supervision
- Display board and marker boards in room
- 12-15 students per classrooms



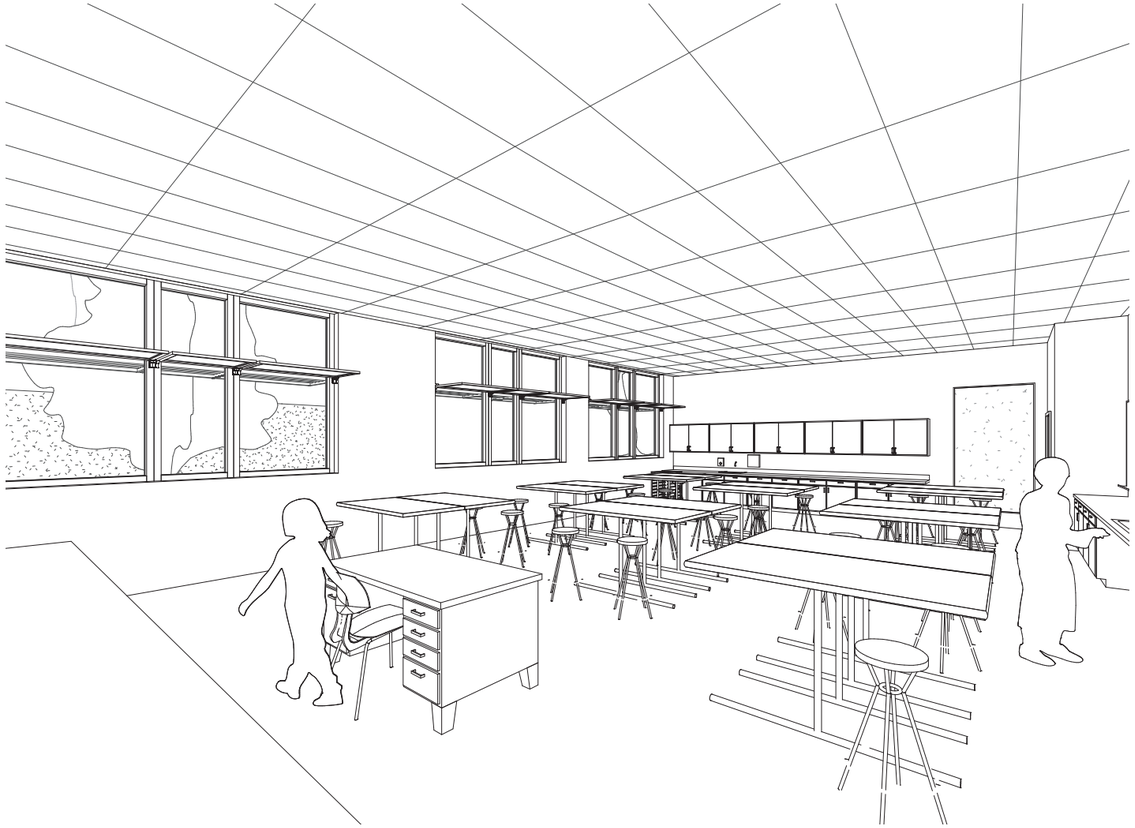
THIRD AND FOURTH FLOORS - LEARNING SUITE



SECOND FLOOR - LEARNING SUITE



FIRST FLOOR - LEARNING SUITE



EXPLORATORY LEARNING

ART

The 1200 sf art room will be located adjacent to the STEAM lab and exterior student learning garden on the ground level. The room will allow for indoor and outdoor teaching, varying art media and will be used by multiple grade levels. Art goals implemented during Schematic Design include:

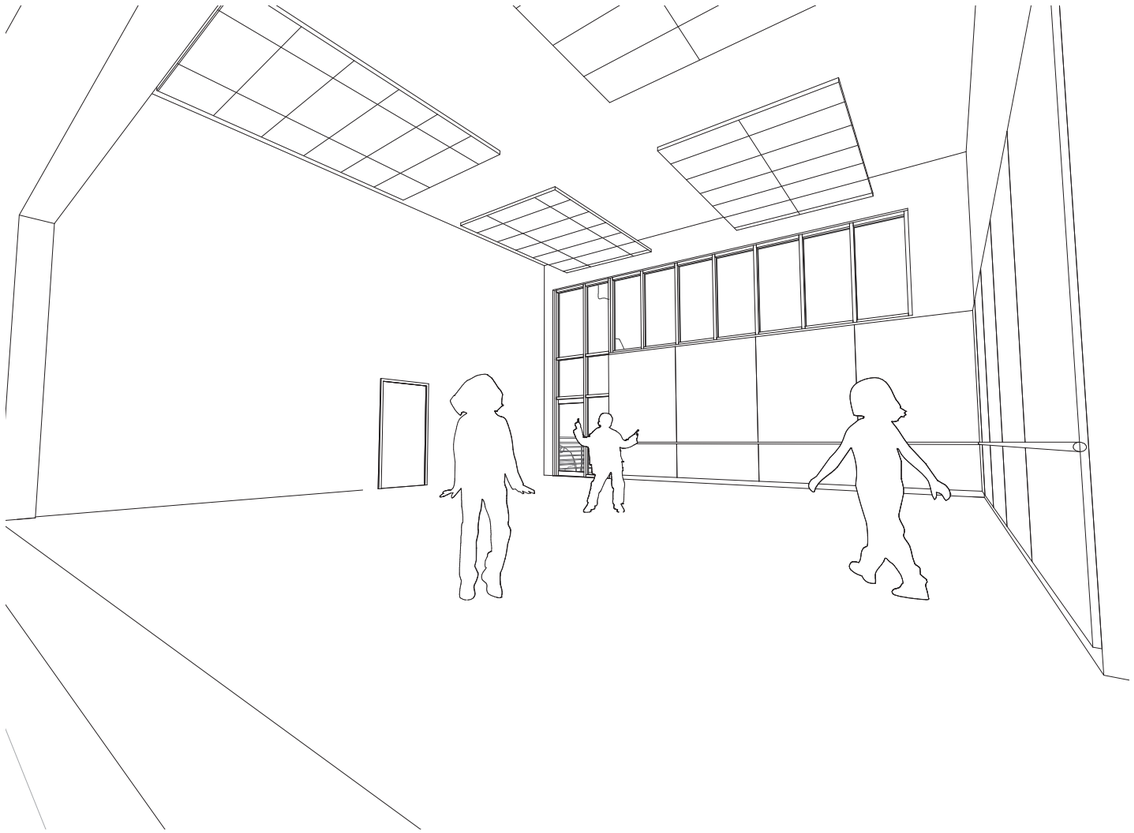
- Adjustable stool seating and tables for different types configurations and instruction layout
- Must support a variety of art activities
  - Accommodate messy, hands-on, project based activities
- Provide display area for student work and student review
- Provide adequate storage for art materials and projects
- Provide an adjacent kiln room
- Provide natural lighting
- Provide proper ventilation for painting
- Visible connection to student learning garden for student monitoring
- Variety of built in casework with one basic sink and one trough sink for cleaning art supplies

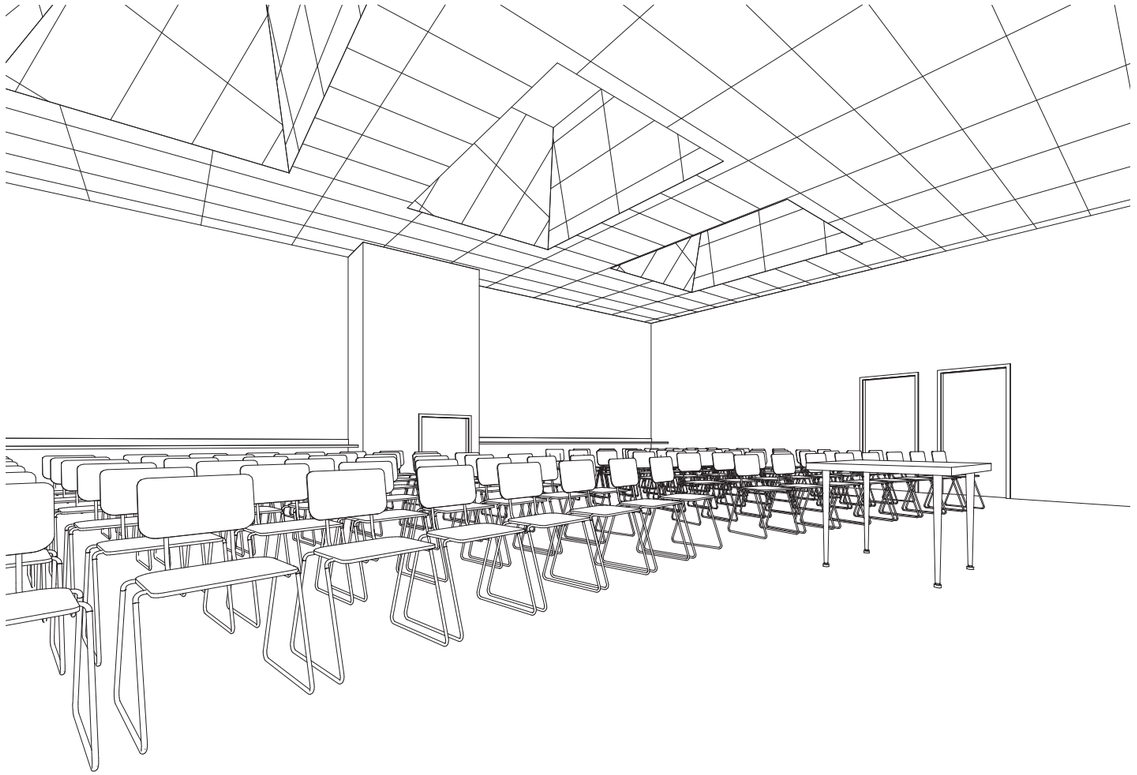
STEAM

The 1,200 SF STEAM (Science, Technology, Engineering, Arts, and Mathematics) lab is located adjacent to the art room and the exterior student learning garden on the ground level. The lab will also have adjacency to the school's media center and community/partner space. The STEAM lab goals that were implemented during Schematic Design include:

- Supports fabrication and maker space activities
- Shared ground access for students and community partners
- Adjustable stool seating and tables for different types configurations and instruction layout
- Provide display area for student work and student review
- Provide adequate storage for materials and projects
- Provide natural lighting
- Provide proper ventilation
- Ability to accommodate 25-35 students
- Sinks and eyewash station
- Visible connection to student learning garden for passive student monitoring

FIRST FLOOR - LEARNING SUITE






CMLS

EXPLORATORY LEARNING: MUSIC ROOM AND DANCE ROOM

DANCE

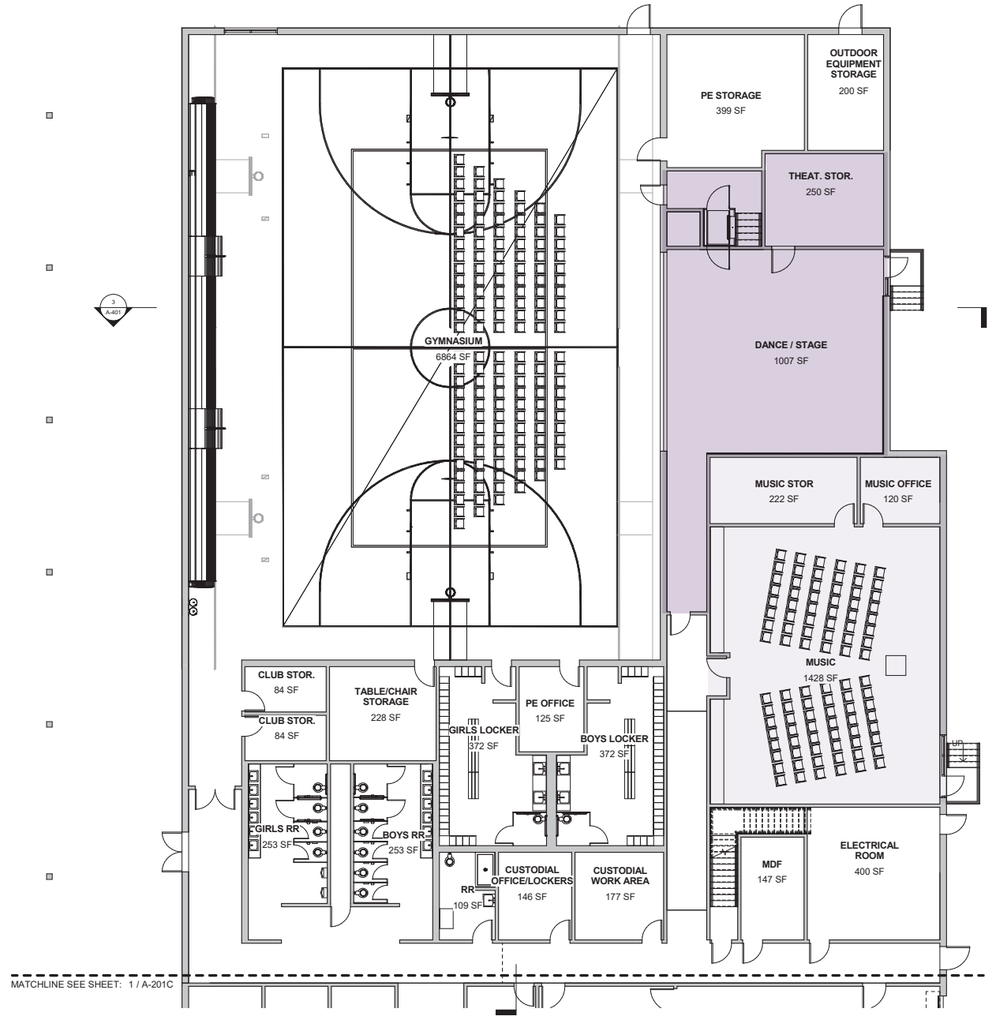
The 980 SF dance classroom is designed to teach a variety of types of dance classes. The performing arts spaces are at the same level as the stage (30”). The dance space serves the dual use as the stage when the acoustical partition is opened to the gymnasium. It can be directly accessed from the music room. Dance Room program goals implemented during Schematic Design include

- Dual purpose as stage and dance class
- Sprung dance floor
- Dance barre and mirrors for instruction
- Storage within the classroom
- A variety of acoustic treatments as recommended by the acoustic consultant
- An operable folding partition separates the stage from the gymnasium and provides additional acoustic treatment
- Direct access to the music room
- Stage curtains
- Stage lighting
- Large projection screen

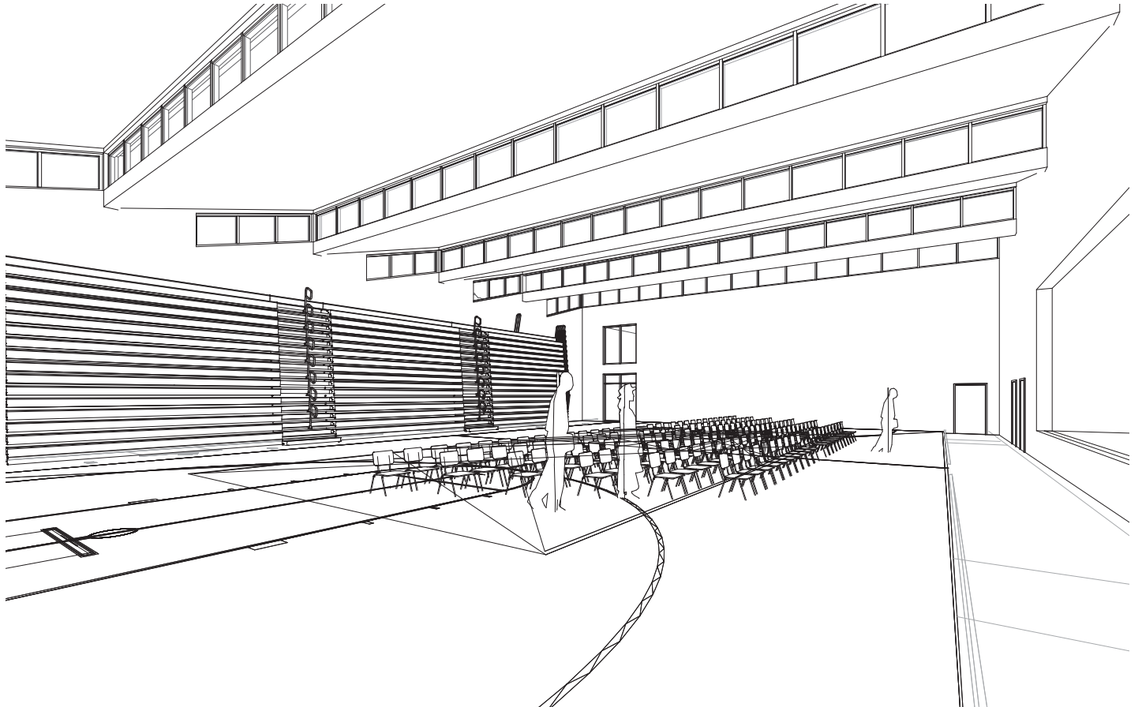
MUSIC

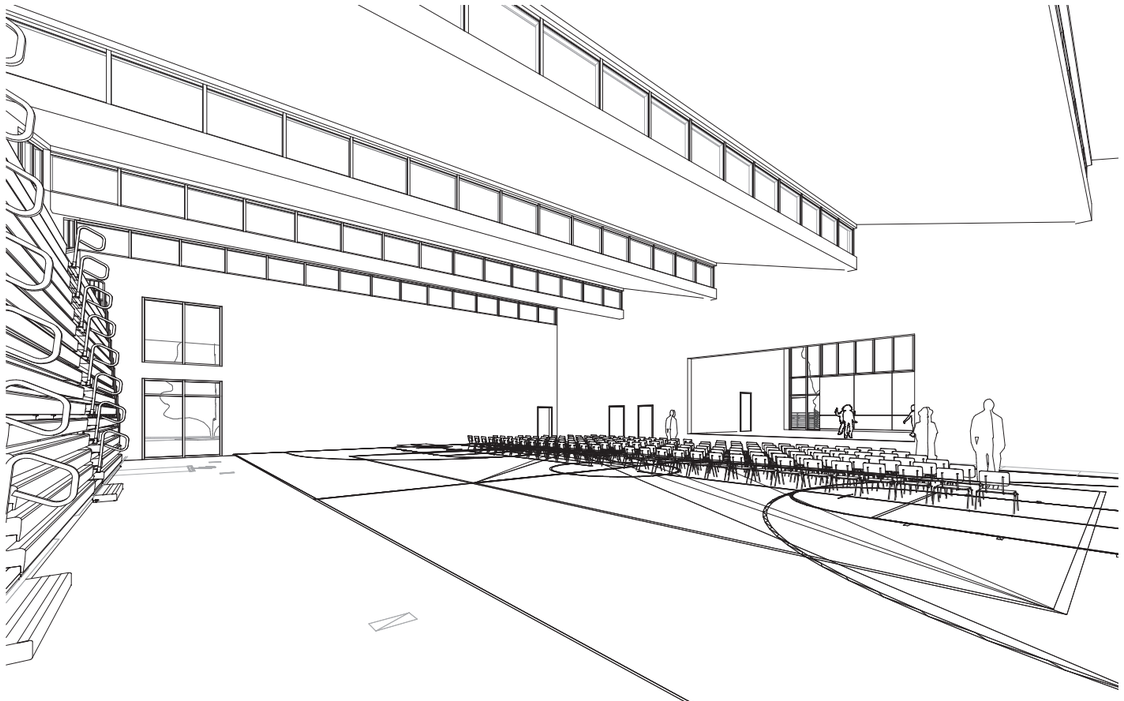
The 1,400 SF music room is designed to teach middle school level music theory, band, orchestra, and chorus. The music office and instrument storage area are directly connected. Music Room program goals implemented during Schematic Design include:

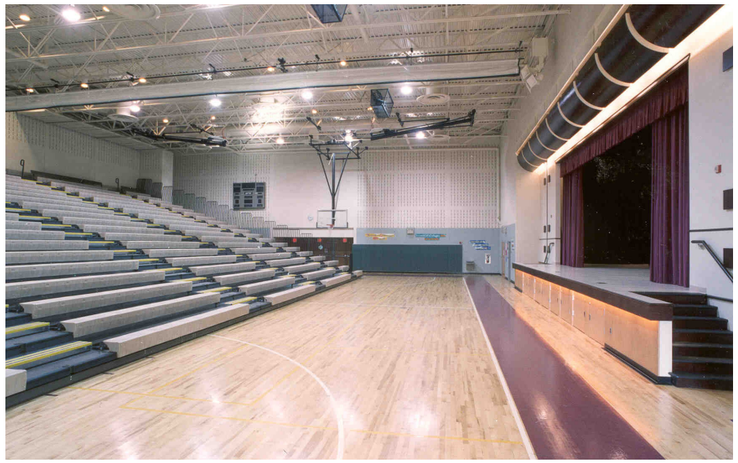
- Same level as Stage, both accessed by ramp or through the stage by stairs or ADA lift.
- Direct access to music storage for curricular materials and instruments, a music office, and the stage
- Flexible seating and furniture for different types of seating arrangements and instruction layout
- casework storage w/ sink
- A variety of acoustic treatments as recommended by acoustic consultant
- marker boards and projector
- tackable surfaces



FIRST FLOOR - DANCE & MUSIC







GYMNASIUM

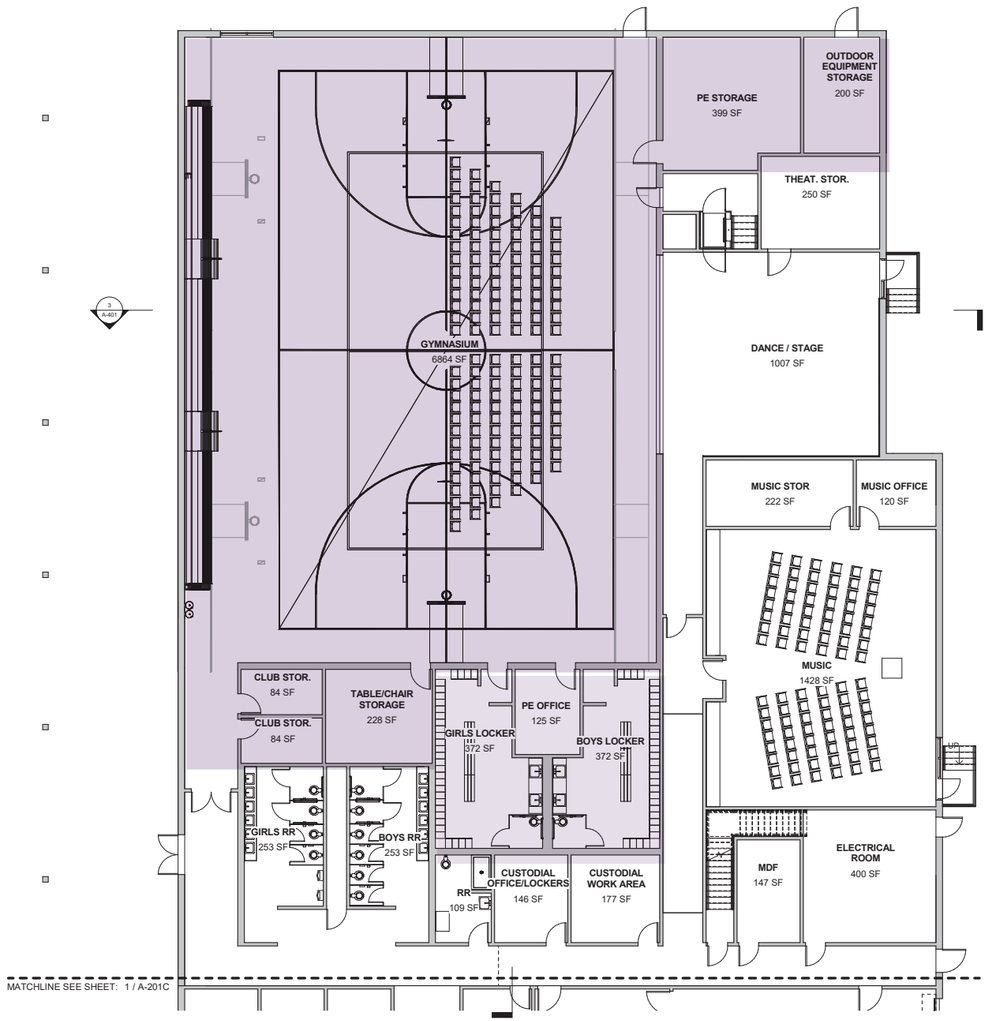
The 6,800 SF gymnasium is designed to accommodate a full student capacity assembly and serve as a performance space for the school's music and dance programs and community functions. The space allows for 2 physical education (PE) classes to use the space simultaneously, (with a divider curtain,) and delivers daylighting throughout. Each PE space will provide teaching amenities such as whiteboards and electrical outlets for projectors on mobile carts. Gymnasium program goals implemented during Schematic Design include:

- 23' (min.) height space to accommodate all PE curriculum
- 6 practice basketball hoops, including 2 in a middle school regulation game layout
- Wood floor striping for basketball (practice and games), volleyball
- In-floor sleeve system for net sports
- Telescoping bleachers located along the west wall. Partial opening for athletic event seating (approx. capacity of 200) and fully extend to mid-court for viewing stage performances (approx. capacity of 600)
- Stage platform is centered on the half court and divided by a sound absorptive operable partition (See Acoustical Narrative)
- Performance lighting and sound equipment in ceiling and walls and will be caged as required for protection from PE activities.
- Storage and building support accessed near or through the gym
- Dedicated lockers and restrooms are adjacent to the gym
- Adjacent to covered play area, nature play, and outdoor fields
- Typical activities: badminton, volleyball, pickle ball, floor hockey, basketball, futsal.

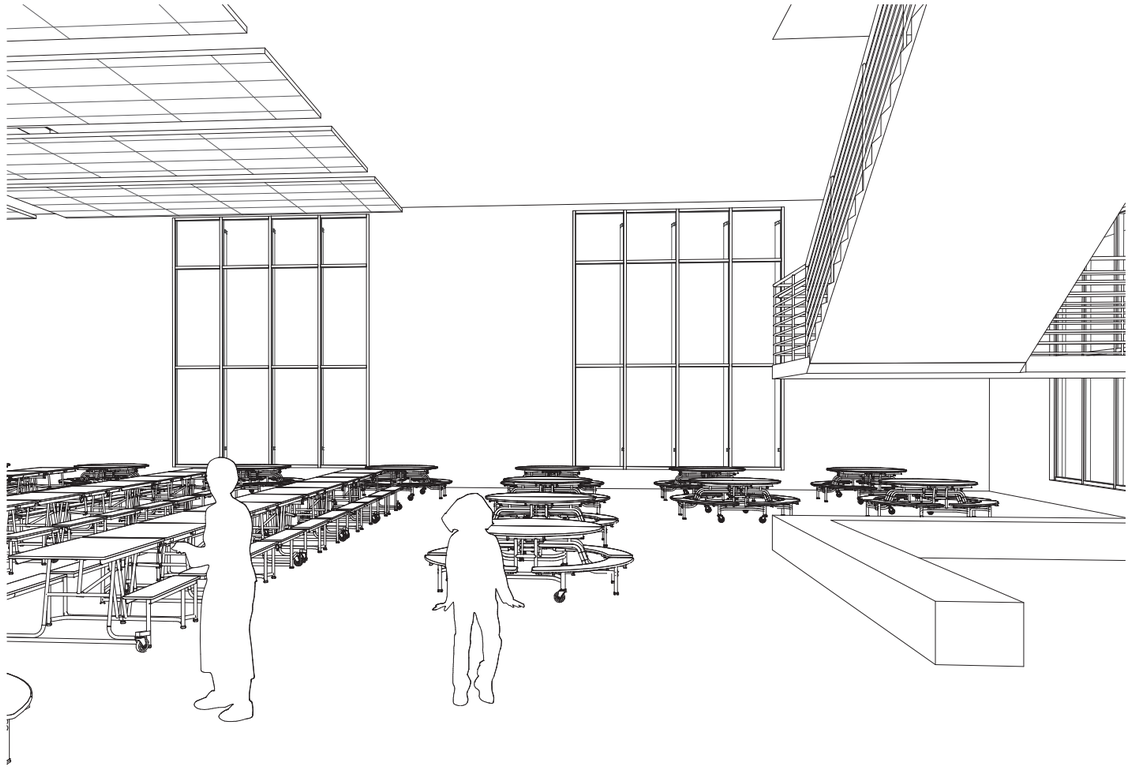
GYM LOCKER ROOMS

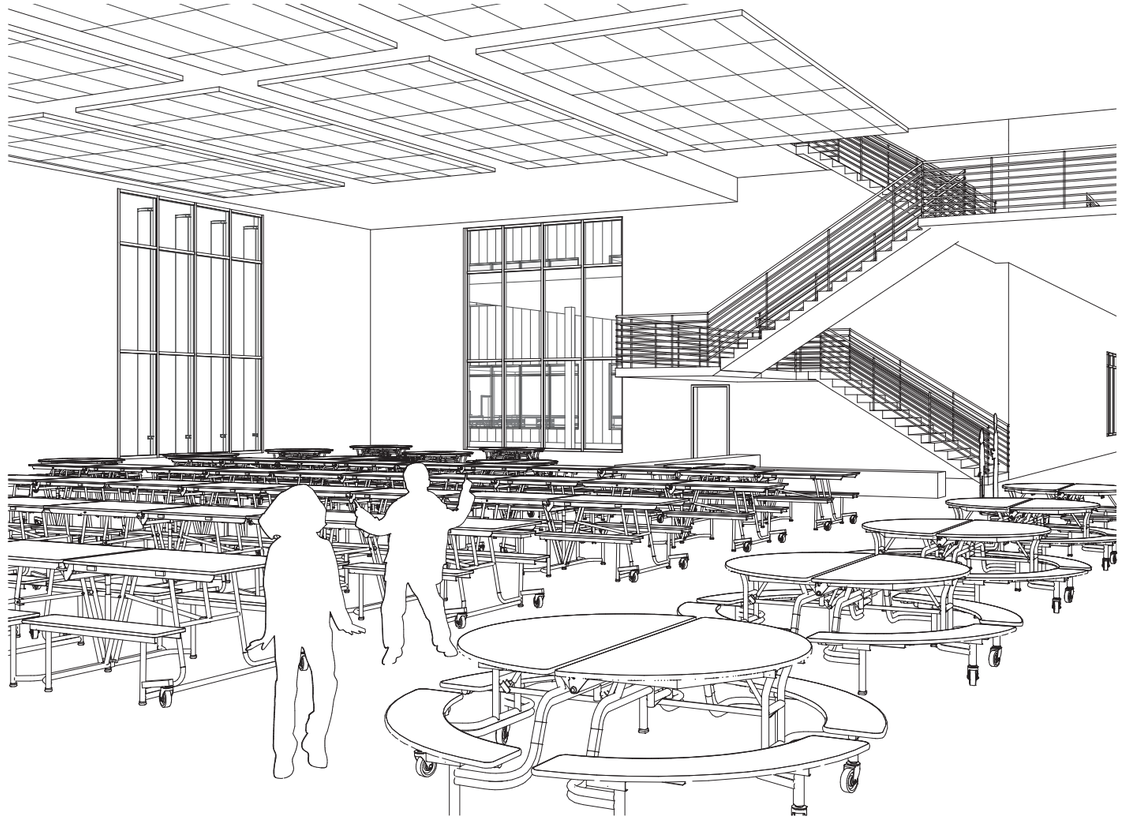
The locker rooms are directly accessed through the gymnasium. Boy's and girl's locker rooms are divided by the PE office for safety and supervision. Each locker room includes one ADA stall and 50 individual, half-height, day-use lockers to hold personal belongings.

- 50 half-height, day-use lockers, each locker room
- ADA toilet stall
- Centralized bench for changing
- Lavatory station
- Direct access to gymnasium
- Adjacent to PE office



FIRST FLOOR - GYMNASIUM





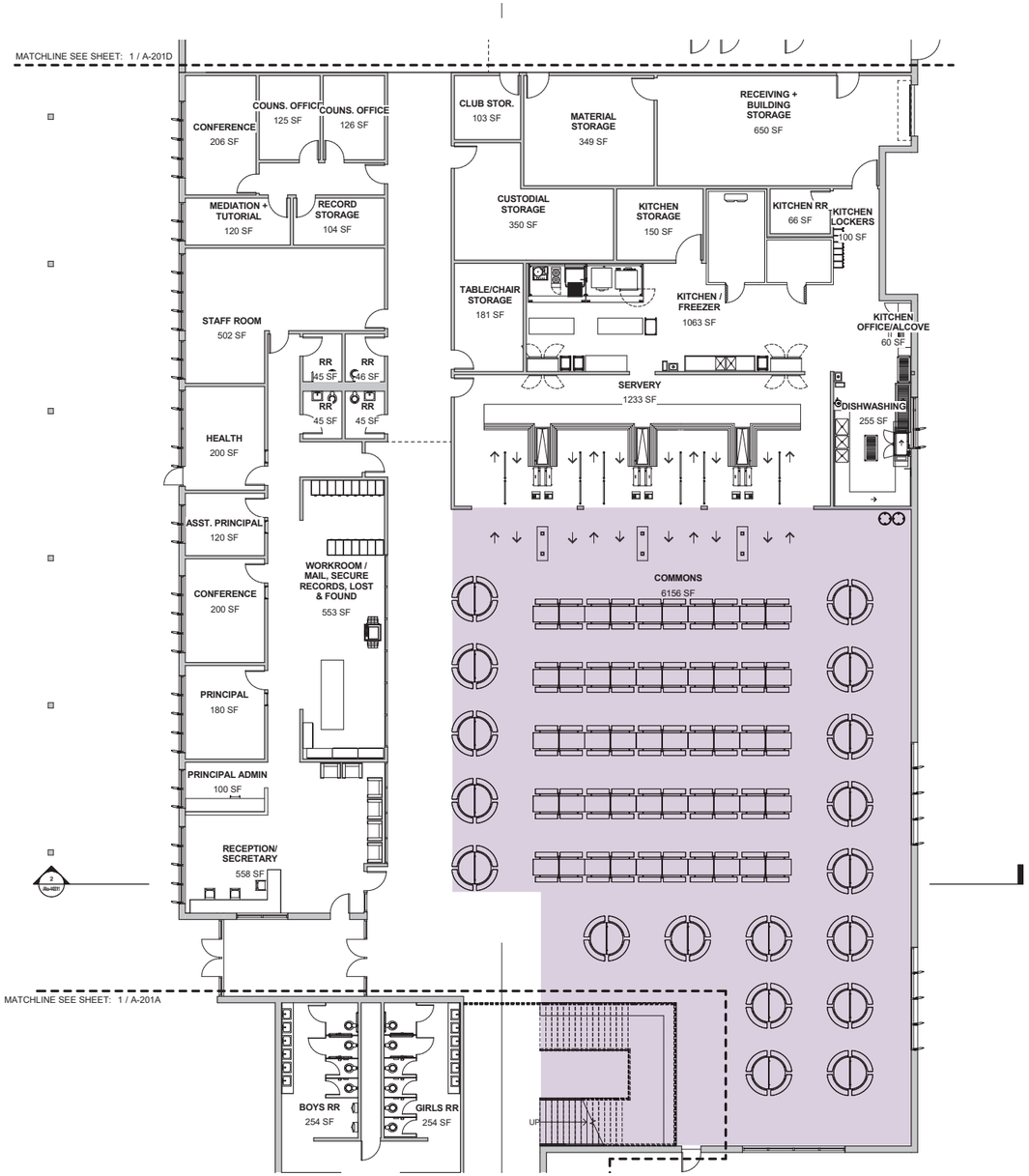

EAGLES

CAFETERIA / COMMONS, KITCHEN & SERVERY

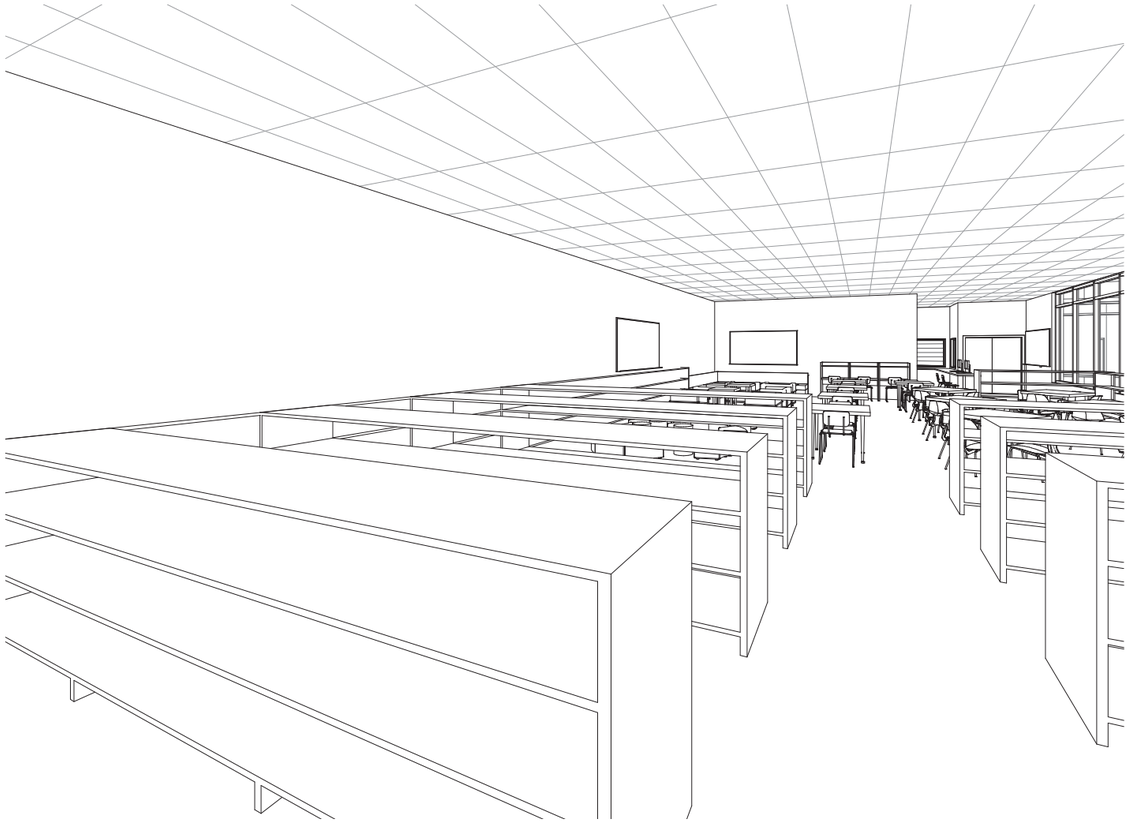
The 6,080 SF cafeteria/commons is located just inside the main entry at the center of the school. It serves as the cafeteria, student gathering space, and after hour large community activity space. Glazing maximizes daylighting in this east-facing space with direct access to the exterior student union courtyard. The central stair and main circulation route connect the commons to the gymnasium and performing area to the north, administration to the west, the learning suites to the south, and outdoor learning spaces to the east.

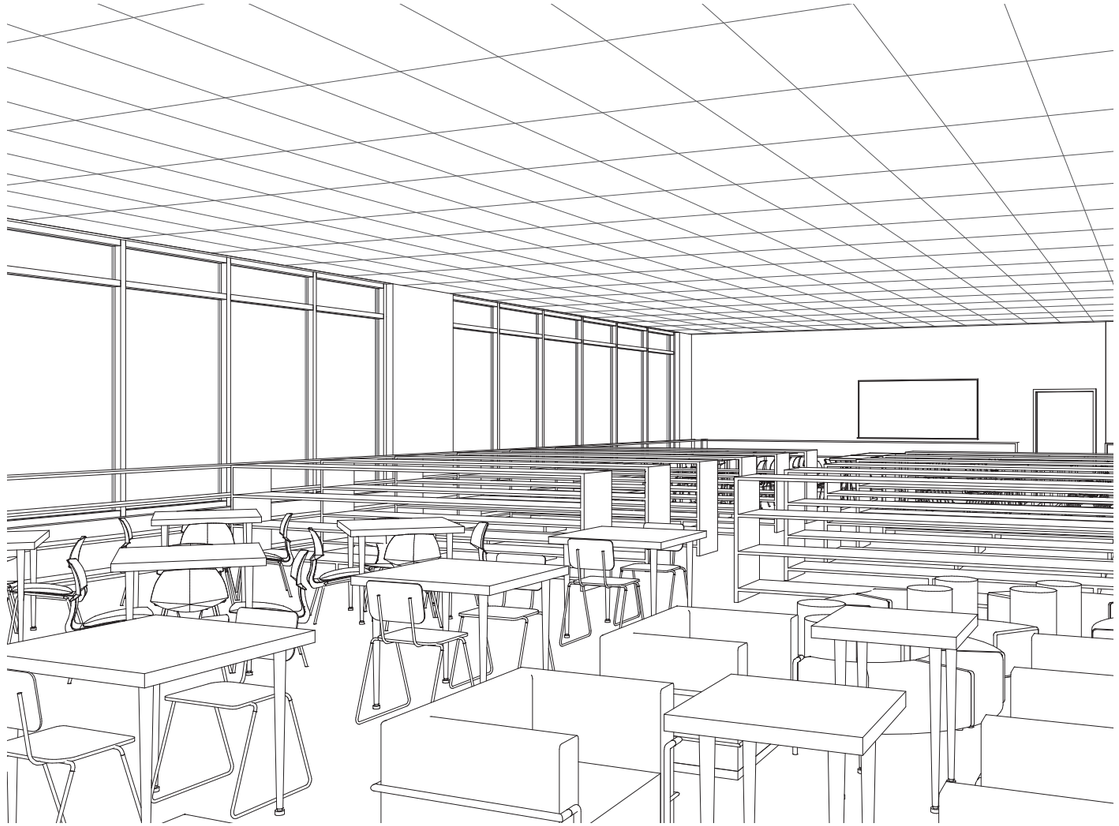
- Designed to accommodate lunch in 2 periods (405 student capacity)
- High, acoustically-treated ceilings
- The kitchen and servery accessible through roll up doors.
- Glazing to the courtyard
- Open to the corridor
- Adjacent to administration offices with direct view for safety and security
- Adjacent to restrooms
- Flexible space for small assemblies, large break-out space, meetings, or community use outside of school hours.

The main circulation stair is a central focal point of the building located at the intersection of the commons, main entry, and administration. Designed to create a stack or chimney effect aiding in interior air circulation throughout. The tower allows naturally buoyant warm air, heated by equipment, occupants, and activity, to rise and vent from the building. This action pulls cooler air, mixing and circulating air from the learning suite, administration, and the commons.



FIRST FLOOR - COMMONS





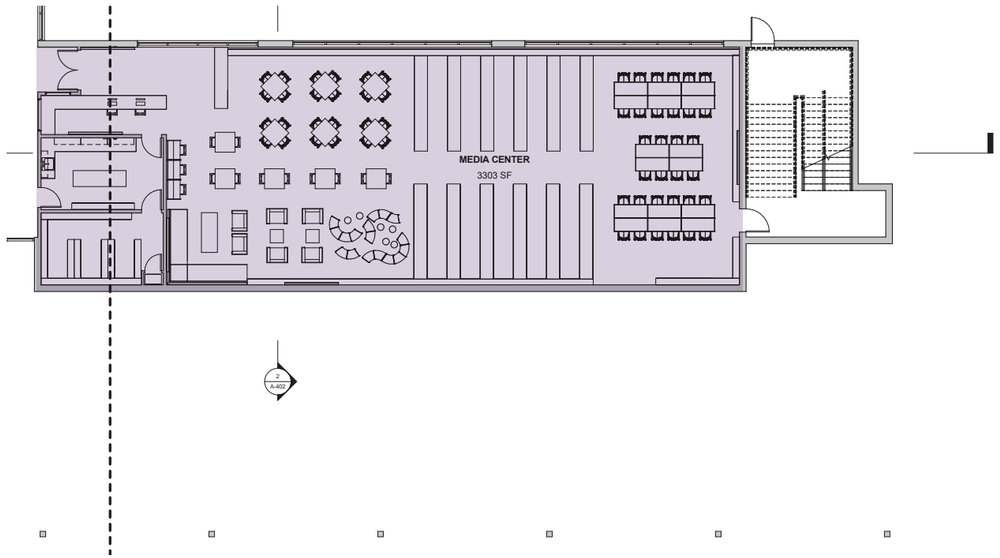
MEDIA CENTER

The media center serves as a central resource for students, teachers and staff, and the community. Access to the media center shall be easy to find and centrally located. One main focus of the media center design was the capability of the space to house a variety of modular seating and table options for both students and staff, a space dedicated to teaching that can fit an entire classroom, and provide enough book storage in the main space and textbook storage in the Textbook Storage room. The media center goals that were implemented during Schematic Design include:

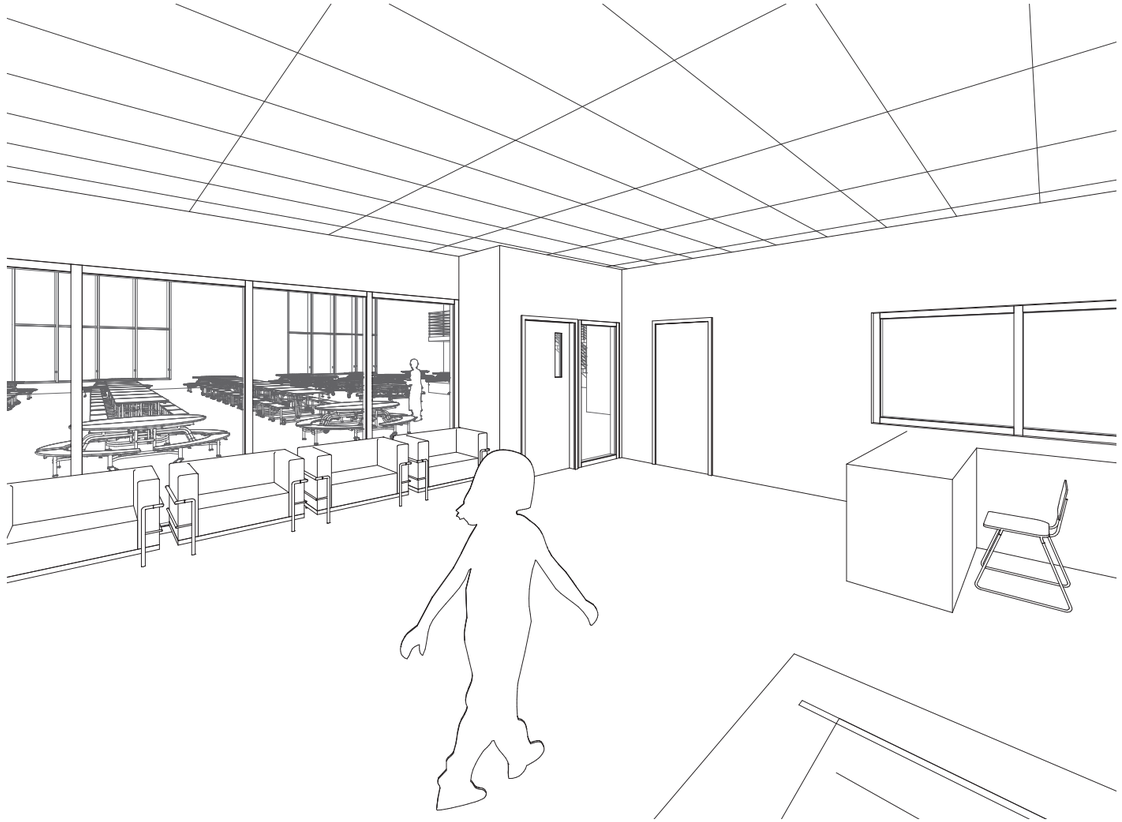
- Centrally located on the ground level: Accessible from learning suites and community/partner spaces
- Natural light and ventilation provided for comfort
- Flexible seating arrangements for small and large group collaboration
- Provide an inviting space for students for academic and social situations
- Visual connection to Student Union courtyard for security monitoring
- Circulation desk located by main entrance, Media Workroom, and Textbook Storage spaces
- Interior glazing provide views to school corridor for student monitoring.

Quantity of books and textbooks requiring media center storage is based on numbers from Mt. Tabor Middle School. Mt. Tabor's library currently holds 19,090 books and 9,154 textbooks, which is what Kellogg shelving is currently designed for. Shelving design is based on shelf capacity, or the number of volumes capable of being shelved on a linear foot. According to a density of 13 books per linear foot required for juvenile non-fiction media, Kellogg media center accommodates the 19,090 juvenile non-fiction books over 1,909 linear feet of shelving by means of half-height, 3-shelf bookshelves, plus an extra 160 LF for growth.

The textbook storage space is an addition and not listed in the Ed Spec requirements, taking over the original Study/ Conference space. Textbooks are being calculated at 10 books per linear foot for non-fiction media. The current room at 200 SF cannot hold the total of 9,154 textbooks at 10 books per linear (a total of 916 linear feet). Current capacity, utilizing full-height, 7-shelf bookshelves holds 5,320 textbooks, a little over half the amount required. The remaining 3,834 textbooks could be divided between the 30 general classrooms, science classrooms, and special education classrooms, where each holds approximately 128 textbooks. Other strategies to accommodate required textbook storage include doubling the size of the media center textbook storage space, or utilizing a high-density mobile shelving unit in the 200 SF space, which would then accommodate 8,610 textbooks.



FIRST FLOOR - MEDIA CENTER



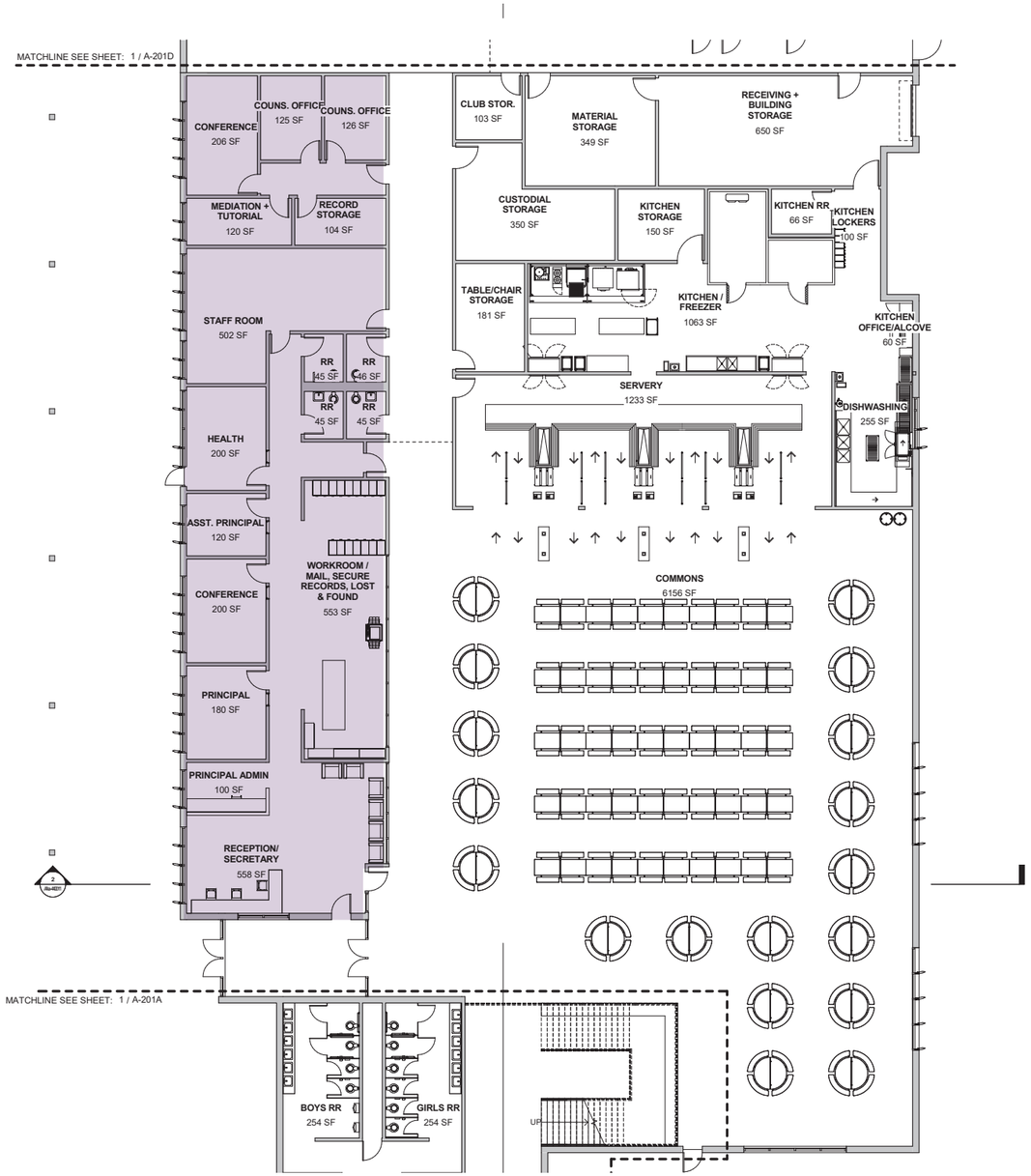

EXIT
RECEPTION


EXIT

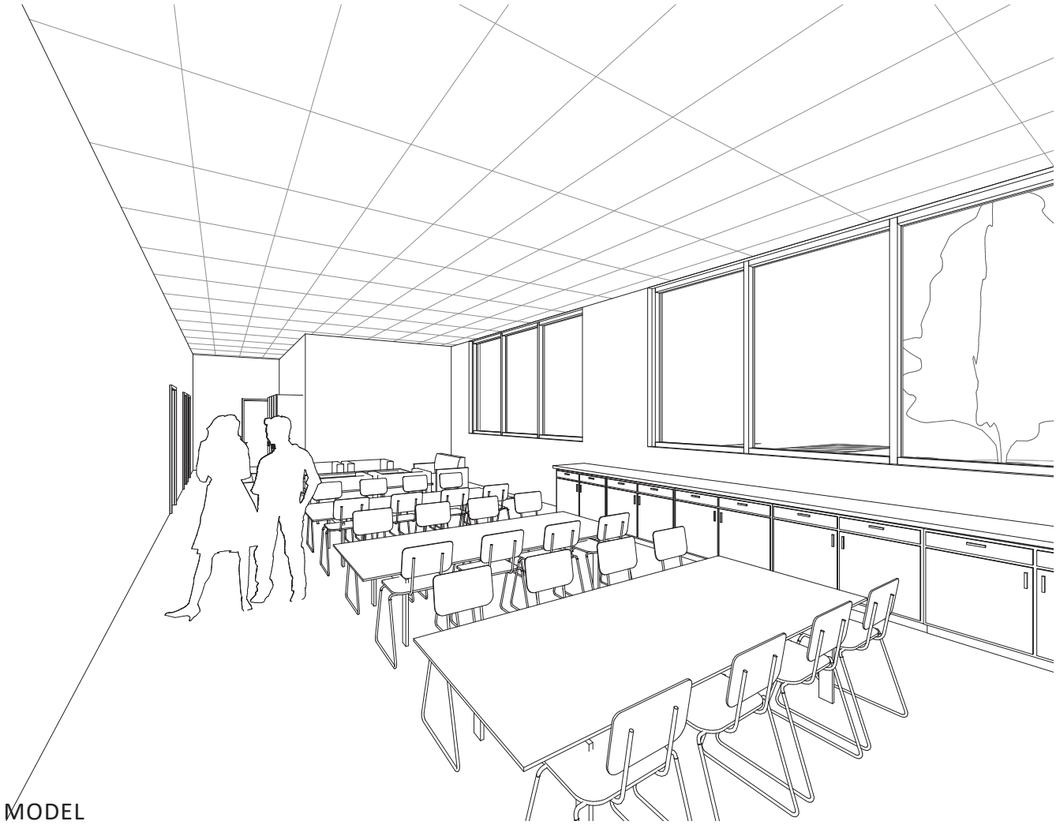
ADMINISTRATION

The administrative offices are located at the front of the school for high visibility of the parking lot and drop off area, bus loop, the main entry for students and visitors, the commons, main circulation corridor, and the central stair. Glare from west-facing windows will be controlled through external fins and operable shading devices. Administration program goals implemented during Schematic Design include:

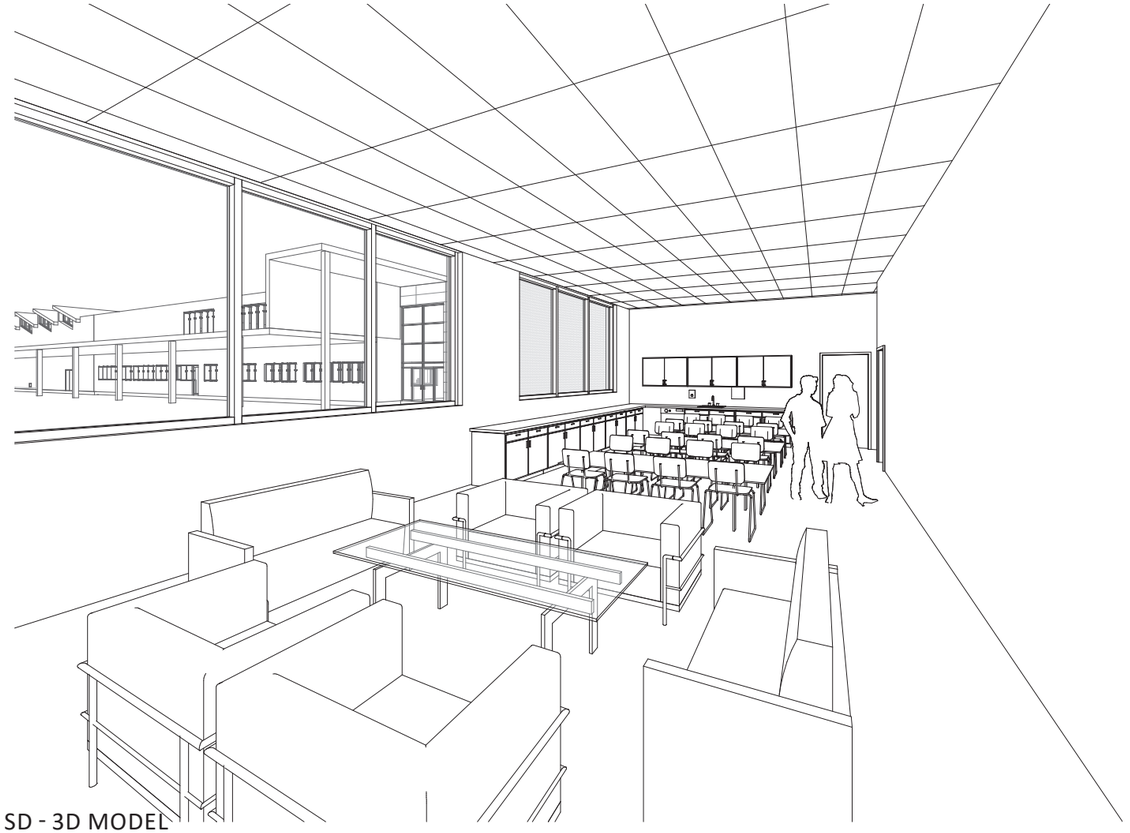
- Central location allows for monitoring of the school site, entry, and commons.
- All visitors access the school through the entry vestibule which leads into the administration reception for security before gaining access to any portion of the school
- Principal's administrator located at reception area to provide support for receptionist
- Conference room located centrally and adjacent to workroom for use by all staff



FIRST FLOOR - ADMINISTRATION



SD - 3D MODEL

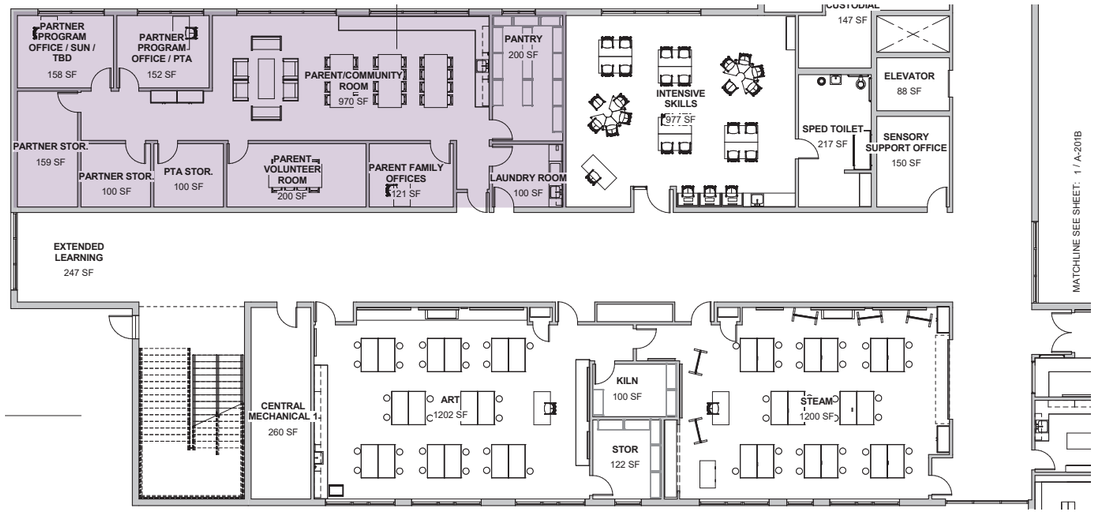


SD - 3D MODEL

COMMUNITY

To serve the community, the Kellogg Middle School program includes community partner and community support spaces. These spaces serve as a connection to the neighborhood and spaces for the community to develop a sense of ownership for the new middle school. These spaces will be utilized by PPS partners such as the PTA, SUN (Schools Uniting Neighborhoods), and other local groups. Community support and community partner goals implemented during Schematic Design include:

- Direct access from the school parking lot
- School partner, community, and family office space
- Flexible storage/office space
- Laundry room
- Central, flexible, gathering space - school living room
- Adjacent to Media Center and STEAM Lab

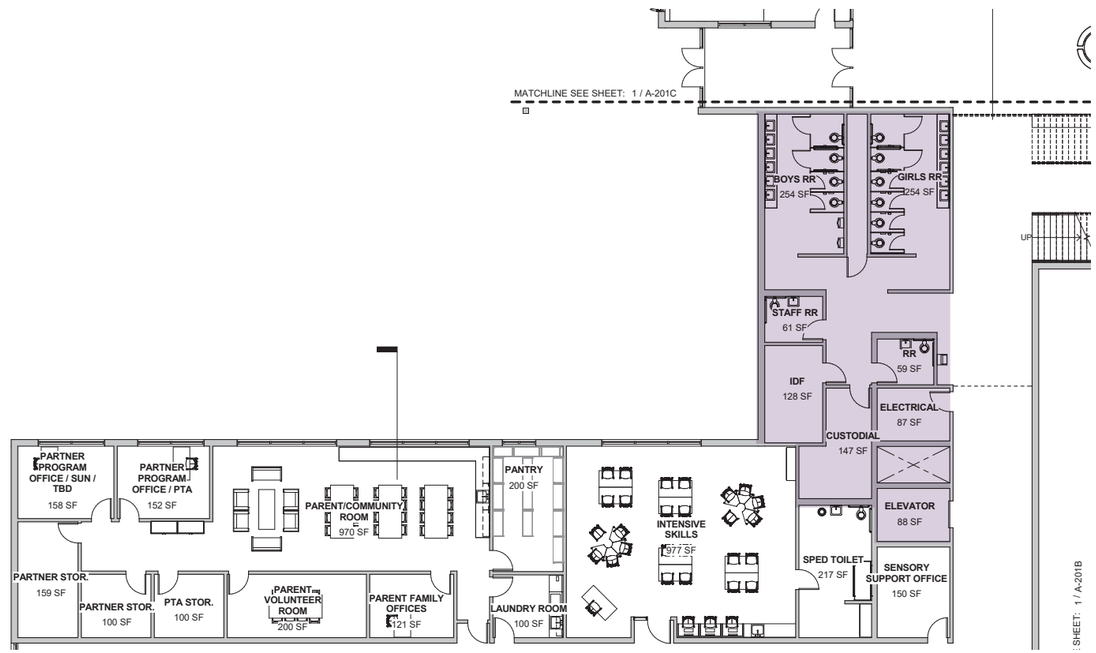


FIRST FLOOR - COMMUNITY

RESTROOMS AND DRINKING FOUNTAINS

Girls and boys restrooms are centrally located in the stacked core of the school to create an equal and accessible environment. One drinking fountain will be provided per floor with an additional location at the gymnasium. Bubblers will not be provided in classrooms. The restroom goals that were implemented during Schematic Design include:

- Adequate number of fixtures per code and programming needs for each floor
- Centrally located drinking fountain on each floor
- Shared restroom entryway with staff as a monitoring strategy
- One Gender inclusive restroom on each floor
  - Integrated into restroom core for equal access
- One staff restroom on each floor
  - Integrated into restroom core to assist with student monitoring
- Entry way perpendicular to central corridor for sound reduction



RESTROOM CORE

STUDENT LOCKERS

Three Kellogg Middle School single-user student locker options have been explored. All options assume a student occupancy of 700 students (700 single-use student lockers) as a baseline. A student count of 800 (800 single-use student lockers) was also explored assuming a max student capacity and growth. Option 1 (below) double tier student built-in lockers will be located on the 2nd, 3rd, and 4th floor along one wall of the Learning Suites' corridors. The lockers are meant to be assigned to individual students for the duration of the school year.

- Option 1: Double Tier Locker
  - Depth: 18"
  - Width: 12"
  - Height: 36" each (72" Overall Height) sf/unit = 1.5sf (0.75sf/student)
- Option 2: Single Tier Locker
  - Depth: 18"
  - Width: 12"
  - Height: 72" sf/unit = 1.5sf
- Option 3: "Duplex" narrow lockers
  - Depth: 18"
  - Width: 9" each (18" total)
  - Height: 72" sf/unit = 2.2sf (1.1sf/student)

A day use locker concept was explored in Schematic Design but was not preferred by the District and the Design Advisory Group (DAG) The following locker goals were implemented during Schematic Design:

- Each student will have their own assigned locker for the school year.
- Individual lockers will create a sense of ownership.
- Enough space for book and winter gear will be provided.
- Lockers will be located along one side of the Learning Suites' corridors.
- Lockers will be assigned and will be able to be monitored if needed.

Single Tier, Double Tier, and Duplex locker styles

Double Tier - "L" Stack

2.2.3 Materials and Finishes

SALVAGED MATERIAL REUSE

There are finishes and materials scheduled to be salvaged from the original Kellogg Middle School demolition. This is done in regards to sustainability, but also to save and incorporate some of the history and culture of the original Kellogg into the new building. The following items are scheduled to be salvaged:

- Exterior brick
- Concrete floor slabs
- Wood flooring for the Gymnasium
- Wood bleachers from the Gymnasium
- Exterior terracotta ornamentation
- Lumber from existing large tree
- Light fixture Globes
- Exterior signage / lettering

EXTERIOR FINISHES

Kellogg Middle School aims to reflect the neighborhood's identity, it's historical identity, as well as the identity of Portland Public Schools. It is important for each school in the district to distinct based on these factors and it's students while embracing the identity for the district as a whole. To achieve this, a diversity of materials and cladding is utilized to embrace the school's context and invoke the District's image. The exterior façade materials are intended to reflect and articulate the programmatic function inside the school, provide sustainable materials, and limit cost while minimizing maintenance.

The exterior cladding materials will be brick veneer and masonry, tilt-up concrete with form liners, and various architectural rainscreen systems. Metal wall panel systems, fiber-cement, fiber reinforced siding, rainscreen systems allow for watershed and ventilation, which are important in our wet, northwest climate, and aid in better interior temperature control, which contributes to reducing the energy used by the mechanical system. Tilt-up concrete walls with form liners allow for durable custom exterior finish without additional expenses.

These material types will utilized the following building zones:

Material Type	% of Material in Building	Location on Building
Brick	26%	Commons, Administration, Performance, 1st Floor of Learning Suites
Rainscreen	40%	2nd-4th Floor of Learning Suites
Tilt-Up Concrete with form liners	15%	Athletics
Glazing	18%	Various Locations
Metal Screen	1%	Roof Mechanical Units

EXTERIOR LETTERING AND BRICK TO BE SALVAGED FROM KELLOGG DEMOLITION

RAINSCREEN CLADDING SYSTEM

CONCRETE TILT, PRECAST CONCRETE, AND RAINSCREEN CLADDING WILL BE USED STRATEGICALLY ON THE KELLOGG BUILDING ENVELOPE

RENDERING OF BUILDING EXTERIOR

INSULATION

Various types of insulation will be utilized at the exterior walls to meet or exceed energy code. This insulation will be continuous from walls to foundation to ensure the building is as energy efficient as possible.

CANOPIES AND ROOF

Canopies and roof systems will be an extension of the building's exterior. The entrance canopy that stretches from the bus loop to the school entrance will not only provide safety from weather but a clear and grand gesture as the entrance to Kellogg Middle School. The canopy adjacent to the Commons over the Student Union will be similar to the entrance canopy to provide a large gathering space with protection from the elements while allowing light penetration and air circulation. A tensile canopy add alternate for cost savings is being explored at the Student Union.

The low slope and sloped roofs will be 3-ply SBS-Modfied Bitumen System with Granule Surface and walk pads. This roof type provides a lightweight and durable solution for school. This roof system provides light reflectivity and lower heat emissivity to help achieve LEED points.

To meet the Oregon OSHA standard railing height of 48 inches for a workplace above a lower level are required. Using the height and width barrier calculation per OSHA, the height and the width of the barrier must equal 48 inches. This project will have 36 high parapets with the depth of each parapet being at least 12 inches, the project will achieve the 48 inch requirement for fall protection where possible and at all other locations, such as the canopies and sawtoothed sloped roofs, fall protection anchors will be used. Canopies and roof systems provide shading which can further reduce solar heat gain into the building.

INTERIOR CONSISTENCY

It is important for each school in the district to have its own sense of identity based on its neighborhood, students, and academics. It is also important to create a sense of identity for the district as a whole, so PPS has developed Design Standards with basis of design specifications for all architects to follow. Following the design standards is crucial for consistency throughout the district and creates an identity for the Portland Public School system, as well as a familiar sense of place for all students, parents, and the community

As buildings have been constructed and renovated throughout the years, Design Standards and Educational Specifications have been used as a baseline. However, they do not define all the elements that go into the interior and exterior design of a building. Items such as color and finish, as well as many smaller detail items such as corner guards, wall base, wall protection, and locker type lack consistency throughout most schools, especially in recent new construction bond projects. It is important for PPS to coordinate these items for both identity purposes and logistics. PPS keeps and stores for future repair and replacement, so each school having its own finishes can get costly and space prohibitive.

It is a goal of Kellogg Middle School to consider all the finishes and detail items used in existing buildings and condense them down by selecting the best in durability, efficiency, cleanability, and obtainability. Lead time of product manufacturing and delivery is very important for keeping schedules and providing efficient repairs and replacements. Future new construction and bond projects will then have a solidly defined strategy and basis of design for selecting products and materials.

In addition, all materials and finishes will be selected based on LEED requirements and guidelines regarding embodied energy, recycled and recyclable content, availability of Environmental Product Declarations, low VOCs, and red-list free ingredients, among others.

WALLS

Interior walls at high traffic areas (corridors, restrooms) are constructed to withstand impact and abuse. The system consists of metal framed walls, high impact gypsum wallboard to 8’-0”, and a finish coat of veneer plaster. Corridor walls will also have stainless steel corner guards, wood wall base, and have tack boards, marker boards, and display surfaces between 3’-0” and 7’-0” to be used for student artwork, educational displays, school information, and to aid in acoustics. All gypsum wallboard products shall be 5/8” Type X, fire resistant rated gypsum board for durability and flexibility of spaces. Water resistant gypsum board with 6’ solid surface wainscot and coved base will be installed in all restrooms, locker rooms, kitchen, and servery. The servery and kitchen will have stainless steel wall flashing covering all cooking wall surfaces and have all light colored, washable, smooth finishes.

Each classroom, extended learning spaces, and exploratory classroom will have one full-height wall with a smooth finish for markerboard paint coating, and all walls will have a 4” rubber wall base. Each classroom, extended learning space, and exploratory classroom will have at least (2) wall mounted 8’-0” x 4’-0” markerboards, and a TV monitor for digital display. There will be at least (2) wall mounted 8’-0” x 4’-0” tackboards. STEAM and Art will also have at least (2) wall mounted 8’-0” x 4’-0” markerboards, (2) wall mounted 8’-0” x 4’-0” tackboards, and extra tackable surfaces on all walls.

The gymnasium will have wall mounted mats up to 6’ as wall protection behind the main basketball hoops. The dance/stage space will have 3 gypsum walls, one full-height with mirrors and one wall with a dance barre, and an adjustable system of curtains, riggings, scrim and teasers. Custodian closets will have FRP on wet walls up to 6’.

Sound transmission characteristics are important to consider to distribute an appropriate volume of sound throughout the building, so multi-purpose finishes such as acoustical tack panels will be used whenever applicable. Additional acoustical treatment will be added to walls in areas with high activity or sound, such as the music room, STEAM classroom, dance/stage area, and gymnasium, as well as in rooms with the ceiling height greater than 12’ to minimize reverberation, installed at 8’ and above. Music specifically will have at least 40% of walls covered with an acoustical treatment at an NRC of 0.9 or greater, such as wood slat acoustical walls for a portion of the tilt-concrete walls. (See Acoustic Narrative).

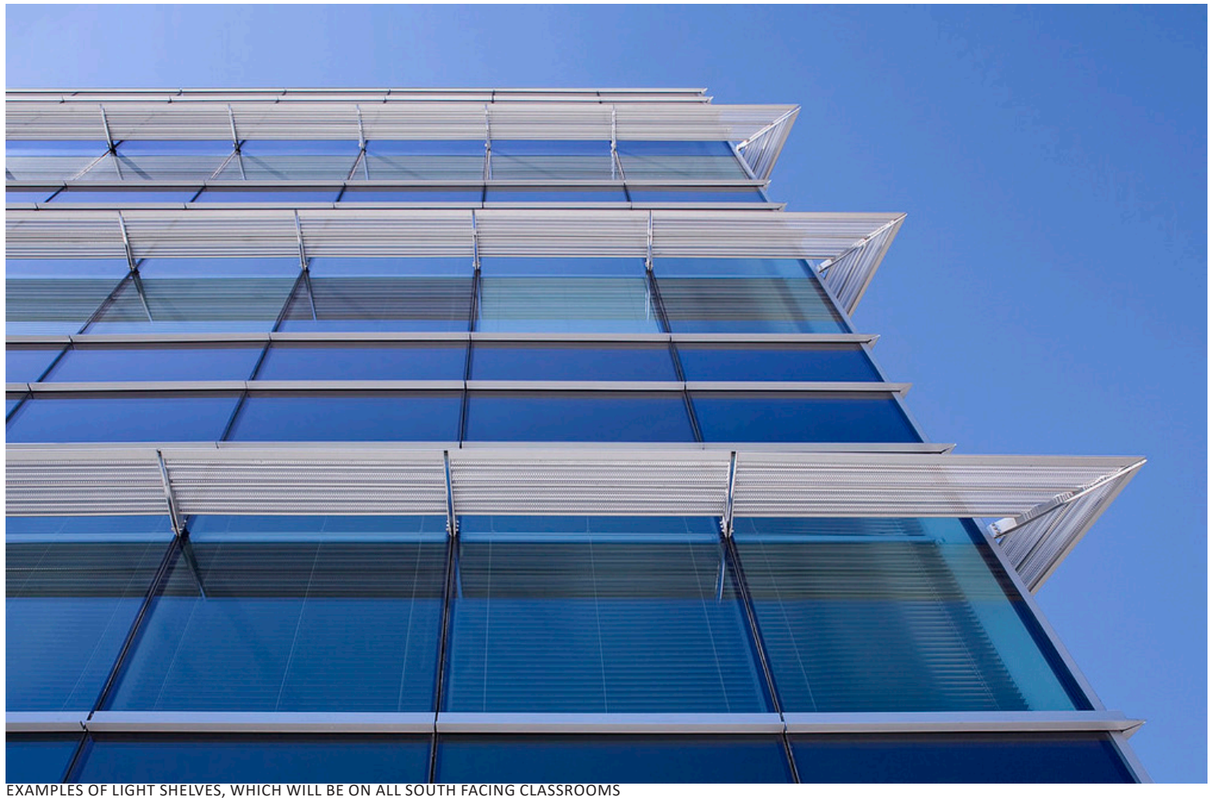
Colors will be chosen from a psychological standpoint, based on studies that deduce how developing student brains react to particular colors in particular settings. Neutral tones will be complimented by brighter colors, such as stimulating reds and oranges in the commons and corridor, and soothing colors such as greens and blues in general classrooms and study areas. The amount of paint colors and finishes in general will be limited to a select few for PPS ease of maintenance.

OPERABLE WALLS

The two corridor walls in each of the extended learning spaces will be operable partitions that pivot open, with 4’ wide panels that will be 50% glass and 50% markerboard/tackboard with an STC rating of 65. The stage/dance space will have one operable folding partition wall with an STC rating of 65.

SLATTED WALL PANELS WILL AID IN ACOUSTICS IN MUSIC ROOM

EXAMPLE OF OPERABLE FOLDING PARTITIONS WITH ACOUSTIC TREATMENT FOR STAGE



EXAMPLES OF LIGHT SHELVES, WHICH WILL BE ON ALL SOUTH FACING CLASSROOMS

WINDOWS

Exterior walls will have windows with sills at 4’ in classrooms, community, and administration spaces to contribute to daylighting without introducing unnecessary glare and minimizing heat gain. Windows will have aluminum frames, designed to meet 6.0 PSF performance standards when tested for rain penetration ASTM standards. Stairwells, corridors, and the central commons area will have larger, storefront style windows with aluminum frames designed to meet 10 PSF performance standards when tested for rain penetration ASTM standards. Interior walls will have minimum relights for ease of maintenance, except for areas requiring visual connection for safety and student monitoring, and each classroom will have a 2’-0” wide full-height relight next to the door. Each window will also have an operable shade for security purposes during lockdown situations.

South, East, and West-facing windows will be fitted with high-performance glazing that has low-e values, exceptional solar control and high visible light transmittance, such as Solarban 70XL. North facing windows that do not have to deal with the same heat gain concerns as the other facades will use a high-performing glazing such as Solarban 60.

All South, East and West facing windows will be fitted with shading devices to control glare and heat gain in interior spaces. South facing windows will utilize horizontal shading devices. Smaller windows such as those in classrooms will have one shade per window. Taller windows in the Commons and elsewhere will require multiple rows of shades to properly control the sunlight. The basis-of-design shading device is the Kawneer Versoleil SunShade Outrigger System. In addition to exterior shading devices, all south facing classrooms will be fitted with internal light shelves to reflect light deeper into the space and further control glare. A product such as the 30” deep Kawneer InLighten Light Shelf with an ACM panel. All east and west facing windows will be fitted with vertical, single-fin shading devices. To adequately control light, the shades will be placed at approximately 3’-0” O.C., and extend the full height of the window. The basis of design product is the Kawneer 14” deep Versoleil SunShade Single Blade System. All window in all regularly occupied spaces will have roller shades for manual control.

CEILINGS

2'x4' acoustical panel drop ceiling:

- General classrooms
- Special Education classrooms
- Media Center support spaces
- Administrative Offices
- Teacher offices
- Community spaces

Suspended acoustic panels containing 20% open area, 20% diffusive panels, 20% gypsum panels, 40% absorptive panels:

- Music room

Open to structure of perforated acoustic deck:

- Art
- STEAM
- Science Classrooms
- Stage/Dance

FRP - smooth, cleanable ACT ceiling:

- Kitchen
- Servery

Open to structure with suspended acoustic clouds and gypsum clouds:

- Media Center

Open to structure with suspended acoustic clouds, suspended wood slat clouds, and suspended gypsum clouds:

- Main floor corridor spanning from commons to gymnasium
- Commons
- Vestibule

Hard lid gypsum with access panels:

- Learning Suite corridors
- All restrooms
- Locker rooms

Open to structure:

- Gymnasium
- Custodial and support spaces

STEAM and Science will each have 8 ceiling mounted retractable power reels. The Stage/ Dance area will have ceiling mounted curtains and riggings, and specialty theatrical lighting. All light fixtures will be LED, with troffers in ACT ceilings and suspended fixtures where ceilings are open to structure. The gymnasium light fixtures will be industrial type with wire guards. All hard lid ceilings will have recessed can fixtures.

A VARIETY OF ACOUSTICAL CEILING CONFIGURATIONS CREATE THE PERFECT ACOUSTICS FOR A MUSIC CLASSROOM

WOOD SLAT CEILING AND ACOUSTIC CLOUDS WILL BE USED TO ADD PLEASING AESTHETIC TO ACOUSTIC REQUIREMENTS

Architectural RCP Diagram - Key

- 2'x4' ACT panel drop ceiling
- open to structure - Perforated acoustic deck
- Open to structure with suspended cloud ceilings, wood, gypsum, ACT
- Gypsum wallboard ceiling
- Suspended ACT panels: 20% open area, 20% diffusive panels, 20% gyp panels, 40% absorptive panels
- FRP suspended acoustical ceiling tile

FLOORING

Rubber tile flooring:
- All general classrooms
- Special Education Classrooms
- Art
  - recessed floor drains
  - recessed outlets
- STEAM
  - recessed floor drains
  - recessed outlets
- Science Classrooms
- floor drains
- outlets
- Administration - mail workroom, student mediation, record storage, health, reception

Stained and sealed concrete:
- Corridors
- Commons
- Custodial and support spaces

Carpet tile:
- Administration offices
- Staff offices
- Media Center
- Reading area in Intensive Skills classroom
- Music
- Community spaces

Poured epoxy with 4” cove base:
- Kitchen
  - floor drains
- Servery
  - floor drains
- Restrooms
  - floor drains
- Locker rooms
  - floor drains

Wood panel flooring:
- Gymnasium
  - recessed floor
  - striping for one full size basketball court, two practice courts, volleyball court sleeves for net installation
  - recessed outlets

Sprung wood panel floor:
- Dance/Stage
  - recessed outlets

STAINED CONCRETE RIVER LEADING CORRIDOR WAYFINDING. OHP+D - OREGON YOUTH AUTHORITY, GRANT PASS

POURED EPOXY FLOORING

RUBBER TILES ARE USED TO MAKE A GRID IN ROBOTICS CLASSROOM. OHP+D - ALOHA HIGH SCHOOL, BEAVERTON SCHOOL DISTRICT

DOORS AND HARDWARE

All doors will have 16 ga. hollow metal frames at a typical 3’-0” width and 7’-0” height. The special education Intensive Skills classrooms will be 3’-6” in width with automatic door operators.

Exterior doors will be 16 ga. hollow metal with powdercoat finish. Keycard access will be at all perimeter doors that will unlock during student dropoff and pickup. All perimeter doors aside from the main entrance and delivery access point will have no exterior hardware to access the building and will be used for egress only.

All interior doors will be FSC certified solid core wood construction with a natural white maple veneer finish. All interior classroom doors will have a 4” wide half-height relight. The media center workroom will have a dutch door opening into the media center. All pairs of doors will provide a 6’ clear opening with removable mullions between doors for ease of moving equipment and durability of closure, and 6’ wide ramps for loading purposes.

All door swings will be limited by used of wall mounted stops to prevent swings from damaging walls.

Cross-corridor fire doors will be an overhead coiling door system to maintain exiting from either direction, with doors that fold into the wall when not in use and include all required hardware such as a magnetic hold-open connected to fire alarm panel, such as the Safescape T2000 Series Fire Door System by McKeon. Corridors will also have 4 overhead security doors at critical access points to close off the classroom suites during community use, performances, and athletic events.

The STEAM classroom will have one 10’-0” x 12’-0” wide overhead garage door that opens up into the corridor, and an overhead grille to secure equipment storage. There will be overhead doors between the servery and commons to restrict student access during off hours.

CASEWORK

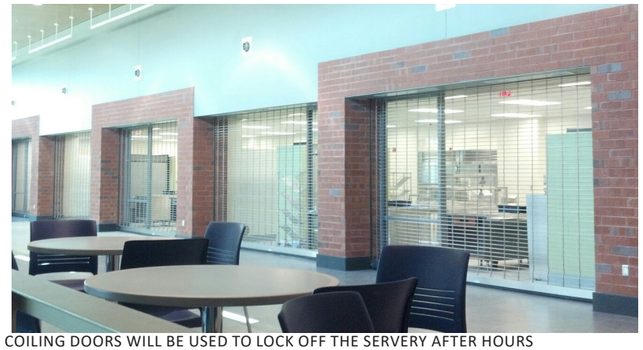
All spaces will have casework made of white maple plywood with a clear stain finish. Casework will consist of cabinets with adjustable shelving, drawers, a lockable teacher cabinet, and cabinets with open shelves to house materials that students regularly use and access.

All spaces will have 1” thick solid surface countertops with 4” integral backsplash and 6” integral backsplash at wet walls, EXCEPT STEAM, Art, and science classrooms, which will have 1” thick epoxy countertops with 4” integral backsplash and 6” integral backsplash at wet walls.

The STEAM classroom will have no built-in casework aside from a recessed countertop and equipment shelving area that will have an overhead grill securing the equipment when not in use.

The Art classroom will also have open portfolio casework shelving at 2’-0” deep and 2’-0” wide.

The media center and reception areas will have custom built-in desks for check in/out, also made of maple and solid surface.



COILING DOORS WILL BE USED TO LOCK OFF THE SERVERY AFTER HOURS

EPOXY COUNTERTOPS HAVE EXCELLENT DURABILITY FOR SCIENCE CLASSROOMS

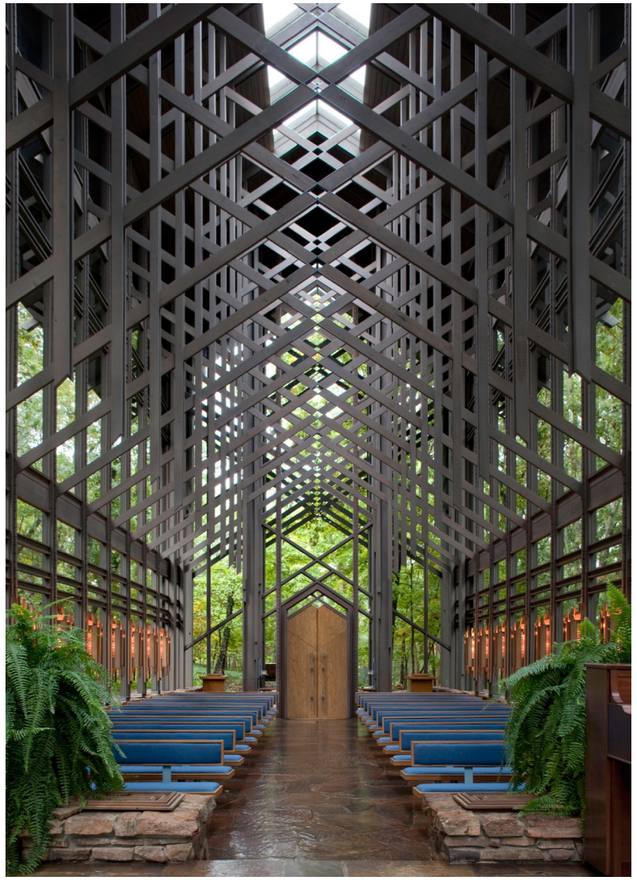
FURNITURE

Kellogg Middle School will take into consideration all the aspects of a modern learning environment when selecting furniture and equipment. Just as no two students learn the same way, no two students respond to the physical environment the same way. Classrooms have traditionally consisted of a simple desk and chair environment with everyone sitting in rows towards a single teaching location in the classroom. As time and technology advances, traditional classroom furniture is being replaced with adjustable, flexible furniture including group tables, sit/stand desks, and a variety of options for chairs and stools. Studies find that students using adjustable furniture receive higher testing scores by encouraging better postures and increasing health benefits, leading to better overall comfort. Modular seating also provides for a variety of instruction, allowing students to work independently or in group settings. Design strategy includes an array of spaces, ranging from private corners for solitude to larger gathering spaces both in and outside the classroom that encourage multi-disciplinary, collaborative learning.

All general classrooms will have adjustable height, reconfigurable 2-student work tables that can be organized in multiple different configurations based on teacher preference or activity, and chairs that are ergonomically pleasing for students at the middle school age range. Extended learning classrooms will have a combination of desks and soft seating that can also be reconfigured depending on student activity. Special Education classrooms will also have combination of hard and soft seating for various group or single activities. The STEAM and science classrooms will have adjustable 30”x60” nesting tables that can be clustered into groups or rows, with adjustable lab-style stools. Art will have 40”x60” Hann Manufacturing tables with black topsThe media center will have a variety of seating and study spaces, including modular tables, adjustable chairs, soft seating and ottomans, and a teacher instruction area with classroom tables. There will also be half-height, 3-shelf bookshelves throughout the space to accommodate literature and study materials, as well as study carrels for students.

All classrooms will also have portable file cabinets and tall double-door storage cabinets. Art storage and the community pantry will have open industrial shelving for various storage purposes. The commons will have a variety of 5’ dia. round and 8’ length rectangular tables. The reception area will have soft seating for visitors. All teachers and administration offices will have a teacher desk and adjustable office chair. The community space will serve a variety of functions, and have group gathering conference style tables as well as soft seating to create a “home” like environment. The gymnasium will have retractable, wall mounted bleachers, as well as a storage space for chairs for assemblies and concerts. The music classroom will have a directors chair and podium, individual student seating and podiums, portable risers, and a music storage cabinets made by Wenger in various shapes and sizes for instrument storage.

TYPES OF FURNITURE FOUND IN EXTENDED LEARNING AREAS INCLUDE A VARIETY OF HARD AND SOFT SEATING OPTIONS



2.2.4 Biophilic Design

WHAT IS BIOPHILIC DESIGN?

Humans are inherently connected to the natural world around them. This connection is what lead us to grow as a people, with the first, “homes,” as we know them built to utilize natural elements such as sunlight and space, air and water, warmth and fire. We have progressed to live in unison with our surroundings, and have developed a deep relationship with the elements that bring us back to our evolutionary roots. We are predisposed to explore and discover nature. The idea of biophilic design is the deliberate incorporation of elements from nature into the build environment. Incorporating biophilic elements in Kellogg Middle School creates a building that promotes the health and welfare of its students, and the building itself.

Early, “technologies,” studied in biophilic design, such as passive heating and cooling, natural building materials, and building orientation have been utilized for centuries in the earliest settlements, using the environment for mutual benefit. Incorporation of motifs and representations of natural shapes and elements, such as organic lines, animals, and plants add and enhance emotional connotations to a space, creating a sense of safety, home, familiarity, and place. We are also subconsciously connected to the processes found inherently in nature, such as patterns, patina, change, balance, and hierarchy. A sense of community and incorporation of history, lifestyle, and local ecology adds to this connection. Even the simplicity of a visual connection to nature is crucial to our physical and mental wellbeings and have lead to growth, development, and overall happiness.

However, modern buildings have been designed to distance their inhabitants and users from the natural environment due to advances in technologies and inexpensive building techniques. Heating and air conditioning units, artificial lighting, and artificial building materials have not only put a physical barrier between ourselves and the world, but have thrown off our biophysical systems and had an immense impact on our emotional wellbeing. Urban environments in particular house structures that are built to low cost, high productivity demands, and designed to assert domination over nature, rather than collaboration with it. These buildings often lack any connection to the outdoors, with 90% of our time is spent indoors. Countless people experience nature deficit disorders, causing psychological and physical problems such as obesity, depression, and attention deficit disorders.

Biophilic design will be used as a defining factor in Kellogg Middle School. It has been proven that connection with nature increases productivity and aids in health and development, particularly in children. Good design considers energy performance, aesthetics, material choices, relationships to site and neighborhood, and programming needs; Good biophilic design takes these considerations and develops on how they promote the health and wellness of its users through connection with nature.

Stephen Kellert, a professor of social ecology at Yale and biophilia pioneer, has studied the biophilic design concept and believes there are 6 main design elements to consider when merging nature with the built environment. He believes that humanity is, “integral to, and not separate from, the natural world.” The 6 elements incorporate both physical and metaphorical concepts, and can be broken down further in their subcategories to 72 attributes. Kellogg incorporates all 6 elements in its design; The elements include:

- Environmental Features
- Natural Shapes and Forms
- Natural Patterns and Processes
- Light and Space
- Place-Based Relationships
- Evolved Human-Nature Relationships

ENVIRONMENTAL FEATURES

Incorporating environmental features involved the use of relatively well recognized characteristics of the natural world in the build environment. Environmental Features include:

- Color
- Water
- Air
- Sunlight
- Plants
- Animals
- Natural Materials
- Views and Vistas
- Facade Greening
- Geology and Landscape
- Habitats and Ecosystems
- Fire

NATURAL SHAPES AND FORMS

Utilizing natural shapes and formes includes representation and simulation of the natural world, often found on building facades and within interiors. Natural Shapes and Forms include:

- Botanical Motifs
- Tree and Columnar Supports
- Animal Motifs
- Shells and Spirals
- Egg, Oval, and Tubular Forms
- Arches, Vaults, Domes
- Shapes Resisting Straight Lines and Right Angles
- Simulation of Natural Features
- Biomorphy
- Geomorphology
- Biomimicry

NATURAL PATTERNS AND PROCESSES

These elements emphasize the incorporation of properties found in nature into the built environment, rather than the representation or simulation of physical shapes and forms. Natural Patterns and Processes include:

- Sensory Variability
- Information Richness
- Age, Change, and the Patina of Time
- Growth and Efflorescence
- Central Focal Point
- Patterned Wholes
- Bounded Spaces
- Transitional Spaces
- Linked Series and Chains
- Integration of Parts to Wholes
- Complementary Contrasts
- Dynamic balance and Tension
- Fractals
- Hierarchically Organized Ratios and Scales

LIGHT AND SPACE

Utilizing light and space brings additional connectedness to the expansive natural world. Light and Space attributes include

- Natural Light
- Filtered and Diffused Light
- Light and Shadow
- Reflected Light
- Light Pools
- Warm Light
- Light as Shape and Form
- Spaciousness
- Spatial Variability
- Space as Shape and Form
- Spatial Harmony
- Inside-Outside Spaces

PLACE-BASED RELATIONSHIPS

Providing a sense of place refers to the successful marriage of culture with ecology in a geographical context. Place-Based Relationships include:

- Geographic Connection to Place
- Historic Connection to Place
- Ecological Connection to Place
- Cultural Connection to Place
- Indigenous Materials
- Landscape Orientation
- Landscape Features that Define Building Form
- Landscape Ecology
- Integration of Culture and Ecology
- Spirit of Place
- Avoiding Placelessness

EVOLVED HUMAN-NATURE RELATIONSHIPS

This concept focuses on fundamental aspects of the inherent human relationship to nature. Evolved Human-Nature Relationships include:

- Prospect and Refuge
- Order and Complexity
- Curiosity and Enticement
- Change and Metamorphosis
- Security and Protection
- Mastery and Control
- Affection and Attachment
- Attraction and Beauty
- Exploration and Discovery
- Information and Cognition
- Fear and Awe
- Reverence and Spirituality

The chart below indicated the categories in which Kellogg incorporates Biophilic Design elements. Half-tone means we can reach that target with additional exploration during design development.

environmental features	color	water	air	sunlight	plants	animals	natural materials	views and vistas	facade greening	geology and landscape	habitats and ecosystems	fire												
	incorporating natural colors and finishes and utilizing color psychology theory		displacement ventilation and passive heating / cooling	daylighting through light shelves, baffles, high windows	landscaping, bioswales, green walls, student garden	representation thorugh reuse of original Kellogg owl ornamentation	utilizing natural stones, woods, sustainably harvested products locally sources	views of Mount Tabor from the 2nd story and up															
natural shapes and forms	botanical motifs	tree and columnar supports	animal motifs	shells and spirals	egg, oval, tubular forms	arches, vaults, domes	shapes resisting straight lines and right angles	simulation of natural features	biomorphy	geomorphology	biomimicry													
			reuse of Kellogg owl ornamentation	use of the "shell" golden ratio / Fibbonocci Sequence																				
natural patterns and processes	sensory variability	information richness	age, change and the patina of time	growth and efflorescence	central focal point	patterned wholes	bounded spaces	transitional spaces	linked series and chains	integration of parts to wholes	complementary contrasts	dynamic balance and tension	fractals	hierarchically organized ratios and scales										
	strategic placement of windows and acoustics to manipulate light and sound	building as teaching tool for curiosity and imagination; materials that mimic natural patterns			administration and commons as focal point of building footprint	all various classrooms united under central building theme	creating "terriroies" through classroom and spacial boundaries	spacial relationships created portals, fenestrations, and thresholds	relationships created with adjacencies, smart building programming	each individual space comes together to form a school community		transitioning from louder, communal spaces to quieter learning environments		Utilizing Fibbonacci's Golden Ratio in courtyard dimensions and elements									
light and space	natural light	filtered and diffused light	light and shadow	reflected light	light pools	warm light	light as shape and form	spaciousness	spatial variability	space as shape and form	spatial harmony	inside-outside spaces												
	utilizing natural daylight as main lighting source	light shelves and relites to diffuse and circulate light		light shelves, strategic use of color to reflect light				multi-story main atrium and commons area	diversity in size and shape of individual spaces per required tasks			windows connecting to outdoor environment, canopies, artium										
place-based relationships	geographic connection to place	historic connection to place	ecological connection to place	cultural connection to space	indigenous materials	landscape orientation	landscape features that define building form	landscape ecology	integration of culture and ecology	spirit of place	avoiding placelessness													
	building orientation and views	incorporating history of Kellogg by reusing artwork and sculpture, trees		integrating history and geography of Powell with neighborhood identities		strategic orientation benefitting slope, sunlight, and wind attributes			LEED building fosters long term sustainability	overall, creating a beautiful, long lasting building that fosters stewardship	overall, creating a second "home" or refuge for students												
evolved human-nature relationships	prospect and refuge	order and complexity	curiosity and excitement	change and metamorphosis	security and protection	mastery and control	affection and attachment	attraction and beauty	exploration and discovery	information and cognition	fear and awe	reverence and spirituality												
	utilizing sensory support spaces, comforting colors and materials, safety technologies		using the building as a teaching tool to foster exploration, discovery, mystery						using the building as a teaching tool to foster exploration, discovery, mystery													

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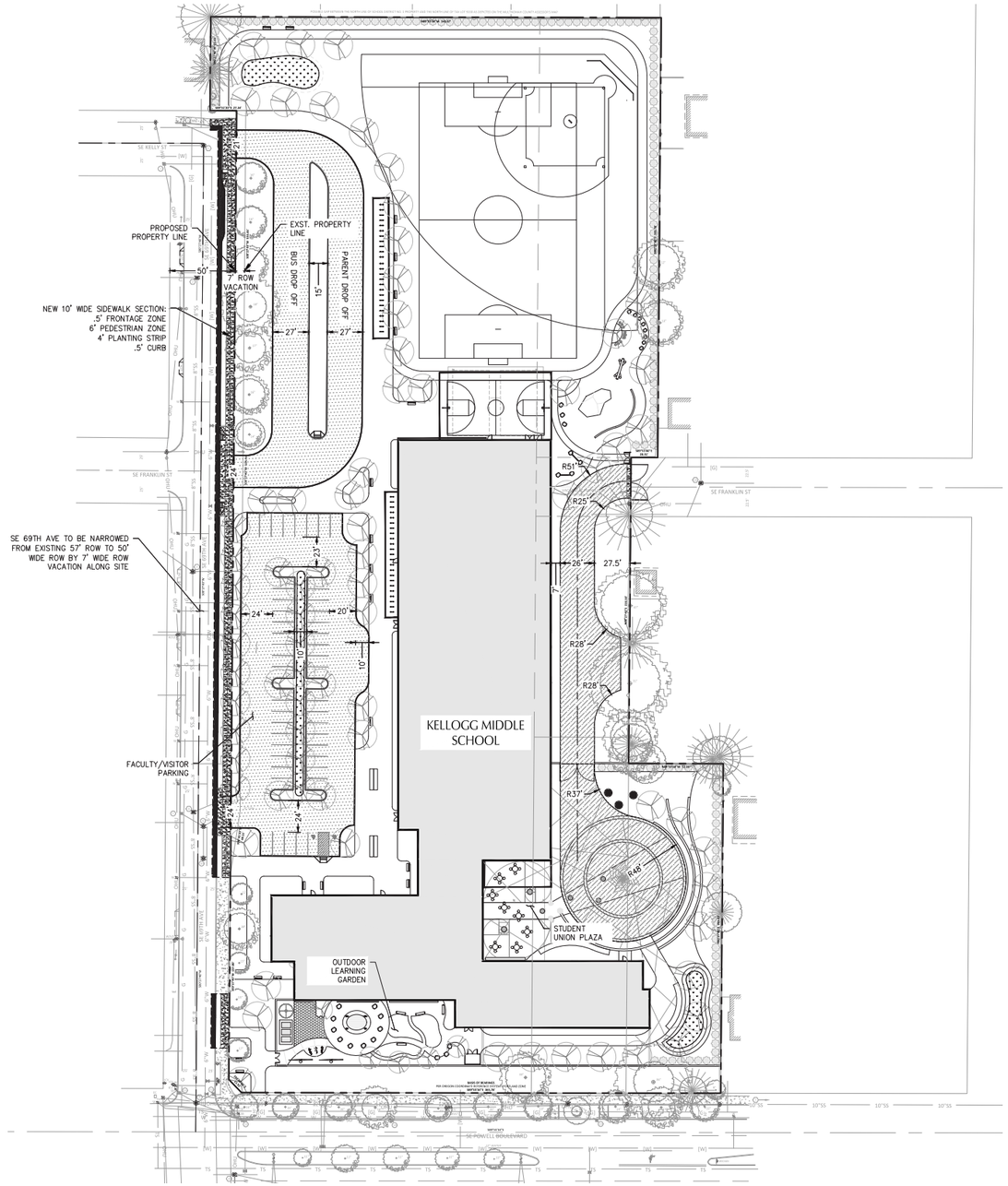


KELLOGG MIDDLE SCHOOL SITE PLAN

2.3 Civil Narrative

The Portland Public School District (PPS) is planning to construct Kellogg Middle School (KMS) on the existing 6.2-acre site of the old middle school. The site improvements include parking areas, pedestrian/ADA access areas, fire lane access, bus turn out, courtyards, and playfields.

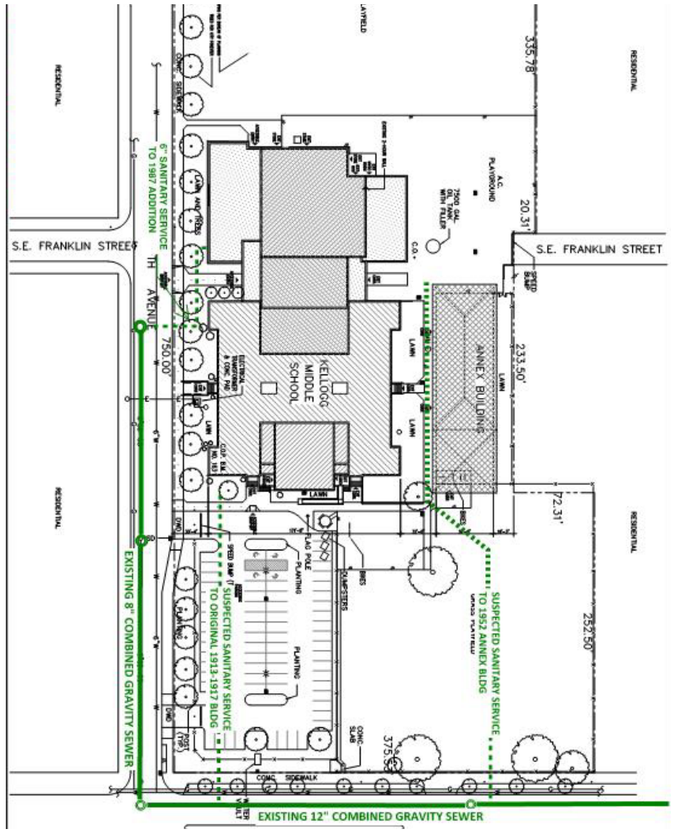
The original school building was constructed between 1913-1917, and has been expanded multiple times over its history, including the additions of an annex building in 1952 and a new gymnasium in 1987. These existing buildings are in the process of being demolished and the site will be stabilized in a prior phase to construction of the school. Due to this, the existing conditions for the project are taken as the final, stabilized, and graded site from the planned demolition for design.

The site is located in the South Tabor neighborhood of Portland, and is surrounded mostly by residential neighborhoods, with a small amount of retail on adjacent SE Powell Blvd. The site of the property is located on the north side of SE Powell Blvd, and fronts the east side of SE 69th Ave from SE Powell Blvd to SE Kelly St. Apart from the nearby Franklin High School, the site of Kellogg Middle School is the largest property in the vicinity. KMS hasn't been occupied as an active school for over 10 years and has been used as administrative space and storage by PPS.

The conceptual layout of the site includes the main school building with a 4-story academic area located on the south end of the property adjacent to SE Powell Blvd. An outdoor learning garden area is proposed located by the south side of the building that includes a rainwater harvesting tank and an outdoor classroom. The middle of the building north of the academic area includes the student commons and administration area. The conceptual site includes the main entrance of the building and faculty/visitor parking west of the building and a student union plaza east of the building that doubles in purpose as the fire lane access turnaround extending from SE Franklin Street. The north end of the property includes play fields and bus drop off loop connected to SE 69th Street.

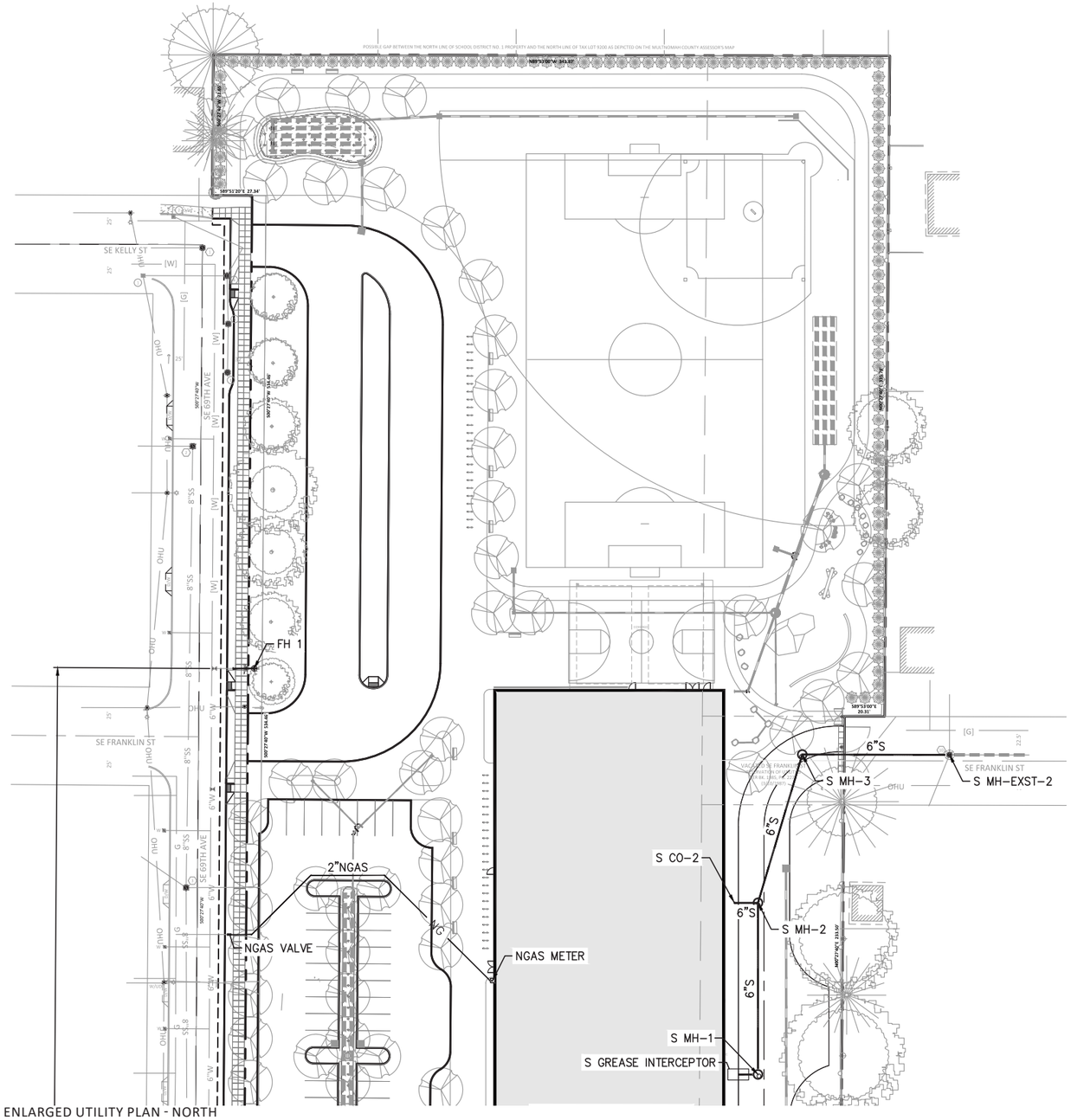
SANITARY SEWER

The existing school is served by several sanitary sewer mains that will be demolished to the property line. This includes an 8-inch combined sewer main in SE 69th Ave that serves only residences immediately on this street. A 12-inch combined gravity sewer is also located in SE Powell Blvd that serves most properties along the roadway. Lastly, there is also an 8-inch sewer main that ends at a manhole in the stub of SE Franklin St east of the property. This main only serves the adjacent residences, similarly to the main on SE 69th Ave.

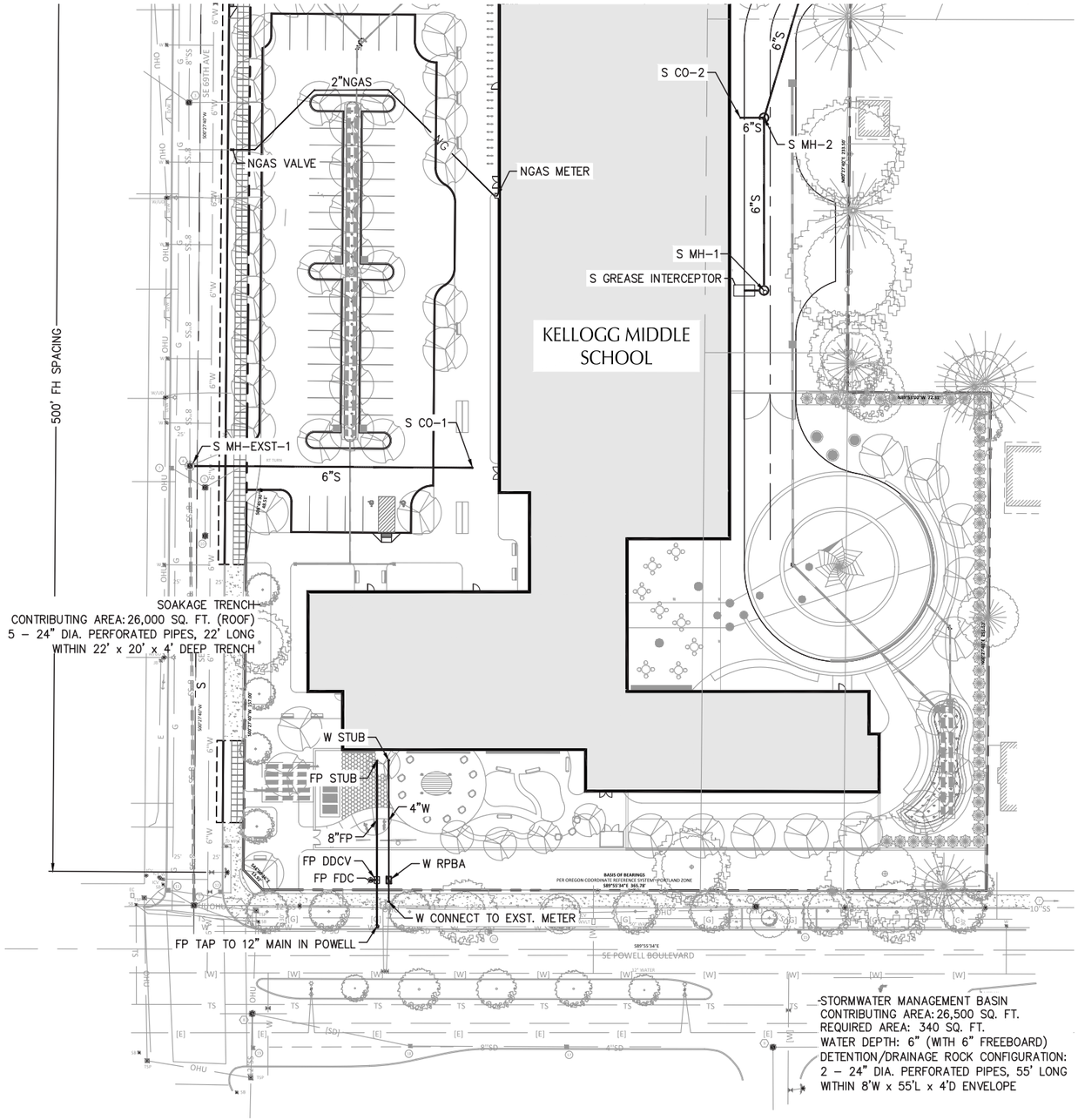


EXISTING SANITARY SEWER

Sanitary sewer from the original building was plumbed in combination with storm drainage and was conveyed to a 12-inch sanitary gravity sewer in SE Powell Blvd. Similarly, sanitary sewer from the annex building was also conveyed to this 12-inchline in Powell by a separate connection. The third existing connection was a sanitary-only line that connected to an 8-inch sewer main in SE 69th Ave. See Sanitary Sewer Diagram.



ENLARGED UTILITY PLAN - NORTH



ENLARGED UTILITY PLAN - SOUTH

The sanitary sewer to the school building will consist of 6-inch PVC piping with precast concrete manholes at normal intervals. A sanitary sewer lateral is proposed from an existing manhole in the 8-inch public sanitary sewer main in SE 69th Ave. A second connection will be required on the east side of the building to serve the kitchen/serveries. This connection will include a below-grade grease interceptor and connect to the 8-inch public sewer system at an existing manhole in SE Franklin St.

GRADING

The existing site is relatively flat, with a very small slope southwards towards SE Powell Blvd. The low point of the site is the southwest corner of the property near the intersection of SE 69th Street and SE Powell Blvd. Existing elevations vary only between 232 feet and 234 feet. To manage this, the proposed site will feature several small gradations and sloped landscape areas to subdivide the property into defined drainage areas with subsequent surface stormwater facilities. This includes a small slope along the perimeter of the play fields, as well as a sloped landscape area in the southeast corner of the site to facilitate enough elevation for radial seat benches with lawn treads in the courtyard. Other parts of the site such as the faculty parking area will slope inwards to a stormwater basin in the parking median. The bus lane area will slope northward to a catch basin that flows to an infiltration planter adjacent to the sidewalk and the play fields. The play field area will remain relatively flat, with minor slopes to provide drainage to field underdrainage and subsequent catch basins. The proposed building finished floor elevation is 234 feet.

STORMWATER

City of Portland Requirements

Regulation of storm water for new development is addressed in City of Portland Public Improvements Ordinance 17. Chapter 17.38 specifically addresses storm drainage and water quality and outlines the following requirements.

- Storm water shall be managed in as close proximity to the development site as practicable and shall avoid negative impacts on nearby streams, wetlands, groundwater and other water bodies.
- The quality of storm water leaving the site after development shall be equal to or better than the quality of storm water leaving the site before development.
- The quantity and flow rate of storm water leaving the site before development shall be equal to or less than the quantity and flow rate of storm water leaving the site before development.
- All conveyance shall be analyzed, designed and constructed for existing tributary offsite runoff and developed onsite runoff from the proposed project.
- All discharge systems shall comply with the standards in the Storm Water Management Manual.

Onsite Infiltration

Catagory 1: Requires total onsite infiltration with vegetated infiltration facilities. Examples include infiltration swales, planters and basins.

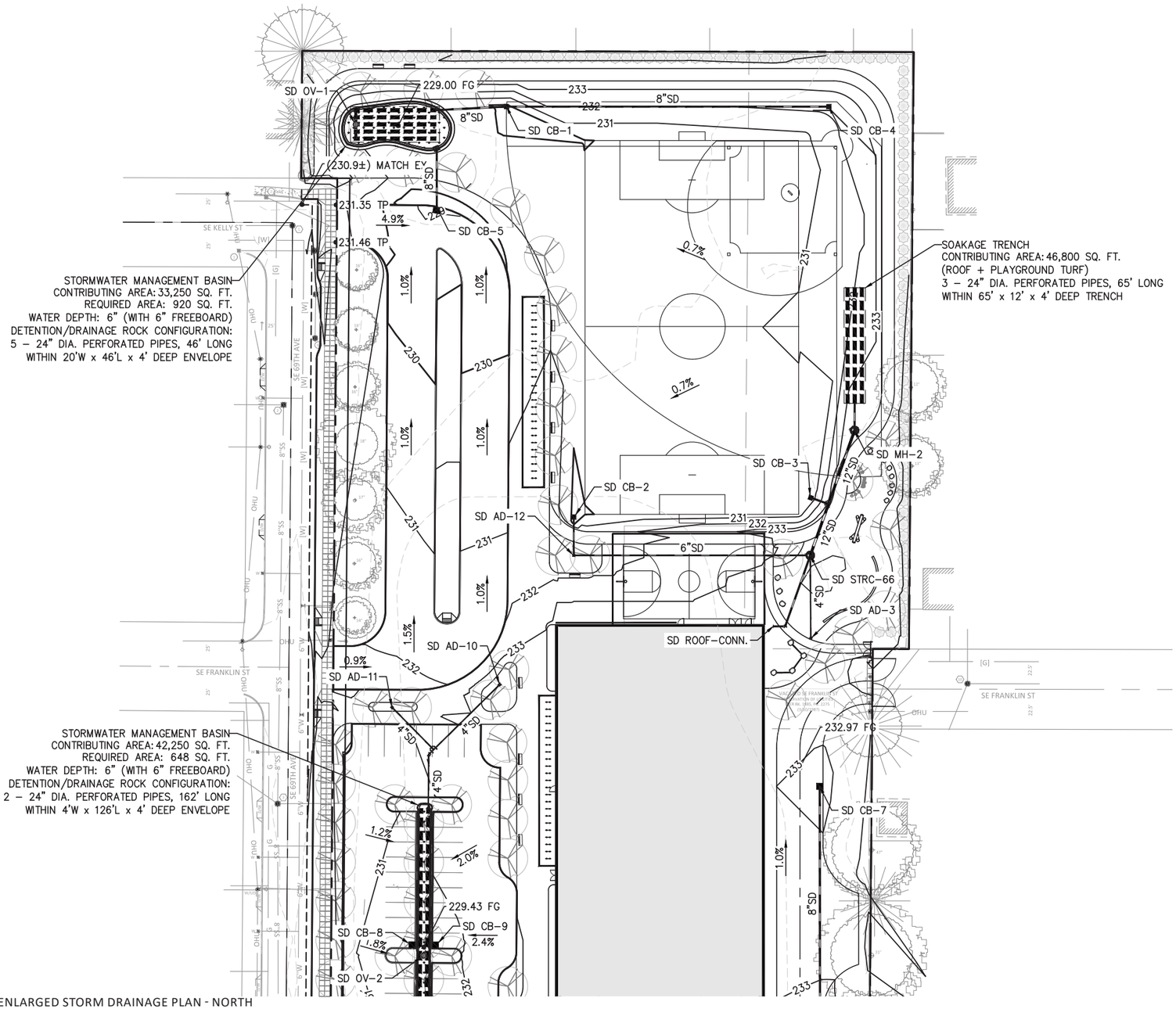
Catagory 2: Requires total onsite infiltration with vegetated facilities that overflow to subsurface infiltration facilities. Examples of subsurface infiltration facilities include drywells, soakage trenches and sumps. These facility types are underground injection control structures (UICs) and must be registered with DEQ. Roof runoff is exempt from pollution reduction requirements and may drain directly to a UIC.

Offsite Discharge

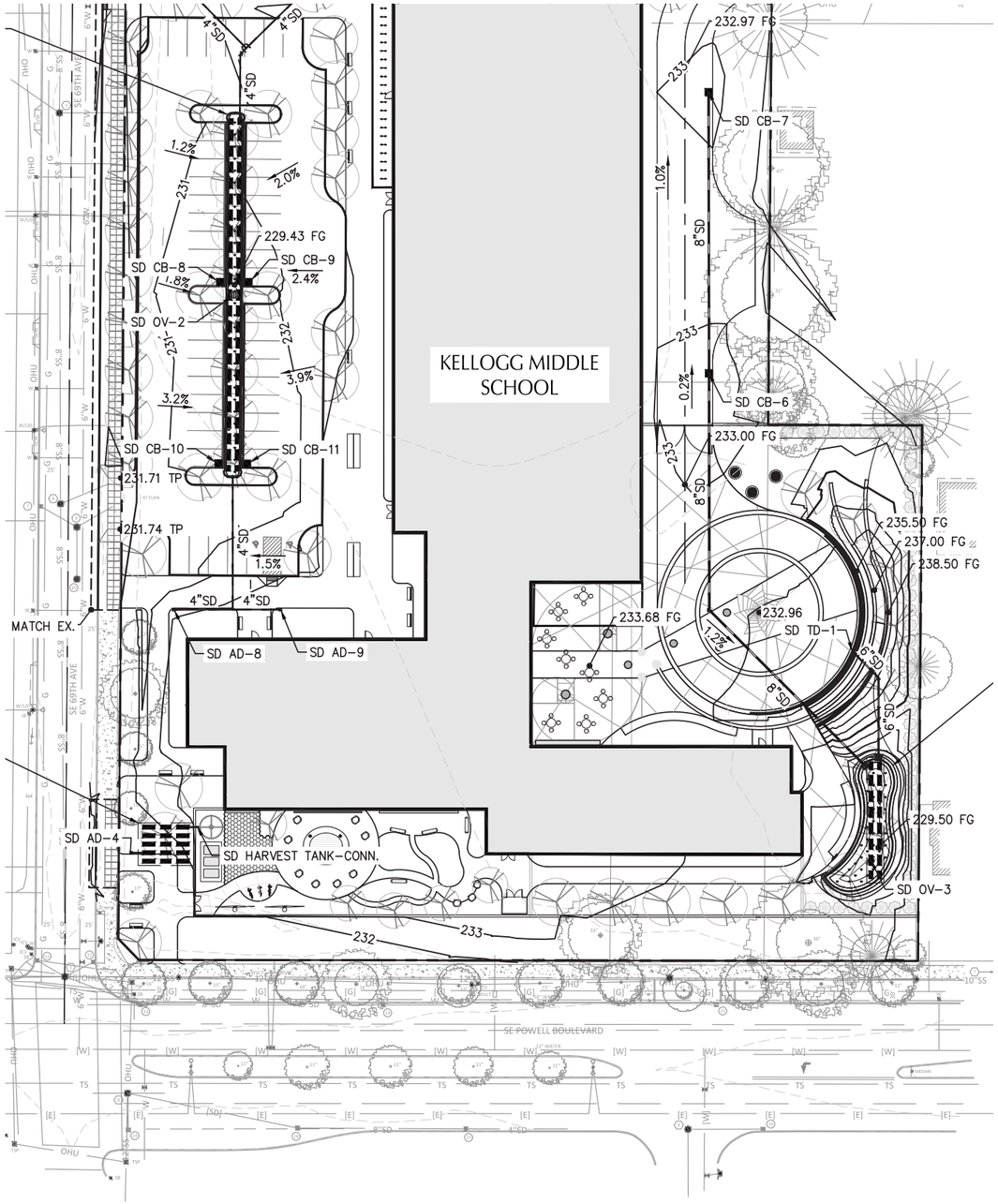
Catagory 3: Requires onsite detention with vegetated facilities that overflow to a draingeway, river, or storm-only pipe. Vegetated facilities (lined or unlined) must meet pollution reduction and flow control requirements to the maximum extent feasible prior to offsite discharge.

Catagory 4: Requires onsite detention with vegetated facilities that overflow to the combined sewer system. Vegetated facilities (lined or unlined) must meet pollution reduction and flow control requirements to the maximum extent feasible prior to offsite discharge.

STORMWATER INFILTRATION AND DISCHARGE HIERARCHY



ENLARGED STORM DRAINAGE PLAN - NORTH



ENLARGED STORM DRAINAGE PLAN - SOUTH

STORM WATER DESIGN HIERARCHY

Development projects in combined sewer areas are required to infiltrate stormwater on site to the maximum extent feasible. The degree of required onsite infiltration is based on the City of Portland hierarchy from the Portland Storm Water Management Manual (SWMM) as shown in the diagram. The highest technically feasible category must be used (1 = highest, 4 = lowest). Applicants must provide appropriate technical analyses and evaluation to demonstrate the need to move from Category 1 down through each consecutive category. Soil testing is required to determine the feasibility of onsite infiltration and the appropriate rate.

According to the Geotechnical Report provided by GeoEngineers, no groundwater was observed at the site, allowing for the opportunity of onsite infiltration.

With City of Portland Stormwater Management Manual (2016) hierarchy requirements, and the availability of high onsite infiltration rates, this places the proposed design in a hierarchy category 1 or 2. Vegetated stormwater facilities with overflow to subsurface infiltration facilities are proposed to meet the hierarchy requirements. The vegetated stormwater facilities are sized to treat 90% of the average annual runoff, and the subsurface infiltration facilities are sized to infiltrate the 10-year storm event. In addition to Portland's SWMM requirements, the subsurface infiltration facilities must also follow underground injection control (UIC) requirements set forth by Oregon DEQ.
Roof, turf, or pedestrian-only plazas do not require treatment in a vegetated stormwater facility prior to infiltration. All other impervious area will be treated prior to infiltration.

To meet these requirements, the site storm system is designed with vegetated stormwater facilities to treat the bus, parking, and fire access lane areas.

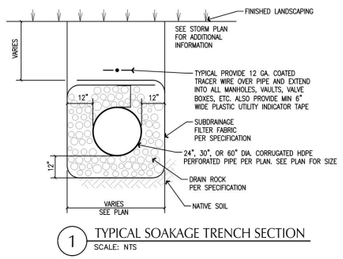
VEGETATED STORMWATER BASIN NEXT TO PARKING LOT

VEGETATED STORMWATER BASIN IN PARKING MEDIAN

These basins feature an overflow to a soakage trench/drainage rock layer below to provide detention and infiltration of the 10-year storm. Roof, turf, and pedestrian-only plazas are managed by conveying stormwater directly to soakage trench facilities located throughout the site.

For the baseline design of a turf field, onsite infiltration will be provided by the current sized facilities shown. Stormwater runoff from the turf areas will be conveyed to basin in the northeast corner of the property and the soakage trench east of the field.

For the onsite storm water infiltration, facilities would be constructed down at the level of pervious substrata, approximately 6 feet. Facilities will utilize a soakage trench system of perforated pipes and surrounding drain rock that envelop the perforated pipe system to provide both detention and infiltration.



1 TYPICAL SOAKAGE TRENCH SECTION
SCALE: NTS

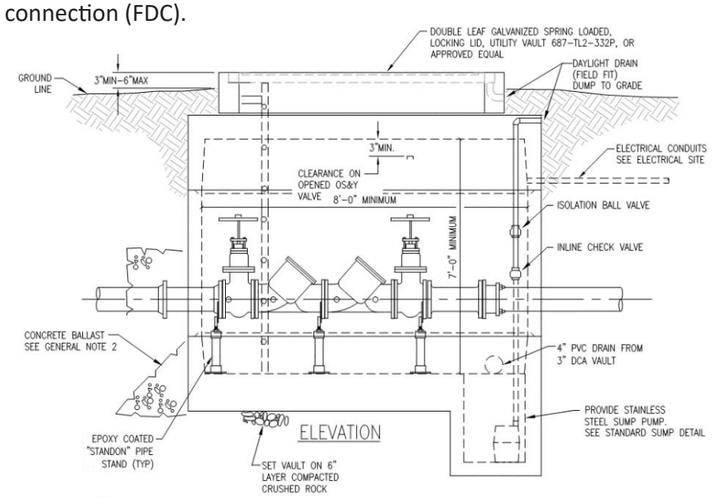
Construction of the storm conveyance facilities would be comprised of conventional storm sewer materials. Precast concrete manholes and 8- to 12-inch PVC piping would largely be utilized to convey stormwater from roof connections and paved surfaces to the treatment and infiltration facilities described above. The perforated pipe infiltration facilities would be constructed of 24-inch diameter corrugated N-12 HDPE standard gravity storm perforated pipe material.

DOMESTIC WATER

A 4-inch domestic line will be extended from the existing water service along SE Powell. This will require a meter set, and reduced pressure backwater assembly located at the property line. The demolition phase included removal of the existing double check valve vault and the capping of this line at the property line while keeping the water meter in the sidewalk on Powell. The extension will include a meter that meets current standards (to replace the existing meter) and a reduced pressure backflow assembly in an above-grade vault.

FIRE PROTECTION

The school building will be fully sprinklered, and will require a separate fire protection connection to a public water main. The size of this line is yet to be determined, but an 8-inch line is anticipated. A connection to the 12-inch public water main in SE Powell is proposed. adjacent to the domestic service connection. A below grade vault located at the southern property line will house the double detector check valve assembly (see diagram below) with a connection to a fire department connection (FDC).



DOUBLE DETECTOR CHECK VALVE ASSEMBLY

For typical school construction, the design fire flow would be limited to 1,500 gpm based on Paragraph B105.3 of Appendix B: Fire Flow Requirements for Buildings of the Oregon Fire Code.

According to the City of Portland Fire and Rescue Standards and Oregon Fire Code D105.1, an aerial fire apparatus lane is required for buildings over 30 feet tall. To meet these requirements, a 26-foot proposed fire access lane is proposed on the east side of the property that extends from the existing stub of SE Franklin St and runs along the east side of the building, also doubling in purpose as a maintenance/service access lane. As required by the same code, this lane shall be located within a minimum of 15 feet and a maximum of 30 feet from the building. The fire access lane ends with a 96-foot diameter turnaround that doubles as an open plaza area for students.

FIRE HYDRANT COVERAGE

For fire hydrant coverage, there are currently two existing hydrants around the perimeter of the Kellogg campus. They are on the same side of the street as the school and are listed below.

- Corner of SE 69th Avenue & SE Powell Blvd.
- East side of SE 69th Ave. near Franklin Street.

Per Oregon Fire Code Table C105.1 in Appendix C: Fire Hydrant Locations and Distribution, the maximum allowable average spacing between hydrants is 500 feet. The current spacing of these two hydrants is nearly 500 feet, and should be adequate to meet the maximum 600-foot route around the perimeter of the building (Oregon Fire Code 507.5.1). Relocation of the existing fire hydrant on the east side of 69th Ave near Franklin St will be required for the narrowing of 69th Ave. The relocation of the fire hydrant will be an extension of this existing stub a few feet from the proposed sidewalk on SE 69th Ave.e.

NATURAL GAS

A natural gas line (size TBD by Northwest Natural Gas) will connect to the existing gas main in SE 69th Avenue. This line will connect to a gas meter located onsite, adjacent to the west side of the building.

ALTERNATES

For the alternate design of a grass field, conveyance will still be located to these facilities, but the sizing of these facilities will be smaller as they no longer have to accommodate the impervious area of the turf.

2.4 Landscape Narrative

This landscape design addresses the entire Kellogg Middle School campus. The following areas are included as part of the project scope.

- Overall site landscaping, irrigation.
- Walkways and plazas adjacent to bus stop, around parking lot and entryways on the west side of the building.
- New recreational fields including a U-10 soccer field, U-10 fast pitch softball field, covered basketball and handball courts, walking trail and a nature playground.
- Outdoor learning garden at the southwest corner of the site.
- Student union plaza located at the southeastern corner of the site.

SPORTS FIELDS DESIGN INTENT

The sports fields are located at the northern part of the site and include a U-10 soccer field, U-10 fast pitch softball field, covered basketball and handball courts, walking trail and a nature playground.

During the conceptual design process various sizes of soccer fields were explored up to a U-15 field size. It was determined that only a U-10 sized field would fit on the limited site. A U-10 field is equivalent to most other PPS middle schools who also have limited field space due to district wide site constraints. This size field works optimally with the building configuration. The baseline option for the soccer and softball fields is artificial turf and the alternate option is natural grass.

The U-10 sized softball field is designed to be used for fast pitch girls softball. The field dimensions include 60' baselines and the pitching mound is located 35' from home plate. A chainlink backstop is included behind home plate that meets the standards of a U-10 girls fast pitch field. The base paths of the infield are comprised of stabilized infield clay or fine aggregate.

The walking trail will be comprised of the same clay or fine stabilized aggregate. The trail will be crowned to achieve adequate drainage just as the soccer field will be.

The covered basketball and handball courts include basketball hoops that are hung from the ceiling instead of ground mounted poles. The wall of the gymnasium will double as a handball wall. The court suface consists of concrete and the court striping is painted onto the concrete. The court paving is colored a color to be determined.

Perimeter chainlink fencing with privacy slats is provided between the fields and the adjacent residential properties. A tall evergreen hedge is provided along the entire north and east property lines on the school side of the fence in order to provide privacy.

A nature playground is provided adjacent to the basketball court. It includes a climbing boulder, custom serpentine climbing wall, climbing log structure and musical play instruments. The play surface will be an artificial play turf. No pellets are necessary therefore maintenance of this surface is very low maintenance.

SPORTS FIELD CONCEPT


SOCCER AND BASEBALL FIELDS


MUSICAL PLAY INSTRUMENTS



STABILIZED AGGREGATE WALKING TRAIL AND INFIELD


LOG CLIMBING STRUCTURE


COVERED BASKETBALL AND HANDBALL


BOULDERS AND TIGHT ROPE



CHAINLINK FENCE AND VEGETATIVE SCREEN


FIBAR PLAY SURFACING



CLIMBING STRUCTURES

BASELINE MATERIALS

The most significant material comparison for both the soccer and softball field was to use artificial turf or to use natural grass. Because Portland Public Schools likes artificial turf it is considered as the baseline design option for the project. It is the lower maintenance option as natural grass has to be reseeded occasionally, mowed, thatched and irrigated.

Various materials were also considered for the walking trail which include asphalt paving or stabilized aggregate paving such as decomposed granite or clay. Stabilized aggregate is the selected material for the baseline option as it does not easily erode, is semi-permeable, is not toxic, is lighter in color which attracts less heat and is a softer surface than asphalt. Asphalt paving is environmentally unfriendly and since environmental stewardship is being promoted throughout the project we declined the use of this material in our design.

The surfacing for the basketball and handball courts selected is concrete. We feel concrete will be the longest lasting material compared to other options such as asphalt.

Rubberized play surfacing, artificial turf and fibar play surfacing were considered for the nature play surfacing. Artificial turf was selected as the surface for the nature play area. It was chosen for it's close resemblance to the natural grass fields in order to keep the playground looking natural. It is also less toxic and attracts less heat than a rubberized play surface would be. Fibar is the most affordable option but it requires ongoing maintenance to keep the material in the designated play area as well as the fact that it needs to be replenished occasionally.

OUTDOOR LEARNING CLASSROOM - BASELINE

The baseline option of the outdoor classroom was designed to provide three separate areas of learning. The western most area includes an integrative science learning garden which focuses on stormwater and alternative energy. The middle area provides a central gathering area for outdoor teaching. The eastern area provides a medicinal, herb and native plant garden with creative educational signage.

Items that will be included in the integrative science area are a science wall which will measure energy output from kinetic bikes, stormwater usage for graywater and flushing toilets, solar wall and paving output, wind energy collection, etc.. The science wall will also include integrative usage of stormwater for watering plants in a manual way. It will also include solar paving, a solar wall, small scale wind turbines, and kinetic bicycles. A tall, vertical stormwater cistern will be included and the water collected will be used to flush toilets in this wing.

The central gathering area for outdoor teaching is comprised of a wood or composite wood stage, surrounded by flat topped boulders for seating. The building wall in this location, will be used for smartboard/chalkboard for teaching lessons on. They will be housed in a water tight encasement to avoid decay from weather. The ground plane surfacing will be artificial play turf. It should be noted the artificial play turf is not the same as artificial turf for sports fields in that pellets are not used to maintain it.

The eastern most area is comprised of stabilized small aggregate pathways. for seating, logs with cut, flat . Garden themes will include medicinal, herb, and native gardens. Informative signage will be provided near plants to aid in teaching the students about each of the plants in the garden. This option does not provide an access to SE Powell St. or SE 69th St. and is designed for student usage and not as much for the community.


OUTDOOR CLASSROOM


RAINWATER CISTERN

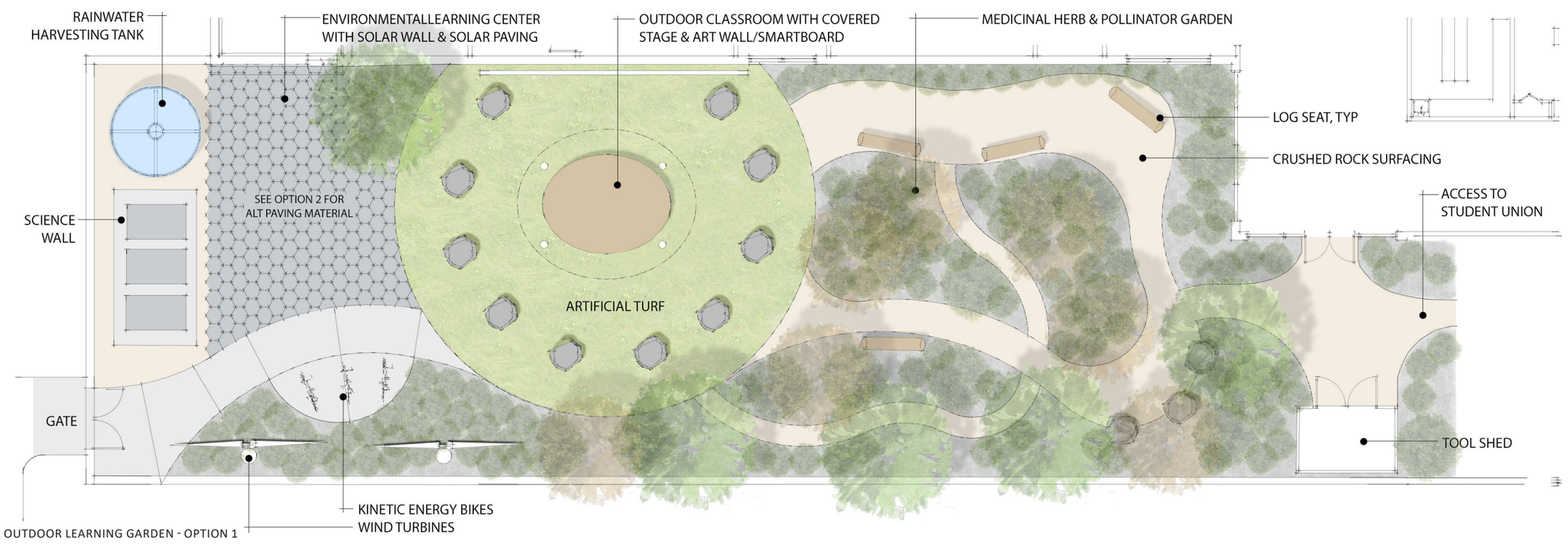

SCIENCE WALL


SMALL WIND TURBINES

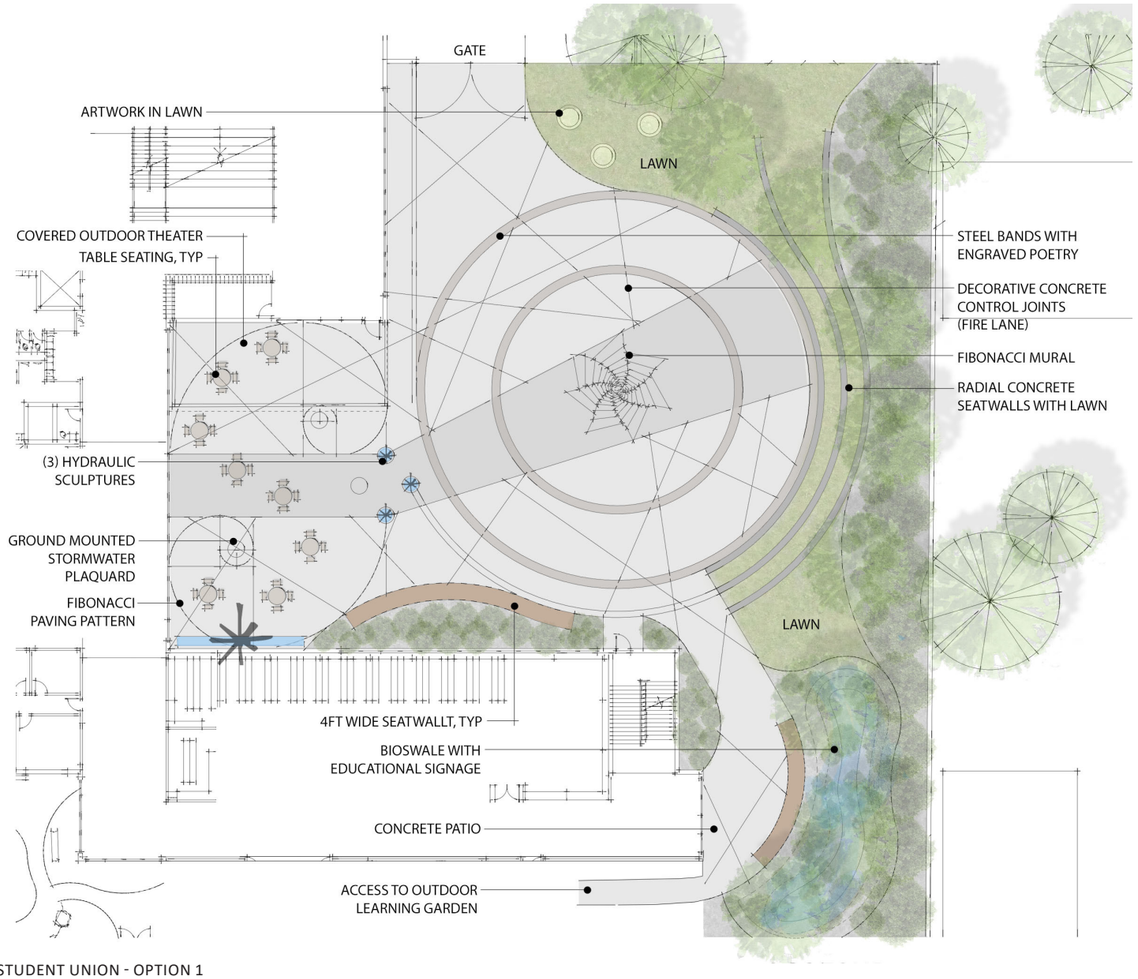

SOLAR WALL


UPCYLCE BICYCLES

PLANT DEMONSTRATION GARDENS



OUTDOOR LEARNING GARDEN - OPTION 1



STUDENT UNION - OPTION 1

STUDENT UNION PLAZA - BASELINE

The baseline option is designed to provide multiple layers of learning for all students no matter what subject they are specializing in. Learning inspiration come in the form of Fibonacci spirals on the pavement, Fibonacci pavers, poetry inscribed in circular concentric bands, sculptural artwork as well as stormwater sculpture, and informational placards.

The ground plane is where most of the learning takes place. A combination of angular scored concrete combined with Fibonacci spiral scoring, Fibonacci pavers and a Fibonacci mural of a cactus/flower makes up the paving for the space. Educational placards are placed strategically to provide learning opportunities for the students.

For seating, three concentric concrete seatwalls with intermediate lawn treads creates stadium seating on the eastern edge of the plaza. Other seating opportunities include a concrete seatbench with wood seatboards on the south side of the plaza and adjacent to the raingarden demonstration garden.

The raingarden is comprised of raingarden plants and trees, a decomposed granite walking trail around the raingarden and educational signage about raingardens.

Placeholders for sculptures are provided throughout the site. Two of the sculptures convey stormwater. One is located at the southern wall of the western Fibonacci square and the other is located centrally in the plaza. Three more sculptures are located in a lawn area to the north of the circular plaza.

For fencing, a punched metal fence will be used along the southern edge to match the fencing that encloses the outdoor learning garden. The eastern and northern boundary fences will be chainlink fences with privacy slats. Vegetation is provided in front of the fence so as to screen it from view.

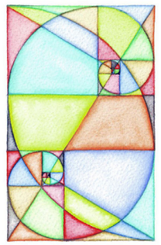

CONCRETE SEATBENCHES AND LAWN TREADS


INLAID OR LASER CUT POETRY


NATURAL PATTERNS AND SCULPTURES


EDUCATIONAL SIGNAGE


FIBONACCI PAVING



FENCING - OUTDOOR LEARNING CLASSROOM

Various material options were considered for an enclosure fence at the outdoor classroom with three items taking precedence when considering design options. The items of importance are aesthetics, security, and the use of materials that do not receive graffiti well.

The material that was preferred by the Design Advisory Group, Portland Public Schools and the design team was a punched metal fence combined with lattice work to support vines. The metal fence panels will be sealed with a graffiti proof sealant.

SITE FURNISHINGS

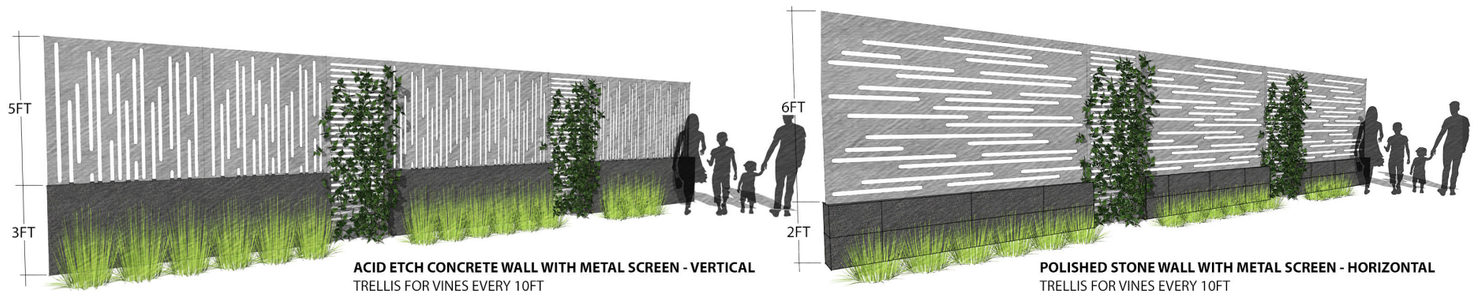
A combination of proprietary benches and custom benches which will be comprised of a concrete base and wood platform are included. Durability will be a priority when choosing proprietary benches. Most likely metal benches will be chosen with a finish that resists graffiti. Metal trash and recycling bins will be placed throughout the site. Metal bike racks will also be included where needed. Currently, 47 bike racks are included. Bike racks will be covered where possible.

IRRIGATION DESIGN INTENT

The irrigation design objective for the site is to provide permanent irrigation to the recreational fields using a high efficiency, automatic sprinkler system that interfaces seemlessly with Portland Public Schools integrated system.

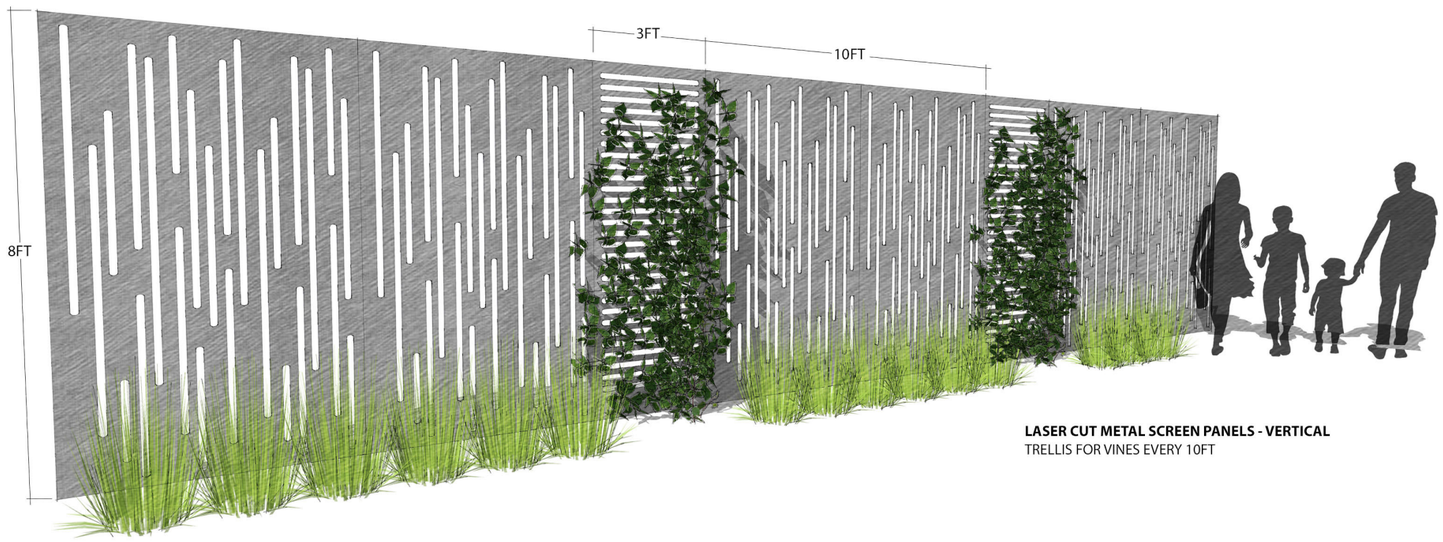
Outside of the recreational fields, irrigation will be provided to all new landscape areas. However, these areas will only utilize irrigation for the first two years until the plants have been established. After the two year establishment period, the irrigation system can be shut down except for the driest periods that pose a threat to plant health.

Even native and drought tolerant plants are stressed by extended periods without water. Typically irrigation is only needed sporadically during the summer months to keep these plants healthy so a limited amount of irrigation would be necessary.



ACID ETCH CONCRETE WALL WITH METAL SCREEN - VERTICAL
TRELLIS FOR VINES EVERY 10FT

POLISHED STONE WALL WITH METAL SCREEN - HORIZONTAL
TRELLIS FOR VINES EVERY 10FT



LASER CUT METAL SCREEN PANELS - VERTICAL
TRELLIS FOR VINES EVERY 10FT

FENCE STUDY

PLANTING DESIGN INTENT

The design objective for planting the site is to create an aesthetically pleasing setting consisting of native and drought-tolerant plant material resembling the natural areas of the greater Portland area.
The selection of plant material will depend on the location plants are being planted. Each landscape area throughout the site has a different microclimate and will need to be assessed for sun exposure, slope, soil type, etc.. Specific landscape areas within the site to be addressed:

OUTDOOR CLASSROOM AND STUDENT UNION PLAZA PLANTING

- Plants within the outdoor classroom and student union plaza will be designed with both education, environmental sustainability and artistic expression when choosing trees and plant specimens. Natives most suited for the greater Portland area and the Pacific Northwest will be provided in the raingarden area and elsewhere throughout the areas. Herbs and medicinal plants will also be used to provide educational experiences.

RECREATIONAL FIELDS

- The recreational fields will be seeded with a blend of grasses that are very durable and drought-tolerant to conserve water.

VEGETATIVE BORDER SCREEN

- A continuous conifer hedge will be provided along the eastern and northern property line in front of a slatted chainlink fence to hide the chainlink fence and provide a 10-12’ high screen. Noise and privacy will be improved for all adjacent neighbors by doing so.

ENTRYWAY AND FOUNDATION PLANTING

- The foundation planting will not only soften the hard edges of the building, but will also deflect heat away from the building during the hot summer months. These plants should be kept under three feet tall where the height of plants will block windows. Primarily, evergreen species will be used to maintain vegetative interest during all seasons but in strategic locations, deciduous plant species will be used.
- Where solid walls exist along the foundation, a blend of plant sizes will be used along with larger specimen trees and shrubs to provide some change in plant species.

PARKING LOT LANDSCAPING

- An evergreen screen using evergreen shrubs no more than 3’ tall, will be provided along SE 69th Street in order to screen the parking lot from the neighborhood. A similar vegetative screen will also be provided in front of the bus turnaround.

STORMWATER FACILITIES

- Native plants that are both conducive to wet and dry conditions will be planted in the stormwater facilities.

TREES

- A combination of both evergreen and deciduous trees will be planted throughout the site. An emphasis will be placed on choosing trees that are low maintenance and have minimal leaf shed.

KELLOGG MIDDLE SCHOOL
PORTLAND PUBLIC SCHOOL DISTRICT
02/01/18

LEED NARRATIVE

WEC1.2 - WATER CONSERVATION

- We will work towards achieving a 50% reduction from a calculated mid-summer baseline case.
- The use of soil tests and/or an assessment of microclimatic conditions will be performed in order to determine appropriate plant material. The use of drought tolerant native and adaptive plants will be used to reduce or eliminate irrigation requirements.
- The use of no irrigation will be discussed with the client and if deemed possible will be exercised in areas of low use or for stormwater facilities where stormwater is already being directed to the facilities.
- Where irrigation is required, we will use high-efficiency equipment such as micro-rotors and rotors with very low precipitation rates, climate-based controllers, soil sensors, and rain sensors.

SSC5.1 - PROTECT OR RESTORE HABITAT

- We will be working towards restoring and/or protecting at least 50% of the total site area with native/or adaptive vegetation. All areas on site that will be planted with vegetation that is a majority native and provides food/shelter for habitat. Lawn areas will be planted with drought tolerant blends that will include native species if possible.

SSC5.2 - MAXIMIZE OPEN SPACE

- We will be working towards exceeding the required amount of landscape area required within the property boundary by at least 25%. We will be providing calculations showing the area of open space within the property boundary which will exclude the building footprint, hardscape, access roads and parking.

SSC 7.1 - HEAT ISLAND EFFECT - NON-ROOF

- We will be specifying a high albedo paving material with a solar relective index of at least 29 for at least 50% of the paved surfaces within the property boundary.
- Where possible we will provide shade (within 5 years of occupancy or sooner) by planting trees or providing shelter over paved surfaces. For example, we will be providing pavement under a covered play area. We will be planting trees to the greatest extent possible in parking lots, courtyards and plazas.

BIOPHILIC DESIGN IN THE LANDSCAPE

In plazas and courtyards we infused a combination of natural geometry and shapes in paving, seating, and in the plants and trees we will be planting. We also included natural methods of seating by including boulders and logs to sit on. In both the Outdoor Learning Classroom and the Student Union Plaza, many biophilic elements are included as educational items such as a Fibonacci flower mural, Fibonacci pavement and the celebration of stormwater by including hydraulic sculpture.

Connection to nature is include it's truest form with the inclusion of a raingarden demonstration area in the student union plaza and a medicinal, herb and native plants garden in the outdoor learning classroom.

Careful attention is taken to provide quality light in each space while offering places of refuge to enjoy the natural surroundings. Air quality is maximized through the addition of trees and vegetation while habitat is supported through strategic selection of plants and trees.

The athletic fields offer wide open expansive views allowing users to enjoy views of mature trees in the surrounding neighborhood and weather patterns while using the sports fields. A nature play area includes elements that are made from natural elements such as logs and boulders giving users a sense of connection to nature. A walking trail made of natural materials meanders past the nature play as well as a raingarden where seating is again provided for enjoyment of nature.

RESILIENCY IN THE LANDSCAPE

While designing the landscape resiliency was a prime component thought process while choosing materials and designing with the future in mind. As our environment becomes more volatile, it is essential that we develop designs that meet sustainable standards in terms of sustainability, energy conservation, stormwater conservation and longevity of materials.

Designing with innovative ways to harvest energy is an integral part of the landscape design. The inclusion of rainwater harvesting cisterns, small wind turbines, and solar walls produce resiliency in regards to creating alternative energy. These alternative energy sources also positively impact future trends through education so that students live by these principles in the future.

Stormwater harvesting and celebration is also prevalent within the design by the inclusion of stormwater celebration sculptures, rainwater harvesting and rain garden demonstration gardens. Treating stormwater on site and passive means of irrigation are apparent in the design and educational interface with how responsible stormwater design can recharge our aquifers and reduce overall water consumption within the landscape as well as inside the building as rainwater could be used to flush toilets.

Durability of materials is an integral part of our design as an increased lifespan of the landscape is of the utmost importance in order to reduce environmental impact. Increasing the lifespan of the landscape will prolong having to replace it saving money and reducing the creation of more waste.

ALTERNATES

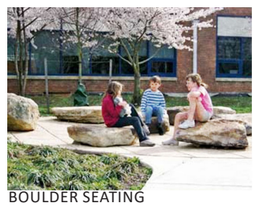
OUTDOOR LEARNING CLASSROOM - DESIGN OPTION

The alternate option places more emphasis on the environmental learning garden. Included in the gardens are a medicinal, herb and native garden. A rain garden will also be included in the central planting bed as well. Scattered boulders are strategically placed along the edges of a stabilized decomposed granite walkway for seating.

At the western end of the outdoor classroom, (3) three above ground rainwater cisterns are located, providing a significant amount of water for flushing toilets and/or irrigating part of the garden.

Adjacent to the stormwater cisterns, an outdoor classroom is provided. A combination of boulders and flat topped logs are provided for seating. A smartboard or chalkboard will be provided in an encasement that can be closed to protect it from the weather. The paving in this area will be permeable pavers to further reinforce sustainable principles within the outdoor learning classroom. This option provides access to SE Powell St. or SE 69th St. and is designed for both student and community usage.


OUTDOOR CLASSROOM

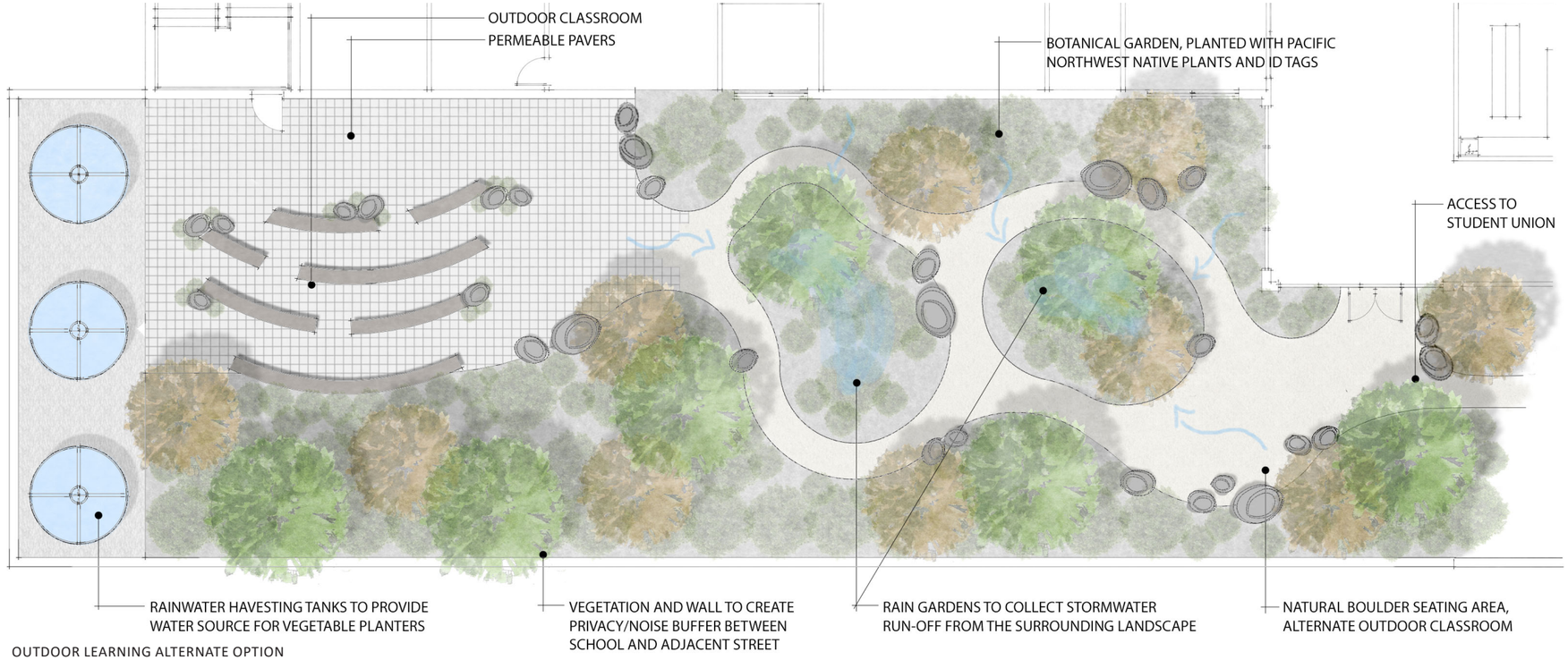

BOULDER SEATING


PERMEABLE PAVERS

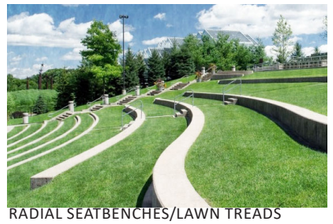

RAINGARDENS

BOTANICAL GARDEN


RAINWATER HARVESTING



OUTDOOR LEARNING ALTERNATE OPTION


RADIAL SEATBENCHES/LAWN TREADS


PLAZA WITH RAISED PLANTERS AND SEATBENCHES


FIBONACCI RAINWATER FEATURE


SOLAR SYSTEM IN
CONCRETE PAVING

STUDENT UNION PLAZA - DESIGN OPTION

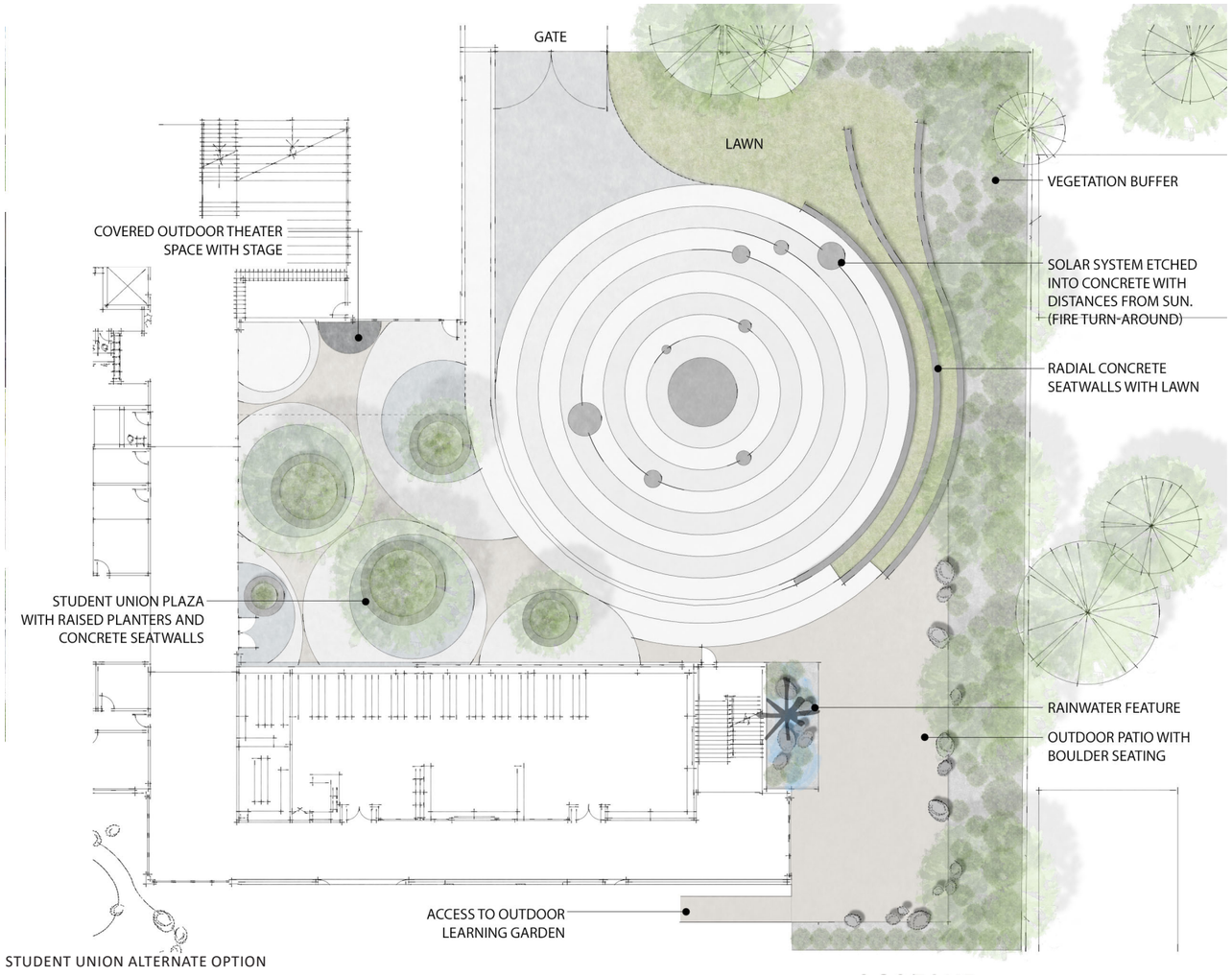
This option consists of three different gathering areas. Concentric circles again are repeated throughout the design in the plaza area. Learning opportunities come in the form of a miniature ground plane model of our solar system, poetry inscribed in circular concentric bands within the solar system, and stormwater conveyance sculpture.

The plaza immediately adjacent to the building to the west, consists of circular concrete planters/seatwalls, amoeba like scoring in concrete paving with subtle contrasts in paving color to create visual interest.

To the south a more naturalized courtyard is provided with soft surfaced paving, natural boulders for seating and native plantings. The highlight of this courtyard is a stormwater conveyance water feature adjacent to the building wall.

For seating, this option is identical to the alternate option in regards to stadium seating. Three concentric concrete seatwalls with intermediate lawn treads creates stadium seating on the eastern edge of the plaza. Other seating options include circular concrete seatbenches on the west side of the plaza.

For fencing, a punched metal fence will be used along the southern edge to match the fencing that encloses the outdoor learning garden. The eastern and northern boundary fences will be chainlink fences with privacy slats. Vegetation is provided in front of the fence so as to screen it from view.



STUDENT UNION ALTERNATE OPTION

OUTDOOR LEARNING GARDEN BASELINE AND ALTERNATE OPTION COMPARISONS AND RECOMMENDED SYSTEMS

The most significant material comparison we explored which differed in both options is solar paving and permeable pavers. Solar pavers are not yet on the mainstream market but can be obtained. The cost for these would be high so we explored other options and landed on permeable pavers as a more feasible option in regards to both cost and availability.

Other comparisons that occurred between the two options was how much stormwater to store in the learning garden. Corrugated metal storage containers were preferred for both options and we preferred to show above ground storage containers so that they would be visible. However, the difference between the two options is that the alternate option is more functional and tries to achieve maximum storage capacity so that water can be reused for flushing toilets and possibly irrigation. The baseline option only includes one tank and is more to be used for flushing toilets in the adjacent school wing and to be used on a minimal basis at the science wall in order to manually water plants.

Another comparison would be found in pavement for the classroom portion of the garden. Permeable pavers are chosen for Option 2 along with log seating and Option 1 provides artificial play turf with boulder seating. The preference of material is artificial play turf as you can not only sit comfortably on the boulders but also right on the artificial play turf. This allows a larger audience to sit in this area. Sitting on permeable pavers may be a little more formal and not as comfortable therefore less people may be able to comfortably sit in this area.

STUDENT UNION PLAZA BASELINE AND ALTERNATE OPTION COMPARISONS AND RECOMMENDED SYSTEMS

Both of these options are strong in their own way and repeating systems are found in both designs. At this point no one system is preferred over another. However both design options include similarities which can be considered as preferred systems.

Since there is a considerable amount of paving in this space, we decided to stick primarily with this paving option for both designs since it would be more cost effective and less maintenance. Various colors or shades of gray will be used in both concepts. The baseline option includes the potential usage of Fibonacci inspired pavers in a specific shape which radiates outwards from the building to the Fibonacci cacti mural but this area could very well become colored concrete paving.

Both options include concentric bands of either paving or metal inlays. Options that have been discussed are the following:

- Steel channels that can also function as drains as words would be inscribed into the steel channels.
- \Colored concrete with inlaid metallic letters Embedded into it.
- Colored concrete with etched letters and planets.

For seating, the baseline option includes free standing tables as well as custom concrete seatbenches. The alternate option includes boulders and custom concrete seatbenches. In order to provide some visual interest and a level of comfort for users, wood seatboards are recommended for the smaller concrete seatbenches.

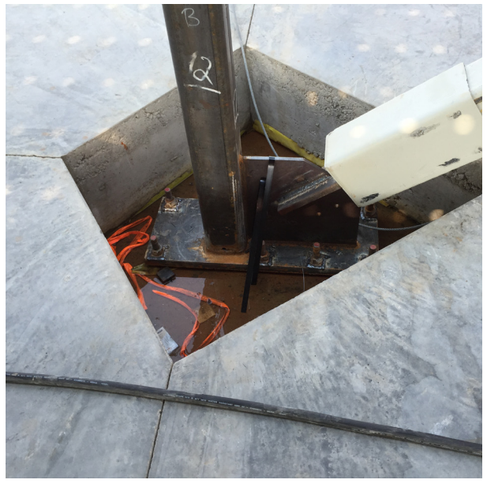
Sculpture is included in both options and using sculpture to convey stormwater is recommended in both options.

GRASS FIELD ALTERNATE

Natural grass is a viable option if the budget does not allow for artificial turf.

FENCE

The materials that were considered were polished stone, metal panels, brick and metal picket fencing. A polished stone fence baseline is also explored in one of our fence options. See fence concepts for more information. Brick and metal picket fences were considered too traditional for the building aesthetic and aesthetic interest.



2.5 Structural Narrative

The Kellogg Middle School is a new middle school building located at 6909 SE Powell Boulevard in Portland, Oregon. The building will be divided into the learning suites wing and the gymnasium/arts wing. The two wings will be separated by a seismic joint.

The learning suites wing will be a steel framed structure with four stories above grade. The square footage is approximately 95,000. The learning suites wing will contain classroom spaces, the media center, art room, and parent/ community spaces.

The gymnasium/arts wing will be a one-story steel framed structure with concrete walls at the gymnasium. This wing will contain the commons area, administrative offices, music room, and dance room. The square footage is approximately 40,000.

Reference the schematic design (SD) building plans for additional details of the structural work described in this narrative.

FOUNDATIONS
Based on geotechnical information from neighboring sites, we expect that the building will be supported on spread and strip footings, with average sizes as shown on the SD building plans. The main floor will be a 5 inch thick concrete slab on grade with approximately 1.5 psf reinforcing.

KELLOGG MIDDLE SCHOOL
PORTLAND PUBLIC SCHOOL DISTRICT
02/01/18

LEARNING SUITES WING STRUCTURE

The learning suites wing will be steel framed. Typical framing will consist of 18 inch deep steel wide flange beams supporting a 3 inch deep steel deck with a 3 inch concrete topping. The steel beams will be supported by 24 inch deep girders. Columns will be 10 inch deep steel wide flange sections. The steel weight at typical areas will be 12-15 psf, which does not include metal deck. The lateral system will be buckling restrained braced frames.

Transfer beams will be required at the 2nd floor of the east classroom suites, above the media center in order to keep the media center free of columns. Transfer beams will add 12 to 18 inches of depth to the structure at this level, and will add 4-6 psf in steel weight in this area.

The south portion of the east learning suites is exposed to the exterior at the ground floor. Two lines of steel columns and four braced frames will extend down through this area. All exposed steel will require protective measures against weather. This area will contain a 5 inch thick slab on grade with approximately 1.5 psf reinforcing.

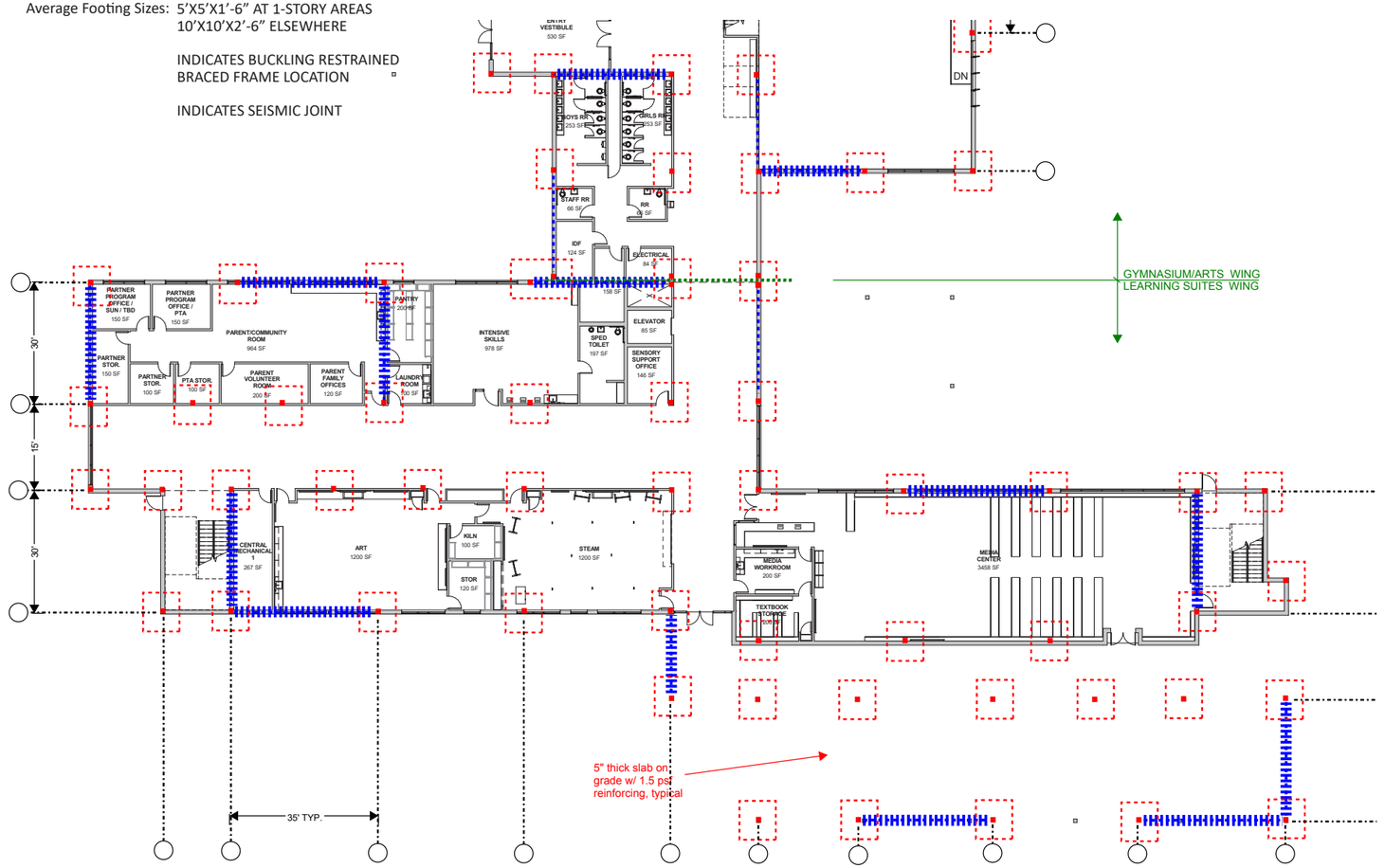
STEEL FRAMING SYSTEM

Notes:
Typical Column Sizes: HSS 5X5 AT 1-STORY AREAS W STEEL COLUMNS ELSEWHERE

Average Footing Sizes: 5'X5'X1'-6" AT 1-STORY AREAS
10'X10'X2'-6" ELSEWHERE

INDICATES BUCKLING RESTRAINED BRACED FRAME LOCATION

INDICATES SEISMIC JOINT



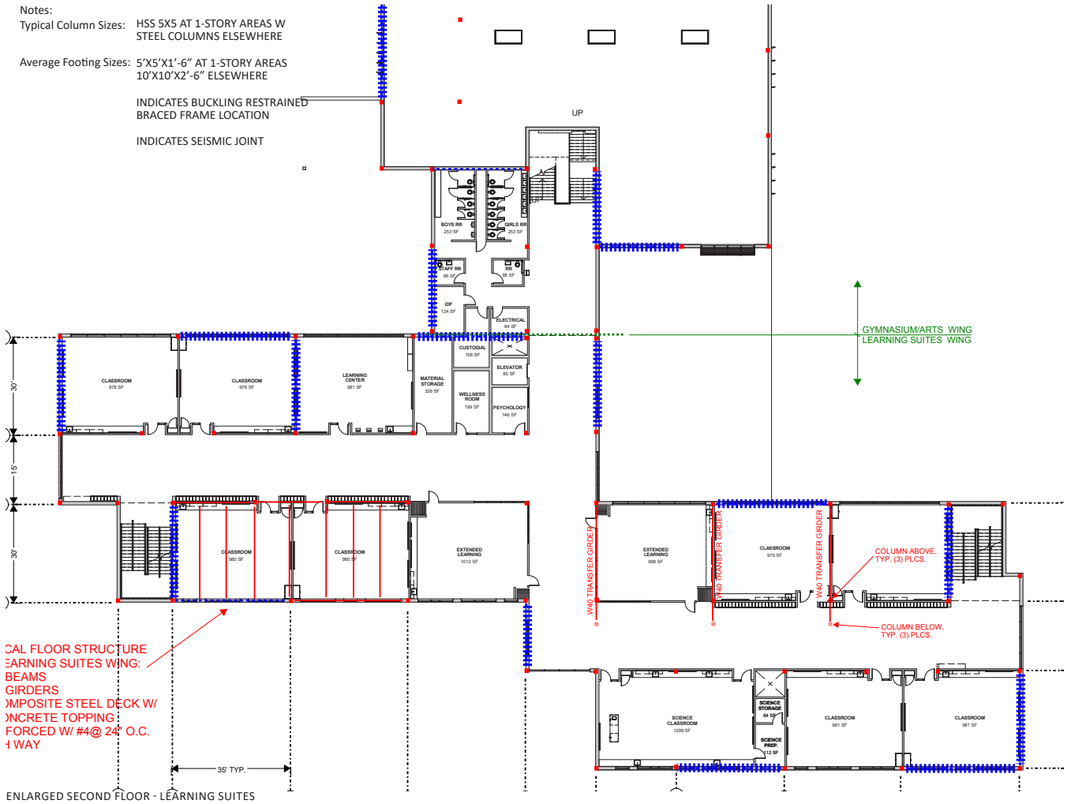
ENLARGED FIRST FLOOR - LEARNING SUITES

Notes:
Typical Column Sizes: HSS 5X5 AT 1-STORY AREAS W STEEL COLUMNS ELSEWHERE

Average Footing Sizes: 5'X5'X1'-6" AT 1-STORY AREAS 10'X10'X2'-6" ELSEWHERE

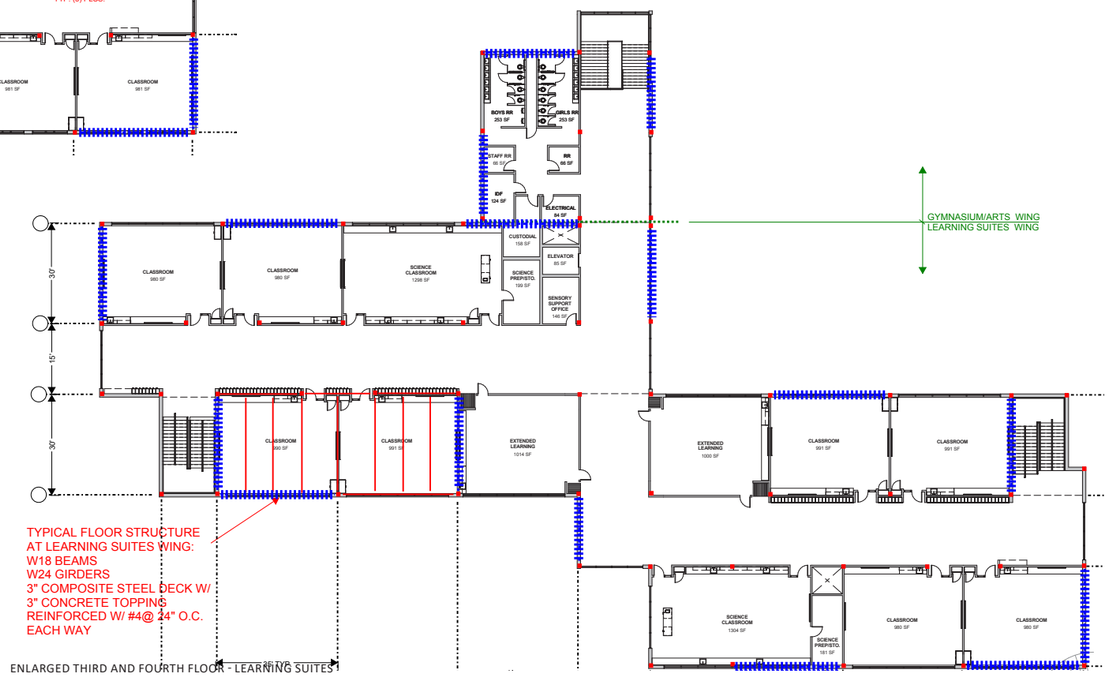
INDICATES BUCKLING RESTRAINED BRACED FRAME LOCATION

INDICATES SEISMIC JOINT



TYPICAL FLOOR STRUCTURE AT LEARNING SUITES WING:
W18 BEAMS
W24 GIRDERS
3" COMPOSITE STEEL DECK W/ 3" CONCRETE TOPPING REINFORCED W/ #4@ 24" O.C. EACH WAY

ENLARGED SECOND FLOOR - LEARNING SUITES



ENLARGED THIRD AND FOURTH FLOOR - LEARNING SUITES

KELLOGG MIDDLE SCHOOL
PORTLAND PUBLIC SCHOOL DISTRICT
02/01/18

COMMONS

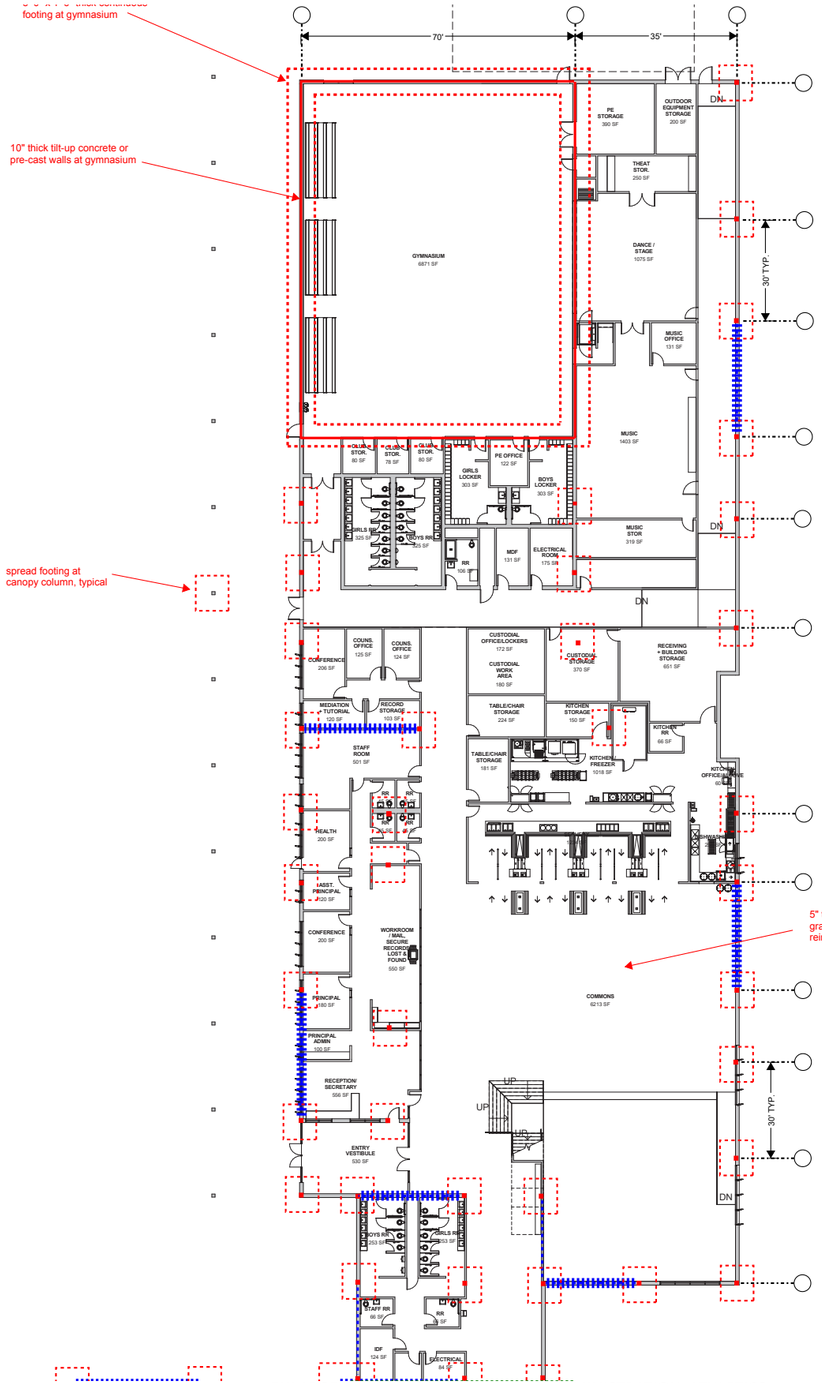
The commons area roof framing will be steel open web joists supporting a 1-1/2 inch metal roof deck. The steel weight at typical areas will be 6-8 psf. The roof framing be supported by steel HSS columns. The lateral system for the commons area will be steel buckling restrained braced frames.

GYMNASIUM / ARTS

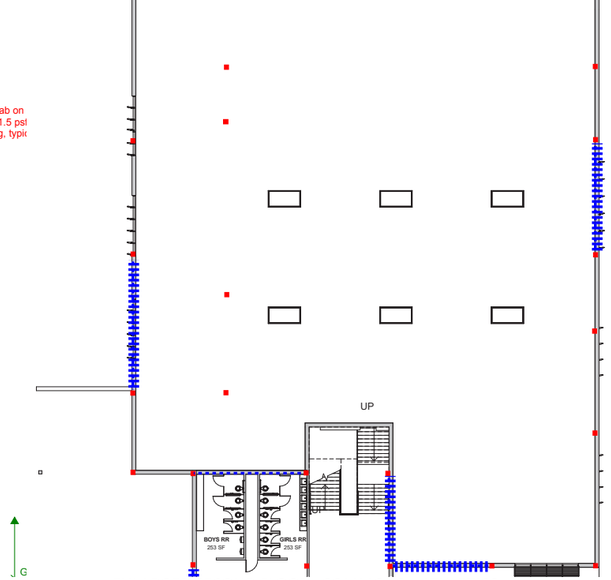
The roof at the gymnasium will have a sawtooth roof profile with steel trusses at approximately 25 feet spacing. Steel wide flange bents at a 7 foot spacing will span at a slope between trusses to support 1-1/2 inch metal roof deck. The roof diaphragm will be at the bottom of truss elevation and will consist of steel rod X-bracing and steel tube sections. The steel weight of the roof structure will be 20-30 psf.

The roof at the gymnasium will be supported by either tilt-up concrete or pre-cast concrete walls. The lateral system will be concrete shear walls.

PRECAST OR TILT-UP CONCRETE WALLS



ENLARGED FIRST FLOOR - COMMONS, ADMINISTRATION, ATHLETICS



ENLARGED SECOND FLOOR - COMMONS + ATHLETICS

COVERED PLAY

There will be a covered play area of approximately 4,000 square feet on the north side of the gymnasium. The roof structure will consist of steel open web joists supporting 1-1/2 inch metal roof deck. The steel weight will be 6-8 psf. CLT construction was considered for the roof of the covered play area. It was determined that bringing another discipline in for such a small area would not be efficient, and therefore the CLT option was not pursued.

POLISHED CONCRETE FLOOR SLABS

It is expected that some areas of the building will have exposed, polished concrete floor slabs. These areas will require control joints, 7-day wet cures, and increased surface protection during construction in order to minimize concrete cracking. In addition, using a fine fiber mesh additive can be considered to further reduce cracking.

EXTERIOR FAÇADE AND CANOPIES

The building façade will be a combination of metal panel, polished stone, and brick with punched openings. All façade types will be supported laterally with 6 inch deep, 43 mil light gauge steel stud framing. The brick will be supported vertically with continuous steel ledgers at each floor line. In addition, some areas will be clad with curtain wall, such as the commons area and entryways.

Steel canopies will extend along the west side of the gymnasium/arts wing for a total length of approximately 350 feet. Canopies will consist of metal roof deck supported by steel wide flange beams and steel HSS columns. The steel weight of the canopies will be 10-12 psf.

SEISMIC RESILIENCE

The code assigns risk categories to buildings based on their use and occupancy. The intent of these classifications is to relate code specified loading to the consequences of the loads being exceeded for the structure and its occupants. These categories are summarized in the table below.

RISK CATEGORY	DESCRIPTION
I	lowest risk to human life, typically unoccupied buildings
II	typical commercial construction
III	buildings that pose a substantial risk to human life in the event of failure
IV	essential facilities such as hospitals, fire stations

Schools are considered Category III structures, however, an upcoming change to the Oregon Structural Specialty Code (OSSC) defines “earthquake relief shelters” as school gymnasiums and cafeterias with an occupancy of 250 or greater people, and specifies that these structures should be classified as Risk Category IV.

This increase in Risk Category is intended to provide a higher level of seismic performance, with a high likelihood that these portions of the building will be safe to occupy immediately after an earthquake. School gymnasium and cafeteria spaces are targeted for this higher level of design so that they can be used as shelters for nearby communities after an earthquake.

In anticipation of this change, the gymnasium/arts wing will be designed as a Risk Category IV building. The change from Risk Category III to Risk Category IV requires using higher seismic design forces and may have special detailing requirements.

The learning suites wing will be designed as a Risk Category III building. Risk Category III buildings are designed to a higher seismic performance level than typical commercial (Risk Category II) buildings, which are designed for life safety only; however, Risk Category III buildings are not expected to provide immediate occupancy after an earthquake.

SCHEMATIC DESIGN QUANTITY NOTES

All rebar quantities given do not include waste, hooks, laps, couplers, form ties, chairs or bolsters, post-installed anchors, embeds, or similar accessories. All structural steel quantities given are based on center to center spans and do not include allowances for typical steel connection plates, angles, bolts, welds, pins, deck edge plates, form closures, etc. Quantities also do not include miscellaneous steel for support of MEP or cladding systems.

DESIGN CRITERIA

- 2014 Oregon Structural Specialty Code (based on the 2012 International Building Code)
- Risk Category III, IV
- Seismic Design Category D
- Wind: 130 MPH Basic Wind Speed
- Reinforcing Bar Yield Strength: 60 ksi
- Steel Wide Flange Shapes: ASTM A992
- Other Steel Shapes: ASTM A36
- Office Live Load: 65 psf
- Classroom Live Load: 40 psf
- Gymnasium Live Load: 100 psf

ALTERNATES

LEARNING SUITES

Cross-laminated timber (CLT) construction was also considered for the classroom wing structure. CLT can be cost competitive with steel by using plywood shear walls as the lateral system and maintaining a very regular structural grid. There were concerns about maintaining the future flexibility of the spaces within these limitations, and therefore the CLT option was not pursued.

GYMNASIUM / ARTS WING

Shed Roof at Gymnasium with Steel Open Web Joists
The roof at the gym will be a shed roof profile and consist of 1-1/2 inch metal roof deck supported by 48 inch deep steel open web joists at a 7 foot spacing. The steel weight of the roof structure will be 4-6 psf.

COVERED PLAY

Fully Enclose the Covered Play Area to Create an Auxiliary Gym:
The following are two structural options for turning the covered play area into an auxiliary gym:

- Concrete: 10 inch thick concrete walls with 5’-0” wide x 1’-6” thick continuous concrete footing to support steel roof framing as noted previously
- Steel: Provide HSS 5x5 columns at 30’ maximum spacing and add (2) steel buckling restrained braced frames in each direction ((4) total) to support steel roof framing as noted previously

SEISMIC RESILIENCE

Design the Learning Suites Wing as Risk Category IV:
From a structural perspective, upgrading the seismic design of the learning suites wing to meet the Risk Category IV/immediate occupancy performance requirements would require use of higher seismic design forces than would be used for Risk Category III. The result of these higher forces would be an increase in sizes and connections of the lateral force resisting system elements including braced framed members, braced frame foundations, collectors, diaphragm reinforcing, and diaphragm connections. The cost increase is probably on the order of 1 to 2 percent of the overall construction cost.

2.6 Mechanical Narrative

Codes, Standards and Guidelines
Systems shall be designed in accordance with the latest edition of the following codes unless noted otherwise:

- 2014 OMSC - Oregon Mechanical Specialty Code
- 2014 OSSC - Oregon Structural Specialty Code
- 2014 OEESC - Oregon Energy Efficiency Specialty Code
- 2014 OPSC - Oregon Plumbing Specialty Code
- ASHRAE Standard 62.1-2010 – Ventilation for Acceptable Indoor Air Quality
- ASHRAE Standard 55-2010 – Thermal Environmental Conditions for Human Occupancy
- ASHRAE Standard 90.1-2010: Energy Standard for Buildings Except Low-Rise Residential Buildings
- ADA or Uniform Federal Accessibility Standards
- National Fire Protection Association (NFPA) Standards
- USGBC LEED Green Building Rating System for New Construction (LEED-NC)

The following reference standards and guidelines shall be used for the design:

- ADA: Americans with Disabilities Act.
- AMCA: Air Movement and Control Association International, Inc.
- ANSI: American National Standards Institute.
- ARI: Air Conditioning and Refrigeration Institute.
- ASHRAE: American Society of Heating, Refrigeration, and Air Conditioning Engineers.
- EPA: Environmental Protection Agency.
- NEMA: National Electrical Manufacturer's Association.
- NFPA: National Fire Protection Association.
- NFPA 90A: Air Conditioning and Ventilating Systems.
- NFPA 101: Life Safety Code.
- SMACNA: Fire and Smoke Damper Installation Guide.
- SMACNA: Guidelines for Seismic Restraints of Mechanical Systems.
- SMACNA: Standards for Duct Construction.
- UL: Underwriters' Laboratories.

Table 1: Outdoor Conditions Portland, OR. (ASHRAE 90.1-2010 Climate Data)

Outdoor Conditions		Summer	Winter
ASHRAE 1% Summer and 99% Winter Data		86°F DB/ 66°F WB	22°F

Table 2: Indoor Conditions – (ASHRAE Standard 55-2013; PPS Design Standards)

Indoor Conditions	Summer	Winter
Offices and Conference Rooms	74°F ±2°F	68°F ±2°F
Classrooms	74°F ±2°F	68°F ±2°F
Computer Services	72°F ±2°F	68°F ±2°F
Gymnasium/Commons	78°F ±2°F	60°F ±2°F
Storage	78°F ±2°F	60°F ±2°F
Circulation and Restrooms	78°F ±2°F	68°F ±2°F
Relative Humidity	<50% ±10%RH	No control

Table 3: Duct and Pipe Sizing Criteria (SMACNA Industry Standards)

Low-Pressure Ductwork	
Static Pressure Loss	Maximum 0.1 inches WC per 100 feet
Main Velocity	Maximum 1,800 feet per minute
Branch Velocity	Maximum 1,500 fpm
Flexible Ducts	Maximum length 7 feet/ minimize total 90° bends.
Medium-Pressure Ductwork	
Static Pressure Loss	Maximum 0.35 inches WC per 100 feet
Main Velocity	Maximum 3,000 feet per minute
Branch Velocity	Maximum 2,000 fpm
Hydronic Piping	
Static Pressure Loss	Maximum 4 feet WC per 100 feet
Velocity	Maximum 8 feet per second

ROOFTOP UNIT

SYSTEM SUMMARY
To serve the school, four air handling systems will be provided. Separating the equipment for the different areas and uses in the school will improve controllability and flexibility during regular and off hours of operation. Two rooftop units will be installed on the classroom wings to serve that area. A third rooftop unit will be installed to serve the commons and office spaces. The fourth rooftop unit will be a dedicated gymnasium/music/dance area.

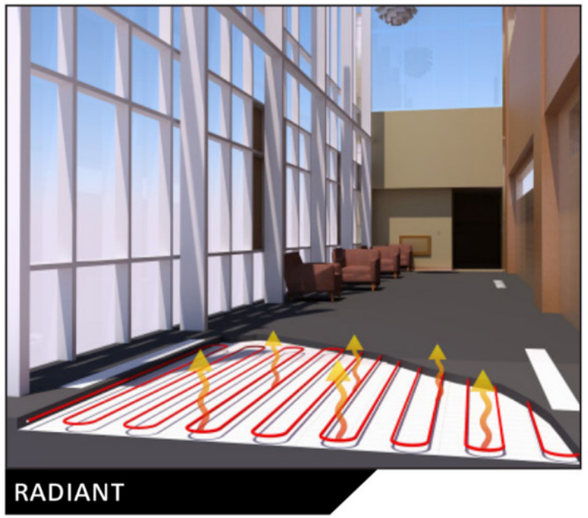
Each air handler will be designed around VAV displacement ventilation with demand control ventilation. Supply air will be fully ducted and a return air plenum will be utilized to reduce pressure drop and ductwork in the building. Heating will be provided by a high efficiency natural gas boiler system. Heating water will be piped to each air handler and to perimeter finned tube in each exterior zone. VAV terminal units with reheat coils will serve all zones.
For additional energy efficiency and comfort, radiant slabs are being installed in the Commons and Gymnasium area of the building. Radiant slab heating also has the advantage of being easily converted to a heating/cooling strategy in conjunction with a geothermal exchange system. Full benefits include:

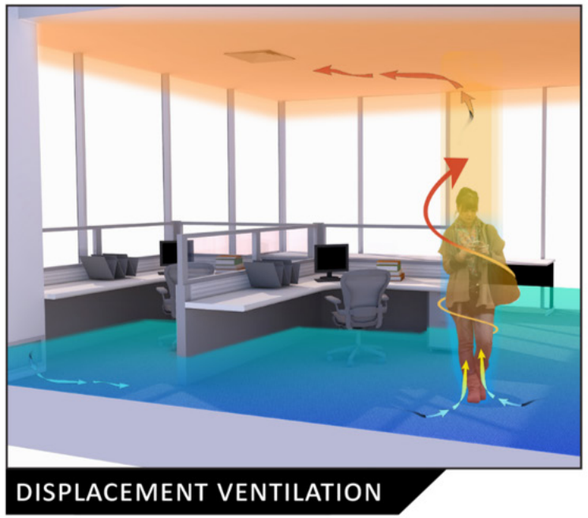
- Lower energy consumption – Reduced Fan Energy.
- Increased Comfort.
- Lower Noise System.
- Energy Storage for Pre-Cooling nighttime strategies.

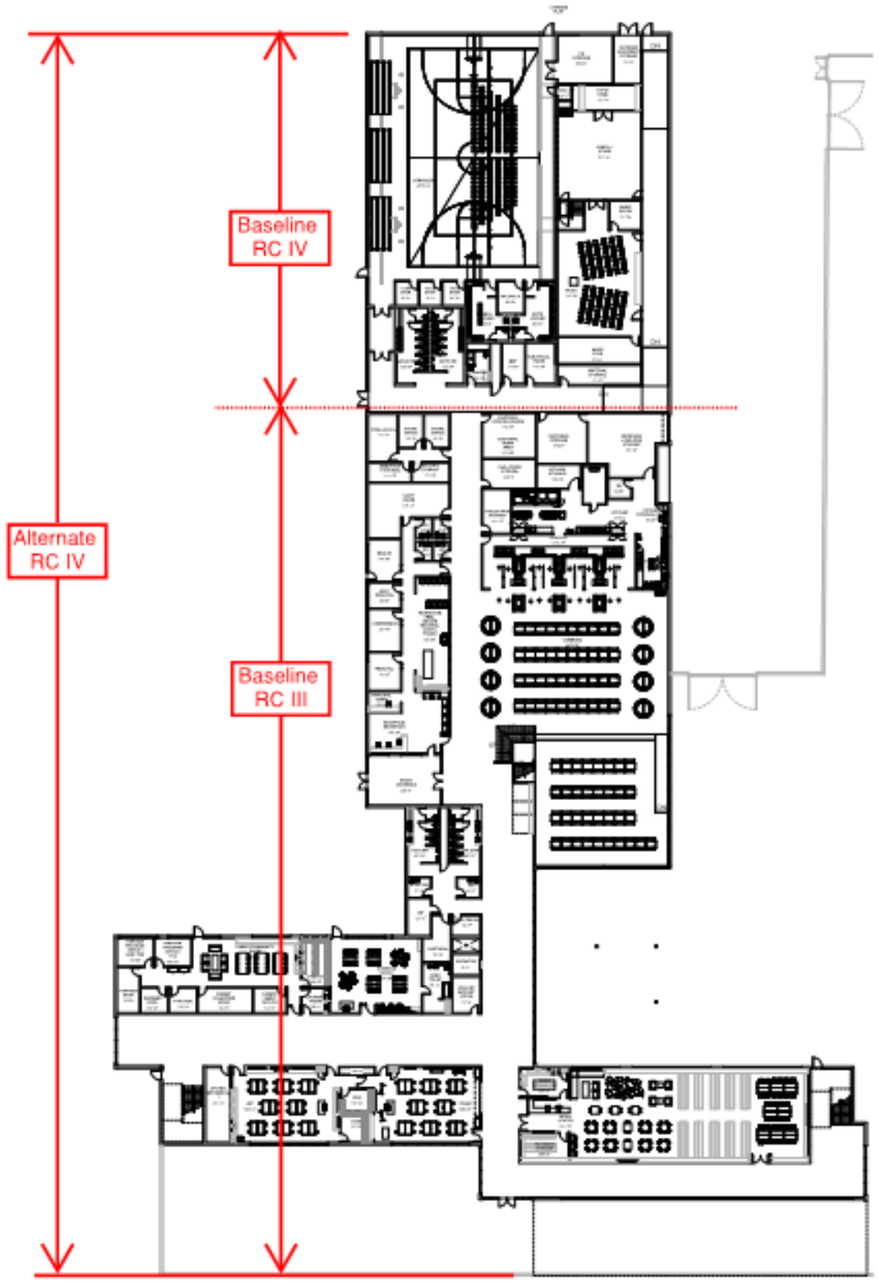
Displacement ventilation was chosen as an air delivery method for its multiple benefits in classroom and high occupancy areas. This technology introduces cool air into a zone at low velocity, usually at a low level, allowing the space to stratify as the heat in the zone rises. This benefits the occupants by delivering fresh air directly into the occupied zone and removing many of the contaminants associated with heat sources creating a comfortable environment. Displacement ventilation systems are energy efficient, low noise systems that have been proven to improve environment and indoor air quality in classroom buildings. Displacement ventilation benefits include:

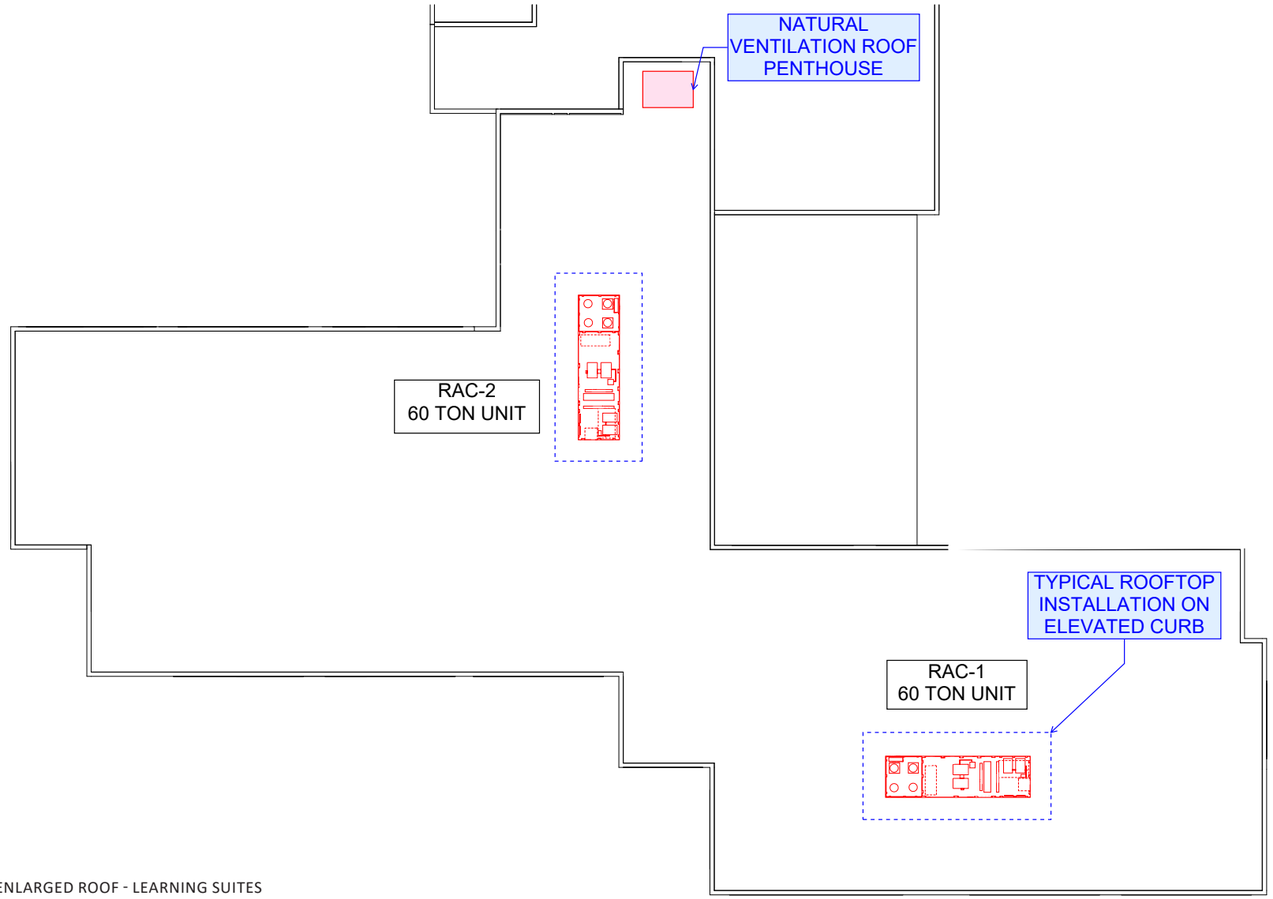
- Improved Indoor Air Quality.
- Flexibility to changing loads.
- Energy savings using lower pressure air systems and increased hours of economizer operation.
- Reduced quantity of outside air required due to system efficiency.
- Lower noise levels for an improved interior environment.

A radon exhaust system will be installed under the entire school. This will include below grade 6” PVC piping routed from below slab void spaces (4’x4’x2’) to roof mounted utility set fans will be utilized. Section 1811 of the 2014 Oregon Structural Specialty Code provides complete requirements.

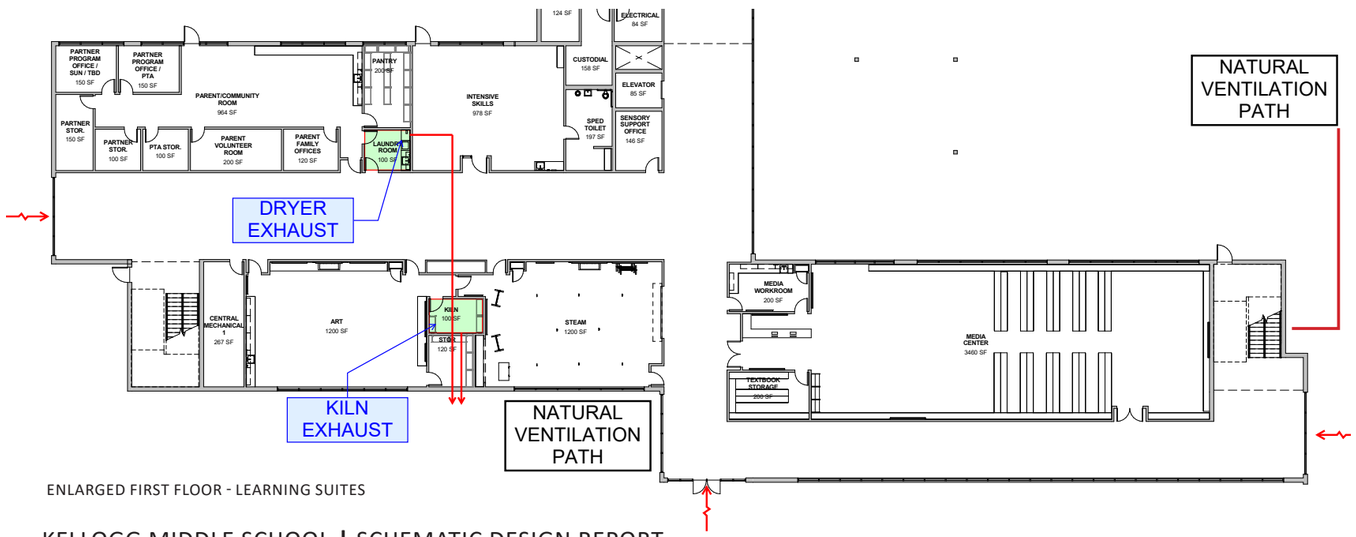








ENLARGED ROOF - LEARNING SUITES



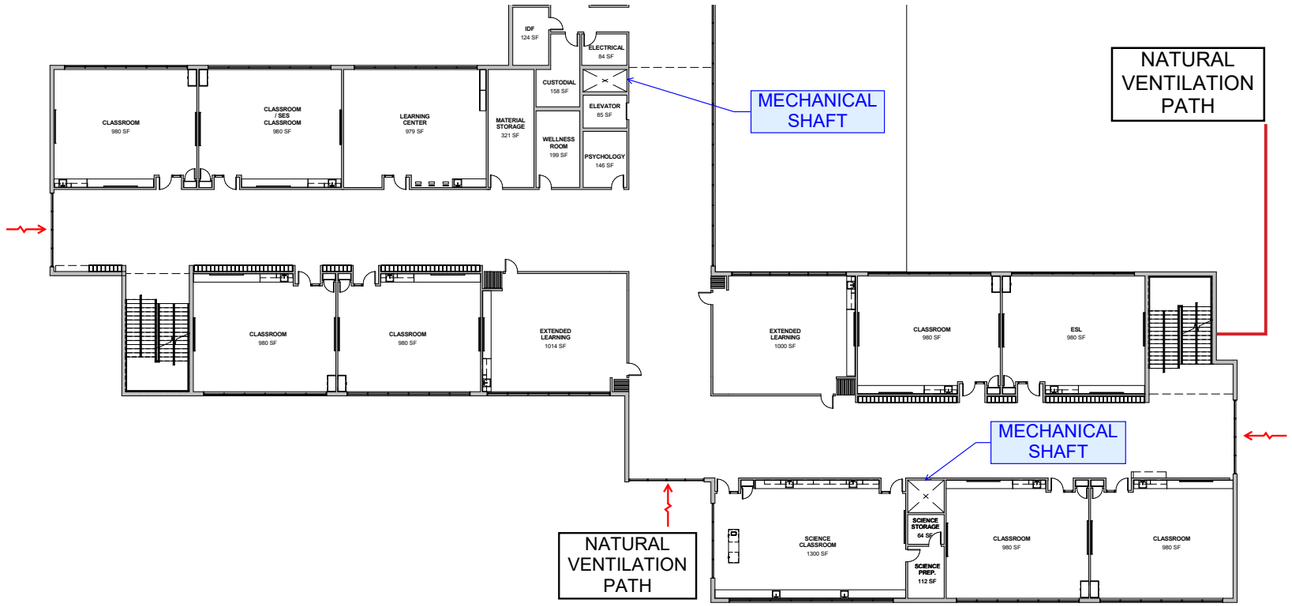
ENLARGED FIRST FLOOR - LEARNING SUITES

LEARNING SUITES

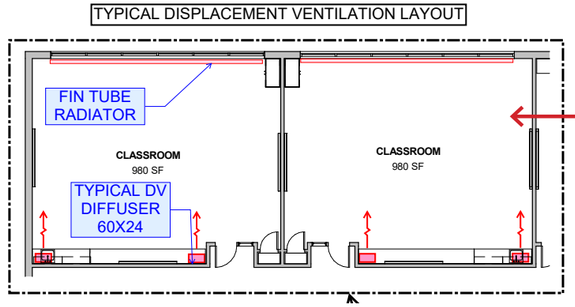
New Classroom HVAC System – Displacement Ventilation w/ Perimeter Finned Tube.

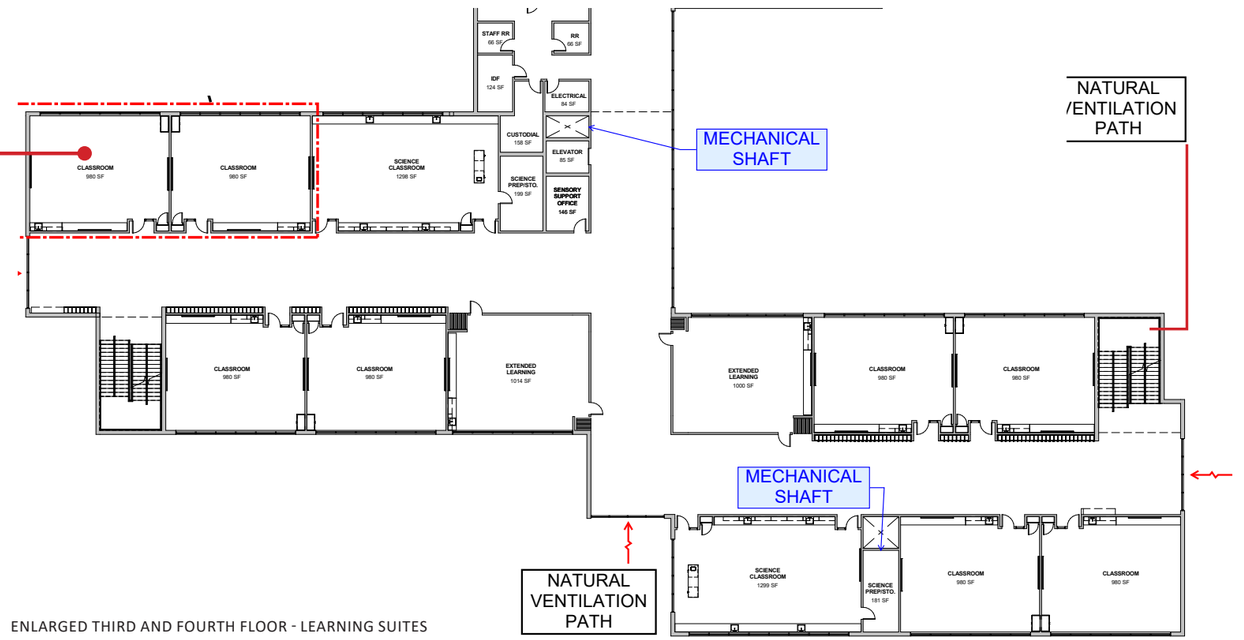
- (2) 60-ton Packaged rooftop air handlers.
  - VAV, hot water heating, DX-cooling with integral condenser.
  - Return/relief fan.
  - Economizer.
  - Rectangular return sound traps.
  - Spring isolated curb.
- VAV, HW reheat fan powered terminal units.
- VAV, HW reheat terminal units.
- (2) Displacement diffusers per classroom.
- Ceiling return grilles.
- A Finned tube convector per exterior space – full length of perimeter wall.
- Temperature sensors, one per zone.
- CO2 sensors for all high occupancy spaces.
- (2) rooftop exhaust fans for restroom and general exhaust.
- Specialty systems to include:
  - (1) Kiln exhaust hood and fan ducted to the exterior wall of the building.
  - (1) Dryer exhaust booster fan and lint trap.

Rooftop units will be mounted on 3’ high concrete tub with spring roof curbs for sound/vibration attenuation. Return air sound traps will be mounted under the unit within the curb. An access platform will be provided around the unit for access and service.

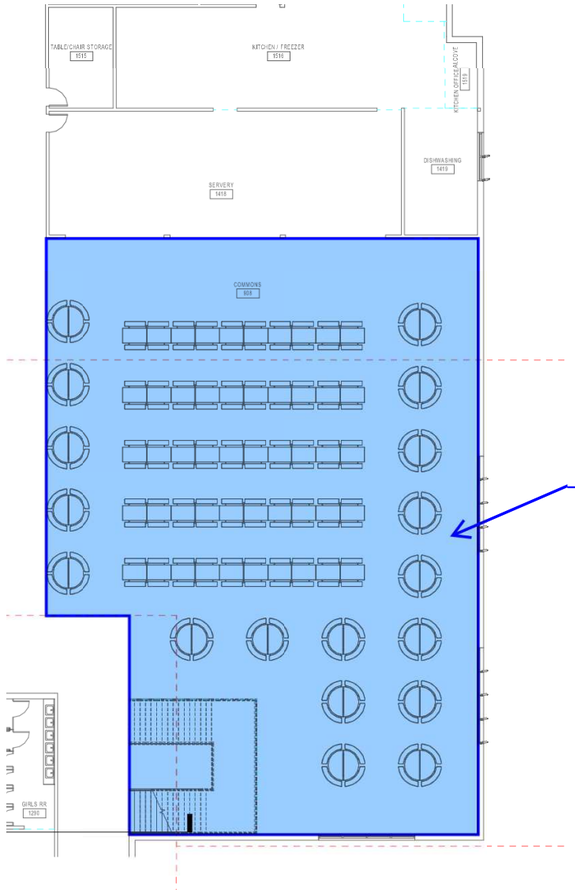


ENLARGED SECOND FLOOR - LEARNING SUITES

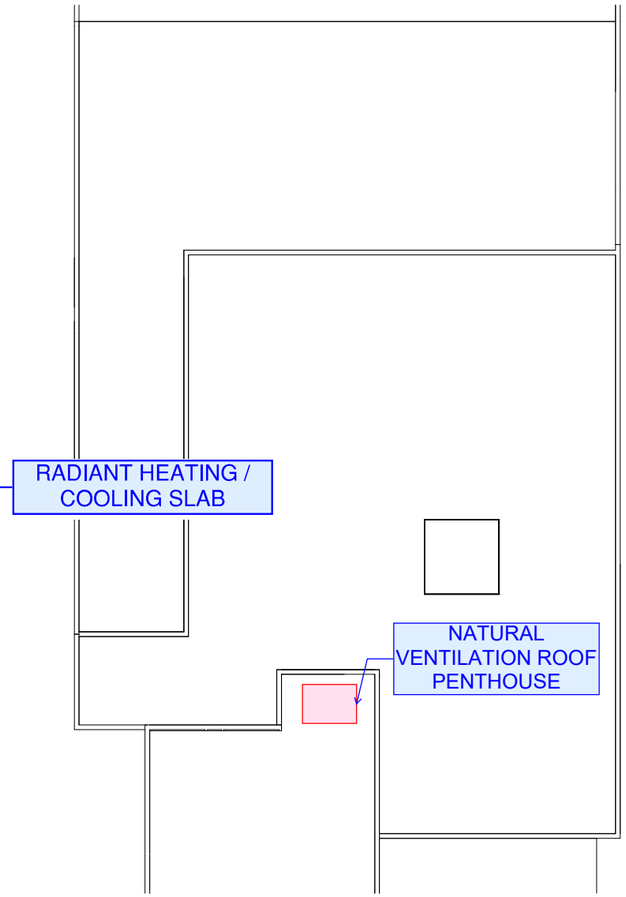




ENLARGED THIRD AND FOURTH FLOOR - LEARNING SUITES



ENLARGED FIRST FLOOR - COMMONS



ENLARGED ROOF - COMMONS

COMMONS/OFFICE/KITCHEN AREA

New Common Space Conditioning System – Displacement Ventilation w/ Radiant Slabs.

- (1) 50-ton Packaged rooftop air handlers.
  - VAV, hot water heating, DX-cooling with integral condenser.
  - Return/relief fan.
  - Economizer.
  - Rectangular return sound traps.
  - Spring isolated curb.
- VAV, HW reheat fan powered terminal units.
- VAV, HW reheat terminal units.
- Displacement diffusers for all spaces.
- Ceiling return grilles.
- Radiant heating slab – Commons floor area (see attached plans).
- Temperature sensors, one per zone.
- CO2 sensors for all high occupancy spaces.
- HW cabinet unit heaters to be provided at all vestibules.
- Specialty systems to include:
  - 6000 CFM gas fired kitchen make up air unit.
  - Type I and Type II kitchen exhaust hoods and fans as required by the kitchen layout.

The commons area radiant slab system will require two radiant slab zones due to its size and configuration on two levels. Slabs will contain 5/8" PEX tubing installed on 6" centers. Heating water will be provided by a secondary heating water pump to provide heating water mixed down to 130 degrees. Radiant manifolds will be placed behind access doors in walls adjacent to the space. Radiant systems have been chosen for this area due to the benefits stated earlier n this report.

Kitchen systems will include an indirect gas fired make-up air unit with DX cooling. A grease exhaust fan will be provided for the main Type 1 grease hood with a second exhaust fan provided for the dishwashing area.

GYM/MUSIC/DANCE ROOMS

New Gymnasium Conditioning System – Displacement Ventilation

- (1) 30-ton Packaged rooftop air handlers – unit to be on
  - VAV, hot water heating, DX-cooling with integral condenser.
  - Return/relief fan.
  - Economizer.
  - Rectangular return sound traps.
  - Spring isolated curb.
- VAV, HW reheat fan powered terminal units for surrounding areas.
- Linear displacement diffusers at perimeter.
- High wall or ceiling return grilles.
- Temperature sensors, one per zone.
- CO2 sensors for all high occupancy spaces.
- A 3000 CFM heat recovery ventilator will be provided for the lockers and restrooms.
- HW cabinet unit heaters to be provided at all vestibules.

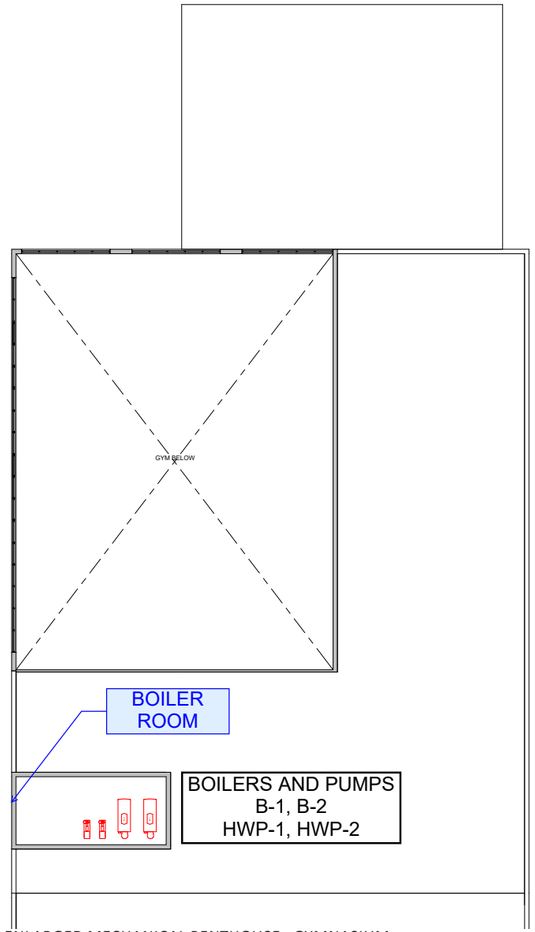
The Gym displacement ventilation system will include large displacement diffusers around the perimeter of the space. Heating will be provided by an in-slab radiant heating system installed below the gym wood floor. The slab will contain 5/8" PEX tubing installed on 6" centers.

HEATING SOURCE

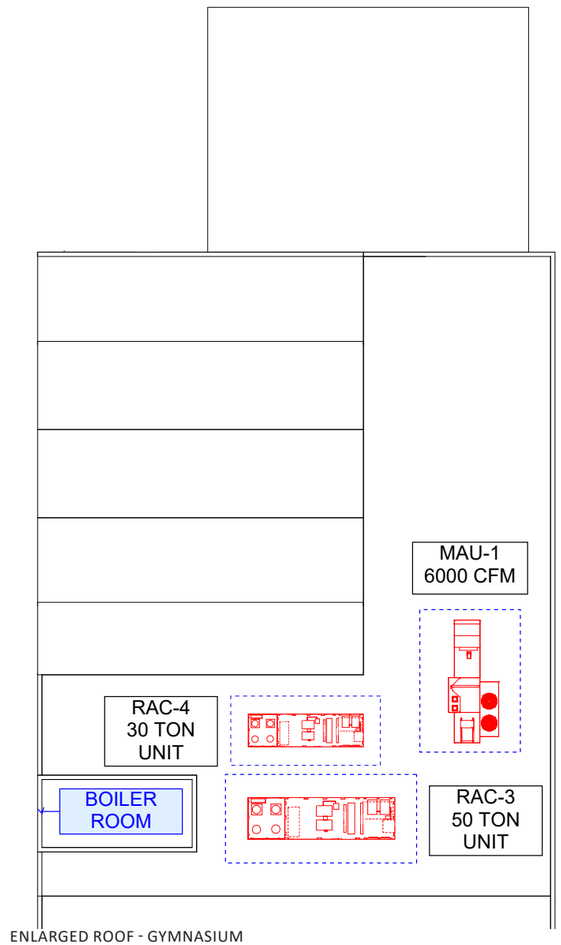
- A central heating plant using (2) two million BTU, high efficiency, condensing boilers will be utilized, and the heating loop will be designed for 100 degrees Fahrenheit return water and 140 degrees Fahrenheit supply with reset based on zone demand. Two-way control valves with a bypass valve to maintain minimum flow will be utilized. Type L copper piping is anticipated.
- Heating is provided by roof mounted VAV air handling units with heating water coils that serve terminal units (fan powered and single inlet) with heating water coils.
- Radiant slab heating will be provided in the central common areas, and this will be served from the central boilers.

COOLING SOURCE

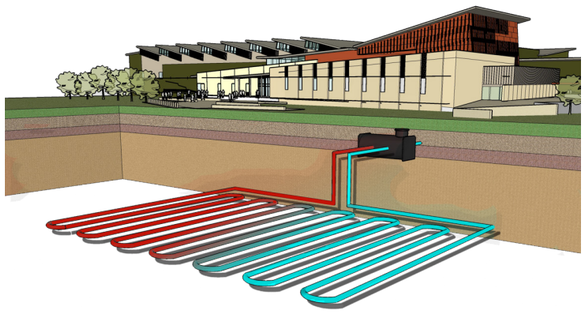
- Cooling is provided for the school by packaged roof mounted air handling units with DX cooling coils. This is typical for all spaces as described in the previous sections.
- At night, supply fans will bring in cool, unconditioned outside air to flush out the building, lower indoor CO2 levels, and pre-cool the building mass to delay temperature swings the following day.
- All units will have economizer capability for "free cooling" using outdoor air. 100 percent modulating exhaust capability will be provided for all air handling units.



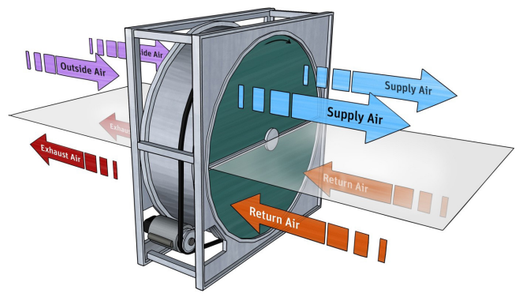
ENLARGED MECHANICAL PENTHOUSE - GYMNASIUM



ENLARGED ROOF - GYMNASIUM

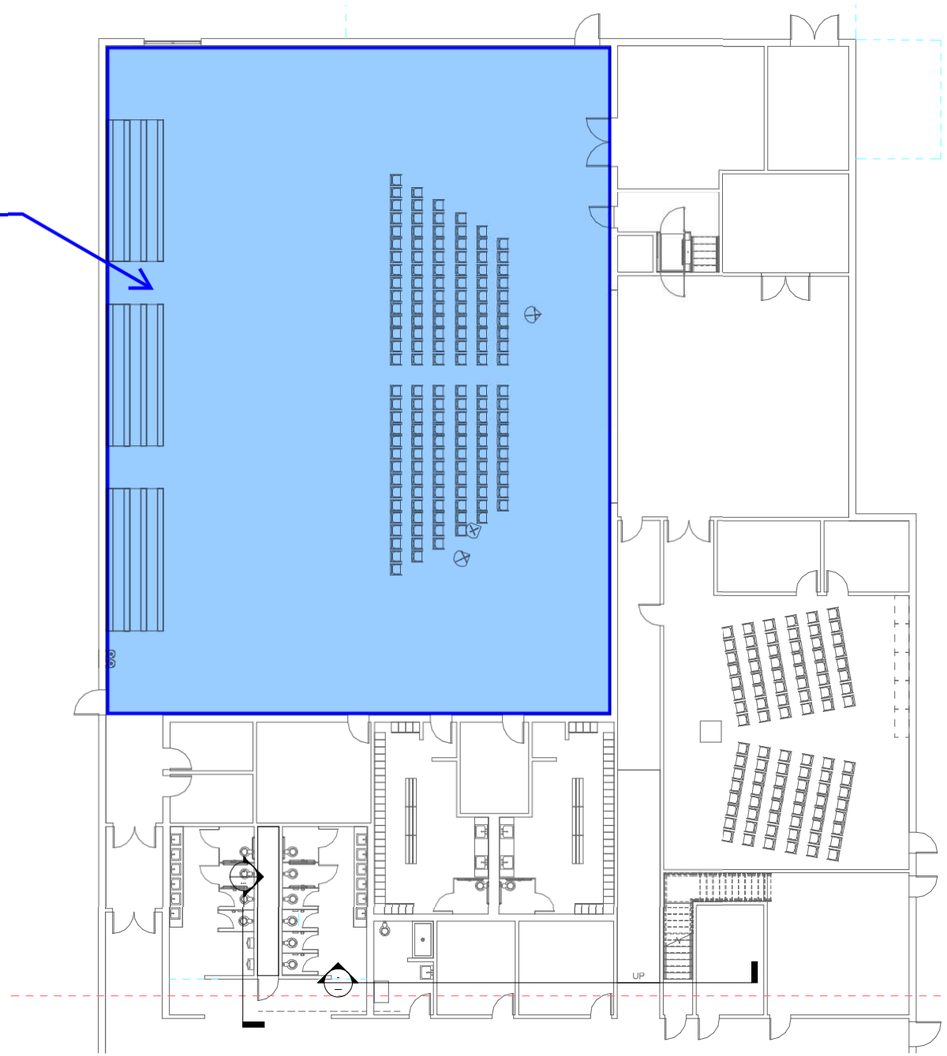


GEO EXCHANGE FOR RADIENT SLAB



HEAT RECOVERY VENTILATOR

RADIANT HEATING / COOLING SLAB



CONTROLS

- New DDC Building Automation System – Basis of Design: Honeywell by Delta Controls per PPS Design Standards.
- A microprocessor-based, direct digital control (DDC) system with graphics at a remote District computer will be provided. All HVAC units, terminal units, etc., will have factory-mounted controllers, and the mechanical system will be commissioned.

SUSTAINABLE STRATEGIES

The goal of the project is to achieve net zero or net zero ready for the entire school or identified parts. The path to net zero needs to be a comprehensive strategy the examines all aspects of the buildings construction and systems together so that all components contribute to reduced energy consumption. To aid in building load and energy reduction, the following must be examined:

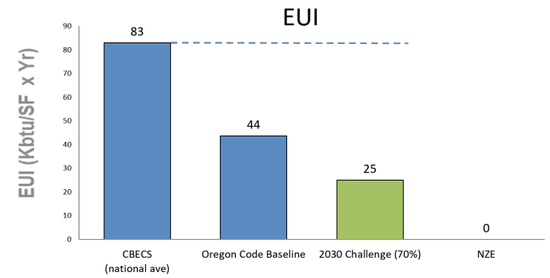
- High Efficiency Building Envelope
  - Optimized glazing area and efficiency (<30% window to wall ratio).
  - Optimized wall and roof insulation.
  - Optimized floor insulation (for radiant slabs).
  - Infiltration (thermal imaging/blower door testing).
  - Incorporate external or internal building shades.
- LED Lighting densities better than code with daylighting and occupancy controls.
- Reduce and monitor plug loads; Switched receptacles; Efficient transformers.
- Low flow water fixtures; Domestic hot water reduction
- Energy Star rated equipment.
- High efficiency boilers and chillers.
- Energy recovery strategies.

As part of the net zero strategies, the mechanical design will explore the use of a geothermal heat pump system for use in heating and cooling. This and other system options will be explored in early design phases as Energy Efficiency Measures (EEMs) in the energy model to improve the overall building performance. The following energy efficiency/sustainable strategies will be included and analyzed for implementation in the mechanical systems:

- CO2 sensors for high occupancy areas.
- Geothermal heating & cooling. (Alternate)
- Building mass pre-cooling at night.
- ECM motors on fan-powered VAV terminal units.
- Displacement ventilation.
- Radiant heating/cooling floor slabs. (Alternate)
- Various HVAC control optimization strategies.
- Premium efficiency motors.

The goal of net zero or net zero ready is to design a building that is as low as possible in energy use then make up that difference in renewable energy. The ETO path to net zero requires a building EUI that is 70% less than a national average for the type of building and 40% below the Oregon Energy Code baseline building. For schools, the target EUI is defined as follows:

- National average as defined by CBECS EUI = 83
- Oregon Code baseline is EUI = 44
- ETO target is an EUI = 25



To achieve an EUI of approximately 25 to make the full school Net Zero, the mechanical systems for the entire school would need to change and utilize a geothermal heat pump system. Some areas would utilize natural ventilation and have a wider interior temperature range. This system would incorporate the following:

- Rooftop unit with DX cooling and gas heating for ventilation (DOAS).
- Ground source heat pumps to provide heating and cooling for each space (whole school).
- Ground source heat pump cooling COP =6.5 and Heating COP=4.6

Alternates

ALTERNATE 1 - NET ZERO SCHOOL
To achieve an EUI of approximately 25 to make the full school Net Zero, the mechanical systems for the entire school would need to change and utilize a geothermal heat pump system. Some areas would utilize natural ventilation and have a wider interior temperature range. This system would incorporate the following:

- Rooftop unit with DX cooling and gas heating for ventilation (DOAS).
- Ground source heat pumps to provide heating and cooling for each space (whole school).
- Ground source heat pump cooling COP =6.5 and Heating COP=4.6
- 175 Ton Geo Exchange Field.

ALTERNATE 2 - NATURAL VENTILATION FOR CORRIDORS
The building corridors offer an excellent opportunity for natural ventilation. Cooling for corridors would be eliminated. Ventilation louvers would be placed at the East, South, and West ends on all levels. A roof vent would be provided over the central circulation stair to facilitate airflow through the stack effect. Perimeter heating would be provided by fin tube radiators or convectors located near the ventilation louvers. All openings would be motorized for full automated control of the system. Utilizing natural ventilation for the corridors by eliminating the mechanical cooling system would reduce first cost and provide long term utility savings by reducing the required cooling energy in this area.

ALTERNATE 3 – PARTIAL GEO EXCHANGE SYSTEM
To increase energy savings and lower overall building energy use (EUI), a geo-exchange system is being proposed as steps towards a net zero goal. This system would be added on top of the existing systems to lower overall energy use. The boilers would remain the same size to provide back-up heating. For this alternate, a geo-exchange heat pump would be added to provide heating and cooling water to the Commons and Gym radiant slabs. A 50-ton geo-exchange water to water heat pump system with a horizontal piping configuration would serve the radiant slab in these areas.

ALTERNATE 4 – NET ZERO GYMNASIUM.
For this, a 40 ton geothermal system would be installed that consisted of a vertical or horizontal well field and a 40 ton water-to-water heat pump. This would produce heating and chilled water which would be piped to small fan coils and air handlers serving the gym, dance, music, and locker areas.. The rooftop unit would be eliminated and replaced by 4-pipe fan coil units.

ALTERNATE 5 – OVERHEAD HIGH PERFORMANCE VAV SYSTEM
As a deductive alternate, the entire school would be served by an overhead VAV system with the following features:

- Package Rooftop Units with DX cooling and hot water heat.
- Terminal units will be equipped with hot water heating coils.
- High Efficiency Boilers.
- Control Strategies to include: Optimal start/stop, fan pressure optimization, demand control ventilation, supply air temperature optimization, zone occupancy control, and night flush features.

2.7 Plumbing Narrative

CODES, STANDARDS AND GUIDELINES

Systems shall be designed in accordance with the latest edition of the following codes unless noted otherwise:

- Oregon Plumbing Specialty Code (ORSC), 2017 Edition
- NFPA 70, National Electrical Code, 2017 Edition
- NFPA 101: Life Safety Code.
- 2017 Oregon Electrical Specialty Code Amendments
- Oregon Structural Specialty Code (OSSC), 2014 Edition
- Oregon Energy Efficiency Specialty Code (OEESC), 2014 Edition

The following reference standards and guidelines shall be used for the design:

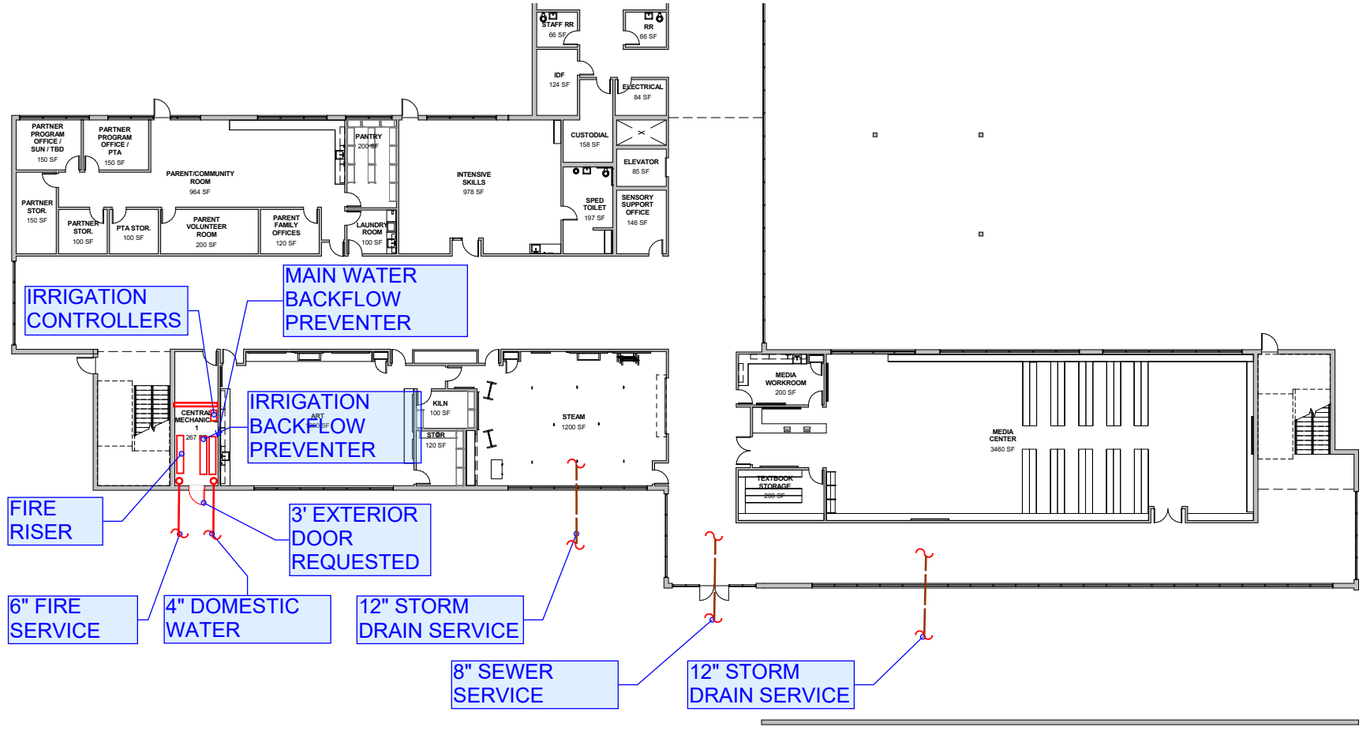
- ADA: Americans with Disabilities Act.
- ANSI: American National Standards Institute.
- ASCE: American Society of Civil Engineers.
- EPA: Environmental Protection Agency.
- ETL: Electrical Testing Laboratories.
- NEMA: National Electrical Manufacturer's Association.
- NFPA: National Fire Protection Association.
- NFPA 110: Standard for Emergency and Standby Power Systems.
- UL: Underwriter's Laboratories, Inc.

DEVICES

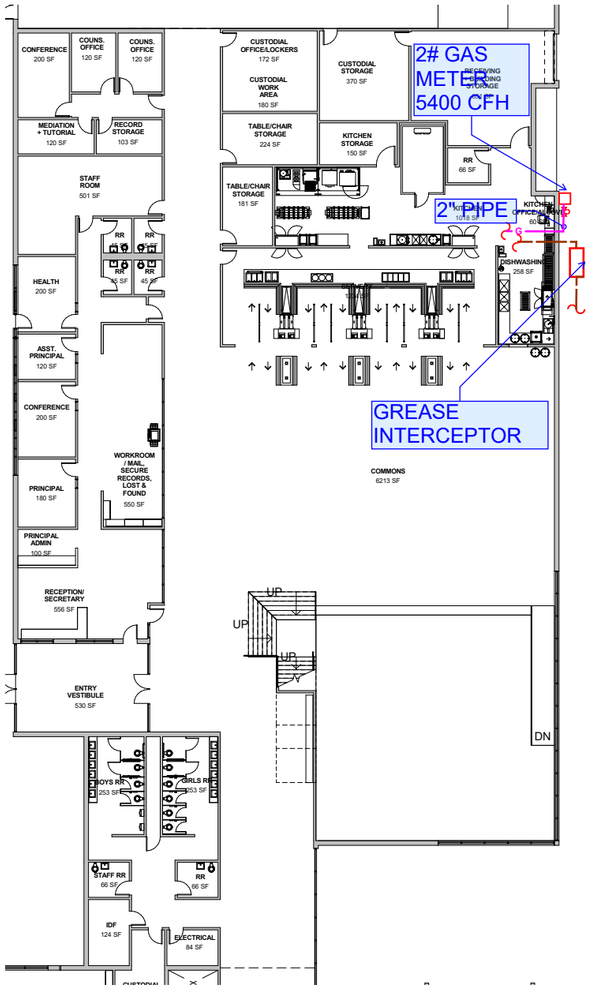
SANITARY SEWER DWV

The waste and vent piping will connect all plumbing fixtures. All the plumbing fixtures will drain by gravity to the building sanitary sewer and exit the building on the north side of the building. Branches for the waste lines to the fixtures will be pitched at 2% slope, if the site sanitary sewer system is deep enough. If not, the branch lines will be routed at a 1% slope. The new 8" building sanitary sewer will be pitched at 1%.

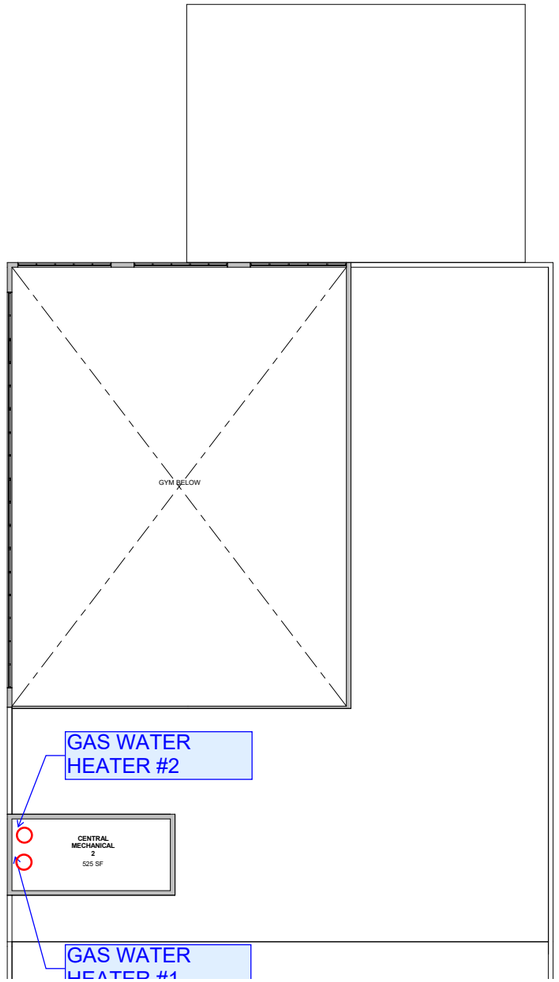
Each fixture will be provided with a trap and vented to prevent sewer gases from entering the building. Cleanouts in finished areas will be wall type with stainless steel covers. Cleanouts in work areas will be floor type with heavy duty covers. Vent pipes through the roof will be a minimum of 3" and be coordinated with Architects flashing details. The piping material will be cast iron with no-hub stainless steel standard couplings for above ground and cast iron with hub and spigot joints below ground with ASTM-C564 multi-ring flexible sealing gasket.



ENLARGED FIRST FLOOR - LEARNING SUITES



ENLARGED FIRST FLOOR - COMMONS



ENLARGED ROOF - COMMONS

CONDENSATE DRAINS

Copper drain lines will be provided at each piece of mechanical equipment including plumbing and HVAC equipment and discharging indirectly to the sanitary drain system.

DOMESTIC WATER SERVICE

The domestic water service will be 4” inches and enter on the south side of the school at the mechanical room on Level 1. Provisions for irrigation/landscape water are included in this service. A 1-1/2” reduced pressure zone backflow preventer will be installed in the Central Mechanical Room. A 1-1/2” stub out will be provided for site irrigation. Irrigation systems will be metered separately and have a sub-meter to avoid city sewer charges. All water meters are required to have an accompanying ultrasonic meter that will measure hourly flowrate and track water leaks in real time.

Underground domestic water service piping will be ductile iron pipe with restrained fittings or Type K copper piping with brazed joints.

DOMESTIC HOT AND COLD WATER SYSTEM

Shut off valves shall be provided to isolate each wing of a building and each floor level as well. Each toilet room will be provided with shutoff valves to isolate the hot/cold water supplies to the space. Piping mains will be pitched and provided with drain valves. Domestic cold water and hot water piping will be sized at 2.5 PSI loss per 100 feet at 6 FPS velocity, maximum.

The piping material for aboveground applications will be hard temper Type L copper with wrought copper fittings and lead-free joints for water mains. Uponor PEX piping will be utilized for domestic water branch lines. PEX piping is not allowed for domestic water mains per PPS Design Standards. Lead-free solder shall be provided at all copper connections.

All the domestic water piping will be insulated with fiberglass and white vapor barrier mastic with PVC fitting covers.

DOMESTIC HOT WATER HEATING EQUIPMENT

Two (2) gas-fired, high efficiency, storage type water heaters will be centrally located in the Boiler Room on Level 2. Each water heater will have 119 gallons of water storage with 500,000 btu/hr input. The high efficiency, energy conserving water heaters will qualify for Energy Trust of Oregon incentives.

The water heaters will store water at 140 deg F. The hot water will be tempered to 110 deg F with an ASSE 1017 certified master mixing valve. The domestic water heaters shall be insulated in accordance with ASHRAE standards. The temperature and pressure relief valve shall be routed to the nearest floor drain with an indirect connection.

A hot water circulation pump, aquastat and balancing valves will be provided to maintain 110 deg F hot water at all plumbing fixtures. The hot water return line shall not be small than ¾". Provide isolation valves and by-pass around circulation pump.

A thermal expansion tank will be provided and sized to serve the two (2) water heaters. The gas flue shall be routed through the roof. Flexible water or natural gas connections will not be used to the water heaters. Utilize rigid piping connections to the water heater only per PPS Standards.

A domestic water booster heater shall be provided at the Kitchen dishwasher to boost the domestic hot water temperature from 140 deg F to 180 deg F.

DOMESTIC HOT WATER CIRCULATION SYSTEM

Domestic hot water circulation system will be provided for the domestic water heaters located in the Boiler Room. Domestic hot water re-circulation piping will be sized at 1.4 PSI loss per 100 feet at 4 FPS velocity.

Re-circulation branch lines shall be ¾" sized at 1.5 gpm flow rate min. Shut-off valves, check valves and balancing valves will be provided on each branch line. A recirculation pump will be provided next to the water heater. An aquastat set at 125 degrees Fahrenheit will operate the pump. The aquastat will be connected to and controlled by the BAS.

The piping material will be hard temper Type L copper with wrought copper fittings and lead-free joints.

MECHANICAL ROOM

Spaces utilized for mechanical or specialized plumbing systems shall be provided with floor drainage and be equipped with hydraulic trap primers. Equipment will be mounted on 4" high concrete housekeeping pads with acoustical pads to prevent vibration and noise transmission to structure.

PLUMBING FIXTURES

All the plumbing fixtures will be water saver type and listed by IAPMO or other acceptable listing agency for the installation in the State of Oregon. Barrier free compliant plumbing fixtures shall be utilized where required by the Americans with Disabilities Act.

The connection joint between the plumbing fixture back and wall shall be caulked with elastic-type caulking compound. The exposed plumbing trim such as sink faucets, valves and trim pieces shall be high quality chrome-plated brass. Angle stops, isolations valves and faucets shall be lead-free. Angles stops shall be globe-type valves with IPS threaded inlet connections.

Plumbing fixture manufacturer and model number selections will comply with PPS Design Standards. Lavatories will wall-hung, white vitreous china with manual metering faucets set at 0.5 GPM flow rate. Classroom sinks will be top mounted (self-rimming), 18-gauge, type 316 stainless steel with faucets set at 1.5 GPM flow rate. Classroom sinks will be ADA compliant.

Mop sinks will be floor mounted, terrazzo with a minimum 24"x24" basin. Faucets set at 1.5 GPM flow rate. Provide with stainless steel back splash plates, hose holder and vinyl bumper guards.

The urinals will be wall mounted, white vitreous china with a 0.125 GPF manual flush valve. Water closets will be white vitreous china, floor mounted with dual flow, manual flush valves with maximum 1.1/1.6 flow rates.

Interior hose bibbs will be provided in each restroom, kitchen, dishwashing room and cafeteria. Each hose bibb shall be provided with a vacuum breaker and loose key handle. Exterior box type wall hydrants shall be freeze proof where exposed to freezing conditions. Wall hydrants shall be located at approximately 100-ft intervals at ground level of the entire building.

FLOOR DRAINS

Provide floor drains in art rooms and rooms with similar activity as identified on the plans. Floor drains in finished areas shall have a six-inch nickel bronze strainer with a 3-inch outlet. In restrooms, install the floor drain under toilet partitions. Square drain grates are preferred in tile floor locations.

Provide a floor drain in custodial closets. Floor drains in unfinished, machine areas or mechanical rooms shall have an eight-inch ductile iron sediment bucket and grate with 3-inch outlet. All floor drains shall be provided with electronically-operated trap primers with access panels.

PLUMBING DEVICES

Electronic Trap Primer Systems: Electronic trap primers shall be provided for all floor drains, floor sinks and hub drains. Point of use thermostatic mixing valves will be provided for public use lavatories. Water hammer arresters will be provided for water closets and urinals and other quick closing valve locations. The water hammer arresters shall be sized and installed per the PDI recommended guidelines. Access panels (12"x16" minimum size) will be provided for maintenance access to shut-off valves, trap primers and water hammer arresters. Access panels shall be sized to allow for the removal and maintenance of the device.

Backflow Preventers (lead-free) will be provided at the following locations:

- Double check valve assembly on the incoming building domestic water service.
- Reduced pressure zone backflow preventer for the make-up supply to HVAC equipment.
- Double check valve assembly for the make-up water to the irrigation system.

Glycol-filled pressure gauges shall be provided upstream and downstream of the backflow preventer assembly.

STORM DRAIN SYSTEM

Storm drain system shall be sized for 1.3" rainfall rate/hour. Primary roof and overflow drains shall be located on the roof. Overflow drains will be piped separately through the exterior wall and discharged 2 feet above outside grade. Storm drainage piping serving the building will be coordinated with Civil Engineer's site work.

The piping material will be cast iron with no-hub heavy weight standard stainless steel couplings for aboveground and cast iron with hub and spigot joints with ASTM-C564 multi-ring flexible sealing gasket for below ground installation. Piping over equipment on the main level will be provided with heavy weight stainless steel couplings.

Roof/Overflow roof drains and horizontal piping shall be insulated with fiberglass, white vapor barrier mastic and PVC fitting covers.

NATURAL GAS SYSTEM

Gas Service shall be provided by NW Natural Gas. Installation will be in accordance with the 2014 Oregon Mechanical Specialty Code and the guidelines stated in the NW Natural Commercial Contractor Handbook.

The natural gas system distribution pressure will be 2 PSI and reduced to 7" to 10" water column pressure at each piece of equipment or appliance. An earthquake emergency gas shutoff valve shall be required downstream of the gas meter regulator. A 1-1/2" gas main will be required downstream of the gas meter and regulator to meet the natural gas demand for gas-fire equipment.

In accordance with ASME Safety Code for Controls and Safety Devices, an emergency shutoff button shall be provided for emergency shut-down of gas boilers and water heaters that exceed 400,00 btu/hr input. Shut-off valves shall be provided at all mains and branch lines. Self-venting pressure regulating assemblies shall be provided at each piece of gas-fired equipment. Standard and 2 PSI gas piping will be Schedule 40 black steel with malleable iron fittings with threaded joints. Piping 2 ½" and larger shall be flanged.

2.7.2 Fire Protection

FIRE SPRINKLERS

The school building will be protected with a wet pipe system per NFPA 13(2013), local building codes and fire marshal requirements as adopted by the AHJ. Areas subject to freezing, such as overhangs, canopies and unconditioned spaces, will be protected with a dry pipe system or dry sprinklers.

A new underground fire main connected to the existing municipal water line will be provided. The fire sprinkler backflow preventer, listed for fire protection will be provided and located between the public water connection and the fire riser room. Just upstream of the backflow preventer, a yard type post-indicator valve will be installed. Downstream of the backflow preventer, a fire department connection (FDC) including a check valve, will be installed. The FDC will be a combined fire sprinkler-standpipe connections with two 2-1/2-inch connections. The underground fire main will enter the building at the ground floor mechanical room in the SW corner of the building. The fire riser room will house the wet system riser(s) and a dry pipe valve.

Sprinklers, valves, switches, pipe, fittings, backflow preventers, hangers, branch line restraints, sway braces and the like will be UL listed. Quick response sprinklers will be provided in Light Hazard areas.

Piping will be concealed where possible.

System control valves and flow and pressure switches will be supervised by the fire alarm system.

Piping will be schedule 40 black steel for piping 2-inches and smaller and schedule 10 black steel for piping 2-1/2-inches and larger.

Sprinklers in finished ceilings will be recessed style, corrosion resistant, white finish with corrosion resistant, white escutcheon. Sprinklers in unfinished areas will be a brass finish. Sprinklers in the gymnasium, electrical, IT and MDF rooms will be provided with a sprinkler guard.

FIRE STANDPIPES

Class – 1 manual wet standpipes will be provided. They will consist of a 2-1/2-inch hose valve connection located in the main exit stairwells. A minimum 3-inch vertical drain will be provided to accommodate testing and draining.

FIRE PUMP

Water flow tests for the site indicate a fire water pump will not be required to meet the system pressure needs.

ALTERNATE DESIGN

To make the entire school MEP systems comply with RC IV, the following items would be added:

- Provide auxiliary potable water connection assembly in vault downstream of meter and backflow preventer to allow connection of portable water tank & associated pump to supply water to building.
- All MEP equipment to be designed and braced to RC IV requirements.

2.8 Electrical Narrative

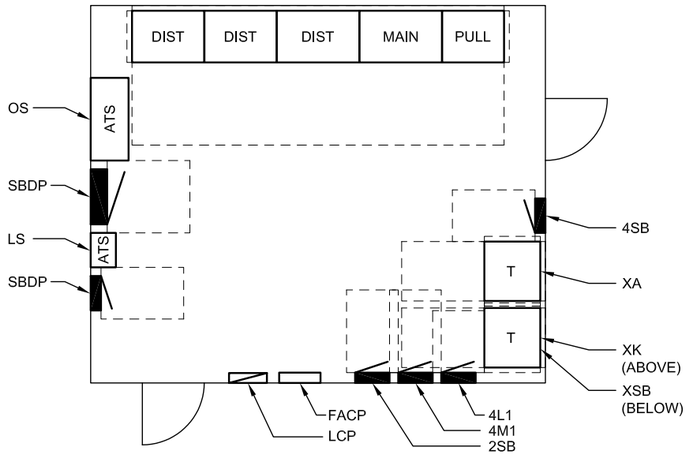
CODES, STANDARDS AND GUIDELINES

Systems shall be designed in accordance with the latest edition of the following codes unless noted otherwise:

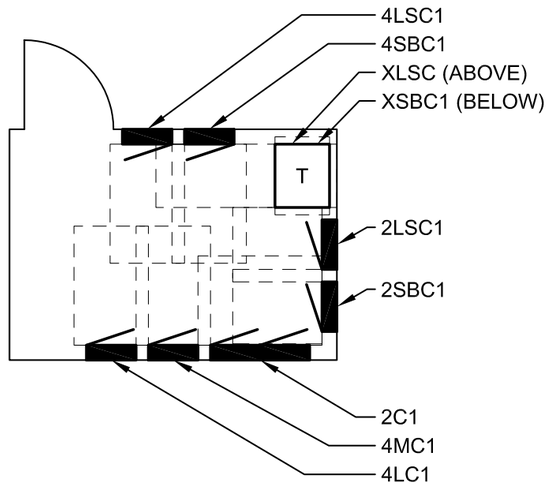
- OESC - Oregon Electrical Specialty Code
- OSSC - Oregon Structural Specialty Code
- OEESC - Oregon Energy Efficiency Specialty Code
- Oregon Elevator Specialty Code

POWER SERVICE AND DISTRIBUTION

- One 2000-amp, 480/277 volt, 3-phase, 4-wire switchboard (4MDS) with a 2000-amp main circuit breaker (solid-state with LSIG-trip settings) and solid-state breakers for distribution (LSIG-trip settings). Breakers will be specified with two-level trip setting to allow arc-flash energy to be lowered when the switchboard is worked on live, and a slower-trip setting for improved selective coordination under normal conditions. All breakers in switchboard will be rated to 100%. Mechanical and lighting loads will be connected to separate panelboards.
- Resiliency: Provide non-structural seismic bracing and anchorage design of switchgear, transformers based on Risk Category III requirements, except for those components required for use of the school as an emergency shelter to satisfy Category IV requirements.
- Utility power will originate from a utility pole along Powell Boulevard, with (1) 4-inch below grade conduit installed from the pole for pathway to a pad-mount utility transformer installed with a pull vault underneath. Below grade secondary feeders will then be routed to the main electrical room in the building.
- Step-down transformers will be used to convert from 480-volt to 208/120-volt in each electrical room. There will be separate panels for the classroom tower, the admin/commons area, the kitchen, and the gym.
- A dedicated transformer in the main electrical room will be provided to serve two kitchen 208/120-volt panels, with one panel provided with a shunt-trip main breaker to serve loads located underneath the Type I hood.
- Panelboards will include copper bus bars, compression type lugs, door-in-door cover. Panelboards sized at 225-amp and larger will be provide with a 200%-rated neutral bus.
- There will be one 400-amp, 42-circuit panel for mechanical loads (4M1) in the main electrical room and one 125-amp, 42-circuit panel for lighting (4L1)



ENLARGED MAIN ELECTRICAL ROOM (NOT TO SCALE)



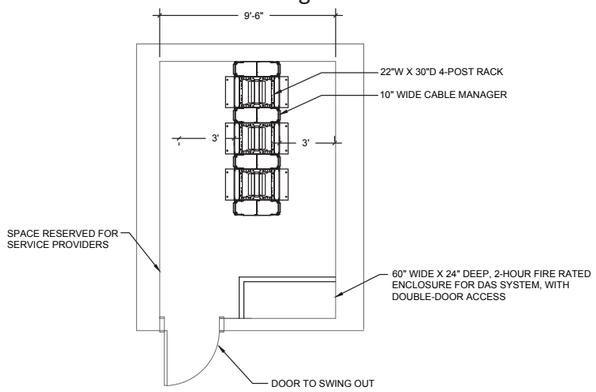
ENLARGED ELECTRICAL ROOM - FIRST FLOOR (NOT TO SCALE)

- The first-floor electrical room in the classroom tower will include:
  - One 100-amp, 480Y/277-volt panel for standby loads;
  - One 15kvA transformer feeding one 100-amp, 240/120V, single phase standby panel;
  - One 100-amp, 480Y/277-volt panel for emergency loads;
  - One 15kvA transformer feeding one 100-amp, 240V/120V, single phase emergency panel;
  - One two-section, 400-amp panel for 208Y/120-volt normal equipment loads and outlets.
  - One 400-amp, 480Y/277V panel for mechanical loads.
  - One 200-amp, 480/277V panel for lighting loads.

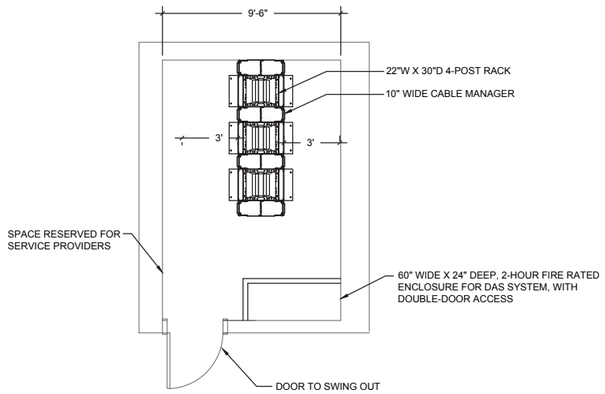
- The second-floor electrical room in the classroom tower will include:
  - One 112.5kvA transformer feeding one two-section, 400-amp panel for 208Y/120-volt normal equipment loads and outlets.
- The third-floor electrical room in the classroom tower will include:
  - One 100-amp, 480Y/277-volt panel for standby loads;
  - One 15kvA transformer feeding one 100-amp, 240/120V, single phase standby panel;
  - One 100-amp, 480Y/277-volt panel for emergency loads;
  - One 112.5kvA transformer feeding one two-section, 400-amp panel for 208Y/120-volt normal equipment loads and outlets.
  - One 200-amp, 480/277V panel for lighting loads.
- The fourth-floor electrical room in the classroom tower will include:
  - One 112.5kvA transformer feeding one two-section, 400-amp panel for 208Y/120-volt normal equipment loads and outlets;
  - One 400-amp, 480Y/277V panel for mechanical loads.
  - PV system inverters should part (or all) of the PV array be located on the classroom tower roof.

- Large mechanical loads will be served from the 4M panels. Smaller mechanical loads (208/120-volt) will connect to nearest panel with matching voltage.
- Transformers will use current Dept. of Energy standard transformers to reduce energy losses. To minimize voltage drop, transformers will be located in branch electrical rooms with the 208/120-volt panels they serve where possible.
- Surge protection will be provided at the main service panels and large sub-panels to prolong the life of solid-state loads, including lighting, PC and server power supplies, consumer electronics, and variable frequency drives of motors.
- Feeder circuit wiring: copper XHHW-2.
- Branch circuit wiring: copper THWN-2.
- MC cable will be allowed, but its use will be limited to the following conditions:
  - Areas with suspended ceilings with accessible space above.
  - Drops to ceiling mounted luminaires in areas with accessible ceiling space.

MC cable will not be allowed for homeruns from branch circuit panels to the first device or luminaire on a circuit. It also will not be allowed in walls in areas where MC cable cannot be fished into the walls after construction is completed, such as walls with glazing or solid beams overhead, partial height walls, etc. No single run of MC cable will exceed 50-feet in length



ENLARGED MDF ROOM LAYOUT (NOT TO SCALE)



ENLARGED IDF ROOM LAYOUT - TYPICAL OF 4 (NOT TO SCALE)

- Branch circuit wiring assumes eight duplex receptacles per 20-amp circuit (general purpose); six duplex receptacles per 20-amp circuit where outlets are located by tele/data outlets. Self-testing GFCI outlets where required by Code.
- Classrooms to have a minimum of six quadplex power outlets per room, and offices a minimum of two quadplex power outlets per room.
- Ceiling mounted cord reel outlets will be provided in all STEAM and Science classrooms, with an assumption of (8) cord reels per room.
- A 150kW solar photovoltaic system will be incorporated into the building electrical system to meet the requirements of the Oregon Department of Energy 1.5% for Green Energy Technology program. This system will require a combined roof area of 15,000 square feet, with the array location(s) to be determined. Per PPS requirements, the associated inverters will be located in the building's electrical rooms, and possibly the mechanical penthouse depending on the final location(s) of the arrays. These are not allowed to be installed on the roof. A solar feasibility assessment will be performed to determine the array locations per district requirements.
- Sub-metering for power/energy is planned for the main breaker for the switchboards, emergency panels, as well as integration of metering from PV system inverters. These meters will tie to the building automation system. The PV system will have the ability to tie into the Bonneville Environmental Foundation's 'Solar 4R Schools' data tracking system.

EMERGENCY POWER

An estimated 200kW diesel-engine-driven generator system will be used to provide emergency power. NFPA 110, Level 1 system. The generator will be specified as compliant for State of Oregon emission standards. The generator is sized for resiliency loads, as noted below. Outdoor generator with a sound-attenuated enclosure, maximum 85dBA at 25 feet distant. Both the emergency (100-amp @ 480V) branch and the standby (300-amp @ 480V) branch will have an open-transition automatic transfer switch. Generator to have two solid-state LSI-trip main breakers for the emergency branch and standby branch.

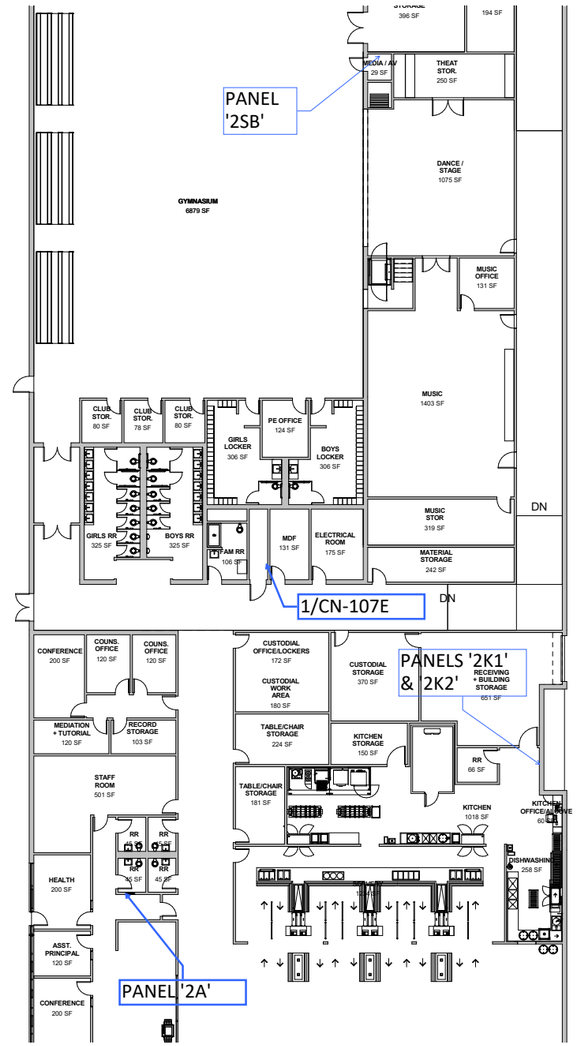
- Resiliency:
  - Provide non-structural seismic bracing and anchorage design of electrical equipment based on Risk Category III requirements, except for those components (e.g. generator, transfer switches) required for use of the school as an emergency shelter to satisfy Category IV requirements.

- The following loads will be installed on emergency power:
  - Egress lighting in corridors and stairways (emergency)
  - Building paging and phone systems (emergency)
  - Fire alarm system (emergency)
  - Generator maintenance loads (emergency)

- The following loads will be installed on standby power:
  - (Resiliency) Lighting, power outlets and ventilation equipment in the gym and adjacent spaces.
  - Door hardware.
  - Security.
  - MDF/ IDF outlets.
  - Freezers and coolers in kitchen area.
  - Domestic water booster pumps.
  - Cooling for IT and electrical rooms.
  - Building automation system (BAS).
  - Elevator.

The total time required in which to sense a power failure, start the generator, and transfer the load to auxiliary power will be 10 seconds or less. The generator will be provided with a crankcase heater to keep the engine warm. A remote annunciator panel to indicate the generator status will be provided in a central location. Three-pole transfer switch with time delay neutral.

To meet the requirements for resiliency, 96-hours of run time diesel storage for #2 diesel with a below-grade fuel tank will be provided. Provide fuel polisher system. Backup power system designed for emergency and standby power systems designed to be operational after an earthquake, meeting the special certification requirements of ASCE 7-10, as referenced by the OSSC.



LIGHTING

PROPOSED LIGHTING SYSTEM

The recommended lighting levels for the project will meet the Illuminating Engineering Society Standards unless otherwise noted.

Natural daylight will be utilized to provide not only a majority of classroom lighting but also views to the outdoor environments. Glare control of both natural daylight and electric lighting systems will enhance the learning environment.

INTERIOR LIGHTING

Interior lighting will be provided by LED luminaires with 4000K color temperature per PPS standards.

TYPICAL CLASSROOMS / STRUCTURED SPACES

Suspended continuous LED linear direct-indirect pendants. The size and arrangement of this luminaire will be specified according to the needs of the spaces and the layout of the floor plan. In Science classrooms, task lighting will be provided by LED under cabinet luminaries.

BREAKOUT SPACES / CORRIDORS / CIRCULATION

Narrow, linear LED lensed luminaires recessed flush in the gypsum ceilings of the classroom tower corridors. These mounting positions follow a pattern of frequency that allows general lighting and more focused layers of task lighting where necessary. Linear LED wall-washers, recessed or suspended, will be utilized as needed to provide visual interest or highlight displays. In the main floor corridor, open to structure with varying clouds, a mixture of pendant mounted and recessed LED luminaires will be provided.

COMMONS

Decorative, suspended LED pendants will provide the ambient illumination with linear LED wall-washers to enhance the space. The size and arrangement of these luminaires will be specified according to the needs of the space and the layout of the floor plan.

MUSIC ROOM

Suspended continuous LED linear direct-indirect pendants will be utilized in this space.

GYMNASIUM
Suspended LED high bay luminaires with direct downlight and wire guard.

MEDIA CENTER / LIBRARY
Suspended LED linear pendant with direct symmetrical downlight optics to illuminate the vertical stacks and cases. Decorative LED pendants will be provided over the circulation desk.

OFFICES/WORK ROOMS
Recessed LED 2 x2 and 2x4 volumetric luminaires with simple clean lines and micro-prismatic lenses for glare-free illumination. The layout of these luminaires will follow the floor plan of each space.

KITCHEN / SERVERY
Recessed LED 2x2 and 2x4 lensed troffer prismatic lenses.

ENTRY / RECEPTION / GATHERING / OPEN STAIRS
Decorative suspended LED pendants will provide the ambient illumination with linear LED wall-washers to enhance the space. The size and arrangement of these luminaires will be specified according to the needs of each space and the layout of the floor plan. Decorative LED pendants will be provided over the reception desk. The existing middle school's glass globe luminaires will be salvaged and reused at the new building's entry.

ENCLOSED STAIRS
Illumination will be provided by LED, low glare, wall mounted luminaires. Lighting levels will provide 1.0 footcandle minimum on stair treads. Occupancy sensors will be used to lower the lighting levels to 50 percent when the stairs are not occupied.

TARGET ILLUMINATION LEVELS TABLE

Target Illumination Levels

Space	Illumination Level	Lighting Power Density
Classrooms/Science Labs	35-50fc at work surface	0.6w/sf
Media Center/Library/Music Room	20-35fc at work surface	0.6w/sf
Commons/Gymnasium/Cafeteria	20-30fc at floor	0.5w/sf
Offices/Work Rooms	35fc	0.5w/sf
Entry/Reception/Gathering	20-30fc on task 10-20fc ambient	0.5w/sf
Staff / Community Rooms	30-35fc at floor	0.5w/sf
Kitchen	40-50fc on task surfaces	0.6w/sf
Storage/Utility/Mechanical	30-35fc	0.4w/sf
Circulation spaces	15-20fc	0.68w/sf

PLAY SPACES / COURTYARDS
Combinations of pedestrian-height glare-free pole-mounted luminaires along walking paths, seating areas, recessed LED steplights in benches, planters, etc.

ENTRY OVERHANGS
Recessed or surface-mounted ceiling LED luminaires with direct downlight distribution for glare-free illumination of steps, columns and racks.

ENTRY DOORS
Wall-mounted LED luminaires with direct downlight optical distribution.

BUILDING-MOUNTED AREA LIGHTING
Wall-mounted LED luminaires with Type IV optical downlight distribution for loading, utility and maintenance areas.

PARKING
The parking lot will be illuminated by full cut-off pole-mounted luminaires at the appropriate height to provide adequate light levels for visibility and safety. LED luminaires with Type IV and V optical distribution and integral motion sensor for auto-dimming. To be provided at 3000K color temperature per PPS Standards. Luminaires to provide enhanced security light levels of 0.2-0.5 footcandles with 15:1 uniformity and increased illumination at the drop-off zones.

LIGHTING CONTROL SYSTEMS
The building will be provided with a digital lighting control network. A unique digital lighting controller is installed in each classroom. This device receives the wiring from wall stations, occupancy sensors, photocell devices and the broader lighting control network. In addition to receiving commands from low voltage devices, the digital lighting controller contains up to four-line voltage relays and 0-10v dimming signal outputs used to switch and dim the lighting zones. Each digital lighting controller can be programmed locally with a hand held remote or tablet, or from a central lighting control system hub with a laptop. Design is based on Wattstopper DLM series digital control system.

A combination of mini relay panels, small digital lighting controllers and line voltage devices form a network that connect the remainder of the building. This network has the capability to behave locally or globally reduce lighting power use where possible, yet giving the individual users the opportunity to use familiar lighting control devices to adjust according to the immediate needs.

The building automation system will be used to directly control exterior lighting through a switching module tied to the BAS controller and a rooftop photosensor. BACnet IP protocol will be used to connect lighting relay panel to the BAS. If the fire alarm or security system goes into alarm, the exterior lighting can be turned on automatically at night for the fire and police department.

Standard dual-technology (ultrasonic and infrared) occupancy sensors will automatically control the lighting in enclosed room spaces with ceilings under 14' 0" in height, including corridors. Combined wall switch/occupancy sensors will be used in small offices.

EMERGENCY LIGHTING

The building will remain lighted, either electrically or via daylight measures during occupied hours. Ties between the security system and emergency lighting control, and between occupancy sensors, daylighting sensors and the emergency lighting circuits, will be utilized to minimize lighting remaining on within the building 24 hours a day. Emergency lighting relays (UL 924 listing) will be installed as needed to ensure emergency lighting remains off in unoccupied areas and where daylighting alone can provide over 1.0 footcandles in the path of egress.

FIRE ALARM

CODES, STANDARDS AND REFERENCES

The fire alarm system will be designed in accordance with the following codes, standards and references:

- Oregon Structural Specialty Code (OSSC), adopted edition.
- Oregon Fire Code (OFC), adopted edition.
- Oregon Electrical Specialty Code (OESC), adopted edition.
- Oregon Mechanical Code (OMSC), adopted edition.
- NFPA 70, National Electrical Code, adopted addition.
- NFPA 72, National Fire Alarm and Signaling Code, adopted addition.
- ASTM, American Society of Testing and Materials.
- NEMA, National Electrical Manufacturers Association.
- UL, Underwriters Laboratories.
- FM, FM Global Approval Guide.
- ADA, Americans with Disabilities Act.

FIRE ALARM SYSTEM DESIGN AND INSTALLATION CRITERIA

An addressable fire alarm system and emergency voice alarm communication system will be provided to meet the requirements of the adopted editions of codes, references and standards as well as Portland Public School District Standards.

The fire alarm control unit will be located in the MDF room and power supplies will be located in IDFs. A fire alarm annunciator with a microphone will be located in the main office.

System power supplies will have batteries to provide a secondary power source in case of primary power loss to the control panel or any remote power supplies.

The fire alarm system will provide system alarm, supervisory and trouble signal monitoring, and alarm notification for the campus and will transmit the signal offsite to a remote monitoring station using an IP communicator.

Automatic smoke detection will also be provided as required by code for elevator recall service, HVAC systems' monitoring, smoke damper monitoring, and for the control of fire doors. Heat detection will be provided to operate the elevator shunt trip. In addition, smoke detection will be provided in all hallways and corridors, in rooms with door holders, at the top of the stairways, in all rooms leading to a corridor or hall excluding offices, workrooms and classrooms. In locations where smoke detectors are not suitable, heat detectors will be used.

As a bid add alternate, smoke detection will be provided in the classrooms per PPS requirements as part of the design documents. Manual pull stations will be provided at the building exits.

The fire protection system water flow, alarm pressure switches, valve supervisory switches and supervisory pressure switches will be monitored for status system.

Activation of system smoke detectors, manual pull stations, fire sprinkler water flow or alarm pressure switches will initiate alarm signals on the fire alarm control panel (FACP) and fire alarm annunciators (FAAs), and activate the audible and visual notification appliances throughout the building. Activation of HVAC duct smoke detectors, dry sprinkler system low air pressure switches or off normal position of fire sprinkler control valves will initiate supervisory signals annunciated on the FACP and the FAAs.

Audible and visual alarm notification appliances will be provided to meet the audible and the visual alarm notification requirements of NFPA 72 and the ADA. Audible notification will be provided by an emergency voice alarm communication system using speakers to transmit an alert tone signal followed by voice instructions. Each floor of the building as well as gyms, commons, cafeterias, and similar large spaces will be capable of separate zone paging; however, general alarm will initiate the evacuation signal throughout the entirety of the campus. The speakers will be located to achieve both audibility and intelligibility per the requirements of NFPA 72. Visible alarm notification using strobe appliances will be provided to meet the requirements of the ADA and NFPA 72 throughout all common use and public spaces.

Control outputs will be provided for fire safety functions such as elevator recall and shunt trip, air handler shut down, fire smoke damper closure, and fire door release.

FIRE ALARM SYSTEM EQUIPMENT

The system will be manufactured by Potter.

Fire alarm equipment will be UL listed or FM Global approved for fire protection.

The fire alarm panel will be an analog, addressable system with point identification and will have a microphone for manual operation of the emergency communication system.

Strobes will have multi-candela settings for field adjustment to achieve ADA and NFPA 72 visual requirements for the protected spaces. Finishes will be red.

Speakers will have the necessary frequency response for intelligibility as well as multi-tap settings for field adjustment to achieve audibility requirements per NFPA 72. Finishes will be red.

Manual pull stations will be double action type with red finish. Where the pull stations are accessible to students, they will be provided with a protective cover.

Smoke detectors will be photoelectric type for all areas except beam smoke detectors will be used where ceilings exceed 16 feet in height. Where installed for monitoring HVAC systems and control of fire smoke dampers, smoke detectors will be either duct mounted or in-duct mounted.

Activation of HVAC duct smoke detectors, fire sprinkler valve tamper switches, and other supervisory causing devices will initiate supervisory signals which will annunciate on the FACP and the FAA. Fire alarm, supervisory and trouble signals will be transmitted off site to a remote monitoring station.

Control outputs will be provided for fire safety functions such as air handler shut down, fire smoke damper closure, elevator recall, elevator shunt trip, and fire door release.

COMMUNICATIONS

PATHWAYS DESCRIPTION
Wire Basket style cable tray will be provided in all major corridors where high cable density is required. The wire basket tray will be mounted to structure with trapeze style supports. Cable supports (rated J-hooks/adjustable saddles) are required for lower density areas where cable is not routed in cable tray to bundle cables together in a common path rated for Category 6 and 6A cabling. Metallic 2-gang outlet boxes with single gang adapters with 1-inch metallic conduit/raceways to accessible ceiling space will be provided for routing and termination of low voltage cabling. Raceway installed per ANSI/TIA/EIA-569-B standards.

VOICE, DATA AND CATV HORIZONTAL CABLING INFRASTRUCTURE

CABLING
Cabling will consist of 4-pair unshielded twisted pair (UTP) Category 6 voice and data network cabling for work area outlets and Category 6A cabling for wireless access point locations. The design will require that the successful bidder submit at least a 20-year, end-to-end solution warranty for the completed installation of these products.

TELECOMMUNICATIONS OUTLETS (TO)
Classroom layout will consist of four locations with two Category 6 (one on each wall) and one ceiling mounted location of two Category 6A. Other standard work area outlets will be two Category 6. All telecom cabling will be terminated on 48 port, rack mounted angled patch panels in their respective telecom rooms.

WIRELESS ACCESS POINTS
Wireless Access Points will have two Category 6A cables per location (included in ceiling mounted location above). These locations are included in every classroom space as well as Office areas and Commons Spaces. Final locations will be determined during design based on software modeling by Owner for their preferred manufacturer's system. Wireless access points are Owner furnished Contractor installed.

VOICE AND DATA BACKBONE INFRASTRUCTURE

COPPER BACKBONE
The copper backbone cabling will be Category 6 cables to Telecom Rooms that feed analog connections such as phone for the elevators, area of rescue and intrusion alarm.

FIBER-OPTIC BACKBONE
Fiber-optic backbone cable consists of 24-strand, singlemode fiber-optic cable. Fiber optic cables will run from the MDF to each IDF. All fiber-optic cables will terminate in rack-mounted, fiber-optic distribution units. Fiber-optic connector and bulkhead types are LC-style connectors. Provide a separate 1-inch innerduct for each fiber run.

COMMUNICATIONS EQUIPMENT ROOMS

TELECOMMUNICATIONS ROOMS (TR'S)
These rooms are required to be environmentally controlled and have power receptacles for active equipment on generator back-up. Owner will provide local rack-mount UPS units for power conditioning.

TELECOMMUNICATION RACKS
Each telecommunication room (also identified as MDF/IDF) consists of four post racks that are 7-feet high by 19-inches wide by 29-inches deep, to support backbone and horizontal cable installation and installation of Owner-provided network equipment. All racks will be seismically braced with overhead ladder racking and properly anchored floor hardware. All racks will have a 48-inch, vertical, 15amp power strip.

GROUNDING
The MDF will have a 20-inch ground bus bar with a 3/0 ground to building steel and the main distribution panel. All IDFs will have a 10-inch ground bus bar with a 3/0 ground to building steel and the main distribution panel.

WIRE MANAGEMENT
All equipment racks have one 10-inch wide vertical wire manager on each end and in between each equipment rack. All equipment racks have one double unit horizontal wire manager at the top and bottom of each column of patch panels and equipment, and double unit horizontal wire manager after every four angled patch panels. The finish for all TR racks and wire management is black.

INTERNET PROTOCOL INTERCOM/PAGING SYSTEM
A complete and operational zoned intercom/paging system will be installed. This system is designed to provide program distribution and "all-call" to speakers throughout, provide local amplification and microphone inputs for local programming and distribute all-call messages concurrent with local programs.

Provide IP speakers for every classroom, teaching space and offices. Provide analog speakers connected to IP zone controllers for all Common Spaces and exterior spaces. Final zoning for analog speakers/zone controllers will be coordinated with the Owner.

The system will also be required to be interfaced to the GPS master clock system for synchronized time display, and to the data/telephone system for general paging from any telephone instrument. Manufacturer will be Valcom. All necessary Cisco PoE switches are to be included.

WIRELESS CLOCK SYSTEM
The wireless clock system in this project continually synchronizes clocks throughout the facility. Each clock will have the ability to transmit and receive eliminating the need for satellite transmitters. The system synchronizes all clocks to each other, utilizes Ethernet connections to provide atomic time, and automatically adjusts for daylight savings time. No hard wiring will be required. Provide standard 12-1/2-inch clocks in every classroom, teaching space and all offices. Provide 16-inch clocks in common areas such as the Gym, Commons, etc. The Wireless Clock system is also capable of being utilized as the master clock for the Intercom/Paging system. PPS is standardized on American Time and Signal.

AUDIO-VISUAL PRESENTATION SYSTEMS

WALL MOUNTED PROJECTION SYSTEMS
Provide a wall mounted, short throw projector mount for every classroom and teaching space. Projectors are Owner furnished Contractor installed. Provide one HDMI cable from the projector to the input location at the teacher's desk.

CLASSROOM AUDIO REINFORCEMENT SYSTEM
Provide a classroom audio reinforcement system in every classroom and teaching space that includes an audio amplifier, one multi-media ceiling speaker and wireless lapel microphone with cradle charger. Provide an audio connection to the projector in every space. PPS is standardized on Lightspeed 995 with a TCQ speaker.

SECURITY SYSTEM

ACCESS CONTROL
Provide access control card readers on exterior doors at staff entrances and loading docks. Provide 2N video intercoms with integral card readers at the main entrance and all ADA entrances. These doors will have electrified hardware and will be included in the lockdown system. Lockdown buttons will be placed in the Admin area. Provide access control card readers on all Telecom Rooms and Computer Labs.

The Access Control System will be Kantech. The card readers will be HID RP-40 with HID iClass 13.56 MHz cards.

DOOR CONTACTS
Door contacts will be placed on all exterior doors for intrusion. Motion detectors are placed in hallways in every area of the ground floor and upper floors with stair access. The motion detectors will be ceiling mounted and detect in a 360 degree pattern. Dual technology detectors with passive infrared and microwave signals will be used to lessen the possibility of false alarms. Manufacturer will be DSC.

KEYPADS
Keypads will be located near common area doors (in spaces not accessible to students) to provide local readout, disable/enable features, and local programming capabilities in the event a workstation is not readily available.

IP VIDEO SURVEILLANCE SYSTEM

SYSTEM DESCRIPTION
IP Video Surveillance system will be provided for monitoring of interior and exterior spaces. Provide cameras at all restroom entries, Gymnasium, Commons, bus loading zones, exterior gathering areas, gates into parking lots, parking lots, parent drop off locations, and in all hallway intersections pointing at all directions. A Network Video Recorder (NVR) and video management software are to be included. The video management software will be Kantech EntraPass Corporate Edition Version 5.02. The NVR will be Exacq and will be sized to accommodate 12 hour event recording, 10 day storage, H.264 compression rate, 15 frames per second, plus 20% spare.
All necessary Cisco PoE switches are to be included.

The video management software will be Kantech EntraPass Corporate Edition Version 5.02. The NVR will be Exacq and will be sized to accommodate 12 hour event recording, 10 day storage, H.264 compression rate, 15 frames per second, plus 20% spare.
All necessary Cisco PoE switches are to be included.

RESILIENCY

GENERAL REQUIREMENTS

As part of the project, resiliency in the design is being implemented to meet specified goals as outlined and defined elsewhere. Two options are currently being considered:

- Baseline
  - Gymnasium/Performing Arts as Risk Catagory IV
  - Learning Suites and Commons as Risk Catagory III

BASELINE DESIGN

The following MEP items would be required to make the north half of the building comply with RC IV requirements:

- Upgrade fire water supply piping from PVC C900 to ductile iron pipe and fittings to provide low vulnerability to damage from seismic events.
- Upgrade potable water supply piping from standard Schedule 40 PVC to a fused polyethylene C906 system to provide low vulnerability to damage from seismic events.
- Provide quick-connect stub-outs at building exterior to allow use of portable water tank and associated pump to supply water to key building areas: kitchen, staff showers, and drinking fountains in common spaces.
- Provide potable and fire water seismic joint fittings at entrance to building.
- Sanitary gravity sewer piping - upgrade from PVC or cast iron to ductile iron pipe and fittings to provide low vulnerability to damage from seismic events.
- Provide sanitary sewer seismic joint fitting at entrance to building.
- Provide 10,000-gallon valved sanitary holding tank and pump connection between building sewer discharge and onsite pump station to provide onsite sewage storage.
- Provide natural gas seismic shut-off valve at meter.
- Provide 200kW emergency generator with 96-hour run time fuel storage. Emergency generator, switchboard, ventilation fans, and other equipment that is expected to be operational after an earthquake should satisfy the special certification requirements of ASCE 7-10, which is referenced by the OSSC.
- Provide non-structural seismic bracing and anchorage design of MEP equipment based on Risk Category III requirements, except for those components (e.g. generator, transfer switches) required for use of the school as an emergency shelter to satisfy Category IV requirements.
- Provide electrical service to power lighting and ventilation fans in common areas and gymnasium on emergency power. Heating and cooling will not be on emergency power.
- Provide electrical receptacles in kitchen on emergency power to allow hot plates for water boiling, etc.

ALTERNATES

RESILIENCY

To make the entire school MEP systems comply with RC IV, the following items would be added in addition to those listed above:

- Due to the location of some of the incoming utilities, portions of the design will include upgrades to services that enter the project site in the lower risk category but serve the higher risk category area. These locations will need to be further evaluated to understand the full impact of the design.
- Increase the size of the emergency generator and fuel reserve capacity to a 300 kW generator.
- All MEP equipment to be designed and braced to RC IV requirements.

NET ZERO

Should a net zero option be pursued for the gymnasium portion of the building, several additional, dedicated branch panelboards will be provided to allow for sub-metering of only those loads serving that area such that the usage can be compared against the PV production on site that will be sub-metered in the base design.

2.9 Nutrition Services

DESIGN GOALS

The Food Service Program will support the Kellogg Middle School maximum population of 810 students served in two lunch periods. The Kitchen will function as a self-supporting operation. Kitchen shall have storage for all deliveries to support the production schedule.

DESIGN OVERVIEW

The new kitchen will support a breakfast, lunch, and supper programs and daily snacks for the student population.

The menu will focus on healthy choice entrees accompanied with fresh fruits, vegetables, and milk. Serving venues shall have a retail look and feel. There will be six cashiers to help get the students out of the serving lines quickly to maximize their time to eat and socialize. Below is the estimated serving timeline matrix:

- 810 students divided by two lunch periods = 405 students per lunch
- 405 students will have lunch however we calculate 70% will purchase a lunch = 284/lunch
- 284 students divided by six pay point lines = roughly 47 students per line
- Each cashier can process up to 6 students/minute = under 8 minutes to get students through each lines pay point.

Deliveries will come from the District's Central Distribution Center as well as from other Vendors and will be brought directly into the kitchen from the service yard for breakdown and loading into cold and dry storage rooms. Space will be allocated for up to (5) transport carts from the Central Distribution Center.

Dry and cold storage rooms shall be located inside the kitchen with a clear path from the receiving door. Dry storage shelving shall consist of 5-tier high adjustable open wire type shelves as well as front loading can storage racks and dunnage racks. Cold storage will consist of a walk-in refrigerator and freezer with epoxy coated adjustable wire type shelving as well as dunnage racks.

On-site prep will be required and located in close proximity to the walk-in cooler. This area shall be supported by work tables with sinks (with indirect wastes) and perforated removable sink strainer for managing produce waste. Other support equipment such as a mixer and food processor will be located within this area.

Hand washing sinks shall be stainless steel with hands-free knee valve activation. Hand sinks shall be provided at multiple locations throughout Kitchen to cover all working/serving zones. Maximum distance from any given work/serving area to a hand washing sink shall not exceed 20 LF.

Cooking equipment will support scratch cooking. Natural gas is preferred fuel source. Type 1 grease exhaust hoods shall cover the lines. Work tables, preparation sinks, and hand sinks will support the various work stations.

Additional production support equipment will be required to support working areas.

Students will be served on plastic trays. They will have access to a variety of hot and cold entrees, self-serve refrigerated milk cooler, and cold variety bars with veggies and fruits. Three double sided point of sale counters with wireless iPad technology will expedite student egress from the Servery.

Serving line(s) shall be decorative with accent lighting; solid surface top in lieu of stainless steel should be considered. Adjustable decorative adjustable food guards, to meet Department of Health Codes, will be included (stainless steel or powder coated color finish complimentary to color scheme). Auto-fill hot wells, refrigerated cold wells, and tiered merchandising cases will be selected to support the menu.

Warewashing will consist of dishtables, waste collector with spray rinse, an automated warewasher with 180-degree hot water rinse cycle, and a 3-compartment potwashing sink table. Support equipment shall consist of a mobile soak sink, mobile waste receptacles, and mobile pot and pan shelving.

Whenever possible equipment shall be made portable. Those items with closed bodies shall be set on raised bases. Open base equipment shall be made with tubular stainless steel legs having sanitary gussets and bullet-shaped feet or casters.

Equipment shall conform to all local and national codes. All items shall be designed to National Sanitation Foundation Standards. Working surfaces and cabinet bases shall be stainless steel, polyethylene, or plastic laminate.

SUPPORT

- A manager's desk, file cabinet, and locking tall storage cabinet will be located in the kitchen with provisions for phone and data lines.
- A Janitor Closet with mop sink and chemical storage will be located within the Kitchen.
- The Kitchen waste volume will require a grease removal device sized per code by the plumbing engineer. Space for a dumpster will be provided in the loading dock area.
- A cart/can wash with hot/cold hose bibb and area drain will be located outside in the Service Yard.
- A unisex staff toilet shall be located within close proximity of the Kitchen.
- Staff lockers will be located within the kitchen.
- Confirm if Kitchen will require a washer/dryer.

FINISHES

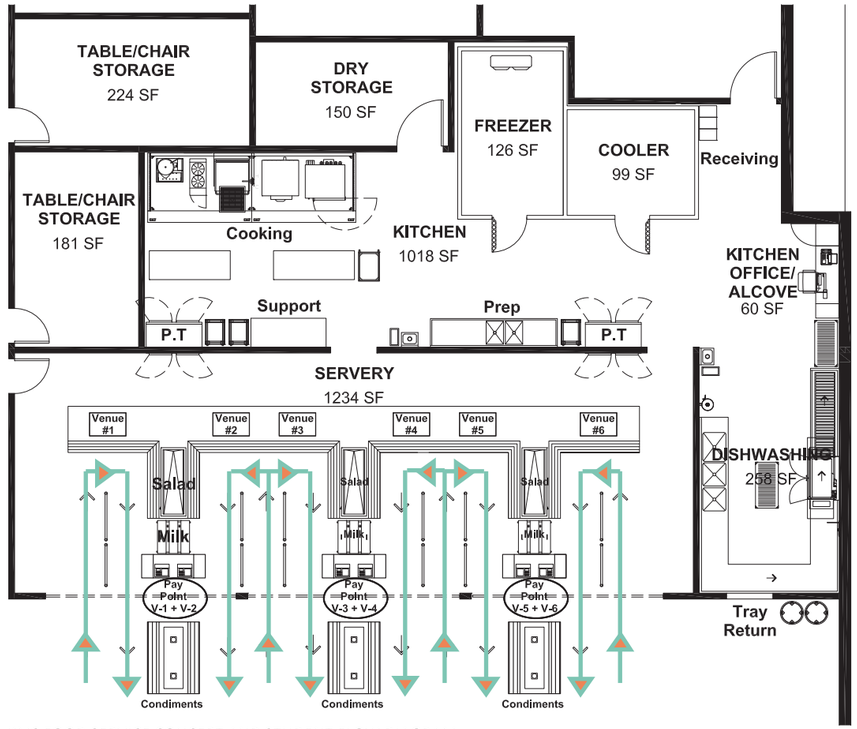
- Finishes shall be smooth, washable, and light in color. Recommended flooring material is quarry tile, epoxy, or Altro Safety Vinyl with an abrasive surface. If the ceiling is suspended the tiles used shall be mylar coated for cleaning. Ceiling height shall be minimum 9'-0". Recommended wall finish is a smooth washable wall board wainscot material, i.e.: stainless steel, Altro White Board, or FRP minimum up to 6 feet with a semi-gloss painted wall surface continuing up to the ceiling.
- Stainless steel wall flashing will cover the cooking wall surfaces.

ED SPEC DEVIATIONS

- To serve 810 students in two (2) lunches (compared to Ed Spec 675 students in three lunch periods) additional cold/ dry storage and larger serving line is necessary to meet the program requirements.
- Having a staff toilet within the Kitchen is desirable however since there are two gender neutral toilets just across from the Servery that Kitchen staff can use we propose deleting the Kitchen toilet to allow space for more cold storage.

PRELIMINARY EQUIPMENT LIST:

- Staff lockers (6- half size)
- Manager's desk and storage cabinet (by Architectural Division)
- Handwashing sinks – as required to cover the Work Zones
- Corner/channel guards (lot)
- Sheet pan racks (4)
- Walk-in cold storage rooms (2)
- Refrigeration systems (2)
- Walk-in cooler and freezer shelving (lot)
- Dry storage shelving (lot)
- Prep and cook's support table
- Prep table with sinks
- Waste collector at prep sink table
- Manual can opener
- Utility carts (2)
- Canopy hood with fire protection system
- Stainless steel wall flashing (lot)
- Double stack convection ovens
- Double stack combi-oven/steamers
- Tilting Skillet
- 2-burner hot plate
- 20-quart tilting kettle with stand
- Pass-thru hot and cold holding cabinets (2)
- Serving counter with hot and cold wells along with 2-tier pass-thru slant shelf hot merchandising cases – sets of three for each serving line segment.
- Portable traffic control system
- Mobile refrigerated milk coolers (3)
- Refrigerated salad bar peninsulas (3)
- Mobile cashier counters (3)
- Point of sale system (by Owner)
- Mobile condiment counters (3)
- Mobile waste receptacles (4)
- Mobile soak sink (for silver soak)
- Recycling containers (by Owner)
- Soiled dishtable with tray return window
- Waste collector in soiled dishtable
- Warewasher vapor exhaust ducts (2)
- Conveyor warewasher with booster heater
- Clean dishtable with rollers
- Potwashing sink table
- Eye wash station
- Janitor sink (by Plumbing Division)



KMS FOOD SERVICE CONCEPT AND STUDENT FLOW DIAGRAM

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2.10 Acoustic Narrative

Good acoustics are a critical factor in the school learning environment at Kellogg Middle School. Proper design of classrooms and other key learning spaces will provide an environment in which clear verbal communication is enhanced.

Per PPS Design Guidelines and Standards, Appendix P, the project must meet Leed for Schools V4 IAQ prerequisite for minimal acoustical standards in classrooms, and make an appropriate effort to achieve the enhanced acoustical performance (1 point). These standards criteria include appropriate reverberation control, reduced sound transmission between classrooms, low HVAC noise, all of which contribute to good speech intelligibility in the classrooms and learning spaces. Please see Appendix A of this report for a summary of LEED Criteria.

This report presents the recommended criteria for each space in the building, and describes the recommended measures to achieve these criteria. A separate MEP noise report is also provided.

WALLS - GENERAL
Where wall type STC ratings are called out the following are the initial recommendations for wall construction.

1. STC 50: Two layers both sides of wood or metal studs, with batts in the cavity.
2. STC 45: One layer 5/8" gwb one side, two layers opposite side of wood or metal studs, batts.
3. STC 62: One layer 5/8" gwb one side, two layers opposite side of double wood or metal studs, batts.
4. STC 70: CMU 12" blocks solid-grouted, or double stud with 3 layers each side, RSIC clips one side, batts.
5. STC 38 glass: dual pane, ¼" 7/8" gap., 1/8" glass.

All acoustical walls need to extend to structure. All walls and ceilings must be sealed air tight, including putty pads on all outlets and boxes, and caulking at all wall and ceiling intersections.

Doors to classrooms and other group rooms should have upgraded door seals on the perimeter and bottom. Pemko 290 PK and Pemko 411 or 412 RL are recommended as the standard of quality. Sensitive areas should utilize upgraded Zero SoundTrap Seals STC 50+

Classroom Acoustics (Including Specialty Classrooms)

DESIGN GOALS:
- Meet or exceed LEED targets as appropriate to the District goals
- Reverberation time less than 0.6 seconds
- Treat extended learning areas as classrooms for acoustical purposes

WALLS:
- Walls should be STC 50+ between classrooms, STC 60 to restrooms/stair/MEP, STC 45 to hallways (per LEED).
- Special Ed to have STC 55+ walls, STC 50+ at psych
- Movable Walls to be STC 52+, Hufcor or Modernfold
- Exterior walls and windows facing and within 50' of Powell will need to be designed based on the site noise levels. Initial study suggests STC 37+ windows, and STC 50+ walls.

FLOOR/CEILING
- The floor/ceiling system should be STC 50+
- Impact Insulation Class (IIC) between classrooms is to be not less than IIC 45 (better: 50) to reduce footfall noise to classes below.
  - Exposed concrete on floors 2 and above is not recommended. By exposing concrete floors above, the IIC will be approximately IIC 23, which is very low. Footfall noise will be clearly audible below, as will be chairs shifting, etc.
  - Carpet is not currently planned in classrooms, but carpet will resolve this issue by providing IIC above 50.
  - For hard surface floors, an acoustical underlayment with minimum IIC 50 is recommended directly beneath the flooring surface.
- Typical classrooms should have complete coverage of the ceiling with acoustical tile ceilings with NRC above 0.7. Partial coverage requires additional wall acoustical panels or carpet to make up for the reduced absorption.
- Classrooms above 20,000 cubic feet and all Hearing Center Classrooms and Speech Classrooms:
  - At least two walls should include 30% coverage of acoustical panels. The panels can be tackable as long as the NRC is above 0.8 (e.g. Kinetics HiTack panels http://www.kineticsnoise.com/interiors/hitack.html)
  - Above tackable areas, the panels can be standard Kinetics HardSide panels NRC 0.8 or above http://www.kineticsnoise.com/interiors/hardsidepanel.html

DOORS:
- The doors to the hallways should have perimeter seals such as Pemko 322 with a drop seal on the bottom (Pemko 412RL).

Science Classrooms Acoustics

DESIGN GOALS:
- Meet or exceed LEED targets as appropriate to the District goals

WALLS:
- Walls should be STC 50+ between classrooms, 45 to hallways, 60 to restrooms/MEP/Stairwell.

FLOOR/CEILING

- Acoustical ceilings with NRC above 0.8
- Classrooms above 20,000 cubic feet:
  - If possible, one wall should include 30% coverage of acoustical panels. The panels can be tackable as long as the NRC is above 0.8 (e.g. Kinetics HiTack panels http://www.kineticsnoise.com/interiors/hitack.html)
  - Above tackable areas, the panels can be standard Kinetics HardSide panels NRC 0.8 or above http://www.kineticsnoise.com/interiors/hardsidepanel.html

DOORS:

- The doors to the hallways should have perimeter seals such as Pemko 322 with a drop seal on the bottom (Pemko 412RL).

STEAM/Makerspace Acoustics:

DESIGN GOALS:

- Meet or exceed LEED targets as appropriate to the District goals

WALLS:

- This type of space requires additional care in separating sound from the activities from other learning spaces.
- Walls should be STC 60+ to other learning areas, 45-50 to hallways, 60 to restrooms/MEP/Stairwell.

FLOOR/CEILING:

- Acoustical ceilings with NRC above 0.8
- Wall Treatment
  - If possible, one wall should include 30% coverage of acoustical panels. The panels can be tackable as long as the NRC is above 0.8 (e.g. Kinetics HiTack panels http://www.kineticsnoise.com/interiors/hitack.html)
  - Above tackable areas, the panels can be standard Kinetics HardSide panels NRC 0.8 or above http://www.kineticsnoise.com/interiors/hardsidepanel.html

DOORS:

- If used, roll-up or garage doors will not provide high STC, so STEAM will not be isolated well from the neighboring areas

Art Classroom:

DESIGN GOALS:

- Meet or exceed LEED targets as appropriate to the District goals

WALLS:

- Walls should be STC 50+ between classrooms, 45 to hallways.
- The kiln room can be quite loud and should have upgraded wall STC to 70+ to reduce noise to the STEAM space.

FLOOR/CEILING

- The floor/ceiling system should be STC 50+
- Impact Insulation Class (IIC) between classrooms is to be not less than IIC 45 (better: 50) to reduce footfall noise to classes below. By exposing concrete floors above, the IIC will be approximately IIC 23, which is very low. Footfall noise will be clearly audible below, as will be chairs shifting, etc.
- The Art classroom should have standard acoustical ceilings with NRC above 0.8

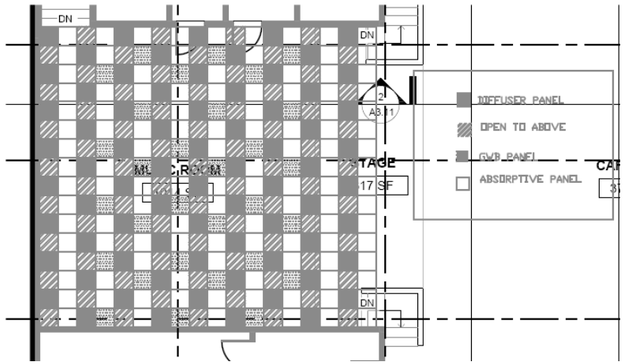
DOORS:

- The doors to the hallways should have perimeter seals such as Pemko 322 with a drop seal on the bottom (Pemko 412RL).

Music Room:

CEILING:

- ACT Grid Ceiling with a combination of 20% diffusive panels, 20% open area, 20% gwb panels and 40% absorptive panels, as roughly shown on the picture below (from another school project). The picture is representative of the type of layout and we will work with the team to determine the best balance of elements, given other factors such as lights and HVAC.



WALLS:

- If possible, articulate one wall 10-15 degrees in plan or section to reduce slap echo off of parallel surfaces
- Add duct liner stick-pinned to the wall above the suspended ceiling area.
- Provide a mix of diffusive elements and absorptive panels above 8'.
- Auralex Peak Pyramid diffusers http://www.auralex.com/sustain/default.asp
- Provide acoustical treatment on the walls with NRC 0.9 or greater covering at least 40% of exposed surfaces on the walls (where possible around glass surfaces and doors). Panels should be evenly distributed. They can be comprised of fabric-wrapped panels, perforated metal, slatted or perforated wood with 2" acoustical absorption material behind.
  - http://www.kineticsnoise.com/interiors/hardsidepanel.html
  - http://www.acousticotton.com/product_info3.htm
  - http://www.echoeliminator.com/soundproofing_material/acoustic_wall_panels.htm

PRACTICE ROOMS (IF USED):

- Self-contained prefab practice rooms from Wenger or Whisper Room or Vocal Booth

DOORS:

- The entry doors should be acoustical door/frame systems with STC not less than 52. Overly and Krieger are recommended brands.

Media Center Acoustics:

DESIGN GOALS:
- Meet or exceed LEED targets as appropriate to the District goals
- If used as classroom/meeting space, keep reverberation time controlled to allow for clear communication

WALLS:
- Walls should be STC 40+ between media center and corridor, and STC 50 to restrooms/MEP/Stair/Shaft/Elevator, 45 to hallways.
- Walls may need acoustical treatment if the space is considered a classroom, in order to meet the LEED reverberation goals.

FLOOR/CEILING
- The floor/ceiling system should be STC 50+ to classrooms above
- The Media Center should have an acoustical metal deck with NRC 0.7+

DOORS:
- The doors to the hallways should have perimeter seals such as Pemko 322 with a drop seal on the bottom (Pemko 412RL).

Cafeteria/Commons Acoustics:

DESIGN GOALS:
- Reduce overall sound levels within the space from large group activities;
- Reduce sound transfer to classrooms.
- Reduce echoes from wall surfaces;
- Reverberation time: 1.0 seconds or less;

CEILING:
- Acoustical absorption product with rating of NRC 0.8+
- Recommended: Acoustical Deck with NRC 0.8+
- MBI Baffles: http://mbiproducts.com/products/cloud-lite/

WALLS:
- Cover walls with 50% coverage above 8’ with (wipe-able) acoustical panels

DOORS:
- The doors to the hallways should have perimeter seals such as Pemko 322 with a drop seal on the bottom (Pemko 412RL).

Dance Classroom/Stage:

DESIGN GOALS:
- Meet or exceed LEED targets as appropriate to the District goals
- Stage designed to work well for musical, drama, and rehearsal uses
- Reverberation 0.6 seconds or less
- Reduce sound transfer between stage and gym for simultaneous use.
- Reduce sound to surrounding areas from loud music

WALLS:
- For most effective separation, Skyfold STC 60 doors should be used. Alternately, for a compromise, doors should be STC 52+ Hufcor or Modernfold, plus a full length STC 20+ acoustical curtain on the stage side, which can combine STC to be approximately 60.
- Walls should be STC 70+ to music classroom, STC 70 to corridor, STC 60+ (folding) to gym.
- Curtains on all walls to provide adjustable acoustic absorption.

CEILING:
- The floor/ceiling system should be STC 70+ if below a classroom or other learning space (not in the current design)
- The Dance Classroom/Stage should have standard acoustical ceilings with NRC above 0.9

DOORS:
- The doors to the hallways should have Zero SoundTrap seals on the perimeter and bottom

Gym Acoustics:

DESIGN GOALS:
- Optimize gym for presentations and classes
- Reduce overall sound levels within the space from large group activities
- Reduce echoes from wall surfaces;
- Reverberation time: 1.0 seconds or less;

CEILING:
- Acoustical Metal Deck, NRC 0.8+

WALLS:
- Add damage-resistant treatments above 8’, cover 20-30% of wall surface on three walls with Kinetics HardSide panels, or equivalent.
- STC 50 to corridor and other areas

DOORS:
- The doors to the hallways should have Zero SoundTrap seals on the perimeter and bottom

Corridor Acoustics:

DESIGN GOALS:
- Minimize reverberant noise transferring between areas, especially classrooms

WALLS:
- Provide (tackable) acoustical wall panels (NRC 0.6 or greater) covering as many wall surfaces as possible, as shown on the attached markups.

CEILING:
- Acoustical absorption product with rating of NRC 0.8+
- Recommended: Acoustical tile ceiling NRC 0.8+ covering the entire corridor area
- MBI Baffles: http://mbiproducts.com/products/cloud-lite/

Reception Acoustics:

DESIGN GOALS:

- Speech clarity for parent, student, and staff communication

CEILING:

- Acoustical absorption product with rating of NRC 0.8+
- Recommended: Acoustical tile ceiling NRC 0.8+ covering the entire reception area

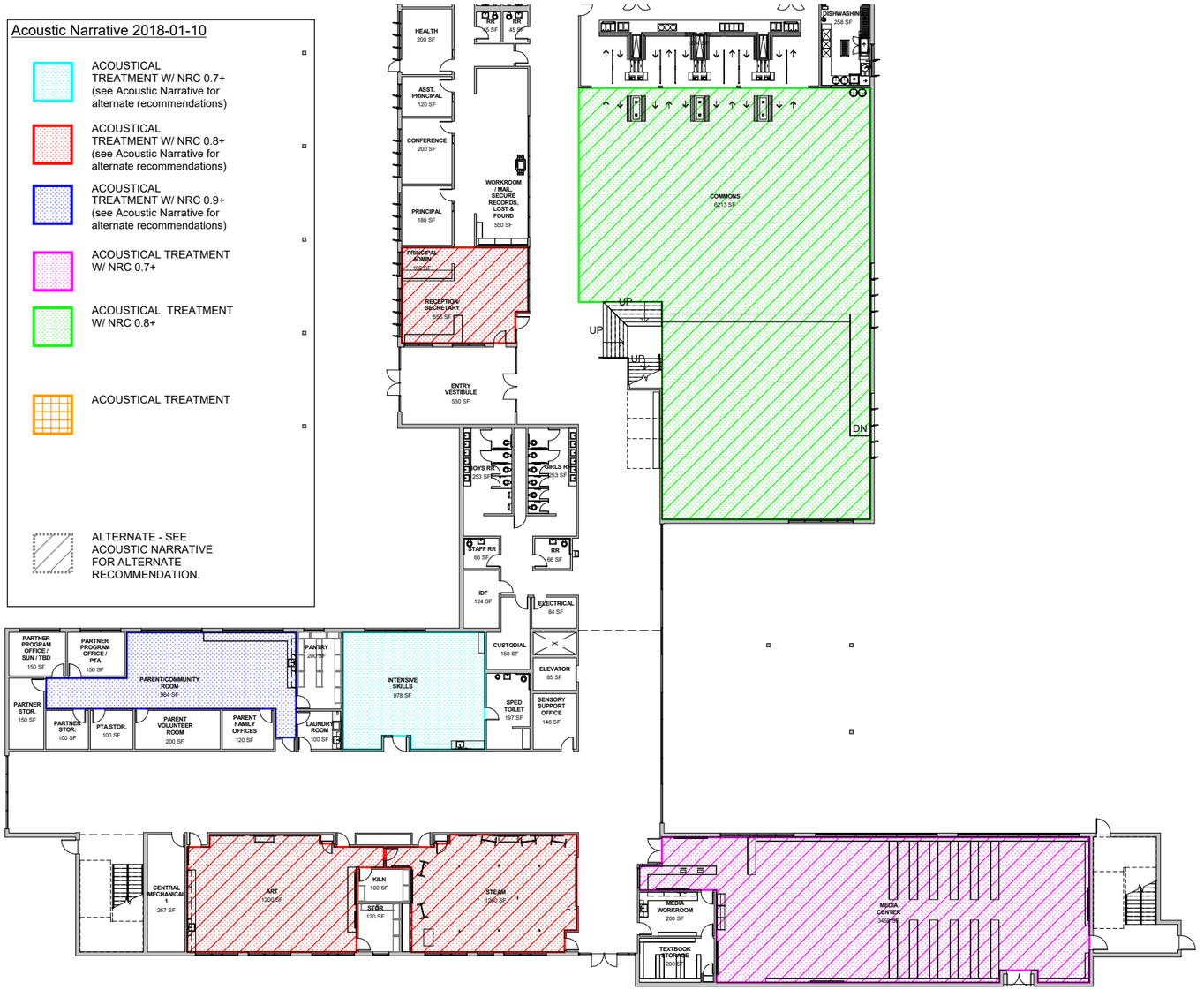
Private Office and Conference Room Acoustics:

Some office requires special levels of privacy, such as principal, counseling, conference rooms, and vice principal offices.

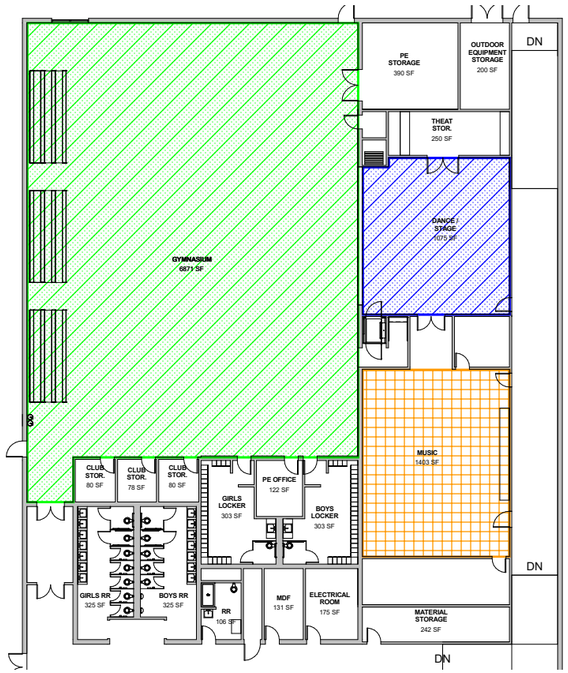
To achieve high privacy satisfaction ratings, all of the following elements must be optimized for each office. The extent of the success of the system is typically dominated by the weakest link.

Speech privacy is created by a combination of the following issues:

- Wall, door and window sound reduction capability (rated by “Sound Transmission Class” or “STC”)
- Sensitive nature of the message (degree of confidentiality desired)
- Background Noise Level (“Noise Criterion Level” or “NC”)
- Physical location and orientation of the persons speaking and listening
- Size of the rooms and partitions
- Sensitivity of the listeners
- Sound level of the source (talker)
- Sound absorption in the sending and receiving rooms
- Sound leaks and flanking paths: HVAC ducts, outlets, seals, etc.



FIRST FLOOR PLAN



INDUSTRY NORMS AND STANDARDS

- "Minimal" speech privacy is defined as "the ability to comprehend a significant portion words that are spoken in an adjacent room".
- "Normal" speech privacy is defined as "the ability to comprehend an occasional word but never full sentences that are spoken in an adjacent room".
- "Confidential" speech privacy means a neighbor is aware that a conversation is occurring in an adjacent room but is not able to understand individual words.
- "Inaudible" speech privacy as defined as "no speech heard".

Typical offices without special acoustical analysis are designed as "minimal". Where concern over privacy is a client goal, "normal" privacy is used for staff offices, whereas principal offices and most conference rooms are designed as "confidential" due to the sensitive nature of communication. Please note that confidential privacy is not achievable in an open office environment.

Wall Performance (STC)

Although STC alone cannot predict the level of privacy, the following chart gives a rough estimation of privacy expected with various STC ratings, assuming all other factors described above are optimized:

STC	PRIVACY AFFORDED
30	Normal speech easily understood
35	Normal speech audible, but partially unintelligible
45	Raised voice understood
50	Raised voice audible, but mostly unintelligible
55	Raised voice unintelligible
60	Shouting barely audible
75	Shouting not audible

Once a wall rating is selected for the desired privacy, maintaining the rating requires attention to the connection of the wall to the structure above and below. Walls terminating at the acoustical tile ceiling (or a raised floor) are limited in STC performance in the field, regardless of the selected STC lab rating.

Walls terminating at the acoustical tile (not to structure above): Sound will transfer over the wall through the tile ceiling if not connected to structure above. Laying sound batts above the ceiling tiles is a commonly used approach to reducing sound, but this does very little to stop sound and should not be used as a solution. Walls in this condition will not likely allow speech privacy levels above "Minimal".

SPECIFIC OFFICE AREA RECOMMENDATIONS:

OFFICES WITH CONFIDENTIAL PRIVACY REQUIREMENTS (PRINCIPAL, VP):

- STC 50+ walls, extending to structure above, and sealed at all perimeter junctions.
- Add acoustical z-boot if ceiling is used as a plenum. Boot must be internally lined with 1" minimum duct liner, and each of the legs of the "Z" must extend 3'+ away from the elbow;
- Back to back outlets should be spaced (minimum) 24" apart and with putty pads on all outlets.
- Interior treatment should included carpet for the flooring and acoustical tile ceiling with NRC 0.8 or greater.
- The doors should have perimeter seals such as Pemko 322 with a drop seal on the bottom (Pemko 412RL).

OFFICES WITH NORMAL PRIVACY REQUIREMENTS:

- STC 45 walls, extending to structure above, and sealed at all perimeter junctions.
- Add acoustical z-boot if ceiling is used as a plenum. Boot must be internally lined with 1" minimum duct liner, and each of the legs of the "Z" must extend 3'+ away from the elbow;
- Back to back outlets should be spaced (minimum) 24" apart and with putty pads on all outlets.
- Interior treatment should included carpet for the flooring and acoustical tile ceiling with NRC 0.8 or greater.

Conference Room/Community Room:

CEILING/FLOORS:

- Acoustical ceilings with NRC of at least 0.9 is recommended;
- 70%+ of the ceiling should be covered in absorptive material;
- Carpet on pad is recommended on the floor.

WALLS:

- The walls should be as described for “confidential” above: STC 55+ recommended for best results.
- Provide acoustical wall panels (NRC 0.9 or greater) covering 50% of two walls. Panels should be evenly distributed from 3’ AFF to 8’ AFF. They can be comprised of fabric-wrapped panels or perforated wood (minimum 40% open area) with 2” recycled acoustical cotton or duct liner behind.

DOORS:

- The doors should have perimeter seals such as Pemko 290PK with a drop seal on the bottom (Pemko 412RL).

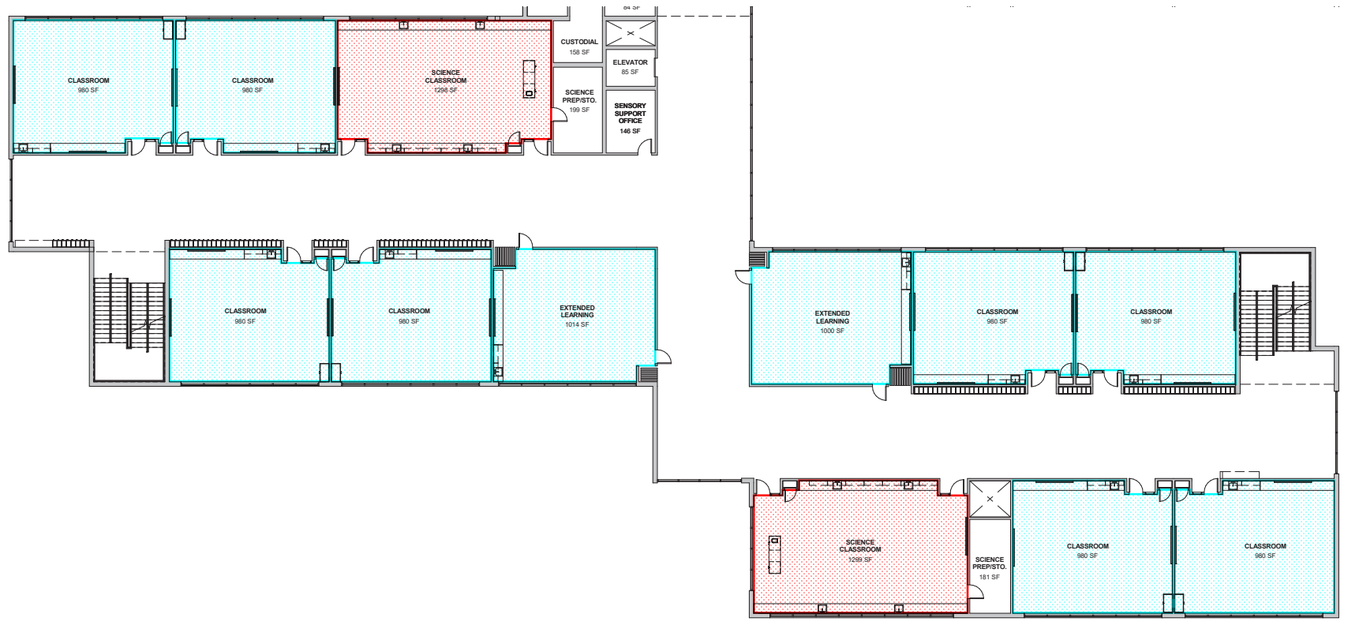
Mechanical Room Acoustics

WALLS:

- Cover walls with 2” duct liner material.
- STC 65+

FLOOR/ CEILING:

- Use Kinetics RIM system with base layer concrete slab of 4”-6”, RIM isolation level, then upper 4” slab.
- Hang ceiling below with 2 layers 5/8” gwb, batts, and use RSCIC clips + hat channels to suspend the gwb.



Listen Acoustics Markup 1/8/18
all STC's are minimum

- STC 70
- STC 60
- STC 50
- STC 45
- STC 40

CAFETERIA / COMMONS
COVER WALLS WITH 50% COVERAGE ABOVE 8' WITH (WIPE-ABLE) ACOUSTICAL PANELS

Alternates

STEAM/MAKERSPACE
- Floor/Ceiling: exposed deck with applied acoustical panels, banners, etc. covering 70%+ of the surface area

ART CLASSROOM
- Ceiling: utilization of exposed structure with applied acoustical panels covering 80%+ of the ceiling is recommended.

MEDIA CENTER
- standard acoustical ceilings with NRC above 0.7
- exposed structure with applied acoustical panels covering 80%+ of the ceiling is recommended.

CAFETERIA / COMMONS
- Ceilings: MBI Vertical Baffles hung from roof deck, with the total area of the baffles equal to the area of the roof deck.

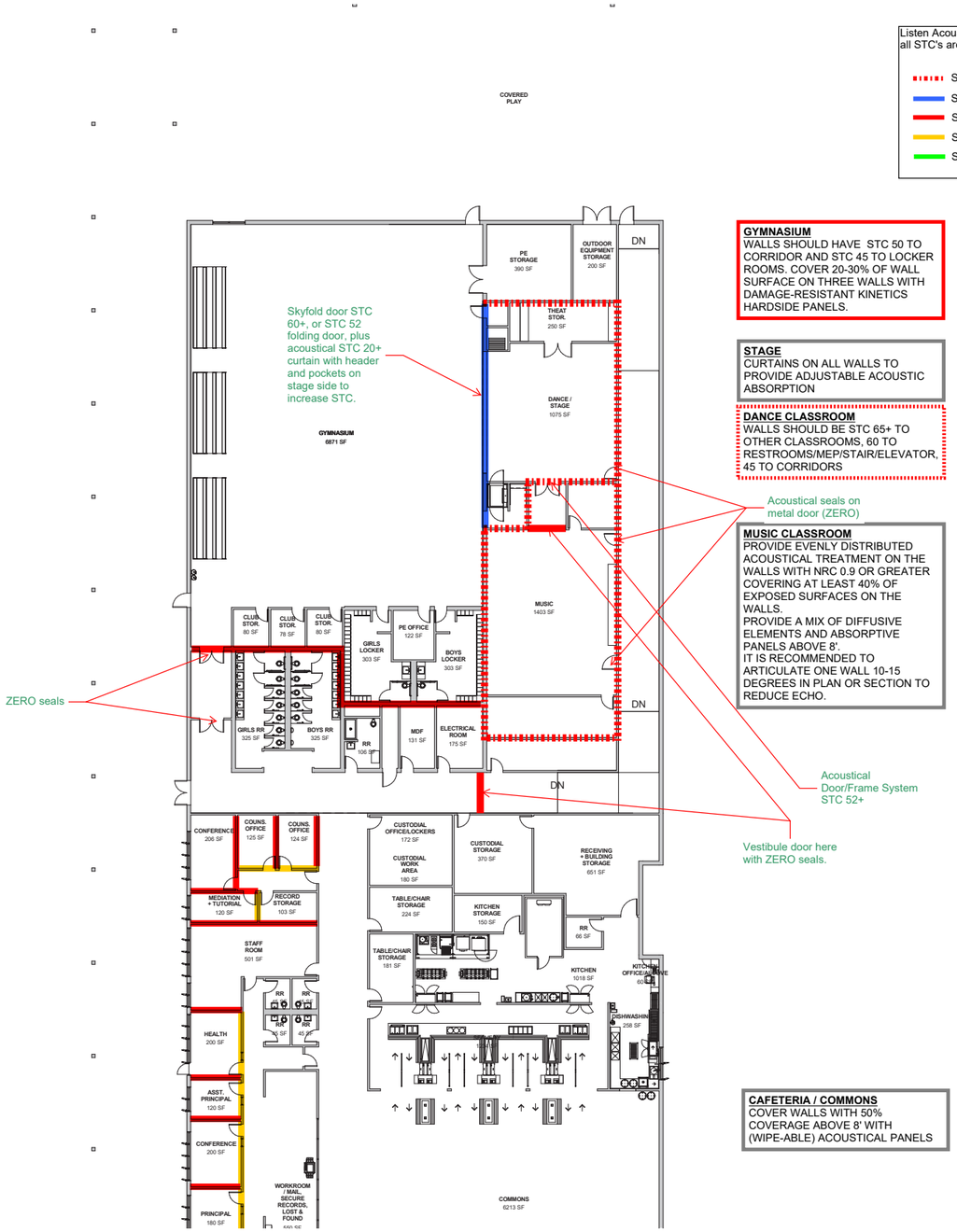
DANCE / STAGE
- MBI Vertical Baffles hung from roof deck, with the total area of the baffles equal to the area of the roof deck.
  - MBI Baffles: http://mbiproducts.com/products/cloud-lite/
- OPTIONAL: Pre-fabricated stage shell elements with 3 rows of suspended, retractable acoustical reflection panels and movable stage shell elements for the rear and sides of the stage (Wenger is a likely supplier).

GYM
- Ceiling: MBI Lapendary Panels: http://mbiproducts.com/products/lapendary/
- Ceiling: MBI Baffles: http://mbiproducts.com/products/cloud-lite/

CORRIDORS
- Ceiling: MBI Vertical Baffles hung from roof deck, with the total area of the baffles equal to the area of the roof deck.
- Ceiling: perforated wood or metal panels with 2” duct liner 0.9 NRC material above is recommended.

RECEPTION:
- Ceiling: perforated wood or metal panels with 2” duct liner 0.9 NRC material above is recommended.

KELLOGG MIDDLE SCHOOL
PORTLAND PUBLIC SCHOOL DISTRICT
02/01/18



Listen Acoustics Markup 1/8/18
all STC's are minimum

- STC 70
- STC 60
- STC 50
- STC 45
- STC 40

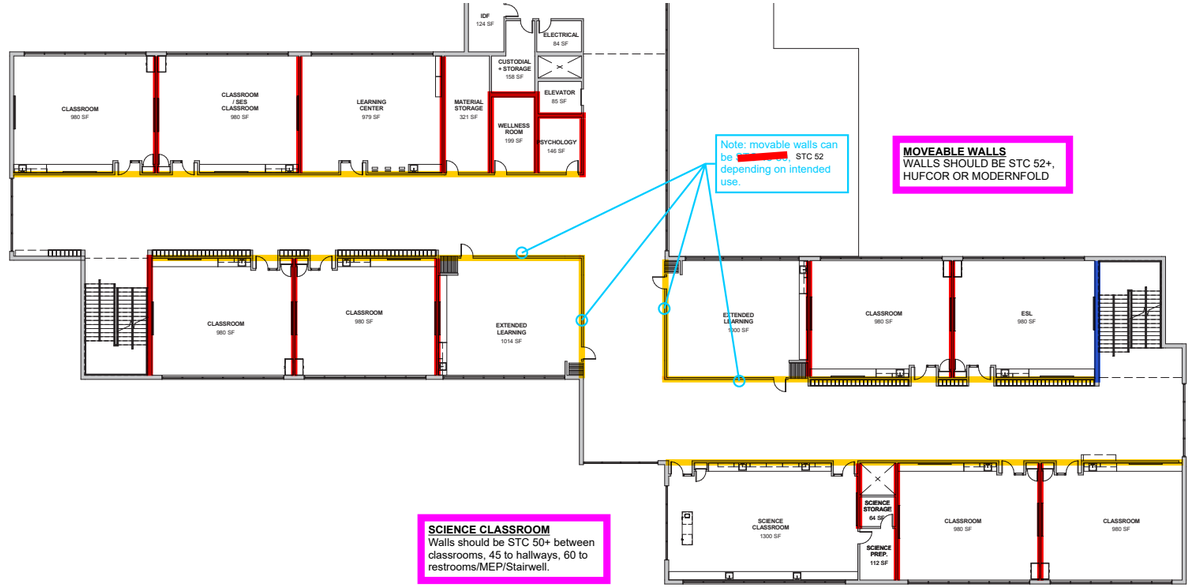
GYMNASIUM
WALLS SHOULD HAVE STC 50 TO CORRIDOR AND STC 45 TO LOCKER ROOMS. COVER 20-30% OF WALL SURFACE ON THREE WALLS WITH DAMAGE-RESISTANT KINETICS HARDSIDE PANELS.

STAGE
CURTAINS ON ALL WALLS TO PROVIDE ADJUSTABLE ACOUSTIC ABSORPTION

DANCE CLASSROOM
WALLS SHOULD BE STC 65+ TO OTHER CLASSROOMS, 60 TO RESTROOMS/MEP/STAIR/ELEVATOR, 45 TO CORRIDORS

MUSIC CLASSROOM
PROVIDE EVENLY DISTRIBUTED ACOUSTICAL TREATMENT ON THE WALLS WITH NRC 0.9 OR GREATER COVERING AT LEAST 40% OF EXPOSED SURFACES ON THE WALLS.
PROVIDE A MIX OF DIFFUSIVE ELEMENTS AND ABSORPTIVE PANELS ABOVE 8'.
IT IS RECOMMENDED TO ARTICULATE ONE WALL 10-15 DEGREES IN PLAN OR SECTION TO REDUCE ECHO.

CAFETERIA / COMMONS
COVER WALLS WITH 50% COVERAGE ABOVE 8' WITH (WIPE-ABLE) ACOUSTICAL PANELS



MOVEABLE WALLS
WALLS SHOULD BE STC 52+, HUFCOR OR MODERNFOLD

SCIENCE CLASSROOM
Walls should be STC 50+ between classrooms, 45 to hallways, 60 to restrooms/MEP/Stairwell.

MEP Acoustics Narrative

Good acoustics are a critical factor in the school learning environment at Kellogg Middle School. Proper design of Classrooms, the Gym, Music Rooms, and other key learning spaces will provide an environment in which clear verbal communication is enhanced.

Per PPS Design Guidelines and Standards, Appendix P, the project must meet Leed for Schools V4 IAQ prerequisite for minimal IAQ acoustical standards in classrooms, and make an appropriate effort to achieve the enhanced acoustical performance (1 point). These standards criteria include low HVAC and other MEP systems noise. Please see Appendix A of this report for a summary of LEED Criteria.

This report presents the recommended criteria for each space in the building, and describes the recommended measures to achieve these criteria. General guidance for achieving the design noise targets is also provided for each system in the building. Detailed calculations, refined analysis, and recommendations will be provided once MEP design drawings and equipment sound levels have been provided.
The format for this report is:

- 1. Important Initial Design Considerations for Specific Spaces
- 2. Acoustical Design Criteria and Goals
- 3. Recommended Design Approach to Minimize Noise
- 4. Guidelines for Specific Equipment Types
- 5. What We Will Need from the Design Team for the Next Steps

1. Important Initial Design Considerations for Specific Spaces

GYM:
The NC level of this performance area should be designed to be lower than a typical school gym, as it is being used for performances and large group meetings in addition to typical gym uses. Initial recommendations are as follows:

- NC target is NC 30
- Select very quiet fan units;
- Do not locate units above or adjacent to the gym or stage
- Plan for long, straight duct runs, with space for silencers.
- Plan for all supply and return ducts (minimum 30') to be internally lined with 1" minimum thickness duct liner.
- Diffusers should be designed to be NC 25 max.

MUSIC ROOM:

- NC target is NC 25
- Make sure HVAC fan or VAV/FPB equipment is NOT located above the ceiling of this space.
- Plan for long, straight duct runs, with space for 7' silencers.
- Plan for all supply and return ducts to be internally lined with 1" minimum thickness duct liner.
- Diffusers should be designed to be NC 20 max.

MEDIA CENTER:

- NC target is NC 30
- Select quiet fan units
- Locate equipment well away from the Media Center, including fans and all other mechanical, plumbing, or noisy electrical items.
- Plan for long, straight duct runs, with space for silencers.
- Plan for all supply and return ducts to be internally lined with 1" minimum thickness duct liner.
- Diffusers should be designed to be NC 25 max.

CLASSROOMS:

- NC target is NC 25
- Make sure no fan units or VAV boxes are located above classroom ceilings. Locate all units above hallways or storage (non-sensitive areas).
- Plan for long, straight duct runs from the main fans, with space for silencers.
- Plan for supply and return ducts to be internally lined with 1" minimum thickness duct liner for at least 30'.
- Diffusers should be designed to be NC 25 max.

MECHANICAL ROOF AREA OR PLATFORMS:

- The roof, floors or platforms should be stiff and as massive as possible to prevent resonances in the structure, and should be isolated form the critical sound areas adjacent, such as classrooms or audience areas.
- The deflection of the floor should not exceed 0.2" as a result of the weight of the units.
- Concrete of not less than 3" at the units is recommended.

2. Acoustical Design Criteria and Goals

NOISE CRITERIA (NC) RATINGS
Noise levels in occupied spaces are typically identified using Noise Criteria (NC) ratings. The NC rating system uses octave band noise levels between 63 Hertz (Hz) and 8000 Hz to evaluate conditions in existing enclosed spaces and also to establish noise goals in mechanical system design. NC curves are based on human sensitivity to noise depending on listening and speaking activities. Lower NC values correspond to quieter environments.

From PPS standards 7/2015 division 23:
F. Noise Criteria:
Barring input from an acoustical engineer, the following Noise Criteria or Room Criterion numbers are suggested to be met:

2.	Classrooms:	25
3.	Private Offices:	30
4.	Conference Rooms:	30
5.	Corridors and lobbies:	40
6.	Calculations documenting	

assumptions, heating loads, cooling loads, and ventilation loads are required for areas over 1,000 square feet of remodeled area or new construction.

Recommended NC Design Goals

The Noise Criterion (NC) level represents the background noise level design target. Mechanical (HVAC) and other systems should be designed to meet these levels. Table 1 presents recommended NC ratings.

Table 1
Mechanical Noise Design Criteria

Location	Preferred Range of NC
Classrooms	25
Cafeteria	35
Music Room	25
Gym	30
Conference Rooms	30
Offices	30-35
Media Center	35
Corridors and Lobbies	40

3. Recommended Design Approach to Minimize Noise

There are several potential sources of noise in the mechanical systems. Typical noise control treatment for the primary noise sources are presented in the following sections. The recommendations are presented in general terms, and will be refined for the specific conditions and design requirements of the project when mechanical plans are available.

The key elements to implement are listed below:

- Size equipment areas for straight discharge conditions;
- Select quiet equipment;
- Provide ample duct sizes to slow velocities;
- Minimize static pressure and obstructions which cause air turbulence;
- Select appropriate diffusers and grilles.

If these approaches are successfully implemented, noise mitigation is much less disruptive and less costly. Each of the key elements is discussed more fully below.

EQUIPMENT ROOM/ROOFTOP CONDITIONS

Discharge conditions can play a major role in sound levels. By creating a straight, smooth discharge of not less than 3 duct diameters, excessive low frequency rumble is typically avoided. Elbows near the discharge need to be radiused at least 6” and should be oriented in the same direction as the fan wheel rotation so that the airflow does not need to change rotation vector. Also, longer, straighter duct runs, with gentle transitions are important in reducing turbulence and allowing for in-line silencers, if needed. Careful sizing of the mechanical rooms will allow for these conditions, as well providing space for the larger ducts recommended for lower velocities.

Penetrations through mechanical room/area walls require careful detailing to reduce sound leakage. The recommended penetration includes the following:

- Leave ½” space around penetrating element;
- Fill the entire length of the gap around element with fiberglass or fire stop;
- Seal both sides with resilient non-hardening sealant.

Neither the supply ducts nor return ducts should contact the wall

Doors into the mechanical room should be heavy (solid core wood or metal) with seals around the entire perimeter. No openings should be made in the doors (grilles, etc). The door should be self-closing, and should open outwards so the negative pressure pulls the door tight.

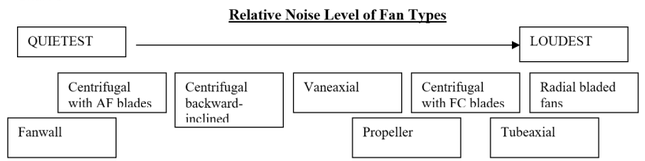
The walls of the mechanical room need to reduce sound going to neighboring spaces. The exact wall type will depend on the proximity of sensitive areas. Typically, the wall will be not less than 2 layers of GWB on each side of metal studs, but often is two stud walls, each with 2 layers of GWB. The floor should typically be concrete with a minimum of 4”-6” depth, and should have sufficient structural stiffness to minimize static deflection. Keep a 1-foot minimum clearance between the air handling units and the mechanical room wall to reduce coupling between the AHU’s and the wall.

SELECTION OF EQUIPMENT

Selecting HVAC equipment serving noise sensitive areas entails selecting the fan type, efficiency, static pressure, and inlet/outlet conditions to solve the noise problem at the source. Often, the added cost of the quieter equipment is more than offset by the savings in mitigation measures, not to mention saving time by avoiding changing the system design.

Fan Types:
Select the packaged air handling system with the lowest sound level. This may entail selecting a different type of fan. Certain fan types exhibit more desirable acoustical behavior than others, as shown in the chart below:

Chart 1



Other Key Issues:

- Operate he fan at near-peak efficiency for lowest noise (typically).
- Obtain sound levels for packaged units, based on AMCA standard 300 or ASHRAE standard 68/AMCA 330;
- Minimize the use of inlet dampers on the units, which cause turbulence and result in excessive low frequency noise.

DUCT AIR VELOCITIES

Reducing air velocities significantly reduces the potential for turbulent noise in ducts. Recommended ducted air velocities for the main supply ducts are shown below:

Table 2
Main Duct Velocities

NC	Velocities (fpm)
25	700
30	1000
35	1200
40	1400
Shafts	2000

At the diffusers, the recommended velocities (based on the target NC level) are shown in table 3.

Table 3
Diffuser Velocities

NC	Velocities (fpm)
15	250
20	280
25	325
30	380
35	450
40	650
45	800

It is recommended that the design reduce the overall speed at each duct split, to minimize regenerated noise.

REDUCING TURBULENCE
To reduce noise caused by turbulent air flow, use radiused elbows, add airfoil turning vanes to 90 degree elbows, make sure duct transitions (expansions/contractions) are less than 15 degrees, and make sure no leakage is occurring at duct joints. Dampers are a major source of turbulence, and should not be placed near elbows, splits, diffusers, or other elements (basically, putting them in straight duct sections is best).

SELECTION OF DIFFUSERS AND GRILLES
When using manufacturer data in selecting the diffusers and grilles, select a product which is rated 5-10 points lower than the target NC. The exception to this is open plan offices, where more careful selection of diffusers is needed, to ensure a more even spectrum of background noise. This may require selecting a part with higher noise rating.

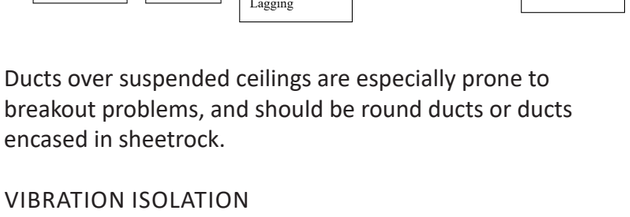
Locate turns, takeoffs, balancers, and dampers at least 6 feet from the outlet. Maintain an offset of the diffuser/ duct of less than 1/8 of the duct diameter. A good method for ensuring appropriate offset is to use flex connectors at diffusers, and to specify and verify proper alignment.

OTHER IMPORTANT CONSIDERATIONS
Crosstalk:
Common ducts between spaces can allow sound to be transmitted through the ducts, thus bypassing the walls, etc. The best solution is to locate the main ducts over corridors or non-sensitive areas, and extend individual lined ducts to each space. Also, return transfer ducts through partitions should be lined and should include at least one elbow. Transfer ducts above ceilings in rooms which do not have walls to structure should have a lined “boot” on the back of the grille. The boot should include at least one elbow, 3-5 feet of duct, and be lined with 1” duct liner.

Duct Breakout:
To minimize sound transmitting through the walls of the duct into sensitive areas (especially those near the mechanical room), it may be necessary to change the duct type. The relative efficiency of ducts to keep noise inside the duct is shown below:

Chart 2

Relative Efficiency of Duct Breakout Rejection



Ducts over suspended ceilings are especially prone to breakout problems, and should be round ducts or ducts encased in sheetrock.

VIBRATION ISOLATION
All mechanical equipment should be isolated from the structure of the building in order to meet the NC goals. Typically, this means spring isolators. Also, the structure supporting the units must be sufficiently stiff to minimize deflection, which often means adding additional structural members. Lighter, longer spans typically allow more vibration and noise into sensitive spaces, so massive and stiff structures are best.

Air handling units, and similar large units should be placed on vibration isolators as described in the specific notes below.

Ducts, pipes and other connecting members in the mechanical room need to be isolated using spring/neoprene hangers. This isolation system may need to be continued beyond the mechanical room into sensitive spaces, depending on the noise criteria. The sleeve detail described above is essential to minimizing vibration into walls.

POTENTIAL MITIGATION MEASURES
If noise levels are still too high after following the guidelines above, additional mitigation measures can be employed. These measures include adding in-line silencers, creating sound plenums, lining ducts, and lagging the outside of ducts. Each of these options should be used for the appropriate application, to solve a specific problem.

4. Guidelines for Specific Equipment Types

VAV BOXES, FAN COIL UNITS, FAN-POWERED BOXES

- The fan units should be sized to operate at medium fan speed if possible to minimize fan noise. Even more effective is to use variable speed drives (with appropriate critical band speed filters) will reduce noise significantly.
- When balancing the system, care should be taken to leave dampers in the most open position possible to avoid rumble caused by turbulence.
- There should be no contact between VAV, FC, FP units and walls, ceilings, or floors.
- Avoid systems which may allow several units to completely shut off. A better solution is to use low speed idle settings.
- Suspended units should be as high as possible in the plenum space, suspended from the deck with spring isolation hangers.
- If a quiet box solution is available from the manufacturer, we recommend this option. Typically, this avoids breakout noise problems from the box, and reduces the discharge and inlet sound levels. Alternative solutions include encasing the box in gypsum wall board, and increasing the amount of duct lining.

AIR HANDLING UNITS

- AHUs should be mounted on spring isolators with 2”-3” (minimum) static deflection.
- Keep a 1-foot minimum clearance between the air handling units and walls or floors to reduce coupling.
- Air ducts should have flexible connections to the air handling units and should be resiliently attached to the structure using suspended hangers (or isolators underneath if run along the roof) with 0.75” static deflection within 50’ of the unit. In addition, all pipes and conduit connections to the air handling units should be flexible.
- Sound traps (if necessary) should be located a minimum of three duct diameters from any elbow or fitting to minimize airflow turbulence.
- Neither the supply ducts nor return ducts should contact the wall. A 1/2” gap within a penetration sleeve, sealed with resilient caulk should surround the ducts at the wall passage.
- Penetrations of large ducts through ceilings or critical walls near sensitive areas may require duct wrap with KNM100 ALQ lagging material, or creating a sheetrock barrier to minimize noise directly adjacent to the penetration.

PUMPS

- Pumps should be mounted on concrete inertia bases, which in turn should be supported by spring isolators with 1” static deflection, and the entire system should placed on a 4” concrete housekeeping pad.
- Neoprene flexible connectors should be used where pipe sections are attached to the pumps.
- All piping at the pumps should be supported with vibration isolation in the form of either floor mounts or hangers.

PIPING SYSTEMS

- All pumped fluid, mechanical room piping, and all piping mains require vibration isolation in the form of either floor mounts or hangers with 0.75” static deflection.
- Where piping passes through the walls, and slabs, no contact should be made between the pipes and the walls or slabs. The openings should be oversized for the full depth of the opening and lined with neoprene isolation. Resilient caulk can be used to provide an airtight seal at penetrations through walls.

EXHAUST FANS

- Fan ducts with exposure to noise-sensitive exterior areas may require a 2” duct liner to control exterior noise levels.
- All vents terminating on the roof and exterior walls should be located away from rooftop mechanical equipment and have sound-muffling caps or hoods to keep direct sound from “funneling” in to the occupied space.
- Vents should be isolated from each other to prevent a cross-talk effect from occurring between separate areas.

CHILLERS

- Chillers should be mounted on spring isolators with 2” (minimum) static deflection.
- Screening for noise mitigation may be necessary depending on location and noise levels
- Keep a 2-foot minimum clearance between the chillers and walls or floors to reduce coupling.
- Pipes should have flexible connections to the chiller units and should be resiliently attached to the structure using suspended hangers (or isolators underneath if run along the roof) with 0.75” static deflection within 50’ of the unit.
- Neighborhood noise code and complaint impacts from HVAC noise can be an issue if the unit is located within 1000 feet of a residence. Significant noise mitigation is likely necessary if this is the case.

CONDENSING UNITS

- Condensers should be mounted on spring isolators with 2” (minimum) static deflection.
- Screening for noise mitigation may be necessary if the units are large sized
- Keep a 2-foot minimum clearance between the condensing units and walls or floors to reduce coupling.
- Pipes should have flexible connections to the units and should be resiliently attached to the structure using suspended hangers (or isolators underneath if run along the roof) with 0.75” static deflection within 50’ of the unit.

ELEVATOR CONSIDERATIONS

Elevator Mechanical Room Equipment Noise:

- Install vibration isolation on elevator equipment utilizing 0.75” deflection neoprene mounts.
- Ensure all connections to the elevator motor, including electrical, hydraulic (if used), and other connections, are resiliently attached with 0.75” deflection neoprene, and are resiliently sleeved through elevator room walls and floor/ceiling systems.

Elevator Car Noise:

- Noise from elevator counterweight and car guide rails will be transmitted into concrete walls via rail support brackets. Door opening mechanisms will add to these structure-borne noise. Special acoustical wall treatment such as double studs and/or multiple gypsum board may be needed for noise-sensitive areas adjacent to elevator noise sources.

PLUMBING CONSIDERATIONS

Plumbing in walls of areas with NC of less than 40 need special consideration. Plumbing noise is transmitted by several paths and requires multiple solutions to achieve containment. Most of the airborne noise in plumbing systems is caused by turbulent water running through the pipes. Flow noise radiating from the piping runs can be minimized by decreasing velocity, increasing pipe diameter, reducing the number of pipe transitions (elbows, tees, etc.), and adding a barrier around the piping.

Noise is also transmitted from the piping runs to the rooms of the building if the pipes are in direct contact with large radiating surfaces (i.e., walls, ceilings, and floors). Such surfaces, acting as resonant elements, radiate the noise at more intense levels. Isolation of these piping runs from the structure provides significant noise reduction.

SUPPLY PIPES

- Supply and waste pipes should be isolated from structure and wall surfaces using a resilient material such as 1/2” neoprene or Armstrong Armaflex between the pipes and the structure of the enclosure containing them.
- A noticeable reduction in noise level may be obtained by using proper-sized piping to lower the water velocity. Flow velocities on the order of 8 ft/sec or less have been found to be acceptable. Specified flow capacity requirements can be met and a substantial reduction in noise can be obtained by using both pressure regulators and proper diameter piping in the plumbing system.
- Noise in piping systems can occur when a rapidly closed valve abruptly stops a moving column of water and produces hydraulic shock (e.g., quickly closing a sink faucet). The resulting

forward and backward water surge within the piping produces pounding noises called water hammer. Water hammer noise can be reduced by using water hammer arrestors on both hot and cold-water lines and should be included by the plumbing designer

WASTE PIPES AND WATER CLOSETS

- Cast-iron waste pipes should be used to minimize sound transmission and vibration.
- Allow sufficient wall thickness to ensure that waste pipes can be installed without contacting either wall surface.
- Horizontal waste lines above suspended ceilings should be boxed out with 5/8" gypsum board.
- All drain lines should be isolated at all floor and wall penetrations.

BOILERS

- Select quiet burner type: natural draft is the quietest, followed by induced draft and forced draft;
- Vibration isolation of the boilers on either waffle pads or other isolators is important;
- Provide sound isolating construction in the boiler room;
- Provide muffler on the exhaust of all boilers/water heaters;

TRANSFORMERS

Electrical transformers located near sensitive areas units will need to be analyzed for their sound creation potential. We will require sound ratings for these units, and will likely recommend vibration isolation measures and added wall material to reduce the potential for hum and other noise in units. The maximum-allowable NEMA sound ratings for transformer size are as follows:

Transformer Size (KVA)	dBA@ 1 ft
25-50	45
51-150	50
151-300	55
301-500	60

5. What We Need to Complete Our Analysis

We will need a complete set of mechanical drawings and equipment/diffuser schedules as well as the manufacturers sound levels for all equipment. All sound levels will need to have been obtained per AMCA Standard 300 or ASHRAE Standard 68/AMCA 330 for radiated and discharge sound levels (ARI standard 880).

We look forward to receiving a full set of mechanical plans and sound levels so we can complete our analysis and recommendations for noise control. If there are any questions, or if we can provide further information, please do not hesitate to call.

2.11 LEED Narrative

Portland Public Schools is recognized nationally and internationally for its commitment to sustainability, both within the classroom and operations. The Kellogg Middle School project offers an excellent opportunity to showcase this commitment in a prominent location along SE Powell Boulevard. The project team is placing the utmost importance on a healthy, durable learning space that utilizes resources efficiently including energy and water.

The team has done a thorough review of green building frameworks that are available to help glean all possible strategies for a sustainable and resilient school. Kellogg Middle School is targeting a LEEDv4 BD+C Schools Gold certification. Discussed here are the overarching sustainability principles that the project will use throughout design and construction. Also included is a LEED scorecard and narrative showing the current design direction.

ECO-CHARRETTE

Green Building Services (GBS) facilitated an eco-charrette with the design team and Portland Public Schools (PPS) on December 6, 2017 for the new Kellogg Middle School. A sustainability workshop provides an opportunity for design professionals and building owners and users to strategize sustainable design goals and identify specific actions to achieve them. The workshop process fosters an environment in which members of the project team can contribute ideas, express concerns, and recommend actions for the project.

The interactive day started with a review of work that has been completed to date by PPS, OHP+D, and other members of the design team. PPS' sustainability priorities were reviewed to ensure all participants understand the goals of the district which include LEED Gold certification, energy savings beyond code, passive design, and a focus on life cycle cost. Design team work to date included schematic layouts, early energy modeling analysis and bioclimatic information about the site. The energy performance of existing PPS schools was also presented to help us set an energy performance goal for Kellogg School.

Armed with this information, the charrette participants (29 in total), split into 4 small working groups to take a deeper dive into possible strategies to meet energy, site, water and indoor environmental goals. Summarized below are some of the big takeaways that came out of these discussions.

- Focus first on passive design strategies including a high-performance envelope, use of thermal mass to heat and cool and natural ventilation opportunities
- Learning suites and gymnasium have differing requirements and should be looked at individually to maximize opportunities for resiliency and energy performance.
- Net zero goal for the gymnasium focusing heavily on passive strategies; supports dual goals of energy efficiency and the ability for the space to remain comfortable longer in the event of a disaster where there is a sustained loss of power
- Site design that supports walking and bicycling through traffic calming techniques, plantings and pathways
- Thoughtful acoustic design, air quality measures and good daylighting design should be incorporated for a healthy learning environment
- Utilize opportunities to showcase building features as an educational tool – expose mechanical systems, wall sections or rainwater traveling from roofs to planted areas

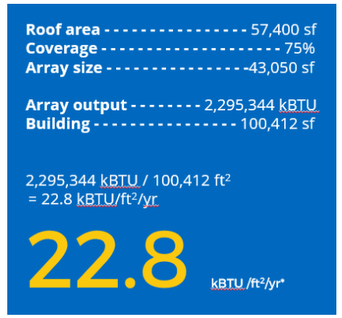
ZERO NET ENERGY (ZNE)

Given the imperative to cut emissions, it is important to design with the end in mind and consider what would it take to have a net zero energy project. Net-zero buildings have the potential to create as much energy as they consume over the course of each year. GBS prepared a snapshot of what it would take to get to net zero to set the stage for exploring specific strategies early in design at the eco-charrette.

Based on data from the Commercial Buildings Energy Consumption Survey (CBECS) the average school in the US will have an Energy Use Intensity (EUI) of 65. An EUI expresses a building's energy use as a function of its size or other characteristics. EUI is expressed as energy per square foot per year. In Oregon, our climate is mild compared to other parts of the country meaning we require less heating and cooling. The average EUI for Portland Public Schools is 49.8, which is substantially lower than the national average given that we have less heating and cooling demands than other parts of the country.

Using the PV Watts software GBS estimated the maximum annular solar energy using solar photovoltaics (PV) that could be produced on the roof of the proposed design. To meet the building's energy needs with the PVs, the building can only have an EUI of 22.8. This was calculated by taking the annual PV energy production and dividing it by the building square footage as shown in the image to the right. This would achieve net zero by having the annual onsite energy production equal the annual consumption.

Achieving a 22.8 EUI is a challenging goal but it is not impossible. Many energy efficiency measures in combination with renewables would be required to meet this goal.



LEEDv4 BD+C: Schools Narrative

Per the PPS Design Guidelines & Standards, Appendix P, this project will be designed to meet Leadership in Energy and Environmental Design (LEED)v4 Gold standards, at a minimum. Wherever possible, the sustainable design practices will be put on display so they can be used as teaching tools. Provided here is a LEED credit by credit analysis to demonstrate which strategies are being targeted within the SD design set. At this early stage in design many of the credits will be listed in the "maybe" or "possible" column in the LEED scorecard. As the design is refined, strategies will be evaluated on their overall performance and their life cycle cost. The project is currently showing 56 points, enough for LEED Silver certification. At least four additional points are needed to earn Gold. Below is a summary of each of the LEED Credits that will be achieved followed by a description of addition credits that could be achieved to get to Gold certification. All the LEED Prerequisites are achievable within the current project scope.

Kellogg Middle School
LEEDv4 BD+C: Schools Scorecard

1/23/2018

GREEN BUILDING SERVICES

Available	Yes	Maybe	No				Primary Responsible Party
INTEGRATIVE PROCESS							
1	1			IPc1	D	**Integrative Process**	GBS
1	1					Total Points for Integrative Process	
LOCATION & TRANSPORTATION							
1	1			LTc1	D	**Sensitive Land Protection**	GBS
2		2		LTc2	D	**High Priority Site**	Oh
5	1	3	1	LTc3	D	**Surrounding Density and Diverse Uses**	GBS
4	4			LTc4	D	**Access to Quality Transit**	GBS
1	1			LTc5	D	**Bicycle Facilities**	GBS/Oh
1	1			LTc6	D	**Reduced Parking Footprint**	GBS/Oh
1		1		LTc7	D	**Green Vehicles**	GBS/Oh
15	8	6	1			Total Points for Location & Transportation	
SUSTAINABLE SITES							
0	Y			SSp1	C	**Construction Activity Pollution Prevention**	GC
0	Y			SSp2	C	**Environmental Site Assessment**	Oh
1	1			SSc1	D	**Site Assessment**	GBS / Oh
2		2		SSc2	D	**Site Development: Protect or Restore Habitat**	Ecotone
1		1		SSc3	D	**Open Space**	Ecotone
3	2	1		SSc4	D	**Rainwater Management**	KPFF
2	2			SSc5	D	**Heat Island Reduction**	KPFF/Oh
1		1		SSc6	D	**Light Pollution Reduction**	Interface
1		1		SSc7	D	**Site Master Plan**	Oh/PPS
1		1		SSc8	D	**Joint Use of Facilities**	Oh/PPS
12	5	7				Total Points for Sustainable Sites	
WATER EFFICIENCY							
0	Y			WEp1	D	**Outdoor Water Use Reduction**	Ecotone
0	Y			WEp2	D	**Indoor Water Use Reduction**	Interface
0	Y			WEp3	D	**Building-level Water Metering**	Interface
2		1	1	WEc1	D	**Outdoor Water Use Reduction**	Ecotone
1	1			WEc2.1	D	**Indoor Water Use Reduction: 25%**	Interface
1	1			WEc2.2	D	**Indoor Water Use Reduction: 30%**	Interface
1	1			WEc2.3	D	**Indoor Water Use Reduction: 35%**	Interface
1		1		WEc2.4	D	**Indoor Water Use Reduction: 40%**	Interface
1		1		WEc2.5	D	**Indoor Water Use Reduction: 45%**	Interface
2	1		1	WEc2.6	D	**Indoor Water Use Reduction: Appliance & Process Water**	Interface
2			2	WEc3	D	**Cooling Tower Water Use**	-
1		1		WEc4	D	**Water Metering**	Interface
12	4	4	4			Total Points for Water Efficiency	
ENERGY & ATMOSPHERE							
0	Y			EAp1	C	**Fundamental Commissioning & Verification**	CxA
0	Y			EAp2	D	**Minimum Energy Performance**	Interface
0	Y			EAp3	D	**Building Level Energy Metering**	Interface
0	Y			EAp4	D	**Fundamental Refrigerant Management**	Interface
6	3	1	2	EAc1	C	**Enhanced Commissioning**	CxA
16	10	6		EAc2	D	**Optimize Energy Performance**	Interface
1	1			EAc3	C	**Advanced Energy Metering**	Interface
2			2	EAc4	D	**Demand Response**	-
3		3		EAc5	C	**Renewable Energy Production**	Interface
1		1		EAc6	D	**Enhanced Refrigerant Management**	Interface
2		2		EAc7	C	**Green Power & Carbon Offsets**	PPS
31	14	13	4			Total Points for Energy & Atmosphere	

Kellogg Middle School
LEEDv4 BD+C: Schools Scorecard

1/23/2018

GREEN BUILDING SERVICES

Available	Yes	Maybe	No				Primary Responsible Party
MATERIALS & RESOURCES							
0	Y			MRp1	D	**Storage & Collection of Recyclables**	Oh/PPS
0	Y			MRp2	D	**Construction & Demolition Waste Management Planning**	GC
5			5	MRc1	C	**Building Life-Cycle Impact Reduction**	-
2	1	1		MRc2	C	**Building Product Disclosure & Optimization - Environmental Product Declarations**	Oh/GC
2	1	1		MRc3	C	**Building Product Disclosure & Optimization - Sourcing of Raw Materials**	Oh/GC
2	1	1		MRc4	C	**Building Product Disclosure & Optimization - Material Ingredients**	Oh/GC
2	2			MRc5	C	**Construction & Demolition Waste Management**	GC
13	5	3	5			Total Points for Materials & Resources	
INDOOR ENVIRONMENTAL QUALITY							
0	Y			IEQp1	D	**Minimum Indoor Air Quality Performance**	Interface
0	Y			IEQp2	D	**Environmental Tobacco Smoke (ETS) Control**	PPS
0	Y			IEQp3	D	**Minimum Acoustic Performance**	Listen
2	2			IEQc1	D	**Enhanced Indoor Air Quality Strategies**	Oh/Interface
3	3			IEQc2	C	**Low-Emitting Materials**	Oh/GC
1	1			IEQc3	C	**Construction IAQ Management Plan**	GC
2	1	1		IEQc4	C	**Indoor Air Quality Assessment**	GC
1	1			IEQc5	C	**Thermal Comfort**	Interface
2	1	1		IEQc6	C	**Interior Lighting**	Interface
3	1	2		IEQc7	C	**Daylight**	Oh
1	1			IEQc8	C	**Quality Views**	Oh
1		1		IEQc9	C	**Acoustic Performance**	Listen
16	11	5				Total Points for Indoor Environmental Quality	
INNOVATION							
1	1			INc1.1	C	**School as a Teaching Tool**	PPS
1	1			INc1.2	C	**Low Mercury Lighting**	Interface
1	1			INc1.3	C	**Community Outreach and Involvement**	Oh/GBS
1	1			INc1.4	C	**Design for Active Occupants/Design for Flexibility**	Oh/GBS
1	1			INc1.5	C	**Exemplary Performance: TBD**	GBS
1	1			INc2	C	**LEED® Accredited Professional**	GBS
6	6					Total Points for Innovation	
REGIONAL PRIORITY							
1	1			RPc1.1	C	**BPDO - environmental product declarations 1 pt threshold**	GBS
1		1		RPc1.2	D	**Rainwater Management 2 pts threshold**	GBS
1		1		RPc1.3	D	**Renewable Energy Production - 2 pts threshold**	GBS
1	1			RPc1.4	C	**BPDO - sourcing raw materials 1 pt threshold**	GBS
				RPc1.5	D	Demand Response	
				RPc1.6	D	Indoor Water Use Reduction: 45% Reduction	
4	2	2				Total Points for Regional Priority	
110	56	40	14			**Total Points Attempting**	Silver

Total Points Possible: Certified 40-49, Silver 50-59, Gold 60-79, Platinum 80+

During Schematic Design, we have been able to reach a LEED Silver certification at 56 points. The goal to acheive during the rest of the design process is to earn 12 more points to bring us to a LEED Gold certification.

INTEGRATIVE PROCESS

IP CREDIT INTEGRATIVE DESIGN PROCESS – 1 POINT (YES)
- The project will achieve this credit based on early design energy and water modeling activities. This credit encourages early design to save cost by implementing measures early in design when they typically can be cost effective.

LOCATION & TRANSPORTATION

LT CREDIT SENSITIVE LAND PROTECTION – 1 POINT (YES)
- This credit will be achieved because this is a previously developed site.

LT CREDIT SURROUNDING DENSITY AND DIVERSITY OF USES – 1 POINT (YES), 3 (MAYBE), 1 (NO)
- At least one point udder this credit will be achieved based on the proximity to diverse uses including retail, restaurants, banks and other uses. Further analysis is underway to determine whether density requirements are met for additional points.

LT CREDIT ACCESS TO QUALITY TRANSIT – 1 POINT (YES)
- This credit will be achieved based on the transit service along Powell Blvd.

LT CREDIT BIKE FACILITIES – 1 POINT (YES)
- This credit is awarded for projects that promote bicycling to school by providing adequate bicycle storage. Further, there must be a bicycle network that allows students a safe route to school. The project is located near a residential area with 20 MPH speed limits. The Portland Safe Routes to Schools map identifies a path to this site. One shower will be required for staff who bike and may want to shower before class.

LT CREDIT REDUCED PARKING FOOTPRINT – 1 POINT (YES)
- The number of parking spaces in the project will not exceed the Parking Consultants Council requirements.

LT CREDIT GREEN VEHICLES – 1 POINT (YES)
- This credit will be earned by designating 5% of all parking spaces used by the project as preferred parking for green vehicles. In addition, at least one electric vehicle charging station will be installed.

SUSTAINABLE SITES

SS PREREQUISITE CONSTRUCTION ACTIVITY POLLUTION PREVENTION – PREREQUISITE (REQUIRED)
- The general contractor will follow a Construction Activity Pollution Prevention plan throughout construction to reduce pollution from construction activities by controlling soil erosion, waterway sedimentation, and airborne dust.

SS PREREQUISITE ENVIRONMENTAL SITE ASSESSMENT – PREREQUISITE (REQUIRED)
- The project has conducted a Phase I Environmental Site Assessment as described in ASTM E1527–05 (or a local equivalent) to determine whether environmental contamination exists at the site. If contamination is suspected, t a Phase II Environmental Site Assessment is required.

SS CREDIT SITE ASSESSMENT – 1 POINT (YES)
- The project site has been studied regarding topographic conditions, climate conditions, existing plant life, exiting water, features as drainage, and human uses.

SS CREDIT SITE DEVELOPMENT: PROTECT OR RESTORE HABITAT – 2 POINTS (MAYBE)
- The project team is assessing the ability to achieve this credit. The credit requires the use of native or adapted vegetation to restore 30% (including the building footprint) of all portions of the site identified as previously disturbed. The City of Portland's planting requirements and plant lists will be met while achieving this requirement. Dedicated athletic fields that are solely for athletic uses are exempted from the soil restoration criteria. These areas may not count toward the minimum required area. As the landscape design is refined we will determine whether the thresholds can be met.

SS CREDIT OPEN SPACE – 1 POINT (MAYBE)
- The project team is assessing the ability to achieve this credit. The credit requires that an outdoor space greater than or equal to 30% of the total site area (including building footprint) is provided. A minimum of 25% of that outdoor space must be vegetated (turf grass does not count as vegetation) or have overhead vegetated canopy. As the landscape design is refined we will determine whether the thresholds can be met.

SS CREDIT RAINWATER MANAGEMENT – 2 POINTS (YES), 1 (MAYBE)
- This credit is awarded based on the amount of rainwater that can be infiltrated on site versus sent to the storm sewer. The City of Portland Stormwater Management Manual requires the team to observe the standard hierarchy of onsite infiltration of stormwater to the maximum extent possible. Early geotechnical infiltration testing on the site has indicated that infiltration rates are very good. The design will employ Low Impact Development (LID) treatment planters for treatment of storm runoff from all new paving areas. The calculations will be refined to determine whether the project can manage on site the 98th percentile of regional or local rainfall event, which would allow achievement of all 3 points.

SS CREDIT HEAT ISLAND REDUCTION – 2 POINTS (YES)
- This credit will be achieved through light colored roofing and hardscape areas. All walkways and paving within courtyards and plazas will be specified as high albedo paving material with a solar reflective index of at least 29 for at least 50% of the paved surfaces within the property boundary. Roofing material will be a white thermoplastic membrane.

SS CREDIT LIGHT POLLUTION REDUCTION – 1 POINT (MAYBE)
- This credit can be achieved by meeting uplight and light trespass requirements, using either the backlight-uplight-glare method. The lighting designer will determine whether this can be achieved in line with PPS goals.

SS CREDIT SITE MASTER PLAN – 1 POINT (MAYBE)
- This credit can be achieved by developing a site master plan for the school in collaboration with school authorities. The project also must achieve at least four of the following six credits, using the associated calculation methods. The achieved credits must then be recalculated using the data from the master plan.

  - LT Credit: High Priority Site
  - SS Credit: Site Development—Protect or Restore Habitat
  - SS Credit: Open Space
  - SS Credit: Rainwater Management
  - SS Credit: Heat Island Reduction
  - SS Credit: Light Pollution Reduction

SS CREDIT JOINT USE OF FACILITIES – 1 POINT (MAYBE)

- This credit can be achieved if the school makes certain spaces available to the general public outside of school hours. At least three of the following spaces much be available: auditorium, gymnasium, cafeteria, one or more classrooms, playing fields and stadiums; and joint parking.

WATER EFFICIENCY

WE PREREQUISITE OUTDOOR WATER USE REDUCTION – PREREQUISITE (REQUIRED)

- This prerequisite will be achieved through drought tolerant plant selection and efficient irrigation to demonstrate a 30% reduction in water use for irrigation.

WEP2 INDOOR WATER USE REDUCTION – PREREQUISITE (REQUIRED)

- This prerequisite will be achieved through low flow features that achieve a 20% reduction from the baseline.

WEP3 BUILDING-LEVEL WATER METERING – PREREQUISITE (REQUIRED)

- The project will have water meters to achieve this prerequisite.

WE CREDIT OUTDOOR WATER USE REDUCTION – MAYBE (1), NO (1)

- This credit may be achieved through drought tolerant plant selection and efficient irrigation if we are able to demonstrate a 50% reduction in water use for irrigation. The landscape architect will continue to track this through the design development.

WE CREDIT INDOOR WATER USE REDUCTION – YES (3), MAYBE (2)

- Preliminary water use calculations have been completed. It is estimated that project will achieve a 35% reduction in water use from plumbing fixtures.

WE CREDIT INDOOR WATER USE REDUCTION – APPLIANCES & PROCESS WATER – YES (1), NO (1)

- The kitchen will include appliances that meet the credit requirement for water use for one of the two available points. The other point is related to commercial water machines which are not included within the scope of this project.

WE CREDIT COOLING TOWER WATER USE – NO (1)

- This credit can be achieved if the project conducts a one-time potable water analysis to optimize cooling tower cycles for cooling towers and evaporative condensers. There are no cooling towers within the scope of this project.

WEC4 WATER METERING – MAYBE (1)

- This credit can be earned by installing permanent water sub-meters for at least two of the following – irrigation, indoor plumbing, domestic hot water, boiler, or other process water. It will be determined in the next stage of design whether this will be achieved.

ENERGY & ATMOSPHERE

EA PREREQUISITE FUNDAMENTAL COMMISSIONING & VERIFICATION – PREREQUISITE (REQUIRED)

- Fundamental commissioning requires a review of project documents (OPR and BOD) and review of project design drawings, and then focuses primarily on the construction phase, with the Commissioning Agent (CxA) verifying the installation and operation of mechanical, electrical, and plumbing. PPS will be contracting a CxA to complete these activities.

EA PREREQUISITE MINIMUM ENERGY PERFORMANCE – PREREQUISITE (REQUIRED)

- Energy modeling will be completed on this project to ensure the design is at least 5% better than ANSI/ ASHRAE/IESNA Standard 90.1–2010.

EA PREREQUISITE BUILDING LEVEL ENERGY METERING – PREREQUISITE (REQUIRED)

- The project will provide the required energy meters.

EA PREREQUISITE FUNDAMENTAL REFRIGERANT MANAGEMENT – PREREQUISITE (REQUIRED)

- The project will not use any CFCs.

EA CREDIT OPTIMIZED ENERGY PERFORMANCE – YES (10), MAYBE (6)

- The project is striving to meet Net Zero Energy goals. The design will perform at least 24% better than the ASHRAE 2010 baseline.

EA CREDIT ADVANCED METERING – YES (1)

- The project will include sub-meters on those systems that represent at least 10% of the buildings energy use.

EA CREDIT DEMAND RESPONSE – NO (1)

- This credit requires the installation of infrastructure to take advantage of future demand response programs. This would require the installation of interval recording meters with the ability for the building automation system to accept an external price or control signal. This credit is not being targeted on this project.

EA CREDIT RENEWABLE ENERGY PRODUCTION – MAYBE (3)

- This credit requires that on-site renewable energy be used to offset building energy cost. Up to 3 points available for offsetting 1%, 5% or 10% of building energy cost. The project is required to set aside 1.5% of the construction for renewable energy. Additional study is underway to determine what offset may be provided by solar photovoltaics.

EA CREDIT ENHANCED REFRIGERANT MANAGEMENT – 1 (MAYBE)

- Refrigerants used in mechanical systems will be selected to minimize or eliminate the emission of compounds that contribute to ozone depletion and climate change. Additional study will be required to determine if the project is below the credit thresholds allowed for achievement of the credit.

EA CREDIT GREEN POWER AND CARBON OFFSETS – 2 (MAYBE)

- This credit requires the project to purchase 50% or 100% of the project's energy from green power, carbon offsets, or renewable energy certificates (RECs) for at least 5 years. The project will use the model energy results to determine the total annual electricity and non-electricity energy use.

MATERIALS & RESOURCES

MR PREREQUISITE STORAGE & COLLECTION OF RECYCLABLES – PREREQUISITE (REQUIRED)

- The building must provide the necessary infrastructure to support the collection and storage of recyclable materials including (at a minimum): paper, corrugated cardboard, glass, plastics and metals.

MR PREREQUISITE CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLANNING – PREREQUISITE (REQUIRED)

- This prerequisite requires the use of a construction and demolition waste management plan by the contractor.

MR PREREQUISITE CREDIT BUILDING LIFE-CYCLE IMPACT REDUCTION – 5 (NO)

- This credit could be achieved by completing a whole building life cycle analysis for 3 points. The project is not pursuing this. The other 3 points are available to projects that rehabilitate historic/ blighted buildings.

MR CREDIT BUILDING PRODUCT DISCLOSURE & OPTIMIZATION - ENVIRONMENTAL PRODUCT DECLARATIONS (EPD) – 1 (YES)

- The project will pursue option 1 requiring the project specifications to include EPD submittals for 20 specific materials.

MR CREDIT BUILDING PRODUCT DISCLOSURE & OPTIMIZATION – SOURCING OF RAW MATERIALS – 1 (YES)

- The project will pursue Option 2 requiring materials properties such as recycled content, Regional Extraction & Manufacture and Forest Stewardship Council (FSC) certified wood products will tracked throughout the construction phase.

MR CREDIT BUILDING PRODUCT DISCLOSURE & OPTIMIZATION MATERIALS INGREDIENTS – 1 (YES)

- The project will pursue option 1 requiring the project specifications to include Health Product Declarations submittals for 20 specific materials.

MR CREDIT CONSTRUCTION & DEMOLITION WASTE MANAGEMENT – 2 (YES)

- The specifications will require the demolition contractor to track materials diverted from the landfill. The construction contractor with also be required to track waste. These calculations will be combined to show the total diversion rate.

INDOOR ENVIRONMENTAL QUALITY

EQ PREREQUISITE MINIMUM INDOOR AIR QUALITY PERFORMANCE – PREREQUISITE (REQUIRED)

- This prerequisite requires that the project meet the minimum requirements of Sections 4 through 7 of ASHRAE 62.1-2010, Ventilation for Acceptable Indoor Air Quality. The design will achieve this prerequisite.

EQ PREREQUISITE ENVIRONMENTAL TOBACCO SMOKE (ETS) CONTROL – PREREQUISITE (REQUIRED)

- No smoking will be allowed on school grounds.

EQ PREREQUISITE MINIMUM ACOUSTIC PERFORMANCE – PREREQUISITE (REQUIRED)

- Listen Acoustics will ensure the project design meets the acoustic performance requirements.

EQ CREDIT ENHANCED INDOOR AIR QUALITY STRATEGIES – 2 (YES)

- The first point will be earned by (a) including 10-foot-long entryway mats at every exterior entrance, (b) ensuring negative exhaust for janitor's closets and (c) using MERV 13 filters. The second point will be earned through the provision of carbon dioxide monitoring.

EQ CREDIT LOW EMITTING MATERIALS – 3 (YES)

- The project team will ensure 5 of the low-emitting materials categories are met, with furniture being excluded as not part of the contractor's scope of work.

EQ CREDIT CONSTRUCTION IAQ MANAGEMENT PLAN – 1 (YES)

- This credit requires the development of a Construction Indoor Air Quality Plan. The requirements for the Indoor Air Quality Management Plan are included within the specifications. This Plan formalizes what are typical best practices in construction and does not significantly alter the practices of most General Contractors. This credit also prohibits the use of tobacco products during construction.

EQ CREDIT INDOOR AIR QUALITY ASSESSMENT – 1 (YES), 1 (MAYBE)

- The building will be flushed out with 100% outside air prior to occupancy. The flush out will continue until 14,000 cu ft of air has been delivered per square foot of floor area. The second point may be earned if the project elects to do indoor air quality testing prior to occupancy.

EQ CREDIT THERMAL COMFORT – 1 (YES)

- The project will be designed to meet the thermal comfort requirements of ASHRAE 55 2010.

EQ CREDIT INTERIOR LIGHTING – 1 (YES), 1 (MAYBE)

- The lighting system will have the ability to be controlled with at least three lighting levels per space, this include daylight dinning control. It provides the opportunity for the users to adjust the lighting for the required tasks. The second point is available to projects that meet the desired quality criteria for lighting. Further study will be completed to determine whether this credit is met.

EQ CREDIT DAYLIGHT – 1 (YES), 2 (MAYBE)

- Daylight modeling is required to demonstrate that quality natural light is being provided to spaces. This analysis will be refined as we enter into Design Development.

VEQ CREDIT QUALITY VIEWS – 1 (YES)

- This credit requires that 75% of all regularly occupied floor area have a direct line of sight to the outdoors via vision glazing. View glazing in the contributing area must provide a clear image of the exterior, not obstructed by frits, fibers, patterned glazing, or added tints that distort color balance.

INNOVATION – 5 (Yes)

The project has the opportunity to earn 5 points for innovation credits. At this time, possible credits include:

- School as a Teaching Tool
- Low Mercury Lighting
- Community Outreach and Involvement
- Design for Active Occupants/Design for Flexibility
- Exemplary Performance: Construction Waste Management
- LEED® Accredited Professional

REGIONAL PRIORITY – 2 (Yes), 2 (Maybe)

The following credits are Regional Priority credit for this location that the project anticipated can be earned.

- BPDO - environmental product declarations 1 pt threshold
- BPDO - sourcing raw materials 1 pt threshold

PASSIVE HOUSE

One useful framework as we consider a new construction option is the Passive House standard. The design principles of passive buildings can be applied to all typologies--from single-family homes to apartment building to offices and skyscrapers. The overarching philosophy is to "Maximize your gains, minimize your losses", which can be seen the following building-science principles it relies on:

- Continuous insulation through the entire envelope without any thermal bridging.
- An airtight building envelope, preventing infiltration of outside air and loss of conditioned air.
- High-performance windows (typically triple-paned) and doors

- Balanced heat- and moisture-recovery ventilation and using minimal space conditioning
- Manage solar gain to exploit the sun's energy for heating purposes and to minimize it in cooling seasons.

Schools designed to the Passive House standard utilizing these principles can achieve a 70% -80% reduction in energy use compared to code.

RESILIENCY

In 2013 the state of Oregon adopted Oregon Resiliency Plan (ORP) which outlines a 50-year strategy to address the threat posed by the Cascadia Subduction Zone. The central finding of the Oregon Resilience Plan is that "very large earthquakes will occur in Oregon's future, and our state's infrastructure will remain poorly prepared to meet the threat unless we take action now to start building the necessary resilience." The Plan reviews policy options, summarizes relevant reports, and makes recommendations on policy direction to protect lives and keep commerce flowing during and after a Cascadia earthquake and tsunami.

One of the key recommendations of the report is to provide ready access to the best available Cascadia earthquake information for emergency responders and planners, architects and engineers, and the general public. It is the responsibility of the Kellogg Middle School team to design a school that will keep children safe during an earthquake. Further to that, the team is looking at ways to adopt the findings of the Oregon Resilience Plan (ORP) for schools. The ORP's goals were to ensure that schools can be reopened thirty days after a Cascadia earthquake, and recommended that they be used for community shelters following the earthquake.

Oregon's current seismic design standard for new buildings, the Oregon Structural Specialty Code (OSSC), classifies buildings according to four distinct occupancy categories based on their relative importance to life safety in the event of a natural disaster. Occupancy Categories III and IV are structures that have large assembly areas, such as schools. Category type III buildings are designed for a 25-percent higher seismic load than Category I and II buildings. Category IV buildings are designed for a 50-percent higher load.
However, we also understand that OSCC standards are changing. School gymnasiums and cafeterias with an occupancy of 250 or greater people will be defined "earthquake relief shelters" , which would place these structures as Risk Category IV. This increase in Risk Category is intended to provide a higher level of seismic performance, with a high likelihood that these portions of the building will be safe to occupy immediately after an earthquake.

In anticipation of this change, the gymnasium/arts wing will be designed as a Risk Category IV building. The change from Risk Category III to Risk Category IV requires using higher seismic design forces and may have special detailing requirements. The learning suites wing would only be required to meet the Risk Category III requirements but the team is evaluating the cost to design to Category IV. Risk Category III buildings are designed to a higher seismic performance level than typical commercial (Risk Category II) buildings, which are designed for life safety only; however, Risk Category III buildings are not expected to provide immediate occupancy after an earthquake.

In addition to seismic considerations, the design team is also exploring how to reduce the amount of time needed to repair a building and restore most of its functionality, to meet the recommended targets in the ORP. Given its potential use as an emergency shelter for students and the community, the gym should be designed such that it could be occupied within 72 hours. The learning suites would be considered as would have recovery of 30 days. For this to occur, the school buildings need to be "safe and usable" immediately after the event and served by the infrastructure systems they depend on (including transportation, energy, water, wastewater, communication, and information systems). Current code does not adequately address this, therefore the team explored opportunities throughout the day to meet this tremendously important goal.

CRITICAL BUILDINGS	Goal for Level of Service	Current Level of Service
Primary K-8	30 days	18 months
High School 30 days	30 days	18 months
Emergency Shelters	72 hours	18 months

LEVEL OF SERVICE GOALS AND CURRENT PERFORMANCE EXPECTATIONS FOR CRITICAL BUILDINGS AND INFRASTRUCTURE THAT SUPPORTS CRITICAL BUILDINGS FOR WILLAMETTE VALLEY (OREGON SEISMIC SAFETY POLICY ADVISORY COMMISSION, 2013)

ENERGY TRUST OF OREGON: INCENTIVES

The Energy Trust of Oregon (ETO) offers projects teams with incentive dollars to support energy reduction goals and on-site renewable measures. The project team is currently evaluating whether it will fall under ETO's standard track for the Path to Net Zero. The Path to Net Zero package offers higher incentive amounts and supports the entire design and construction process, from project kick-off through completion and occupancy. The financial incentives for projects seeking Zero Net Energy performance include:

- Technical Assistance: 75% of the cost of energy studies up to $50,000; including energy modeling, daylighting studies and computational fluid dynamics (CFD) analysis
- Renewable Energy:
  - Up to $2,000 for technical studies to determine if solar energy systems will be effective at the building.
  - Up to $5,000 to prepare the solar array plans and specifications.
  - Up to $15,000 to help the project be solar ready
- Installation and Completion Incentives
  - Building commissioning: $0.15 per square foot, up to $40,000
  - Modeled Savings: $0.40 per kWh, $1.20 per therm
  - Energy Metering: 50% of the cost of energy metering up to $40,000

Part 3 - Specifications

3.1 Outline Specifications

DIVISION 03 - CONCRETE

03 10 00 FORM WORK

- Concrete surfaces equal to or better than APA B-B Grade plywood forms, exterior type, class-1 plywood with uncoated surfaces. Sustainable Forestry Initiative (SFI) or American Tree Farm System (ATFS) certified.
- Form release agent shall be used on all concrete formwork, must be low VOC in complaince with LEED, example: Cresset Chemical “Crete Lease 880 VOC”, 240 g/L.
- Vapor Barrier Sheet, example, Stego Industries 15 mil “Stego Wrap Vapor Barrier” and “Stego Wrap Red Polyethylene Tape.”

03 20 00 CONCRETE REINFORCEMENT

- all reinforcing steel conforming to ASTM A615 Grade 60 or ASTM A706 Grade 60
- Bar and rod mats for concrete reinforcement conforming to ASTM A184
- Cold drawn wire reinforcement conforming to ASTM 82
- Provide Raw Material Source and Extraction Reporting in conformance with LEED v4 MR Credit: Building product disclosure and optimization - sourcing of raw materials.
- Provide reinforcing steel containing a minimum of 95% recycled content.
- Provide reinforcing steel manufactured within a 100-mile radius of the project site to the greatest extent possible.

03 30 00 CAST-IN-PLACE CONCRETE

- Concrete minimum strengths (at 28 days) as required by SEOR and verified by Special Inspector:
- 2,000-psi @ non-structural interior elements
- 3,500-psi @ exterior concrete paving, retaining walls and concrete exposed to weather.
- 4,000-psi @ all structural concrete elements
- Cement Content: Five sacks per cubic yard, minimum.

03 35 13 HIGH TOLERANCE (POLISHED) CONCRETE FLOOR FINISHING

- Polished sheen: Dynamic coefficient of friction for slip resistance tested per ASTM B101.3. Dry surface at 0.70 min and wet surface at 0.60 min.
- Example process: Advanced Floor Products, Inc. “Retro-Plate 99

03 40 00 PRECAST CONCRETE

- Vandal Resistance: Exposed precast surfaces with textures and finishes to be resistant to weather deterioration and vandalism.
- Concrete materials shall contain a minimum of 80% regional material from within a 100-mile radius , as defined for LEED v4, MR Credits Building product disclosure and optimization - sourcing of raw materials and - material ingredients.
- Maximize use of fly ash as appropriate (15-50% volume) to increase recycled content as suggested by LEED v4 MR Credit: Building product disclosure and optimization - sourcing of raw materials.. Structural Engineer to verify mix.
- Curing compounds and sealers shall comply with LEED v4 EQ Credit: Low emitting materials requirements for low-emitting materials, see VOC appendix document.

DIVISION 04 - MASONRY

04 00 00 MASONRY

- Supply brick from within 100 miles of project location in compliance with LEED v4 MRc3 and MRc4.
- Mortar: Type S, ASTM C270
- Tooled mortar joints: Concave and weathered
- Concrete masonry units and brick veneer expansion joints at 30 feet maximum distance with a 3:1 length to height ratio guideline.
- Weep holes at 24” apart to be full height of joint with insect mesh matching mortar color installed. Provide cellular plastic weeps in all head joints. Example, Advanced Building Products Inc
- Provide mortar diverters for brick veneer construction sized to thickness of wall cavity and designed to prevent mortar droppings from clogging weeps and cavity vents to all for proper cavity drainage. Use semi-rigid polyethylene or polyester mesh panels. Example, Advanced building Products Inc.; Product Mortar Break I or Mortar Break II
- Provide a water repellent coating on all exterior masonry with low VOC per LEED v4 per EQ credit.
- Full height of masonry should have anti-graffiti coating.

04 20 00 CONCRETE UNIT MASONRY

- Hollow-core and load-bearing to meet ASTM C90
- Minimum 28-day compressive strength of 1900 psi, average net area.
- Minimum Compressive Strength f’m: 1500 psi
- Integral moisture resistant additive, amount as recommended by additive
- manufacturer.
- Class: Medium Weight (105 lbs. to 125

lbs. per cubic foot density)
- Maximum Fly Ash Content, if used: 22% of combined Cement and Fly Ash weight.
- Nominal Size: 8x8x16 inches

DIVISION 05 - METALS

05 12 00 STRUCTURAL STEEL FRAMING
- Provide steel containing a minimum of 50% recycled content.

05 31 00 METAL DECK
- Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following: Galvanized Steel Sheet: ASTM A 653, Structural Steel (SS) Grade 33, with G90 galvanized coating
- Fasten metal-deck panels to steel supporting members by ¾" diameter arc spot (puddle) welds or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long .
- Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals as indicated on drawings
- End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches.

05 40 00 COLD FORMED METAL FRAMING
- The Steel Network
- Steel Sheet: ASTM A1003, Structural Grade, Type H, metallic coated, of grade and minimum G60 galvanized coating.
- Steel Studs: ASTM C955, G90 coating.
- Exterior Z-furring: G185 coating, minimum 18 gauge.

05 52 00 HANDRAILS, GUARDRAILS, AND DECORATIVE METAL RAILINGS
- Finish: stainless steel or exposed galvanized
- Core drill concrete surfaces for handrail post installastion.

DIVISION 06 - WOODS, PLASTICS, AND COMPOSITES

06 10 00 ROUGH CARPENTRY
- Douglas fir or equivalent
- Wall sheathing: D CDX or better plywood at 1/2" thick, No. 1
- Subfloors and Roof sheathing: C or better plywood, 3/4" thick, No. 1
- Subfloor underlayment Group 1
- Blocking and backing 1: thick AC, fire resistive plywood 12" by stud width
- All FSC and locally sourced woods and low emitting adhesives

06 11 00 WOOD FRAMING
- Stud spacing 16" on center
- Roof sheathing: structural I, CDX 1/2" No. 1
- Overhands B exterior grade

06 40 00 WAINSCOT
- Prefinished, easily cleaned, impact resistant materials in corridors
- Metal protection at exposed columns and corners

06 41 00 ARCHITECTURAL WOOD CASEWORK
- All counters to be 34" AFF
- Construction of white maple plywood with clear finish
- Base cabinet backs 1/4" pre-finished tempered hardboard, 3/4" formaldehyde free plywood
- Upper cabinet backs pre-finished 1/2" formaldehyde free plywood
- Shelving to be hardwood plywood with 5000 lb capacity
- Solid surface countertops with integral 4" splash, 6" at wet locations

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 11 13 DAMPPROOFING
- Hot or cold asphalt emulsion.
- 2 coat system fully dried between applications.
- Henry 789, BASF Hydroxide 700B or equal

07 13 26 SELF-ADHERING SHEET WATERPROOFING
- Self-adhering, positive side modified bituminous sheet waterproofing sufficiently thick and flexible to bridge minor joints and cracks in the substrate. 60-75 mil thickness with 4 mil polyethylene facer and release liner on adhesive side. Seams are adhesively lapped.
- WR Grace Bituthene 4000 or equal

07 14 13 HOT FLUID-APPLIED RUBBERIZED ASPHALT WATERPROOFING
- 215 mil hot rubber reinforced between two applications.
- CAN/CGSB-37.50, no equivalent ASTM standard
- Hydrotech 6125 or equal

07 14 16 COLD FLUID-APPLIED WATERPROOFING
- 90-120 mil (dry film thickness) modified polyurethane installed in two applications with reinforcing at joints.
- Crack and joint treatment required.
- Tremco 250GC or equal

07 17 00 BENOTITE WATERPROOFING
- For waterproofing below grade blind-side walls and below slab on grade, as well as positive side foundation walls and elevator and orchestra pits, as applicable.
- Performance Standards: ASTM D412and ASTM D4833
- Tremco Paraseal LG or equal

07 19 00 WATER REPELLENT AND ANTI-GRAFFITI COATINGS
- Provide a single product that provides both water repellant and anti-graffiti
- Low emitting materials to comply with LEED
- Prosoco

07 21 00 THERMAL INSULATION
- Continuous exterior insulation
- Semi-rigid mineral wool is fireproof. R-4.3 per inch
- Rigid foam (R-5 per inch) may be used if assembly has been tested to meet NFPA 285. 2" maximum thickness of insulation per layer.

07 25 00 WEATHER RESISTIVE BARRIERS (WRB)
- self-adhesive, vapor permeable WRB for insulated stud cavity walls
- Also used as air barrier
- Wrapshield SA by Vaproshiel

07 26 00 VAPOR RETARDERS
- Under-slab vapor retarders to be minimum 15 mil

thick minimum for durability during placement of rebar.
- Provide a separate sheet vapor retarder over batt insulation. Example: JM Commercial Facing 35TL

07 33 00 NATURAL ROOF COVERINGS
- red cinder ecoroof

07 46 00 SIDING
- All siding products are to be installed over a ventilated air cavity (i.e. rain screen) to increase drying and durability and longevity of cladding materials.
- Painted fiber cement (Hardie orAllura), monolithic factory colored fiber cement, factory finished aluminum panel, or factory finished steel panel.

07 50 00 LOW-SLOPE ROOFING
- 20 year warrenty
- ½" per foot roof slope for all new roofs, with ¼" per foot slope allowed in areas that do not require crickets or roof valleys to direct water to drain collectors
- Plywood Substrate Insulation Fasteners: Standard duty roofing screw that is pre-assembled with a 3" metal plate. Example, Parafast PA Roofing Fastener
- Rigid closed cell Polyisocyanurate foam core insulation boards with glass fiber faces, installed in a minimum of two layers.
- Rigid cover boards 4' x 4' maximum size,cold applied
- Minimum 2-ply SBS (Styrene Butadiene Styrene) modified bitumen roof membrane with granule-surfaced top ply (cap) sheet. Base Ply and Top Ply shall be glass fiber mat and glass fiber scrim reinforced. Base flashings shall be foil-faced. Example: Siplast

07 60 00 SHEET METAL FLASHING
- 2 year warrenty
- Pre-coated galvanized steel per current ASTM A653/A653M, G90; 24 gauge minimum core steel, shop pre-coated with Two-coat fluoropolymer finish containing not less than 70% PVDF resin by weight in color-coat.
- Example product: Kynar 500

07 61 00 SHEET METAL ROOFING
- sloped metal roofs with 4:12 or greater slope
- Standing seam
- Pre-finished galvanized steel sheet: 24-gauge minimum, hot-dipped galvanized steel.
- Kynar 500 Fluorocarbon coating

07 65 00 FLEXIBLE FLASHING
- Under roof copings and other horizontal sheet metal: Provide SBS modified asphalt. Example, Carlisle CCW WIP 300HT
- Where not exposed to heat or excessive air flow: 40-mil, self-adhering, regular temp rubberized asphalt membrane flashing may be used. Example, WR Grace "Perm-A-barrier Wall Flashing."

07 72 33 ROOF HATCHES
- Safety Rail: "Kee Safety" KeeHatch Railing System, Model RHSR-SS roof hatch railing system
- 3'-0" x 4'-0" min. hatch is preferred at vertical ladders. A ships ladder may require a longer hatch. Example: Bilco Roof Hatch

07 92 00 JOINT SEALANTS
- 20 year warrenty
- Low emitting meterials

DIVISION 08 - OPENINGS

08 10 00 DOORS AND FRAMES, GENERAL
- Exterior Doors: 42" x 84" height, 1-3/4" thick, typical.
- Provide removable mullions between multiple doors for ease of moving equipment and durability of closure. (I / C Cores) Removable mullions to be keyed w/mortise cylinder at the head between doors.
- Interior Doors: Provide Hollow Metal Frames: 16 ga. minimum or wood frames of no less than 1" actual thickness.
- Fire Doors: Cross-Corridor Door recessed in pocket

08 12 13 HOLLOW METAL FRAMES
- Provide standard reinforcement at locks, hinges and closers per ANSI/SDI 250.6 as modified by District Details S-199 and S-200
- 5" butts at exterior locations, 3 butts per door minimum
- Exterior: 14 gauge minimum. Prepped for access control
- Interior: 16 gauge minimum for typical doors. 14 gauge minimum for extra heavy-duty interior openings, and openings over 42 "in width and/or 7'-0" in height.

08 13 00 HOLLOW METAL DOORS
- Fully welded seamless construction
- Provide standard reinforcement at locks, hinges and closers per ANSI/SDI 250.6 as modified by District Details S-199 and S-200. Pocket hinges
- 16 gauge faces, 20 gauge "Z" section vertical reinforcement 6" on center minimum.
- 14 gauge galvanized faces at exterior, humid or corrosive atmosphere locations.

08 14 00 INTERIOR WOOD DOORS
- Solid core wood construction only
- Natural finish-white maple veneer faced
- Provide extra heavy duty particleboard core for lower cost and durability
- Provide FSC certified wood.
- Edges: solid hardwood.
- Doors swing is to be limited by wall mounted stop whenever possible.

08 31 00 ACCESS DOORS AND PANELS
- 3’-0”x7’-0” doors in walls
- At valves, cleanouts, junction boxes, etc, 12” x 16” (min. size) access

08 33 00 COILING DOORS AND GRILLES
- Fire Rated: Door equipped with an automatic closing device operating from magnetic release holders connected to the building fire detector system, complete with door bottom safety edge and automatic reset UL approved fire door test system.
- Non-Rated: 3 button, key control with constant key contact required for motorized closing
- Lock cylinders shall be Schlage E or F or EF classic keyway

08 35 13 FOLDING DOORS
-

08 50 00 WINDOWS
- Alumnium windows
- All windows to meet 6.0 psf performance standards when tested for rain penetration with ASTM E 1105
- Storefront windows to meet 10-psf performance standard when tested for rain penetration with ASTM E 1105

08 60 00 ROOF WINDOWS AND SKYLIGHTS
- Translucent fiberglass replacement skylights are preferred

08 71 00 DOOR HARDWARE
- Schlage ND Rhodes
- Mechanical locks
- Electric locks for card access only.
- Use Schlage ND Series Vandlgard at high abuse doors
- Panic Hardware: Von Duprin 99 series
- Classrooms: Entrance Lock type with Push-button locking similar to Schlage ND50PD
- Administration offices: Entrance Lock type with Push -button locking similar to Schlage ND50PD
- Non-administrative offices: Lock type similar to Schlage ND-50PD.
- Intercommunicating locksets (Store Lock type), i.e. door between boys and girls locker room, shall require keyed use both directions: Schlage ND66JD
- Single Use Restrooms: Privacy lock with “Occupied” Indicator Schlage mortise L9496 06 L283-722 L583-363.
- Door Closers: Not at classrooms. Norton 7500 (interior), LCN 4040XP with EDA arm (or District
- approved equal) at high use / abuse locations. Use SRI Prime at exterior corrosive openings.
- Hinges: Exterior: heavy-duty, ball bearing, with non-removable pins not less than 5”x 5”. Non-removable pin hinge.
- Hinges: Interior: heavy-duty, Ball bearing not less than 4.5” x 4.5”. Non-removable pin hinge.
- kick plates at all exterior and service doors; 18 gauge stainless steel, 12 inches high.
- Wall Stop: Ives WS401CVX

08 71 13 AUTOMATED DOOR OPERATORS
- Norton 6000 series, LCN 4600 series and associated actuators and switches

08 81 00 GLAZING
- Laminated glazing at Ground floor/ground accessible doors/windows as a security measure/ Adjacent to playgrounds/Areas prone to vandalism/ break-in.
- Tempered glazing – Preferred at all other openings/ glazing locations.
- Glazing to be a minimum 32” above floor
- Low-E Glazing Units: Guardian SNX 62/27

08 83 00 MIRRORS
- ASTM C 1503, Mirror Glazing Quality, silvered flat glass mirror, nominal ¼” (6.0 mm) thick, tempered glass with stainless steel frame.

DIVISION 09 - FINISHES

09 20 00 PLASTERING AND GYPSUM BOARD
- impact resistant gypsum surface at 6’ and below in all corridors and circulation spaces
- impact resistant surfaces at 12’ and below in gymnasium

09 21 13 LATH AND PLASTER
- high impact veneer plaster in corridors
- shower rooms with ceramic tile to have cement plaster over metal lath

09 21 16 GYPSUM WALLBOARD
- all products shall be 5/8” type X fire resistant rated gypsum board for durability and flexibility
- all exposed gypsum will be Level 5 finish
- moisture resistant wallboard at all wet locations

09 22 00 SUPPORTS FOR PLASTER AND GYPSUM BOARD
- provide minimum 20 gauge steel studs for framing at 16” on center
- provide double studs at doors and openings full height to structure above
- casing beads at exposed edges and control joints at each door or sidelight jam.

09 26 13 VENEER PLASTER BASE
- preferred in all areas occupied by students at 1/8” thick skim coat, hand trowelled
- provide anodized or prefinished trim

09 51 00 ACOUSTICAL CEILINGS
- provide high-density mineral fiber 2x4 suspended ACT ceilings with NRC of 0.8
- 1” grid and perimeter
- acoustical wall tiles to be mechanically fastened
- music room to have 20% diffusive panels, 20% open area, 40% absorptive panels
- Product BOD: Ultima by Armstrong or similar

09 60 00 FLOORING - GENERAL
- 0.6 min COF at level floors, 0.8 min at ramps and slopes
- verify moisture content of slab meets manufacturer requirements
- all flooring to follow LEEDv4 requirements for products and adhesives
- Fluid applied epoxy flooring in restrooms, locker rooms, kitchen, and servery, product BOD: Stonhard Stonshield HRI or similar

09 61 00 FLOOR TREATMENT - CONCRETE
- permanent penetrating stain concrete floor with polished sheen. no surface color coatings

09 64 00 WOOD FLOORING
- gymnasium competition level flooring made of grade 1 better northern hard maple
- 2-1/4” wide and minimum 25/32” thick tongue and

groove end matched
- floating floor system over concrete subfloor
- sprung wood panel dance floor at stage

09 65 00 RESILIENT FLOORING - GENERAL
- low maintenance, low VOC flooring required

09 65 13 RESILIENT BASE
- 1/8” rubber base, PVC free
- water based adhesives
- product BOD: Mondo or similar

09 65 13 STAIR FLOOR COVERING
- 1/8” sheet rubber with extruded rubber treads and visual contrast at leading 2”
- Product BOD: Mondo or similar

09 65 16 RESILIENT FLOORING
- 3.5mm thickness rubber floor tile in all classrooms with low gloss finish and no additional waxes, coatings, or finish
- Product BOD: Mondo or similar
- dense, waterproof, non-porous surface with no PVC or plasticisers.
- no welded seams
- capable to withstand rolling loads such as bleachers, tables, chairs.

09 68 00 CARPETING
- 6.6 continuous filament nylon yarn 12x12 carpet tile with hard rubber reducer strips and TARR rating 3.0 heavy traffic use
- 100% solution dyed or yarn dyed from single lot
- PVC free backing
- self-adhered glue free backing preferred
- Product BOD: Tandus Powerbond with Ethos backing or similar

09 80 00 ACOUSTICAL TREATMENT
- durable mechanically fastened wall panels
- panels below 7’ must also serve as tackable surfaces
- Product BOD: Armstrong or similar

09 91 00 PAINTING - GENERAL
- all painting materials to comply with LEED v4
- all walls at gloss level 5, ceiling at gloss level 3
- prime surfaces in compliance with manufacturer’s instructions per substrate
- top line, high quality commercial grade paints with low to zero VOC content

09 91 13 EXTERIOR PAINTING
- clean and prepare surface based on substrate type and manufacturer paint requirements
- pacvement striping to comply with AASHTO M248 Type 3F

09 91 23 INTERIOR PAINTING
- latex wall primer and two coats water-based enamel on plaster surfaces

09 96 23 GRAFFITI RESISTANT COATINGS
- Max VOC limit of 1000 g/L

09 96 46 INTUMESCENT PAINTING
- fire marshall approved only

09 97 00 HIGH PERFORMANCE STEEL COATINGS
- all exterior metal shall be galvanized
- all interior metal to receive one coat primer and two top coats. includes door and lite frames, electrical plaster rings, grilles, railings, registers, conduit, pipe, mechanical ducts, structural metal truss connections.

09 97 13 CORRIDOR LOCKERS COATINGS
- factory finish

09 97 23 CONCRETE MASONRY COATINGS
- one prime coat block filler type at masonry and two coats semi-gloss

DIVISION 10 - SPECIALTIES

10 11 00 VISUAL DISPLAY SURFACES
- plaster walls, continuous perimeter and interpanel joints with solid wood backing, map rails with cork, map hooks, marker trays, flagpole holder
- satin annodized trim and finishes
- mechanically anchored

10 11 13 CHALK BOARDS

10 11 16 MARKER BOARDS
- porcelain on 24 gauge steel facing laminated to 1/2” core
- magnetics with low gloss finish for dual use as projector screen
- Product BOD: Ghent or similar

10 11 23 TACK BOARDS AND STRIPS
- cork with aluminum frame

10 14 00 SIGNAGE
- follow all ADA and district requirements for signage design

10 21 13 SOLID SURFACE PLASTIC TOILET AND SHOWER PARTITIONS
- high-density polyethylene fabricated from polymer resins forming single thickness panel
- monolithic color at 1” min. thickness
- floor mounted and vandal resistant
- heavy duty anodized aluminum finish
- Product BOD: Scranton Products “hiny hiders” or similar

10 28 13 TOILET ACCESSORIES
- all accessories to be vandal proof with concealed fastenings
- backing and blocking required to resist vandalism
- ADA accessories to meet all code requirements, stainless steel
- includes soap dispenser, paper towel, toilet paper, seat covers, sanitary product receptacles, mirrors, ADA grab bars etc; waste receptacles
- Product BOD: Bobrick or similar

10 44 13 FIRE PROTECTION SPECIALTIES
- recessed fire extinguisher cabinets, ADA with keyed lock and break entry glass
- AED located near main office
- Knox Box near main office

10 51 00 LOCKERS
- corridor lockers to be heavy duty, knockdown, all welded fully framed construction, 14 guage louvered doors, 16 gauge frame with built in locks
- athletic lockers fully framed, all welded hollow T construction, 14 gauge perforated doors and sides
- Product BOD: Sentry All American or similar

10 55 00 POSTAL SPECIALTIES
- Roadside delivery to be heavy-duty vandal resistant steel without locking mechanism
- Door to door delivery to be heavy gauge metal container

10 56 00 STORAGE ASSEMBLIES

10 75 00 FLAGPOLES
- 30’ pole with cable pull, removable, aluminum satin finish with cleat cover box and key operated cylinder and lock matching masterkey system
- To hold US and Oregon flags

DIVISION 11 - EQUIPMENT

11 40 00 FOOD SERVICE EQUIPMENT
- Raised and covered loading dock, and ADA access to kitchen areas required
- 150 SF dry storage with adjustable shelving in 1” increments with antimicrobial coatings and removable, dishwasher safe mats. Reinforced dunnage style bottom shelf
- 150 sf cold walk-in storage with adjustable shelving in 1” increments with antimicrobial coatings and removable, dishwasher safe mats. Reinforced dunnage style bottom shelf
- Modular 14 ga. stainless steel serving lines with counter, electrically wired hot and hold wells, tray slide surface, with plastic laminate flame retardant fiberglass front end panels, swivel casters adjustable food guards
- Mobile refrigerated salad/variety bars, double sided forced-air milk coolers, stainless steel
- Mobile point of sale (6) total with utility/cash drawer, stainless steel with casters and brakes
- Stainless steel hand washing sinks in kitchen
- Double stack combi-oven/steamers, gas preferred with 48” long gas quick disconnect and cable restraints
- Type 1 canopy hood with fire protection system and auto start/on demand technology
- Reach-in refrigerators and freezers as needed
- Stainless steel self-draining drain boards with sink at dishwasher infeed sized for soiled rack load
- Waste collector when disposers are prohibited
- Wall mount hose reel for cleaning warewasher and dishtables
- (3) compartment stainless steel pot-washing sink tables with self0draining drain boards with standard faucet and spray rinse sized to fully immerse full size sheet pans
- Rubbermaid Slim Jim waste receptacles
- (2) compartment stainless steel prep sink tables with self-draining drain boards and spray rinse with add-on faucet
- Floor mats provided at sinks and along kitchen side of serving lines such at Nitrile antimicrobial, 3/4” thickness with beveled edges
- Non-heated air curtain at receiving door with plunger switch for auto-on
- Reach-in and walk-in coolers, refrigerators, and freezers to include remote temperature monitoring
- Kitchen finishes to be smooth, washable, light in color with 6’ wainscot and stainless steel wall flashing covering all cooking wall surfaces, reference Division 9. Minimum ceiling height 9’-0”
- Support to include managers desk, file cabinet in office, staff lockers, wall mounted eyewash station (Haws or similar), unisex restroom, janitors closet with mop sink and chemical storage in close proximity,

11 41 23 KITCHEN APPLIANCE STANDARDS
- Reach in freezers: stainless steel fronts with aluminum interior, full height solid doors with locks, stainless steel shelves, casters with brakes, self-contained refrigeration with top mount compressor, 404A refrigerant and thermostatic expansion valve, maintains -5 degrees F, lighted interior by door switch, exterior temperature display, 120v electrical cord with plug, Energy Star rated
- Reach-in refrigerators: stainless steel fronts with aluminum interior, full height solid doors with locks, stainless steel shelves, casters with brakes, self-contained refrigeration with top mount compressor, 404A refrigerant and thermostatic expansion valve, maintains 34-38 degrees F, lighted interior by door switch, exterior temperature display, 120v electrical cord with plug, Energy Star rated
- Roll-in refrigerators: stainless steel fronts with aluminum interior, full height solid doors with locks and self-closing with stay-open feature, stainless steel loading ramps stainless steel shelves, casters with brakes, self-contained refrigeration with top mount compressor, 404A refrigerant and thermostatic expansion valve, maintains 34-38 degrees F, lighted interior by door switch, exterior temperature display, 120v electrical cord with plug, Energy Star rated
- Walk-in type coolers and freezers: airtight seal, spring assisted hinges on doors, R-34 + insulation value with foil backing, floor depression complete with 6” class 1 Dow Freezermate Insulation and vapor barrier of 15 lbs required for install, air cooled compressors mounted outside, expansion valve system, insulated hung refrigeration lines, flush mount press-type switches with Hypalon covers, polyurethane sealants at penetrations with shore A hardness of 30, ACR copper refrigeration lines, Silfoss solder, 404A refrigerant, high-efficiency electronically commutated motors, Beacon-smart defrost with controller, Energy Star, window at door, 26 ga. Galvanized steel with 36” polished aluminum treadplate wainscot, LED interior lights, interior door lock release
- Food warmer cabinet: full size insulated heated hot-holding cabinet, insulated polymer dent/impact/stain resistant cool-to-touch exterior, mobile cabinet with casters and brakes, clear polucarbonate insulated door, magnetic pull door latch with lever action release, universal adjustable wire slides on 1.5” centers, drip trough with catch pan, removable bottom heater, fan and control module,

forces air heating system, exterior digital thermometer, non-heated water container in bottom module, 2000 watt 120 v 1ph NEMA 5-20 plug
- Canopy hood: with fire protection system, 18 ga. 304 stainless steel with exposed welds ground and polished and external surfaces with #4 finish
- Grease removal: non-adjustable stainless steel grease filters with drip=channel gutters, drains, and collection basins
- All products to be UL Listed
- Light fixtures: all LED NSF approved with sealed safety lenses
- Exhaust dusts: welded stainless steel formed duct collars where exposed
- Fire extinguishing system: pre-piped liquid chemical fire suppressant system
- Coordinate all equipment with mechanical engineer
- Electric convention oven: double-stack, full size, 6" heavy-duty caster wheels with brakes, standard size to accept (5) 18"x26" full size baking pans left-to-right, full angle-iron frame, solid mineral fiber insulation, stainless steel exterior, porcelized and lighted interior, 5 adjustable pan racks, solid state manual controls, thermostat control 200-500 degrees F, control area cooling fan, simultaneous operated doors with thermal glass windows, 2-speed fan with 1/3 hp motor, voltage to match supply voltage, Energy Star,
- Gas convection oven: double-stack, full size, heavy duty caster wheels with brakes, standard size to accept (5) 18"x26" full size baking pans left-to-right, full angle-iron frame, solid mineral fiber insulation, stainless steel exterior, porcelized and lighted interior, 5 adjustable pan racks, solid state manual controls, thermostat control 200-500 degrees F, control area cooling fan, simultaneous operated doors with thermal glass windows, 2-speed fan with 1/3 hp motor, electronic spark ignition, manual gas shutoff, 48" gas quick disconnect
- Dishwasher: rack conveyor, 44" single tank dual rinse, Energy Star, fully automatic heavy gauge stainless steel with angle frame, top mounted controls with single point electrical connection, water tight tanks and hoods, perforated stainless steel refuse screens, built-in booster, reciprocating dual pawl bar, anti-jam rack conveyer drive system with stainless steel enclosure panels

11 61 43 STAGE CURTAINS
- Flame resistant per NFPA 701
- Front Setting Curtain Fabric: Woven Cotton Velour napped fabric 100% cotton, 54" width min. not to exceed less than 40 backing ends, 40 pile ends, and 32 picks per inch
- 640 pile tufts per square inch
- Heavy weight fabric not less than 23 oz. per linear yard before flameproofing with pile height of 125 mils
- 54" 100% cotton denim cloth lining
- Product BOD: Memorable K&M Fabrics or similar
- Cyclorama setting fabric: 100% cotton short napped fabric one side, woven other side, not weighing less than 16 oz per running yard before flameproofing
- Product BOD: Colored SuperSet Cloth by Stagecraft or similar
- Metal products: 1-1/2" 16 ga. Tube steel with flat rust inhibitive primer and finish coat; steel pipe schedule 40 1-1/2" painted with flat rust inhibiting primer and finish coat
- Curtains not less than 50% additional fullness with 2" double stitched vertical hems, turnbacks
- 3-1/2" wide heavy jute top hems
- 6" additional material into box pleats at 12" OC with #2 brass grommets at 12" OC
- bottom hems not less than 3" deep, 5" on floor length curtains
- fabric lining finished 2" shorter than curtains
- Front setting valance with heavy weight cotton velour fully lined and curtain with 12" turnbacks
- Cyclorama setting borders and legs fabricated with 16 oz. 100% cotton short napped fabric
- Curtain track / rigging with live end double pulley min 4" dia with molded nylon bodies and parallel wheels
- Carriers with rubber bumper with curtain snap and end stops for track
- Product BOD: Atlas Silk No. 401 or similar
- Battens 1-1/2" dia 16 ga. , shop painted black
- 360 degree pivotal fixtures with u-bolts to attach to batten
- Product BOD: Atlas Silk No. 6 and No 40 or similar

11 66 53 GYMNASIUM DIVIDERS
- Fabricated solid polyester reinforced 19-22 oz vinyl fabric lower 12 ft with white woven vinyl and polyester above 12 ft
- Self-extinguishing, rot and mildew resistant, waterproof
- Ballasted or secured bottom hem
- passageway

11 68 13 PLAYGROUND EQUIPMENT
- Required to meet Rules for Certified Child Care Centers
- Comply with Consume Product Safety commission Public Playground Safety Handbook and ADA requirements
- Athletic field equipment to include

3.1 Specifications

soccer goals, baseball and softball backstops

11 68 13 TRACK AND FIELD EQUIPMENT

DIVISION 12 - FURNISHINGS

12 00 00 FURNISHINGS
- Owner to furnish all furniture unless otherwise indicated
- Meet requirements for LEED for Schools Low-Emitting Materials requirements

12 10 00 ART

12 20 00 WINDOW TREATMENT
- Monolithic, horizontal heavy-duty, commercial, manually operated roller shades with sun/glare/heat opacity control or room darkening as space requires
- PVC free
- Product BOD: Mechoshade or similar
- 12 21 13 HORIZONTAL ROLLER SHADES
- 3% openness base standard, manually operated with chain attached to side of jambs

12 22 00 CURTAINS AND DRAPES

12 40 00 ACCESSORIES
- File cabinets - letter or legal, locking, 4 drawer and 2 drawer

12 48 13 ENTRANCE FLOOR MATS AND FRAMES
- Walkoff mats at least 10’ in length at public entrances and from playgrounds and fields
- Recess into floor wherever possible, or provide aluminum frame
- 100% preconsumer fibers to comply with LEED for schools
- Product BOD: Flexco Flextuff rubber tile or similar

12 50 00 FURNITURE

12 61 00 FIXES AUDITORIUM SEATING

12 66 13 TELESCOPING BLEACHERS
- Motorized telescopic with wood bench
- Non-slip surfaces with contrasting edge
- Outer permanent edge handrails, removable inner rails
- Front and side skirt boards and wheels sized to prevent marring flooring
- Power operators with heavy duty motor or gear drives and safety switch and auto stop feature and pendant controls
- Schlage electrical locking system keyed to masterkey
- Product BOD: Interkal or similar

12 93 00 SITE FURNISHINGS
- All to meet ADA requirements

DIVISION 14 - CONVEYING EQUIPMENT

14 24 00 HYDRAULIC OR MACHINE-ROOM-LESS TRACTION ELEVATORS
- BOD Product: Schindler 3300, 3500lb, Machine-Room-Less

14 28 19 ELEVATOR EQUIPMENT
- Hands free push button emergency telephone.
- Telephone line shall be a dedicated line for the elevator only.

DIVISION 21 - FIRE SUPPRESSION

21 00 00 FIRE SUPPRESSION BASIC REQUIREMENTS
- All drawings and calculations to be prepared under the direct supervision and control of a Professional Engineer competent to do such work and licensed in the State of Oregon. They shall bear the seal and signature of the professional Engineer
- Operation and Maintenance Manuals

21 05 00 COMMON WORK RESULTS FOR FIRE SUPPRESSION
- Aboveground Black Steel OR Galvanized Steel Piping: Pipe: Size 2-inch diameter and smaller. ASTM A135 or ASTM A795; minimum of schedule 40. Pipe: Size 2-1/2-inch diameter and greater. ASTM A53, ASTM A135 or ASTM A795; minimum of schedule 10. CPVP piping is not permitted.
- Hangers and supports: provide hangers spaced at maximum interval of 10 feet per hanger where piping is exposed.
- Backflow Prevention Devices: Two check valves in series with an in-line strainer and OS&Y gate valves at each end. Utility Vault.
- Valves
- Drains

21 12 00 FIRE SUPPRESSION STANDPIPES
- Fire suppression standpipes to be provided as required by codes: OSSC chapter 9, NFPA 14, and the AHJ

21 13 00 FIRE SUPPRESSION SPRINKLER SYSTEMS
- Provide glycol filled gauges.
- Quick response sprinklers to be provided throughout the building.

21 30 00 ELECTRIC FIRE PUMPS
- Fire pumps to be provided where results of water supply test and hydraulic calculations indicate the need for a booster pump. Provide fire pump per the requirements of NFPA 20 and AHJ.
- Provide housekeeping pads for fire pump equipment.

DIVISION 22 - PLUMBING

22 00 00 RELATED SITE WORK
- In areas where new pipe shall be laid, soil shall be compacted to minimum 95% compaction. Compaction shall be tested and documentation provided prior to pipe install.

22 00 00 DEMOLIITION AND REMOVAL OF FIXTURES

22 00 00 DESIGN REQUIREMENTS FOR ACCESS
- Access Panels: 12” x 16” (min. size) access to valves, clean outs, water hammer arresters, trap primers, etc.
- Pipe Tunnels: Tunnels shall be large enough to accommodate manpower to maintain the installation, preferably 72” x 36” in size; ventilated.

22 05 23 GENERAL DUTY VALVES / DOMESTIC WATER VAVES / DOMESTIC WATER
- Backflow Valves; “Febco”, “Watts”, and “Wilkins”.
- Hose Bibbs: Inside: “Chicago 952” chrome plated with vacuum breaker and loose key handle or District Approved Equal. Outside: Chrome plated with loose key handle. Provide bibb with chrome-plated atmospheric vacuum breaker.

22 05 29 PIPE HANGERS AND SUPPORTS
- Clevis-type hangers or channel support system similar to “Kindorf” or “Unistrut” style supports or District Approved Equal.

22 05 53 PIPING IDENTIFICATION

- Valves, piping, and equipment will all be identified with “Brady system” or District approved equal.

22 05 76 CLEANOUTS, STORM, AND SANITARY

- Inside: floor flush-mount, “Josam Series 57008-Z-1” or District Approved Equal
- Outside: provide a no-hub IBCO fitting with cast brass cleanout plug inside Brooks 1-RT or 3-RT traffic rated yard box per PPS Standard Detail S-258

22 07 00 PIPE INSULATION

- Provide an ASJ (all-service jacket) with fiberglass insulation. Avoid PVC if possible to cover insulation. Insulation will meet flame and smoke requirements for the project.

22 11 00 FACILITY WATER DISTRIBUTION

- All pipes, fittings, pumps, valves, faucets, etc. which serve domestic water systems shall be lead-free.
- Install isolation valves at each: wing of a building, floor of a building, and each toilet room.
- Install valves on inlet and outlet sides of water meters and backflow devices.
- Irrigation systems will be metered separately.

22 11 19 BACKFLOW PREVENTERS

- 1” pipe size and smaller “Watts” or district approved equal.
- 1 1/4 and larger “Watts, Febco, Wilkins” or district approved equal.

22 13 00 FACILITY STORM AND SANITARY PIPE AND FITTINGS

- For storm and sanitary sewer outside of building provide: DWV, HDPE, PVC Schedule 3034 or No-Hub cast iron ASTM A888 waste piping.
- For storm and sanitary sewer inside of building provide: Only use no-hub cast iron pipe, ASTM A888.
- “Huskey SD4000”, “Clamp-All 125” high torque heavy duty couplings
- “Huskey” or equivalent brands are required when joints are exposed.
- “Anaco” coupllings, CISPI 310 are acceptable for above grade concealed applications.

22 13 19 FLOOR DRAINS

- Industrial arts, art rooms, and rooms with similar activity-type, non-clogging similar to “Josam No. 32100” or district approved equal. Provide Nikaloy or approved finished strainer in finished floor areas.

22 14 26 FACILITY AREA DRAINS

- Non-clog type with sediment bucket. JR Smith 1450 or 1460 with ductile iron strainer. Provide JR Smith 1412 drain with ductile iron strainer and nickel bronze veneer in finished areas.

22 14 26 ROOF DRAINS

- Interior roof drains: “Josam 21500” or district approved equal.

22 15 00 COMPRESSED AIR EQUIPMENT

- Provide a vibration arrester connection between compressor and piping. Equip with automatic drain. Provide compressors with a refrigerated air dryer system.

22 33 36 BOOSTER HEATERS

- Booster heaters will be provided for cafeteria and kitchen equipment as required. For large capacity applications, provide gas water heaters. Heaters will be isolated for summer use.

22 34 36 WATER HEATERS

- Primary and preferred source; steam or hot water external horizontal heat exchanger supplying hot water to existing storage tanks.
- New, Large water heaters (100 + gallons) will be concrete lined and field insulated.

22 40 00 PLUMBING FIXTURES

22 42 13 COMMERCIAL WATER CLOSETS AND URINALS

- Urinals: Wall-mounted, 0.125 gpf fixture by “Kohler Model K-4904-ET”, “American Standard” or approved equal.
- Water closets / Toilets: floor-mounted, elongated-type, flushometer-type with exposed top spuds, vitreous china. “Kohler K-4350 Siphon Jet” or similar “American Standard” or district approved equal.
- ADA floor mounted toilets: “K-4368 Siphon Jet” or similar “American Standard” or district approved equal.
- Toilet seats: Black “Olsonite”, open-front, elongated bowl, self-sustaining seats, “Beneke”, “Kohler”, “Church”, “Bemis”, or district approved equal.
- Flush valves: “Sloan WES-111” or district approved equal and should be the same manufacturer for both urinals and toilets.

22 42 16 COMMERICAL LAVATORIES, SINKS, AND FAUCETS

- Drain accessories and trim: provide industrial arts and art room sinks with a solids interceptor. Where paints, thinners, and chemicals are used, provide a chemical disposal storage tank.
- Classroom Sinks: provide ADA compliant “Just SL-2019-A-GR”, “Just SL-2225-A-GR” or similar “Elkay” product.
- Faucet: “Chicago786-GN8AE3VPCABCP” or district approved equal.
- P-traps cast brass “J” sections with cleanout plugs with chrome plated, 17-gauge waste ell “Kohler K9000” or district approved equal.
- Specialized sinks in science and labs: acid resistant epoxy sinks or Type 316 stainless steel sinks where appropriate with chemical usage. Chicago faucet 930 with GN8B-VB-E&-317XK serrated nozzle

spout end or district approved equal.
- Lavatory sinks: “Kohler K-2812”, “American Standard” or district approved equal
- Lavatory faucet: “Moen 8884” with “Zurn, model MV 6900” mixing valve or district approved equal.
- Cafeteria and kitchen sink: “Elkay” or “Jensen” or district approved equal.
- Service sinks: “Elkay ESS2319” with “Elkay LK 173” trap standard or district approved equal.

22 45 16 EMERGENCY EYE WASH
- Required at middle school science, shops, and kitchens. “Haws model 7610” or “Bradley S19-220B”, “Haws 7360” or approved equal.

22 47 13 DRINKING FOUNTAINS
- Include at least one bottle filler or combination drinking fountain/bottle filler per floor. All drinking fountains near gymnasium and athletic facilities to include a bottle filler integrated or separate. “Elkay EHWM217C” “Haws 1900” bottle filler, “Halsey Taylor”, “Elkay EZH2O” or district approved equal.

22 66 00 CHEMICAL WASTE ACID PIPING

DIVISION 23 - HEATING, VENTILATION, AND AIR CONDITIONING

23 00 00 DEMOLITION AND REMOVAL OF EQUIPMENT

23 00 00 HEATING, VENTILATION, AND AIR CONDITIONING GENERAL

23 05 29 PIPE HANGERS AND SUPPORTS
- Clevis-type hangers or “Kindorf” / “Unistrut” style supports.

23 05 48 VIBRATION AND SEISMIC CONTROLS FOR HVAC EQUIPMENT
- Except for packaged equipment with integral isolators, single manufacturer selects and furnishes isolation required.

23 05 53 IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

23 05 93 TESTING, ADJUSTING, AND BALANCING

23 07 00 HVAC INSULATION

23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC
- “Honeywell WEB AX” is preferred product.
- “Belimo” is the approved manufacturer for Modulating Control Valves and Damper Operators
- Direct Digital Control (DDC) room temperature sensors: Thermistor or Platinum RTD Type
- Room Thermostats: Programmable; provide remote sensor in unsupervised areas: Gym, Cafeteria, restrooms. “Honeywell” or approved equal.

23 09 43 PNEUMATIC CONTROL SYSTEM FOR HVAC

23 11 23 FACILITY NATURAL GAS PIPE AND FITTINGS
- Provide earthquake valve at main service.

23 20 00 HYDRONIC PIPING AND PUMPS
- Vertical In-line pumps: approved manufacturers include, “Armstrong”, “Xylem/Bell & Gossett”, “Taco”, and “Grundfos/Paco”
- End-suction, base-mounted pumps: approved manufacturers include, “Armstrong”, “Xylem/Bell & Gossett”, “Taco”, and “Grundfos/Paco”

23 22 00 STEAM AND CONDENSATE PIPING AND PUMPS
- Approved manufacturers include: “Wolverine”, “Nibco Ltd”, “Milwaukee Ltd”, “Keystone”, “Hammond”, “Lunkenheimer Ltd”, “Stockholm”, “McDonald Miller”.
- Steam Pressure Reducing Valves (example manufacturers): “Bell and Gossett”, “Hoffman”, or “Armstrong” containing a small bypass pilot-reducing valve.
- Balancing Valves (example manufacturers): “Bell and Gossett”, “Hoffman”, “Armstrong”, or “Taco”

23 22 16 STEAM SPECIALTIES
- Steam Traps: “Hoffman”, “Dunham-Bush” or approved equal.

23 31 00 HVAC DUCTS AND CASINGS
- Galvanized steel ducts to be used unless otherwise approved or under special design circumstances. Hot dipped galvanized steel sheet, lock-forming quality, ASTM A653/A653M FS Type B with G90/Z275 coating. Ducts to have mill phosphatized finish for surfaces exposed to view.
- Fiberglass, flex duct and other alternative materials, by district approval.

23 32 36 AIR DISTRIBUTION FLOOR PLENUMS

23 33 00 AIR DUCT ACCESSORIES
- Galvanized steel sheet, lock-forming quality, ASTM A653/A653M. Galvanizing 1 1/4 ounces per square foot total both sides.

23 34 00 HVAC FANS

23 40 00 HVAC AIR CLEANNG DEVICES
- Provide MERV 8 filtration on all air handling systems serving occupied areas. Provide MERV 13 filters on systems required to achieve LEED certification as part of EQ Credit Enhanced IAQ strategies.

23 51 23 NATURAL GAS VENTING
- Gas appliances shall have a dedicated vent routed through the roof.

23 52 00 HEATING BOILERS
- New boilers shall be natural gas fired high efficiency, condensing boilers; minimum 86% efficiency at 160 degrees F entering water temperature and 93% efficiency at 100 degrees F entering water temperature at full fire.
- Cast iron section boilers are acceptable for hydronic heating systems only.
- Package boilers are acceptable for both steam and hydronic systems.

23 60 00 CENTRAL COOLING EQUIPMENT
- The use of mechanical cooling is to be limited to spaces that require cooling year-round or have extremely high cooling loads.

23 62 00 VARIABLE REFRIGERANT FLOW/VOLUME (VRF/VRV) SYSTEMS
- Heat Recovery System consists of an outdoor unit, Branch Circuit Terminal or Branch Selector Units, multiple indoor fan units and PID DDC (Direct Digital Controls).
- Variable capacity heat pump system (non-heat recovery) system consist of outdoor unit, multiple indoor units and PID DDC (Direct Digital Controls).
- “Daikin” and “Mitsubishi” are listed manufacturers.

23 74 00 CENTRAL STATION AIR HANDLING UNITS

23 82 00 CONVECTION HEATING AND COOLING UNITS

23 82 36 FIN TUBE RADIATION
- Fin tubes must be installed on wall-mounted brackets. Provide 1” plywood backing for walls with fin tube radiators.

DIVISION 25 - INTEGRATED AUTOMATION

25 01 00 OPERATION AND MAINTENANCE OF INTEGRATED

AUTOMATION

25 05 00 COMMON WORK RESULTS FOR INTEGRATED AUTOMATION

25 05 13 CONDUCTORS AND CABLES FOR INTEGRATED AUTOMATION

25 05 28 PATHWAYS FOR INTEGRATED AUTOMATION

25 05 53 IDENTIFICATION FOR INTEGRATED AUTOMATION

25 06 00 SCHEDULES FOR INTEGRATED AUTOMATION

25 06 11 SCHEDULES FOR INTEGRATED AUTOMATION NETWORK

25 06 30 SCHEDULES FOR INTEGRATED AUTOMATION INSTRUMENTATION AND TERMINAL DEVICES

25 08 00 COMMISSIONING OF INTEGRATED AUTOMATION

25 13 00 INTEGRATED AUTOMATION CONTROL AND MONITORING NETWORK

25 13 13 INTEGRATED AUTOMATION CONTROL AND MONITORING NETWORK SUPERVISORY CONTROL

- Server: A Honeywell WEB-S-AX-100-O server version 3.8 is furnished by the Owner.
- Alarm Console: The system will be provided with a dedicated alarm window or console for a remote computer other than the server.
- JACE Controllers and Accessories: Honeywell WEB-700-O with maximum RAM and HEAP memory upgrade installed.
- All JACE controllers shall be installed in an enclosure. Honeywell ENC-H-001, Honeywell ENC-H-002, Siemens CP567, Hoffman A-ALP, Hoffman A-LP.

25 14 00 INTEGRATED AUTOMATION LOCAL CONTROL UNITS

25 14 13 INTEGRATED AUTOMATION REMOTE CONTROL PANELS

- Provide pushbutton override station(s) in locations as shown on drawings. Touch-Plate Ultra Smart Station or approved equal.

25 14 16 INTEGRATED AUTOMATION APPLICATION-SPECIFIC CONTROL PANELS

- Provide unitary controllers as called for on the drawings, or as necessary to control equipment. Honeywell PUB1012S-ILC, PUB4024S-ILC, PUB6438S-ILC, PUB6438SR-ILC

25 14 23 INTEGRATED AUTOMATION FIELD EQUIPMENT PANELS

25 15 00 INTEGRATED AUTOMATION SOFTWARE

25 15 16 INTEGRATED AUTOMATION SOFTWARE FOR CONTROL AND MONITORING NETWORKS

- The Owner-furnished Supervisor is loaded with WEBPro-AX version 3.8. All controls shall be implemented using this version of the tool.

25 15 19 INTEGRATED AUTOMATION SOFTWARE FOR LOCAL CONTROL UNITS

25 15 19 INTEGRATED AUTOMATION SOFTWARE FOR LOCAL CONTROL UNITS

25 35 00 INTEGRATED AUTOMATION INSTRUMENTATION AND TERMINAL DEVICES FOR HVAC

25 35 13 INTEGRATED AUTOMATION ACTUATORS AND OPERATORS

- Provide electrically driven, direct-coupled actuators unless otherwise shown on the drawings or specified. Approved manufacturers include: Belimo, Honeywell, Johnson Controls

25 35 16 INTEGRATED AUTOMATION SENSORS AND TRANSMITTERS

- Provide temperature sensors. Approved manufacturers include: Building Automation Products Inc (BAPI), Honeywell, Johnson Controls, Mamac, Veris
- Provide relative humidity sensors. Approved manufacturers include: Building Automation Products (BAPI), Honeywell, Mamac, Vaisala, Veris
- Provide current sensors, current switches, and devices combined with relays. Approved manufacturers include: Functional Devices, Honeywell, Johnson Controls, NK Technologies (Nielsen Kuljian), Veris
- Provide CO2 sensors. Approved manufacturers include: Honeywell, Johnson Controls, Telaire, Vaisala, Veris
- Provide air flow meters and stations. Approved manufacturers include: Air Monitor, Ebtron, Ruskin
- Provide water flow meters. Approved Manufacturers include: Badger/Data Industrial, Onicon

25 35 19 INTEGRATED AUTOMATION CONTROL VALVES

- Provide control valve and actuator assemblies. Approved
- manufacturers include: Belimo, Honeywell, Johnson Controls

25 35 23 INTEGRATED AUTOMATION CONTROL DAMPERS

- Provide control dampers. Approved manufacturers include: Greenheck Honeywell, Johnson Controls, Ruskin, Tamco

25 35 25 INTEGRATED AUTOMATION POWER SUPPLY TRANSFORMERS

- Provide UL Listed Class 2 control power transformers. Approved
- manufacturers include: Functional Devices, Honeywell, Johnson Controls, Or Equal

25 35 27 INTEGRATED AUTOMATION VARIABLE FREQUENCY DRIVES

- Provide Variable Frequency Drives. Approved manufacturers and models include: ABB, Model ACH550; Allen Bradley, Model PowerFlex 4 or 40; Eaton, Model H-Max

25 90 00 INTEGRATED AUTOMATION CONTROL SEQUENCES

25 95 00 INTEGRATED AUTOMATION CONTROL

3.1 Specifications

SEQUENCES FOR HVAC

DIVISION 26 - ELECTRICAL

26 01 00 OPERATION AND MAINTANCE OF ELECTRICAL SYSTEMS
- General Electrical Provisions/Design Requirements: Design systems that stress durability, resistance to vandalism, and ease of maintenance, reliability, and energy conservation.

26 05 09 EQUIPMENT WIRING
- 1/2 HP and under: 120V, 1 phase motor
- 3/4 HP and over: 208V, 3 phase or 480V, 3 phase motor

26 05 19 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
- Terminate feeder conductors with indent compression lugs.
- Feeder conductors - copper; no substitution.

06 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

26 05 33 RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS
- Approved conduit types shall be Galvanized steel or EMT where specifically approved.
- Minimum Conduit Size: 3/4 inch for power and control unless otherwise noted.

26 05 53 IDENTIFICATION OF ELECTRICAL SYSTEMS

26 05 73 ELECTRICAL DISTRIBUTION SYSTEM STUDIES

26 06 00 SCHEDULES FOR ELECTRICAL

26 06 20 SCHEDULES FOR LOW-VOLTAGE ELECTRICAL DISTRIBUTION

26 08 00 COMMISSIONING OF ELECTRICAL SYSTEMS

26 09 23 OCCUPANCY SENSORS
- Line voltage relays with occupancy sensors is the standard for existing facilities.

26 22 00 LOW VOLTAGE TREATMENTS
- Dry type autotransformers, “K” type to change 208V to 120/240V circuits.
- K rated transformers shall be used in all locations
- Provide Class 220 insulation with 80 degree C average temperature rise.

26 23 00 LOW VOLTAGE SWITCH GEAR
- Distribution Switchboards: Acceptable brands are Square D, Siemens, Cutler Hammer, GE or District approved equal.
- Branch Circuit Panels Acceptable brands are Square D, Siemens, Cutler Hammer, GE or District approved equal.

26 27 26 WIRING DEVICES
- All devices shall be UL approved and labeled.
- Motor Starters or VFDs shall be Allen Bradley or District approved equal and located in accessible lighted areas.
- VFDs, at a minimum, shall incorporate an appropriately sized internal or external Line Reactor.
- Duplex receptacles shall be 20 AMP, Spec Grade minimum, tamper resistant.
- GFI receptacles shall be 20 AMP, Spec Grade minimum.
- Overhead pull down outlets with 14 AWG Cord, seismically braced. Reelcraft LD2030 Cord Reels or District approved equal.
- Multi-outlet assemblies shall not be used where individual receptacles cannot be replaced.
- Control switches rated 20 AMP.
- Single pole, double pole 3-way and 4-way switches shall be toggle-type, or keyed type when specified elsewhere in this document.
- When floor outlets necessary, provide flush type with brass cover and flange. Types: “Hubble”, “Walker duct”, “Steel City” or District approved equal.
- Light switches shall be located near entry doors on the door strike side.

26 29 23 VARIABLE FREQUENCY MOTOR CONTROLS
- All motors under VFD control shall be VFD Duty rated and equipped to mitigate bearing currents.

26 32 13 EMERGENCY MOTOR GENERATOR
- Packaged Generator System: Generator set will meet requirements for Level 1, Class 96, Type 10 system as per NFPA 110.
- Engine Type: Water-cooled, four stroke cycle, compression ignition Diesel internal combustion engine producing 1.5 Hp per Kw.
- Fuel System Fuel Oil: No. 2 diesel conforming to VV-F-800. Diesel engines requiring premium fuels will not be considered.
- Construction: Provide generator with revolving field, single bearing type, coupled directly to engine flywheel through a flexible driving disc for positive alignment. Provide rotor dynamically balanced up to 25 percent over speed.
- Generator Set Performance: Provide voltage regulation from no load to rated load within band of plus or minus 0.5 percent of rated voltage. Steady state voltage stability remains within 0.5 percent band of rated voltage. Steady state voltage modulation does not exceed 1 cycle per second.
- Diesel generator suitable for exterior or interior installation: One dry contact - Grasslin Digi 20AorE-xx (A= Surface E= Flush xx= Voltage) Two dry contacts - Grasslin Digi 42AorE-xx
- Manufacturers, “Cummins/Onan”, “Caterpillar” and “Kohler” or District approved equal.

26 42 00 CATHODIC PROTECTION
- Underground systems protected by cathodic protection magnesium anodes or impressed direct current impressed direct current.

26 50 00 LIGHTING
- Lighting Accessories: Ballasts manufacturers “Advanced”, “Universal”, “Sylvania” or District approved equal.

26 53 00 EXIT SIGNS
- Approved manufactures “Lithonia Extreme”, Kenall Trailmate 6500 high abuse” LED or Cold Cathode or District approved equal.

26 56 16 PARKING LIGHTING AND SECURITY
- Fixture selection and placement to minimize glare outside property lines. The use of LED lamp source is encouraged with full cutoff and offsite light spill control.
- 3000K lamp source.
- Use houseside shield for all perimeter lighting.

26 56 33 WALKWAY LIGHTING
- Exterior Exit and Entry Lighting: All exterior doors. Use of LED lamp source is encouraged with full cutoff control.
- 4000K lamp source.
- “RUUD E8226-1 inch”, “Stonco” “Lytepro” series

or “Morlite Vandal WP” or District approved equal.
- Vandal resistant cast metal base with poly carbonate lenses.
- Stainless steel vandal wire guards are acceptable.
- Photoelectric controls and time clocks with skip-a-day and manual override bypass. Alternate, included as part of the Energy Management System.
- Fully programmable time clocks. Intermatic ET9000 Series or District approved equal.
- Key or standard switches shall not be used.

26 56 68 EXTERIOR ATHLETIC LIGHTING
- Stadium Lighting: High output metal halide. Fixture rigging for lowering fixtures.
- Covered Play Sheds: Fluorescent lamps standard color, 4 foot, T5 or T8, or plug in fluorescent, type to be determined by Energy Specialist. Lenses to be high impact resistant Lexan or polycarbonate. Fixture to be equipped with fall protection chains

DIVISION 27 - COMMUNICATIONS

27 00 00 COMMUNICATIONS BASIC REQUIREMENTS

27 05 28 COMMUINICATIONS RACEWAY
- EMT conduit above grade.
- Outdoor underground PVC conduit allowed per NEC requirements.
- Provide Galvanized Rigid Steel (GRC) for elbows and penetrations out of the slab.

27 11 01 COMMUNICATIONS EQUIPMENT ROOMS
- Backboards: Provide 3/4-inch fire retardant plywood backboard around full perimeter of room.
- Equipment Racks: Free Standing (floor mounted) -19” x 84” four post racks. Wall mounted racks – minimum 36” tall by 24” deep with 19” mounting rails

27 13 00 COMMUNICATIONS BACKBONE CABLING
- 12 strand fiber minimum between all MDF & HDFs per site.
- 8 micron 1310-nm OS1 single-mode fiber optic cable – various strand counts as indicated on the drawings.

27 15 00 COMMUNICATIONS HORIZONTAL CABLING
- Category 6 rated copper cabling (blue cabling).
- Category 6 rated termination hardware (blue inserts)
- Category 6 rated angled patch panels (modular or universal) 48-port unpopulated .
- Contractor must meet specifications for minimum performance standards of cable.
- Category 6a rated copper cabling.(yellow cabling)
- Category 6a rated termination hardware (yellow inserts)
- Category 6a rated angled patch panels (modular or universal) 48-port unpopulated .
- Contractor must meet specifications for minimum performance standards of cable.
- Horizontal Fiber: 8-micron 1310-nm OS1 single-mode fiber optic cable – minimum 12 -strand per location indicated

27 40 00 AUDIO/VIDEO (AV) SYSTEMS - GENERAL
- Wire and Cable: Large Speaker Cable, for Class 2 low impedance (less than 20 ohm) or long run loudspeaker circuits, and for Class 2/3 DC power to devices: #12 AWG minimum.
- Small Speaker Cable, for Class 2 high impedance (70 volt) or short run (less than 10 feet) loudspeaker circuits: #18 AWG minimum.
- Wires do not need to be twisted within conduits.
- Control Cable (unshielded conductors)
- #20 AWG, jacketed cables.
- Analog Video Cable (for existing only).
- Composite YC, YUV, RGB, RGBHV Video Cables
- Full-size coaxial cable; do not useminiature coaxial cables.
- HDMI for all new installations.
- Digital video and digital audio cable.
- As required by equipment.
- CATV cable
- Comcast provides 3 free lines per school site; requires they be in common spaces. Spaces are typically Media Center, Commons, and Gymnasium.
- Coaxial, RG6 for short runs, RG11 for runs between 100 and 500 feet, 0.500 inch coaxial or optical fiber for runs over 500 feet.
- DC Power Wiring
- #18 minimum, jacketed cables.
- HDMI Cables
- Bonded pair data cables with factory-installed HDMI connectors, or CAT 6 data cables with active interface/converters.
- Camera Cables :As required for selected cameras. CAT 6 POE.

27 41 13 PROJECTION SCREENS
- Manual may be used for screens under 10 feet wide.
- Provide with controlled release mechanism.
- Example product: Da-Lite Model B, Draper Luma NTSC 4:3 video format
- Motorized screens shall have Class 2 control circuits, to allow connection to AV control systems.
- Example product: Da-Lite Advantage, Electrol, Draper Access/Series E

27 41 16 CLASSROOM AV SYSTEMS
- Video projectors: short throw, wall

mounted
- Remotely controllable, via RS232 or Ethernet.
- Integral scaler.
- LED TV
- 42” LED with HDMI, VGA, remote control, USB 2.0, wireless, Energy star
- NEC WMK-3257 Univ tilt wall mount kit
- Must connect to audio reinforcement system
- 5-6.5-inch coaxial in metal enclosures, with 70 volt transformers
- AMK SA615, SoundTube CM600i, Community D5, Community D6.
- Mixer/amplifiers
- Programmable, modular, remotely controllable.
- TOA 9000M2-series
- Assistive Listening Systems
- Infrared (new construction): Listen Technology, Sennheisser
- RF (extensions and retrofits only): Phonak
- Control System
- Programmable, touchscreens or button panels as appropriate, ability to connect to devices via Ethernet, RS232, and contact closure.
- Extron, Crestron, AMX

27 41 16 CLASSROOM AUDIO REINFORCEMENT SYSTEMS
- Infrared wireless microphones
- Multiple sensors, wall and/or ceiling mounted.
- Inputs and outputs for integration with sound systems also providing amplification for audio program, and paging/intercom.
- Atlas Soundolier, Califone PAIRSYSBCS
- Digital Signal Processors
- Programmable, modular, remotely controllable.
- TOA 9000-series

27 41 16 DISTANCE LEARNING CLASSROOM: VIDEO CONFERENCING
- LCD flatscreens, LED lit.
- Sharp Aquos, Samsung ME or MD series, NEC
- Cameras
- Motorized pan, tilt, zoom where appropriate.
- Remotely controllable.
- Ability to send signal on CAT6 data-type cabling.
- Ceiling and/or wall mountings.
- Vaddio
- Table top microphones
- Boundary type.
- Shure, Audio Tecnhica
- Wireless microphones
- Handheld, lavalier, or headworn mircophones.
- Digital, frequency agile.
- Capable of maximum channels for available bandwidth.
- Integral scanning, testing, automatic configuration.
- Shure ULX-D-series

27 41 17 GYMNASIUM SOUND SYSTEMS
- Video Projectors
- Panasonic DS20
- Christie Digital
- BluRay / CD Players
- Remotely controllable, via RS232 or Ethernet.
- Integral scaler.
- Oppo BDP103
- Loudspeakers
- Where appropriate, active loudspeaker systems are preferred:
- Yamaha DXR-series
- iQSC K-series
- Digital Signal Processors (DSPs)
- Optional: Programmable, via Ethernet, using drag/drop GUI.
- Available with both digital and analog inputs and outputs.
- Biamp Nexia, Flex, Tesira
- Rane HAL
- Symetrix SymNet
- Power Amplifiers - 2 channel.
- QSC, Crown, Yamaha
- Power Amplifiers - 70 volt.
- QSC, Crown, TOA, Yamaha
- Assistive Listening Systems
- Gymnasium appropriate ALS (Infrared, RF, or Loop)
- Listen Technology, Sennheisser
- Control System
- Programmable, touchscreens or button panels as appropriate, ability to connect to devices via Ethernet, RS232, and contact closure.
- Extron, Crestron, AMX
- Microphones: wireless, handheld speech, vocal performance, instrumental performance, choir, direct boxes, computer interfaces.
- Shure, AudioTechnica, Audix
- Mixing Console
- Allen & Heath (digital and analogue)

27 41 18 AUDITORIUM AV SYSTEMS
- Video Projector
- High-output, large venue triple LCD or DLP/DMD.
- Available with long-throw lenses.
- Remotely controllable via Ethernet or RS232.
- Panasonic D-series
- Christie Digital
- Blu-ray Players
- Remotely controllable, via RS232 or Ethernet.
- Integral scaler.
- Oppo BDP103
- CD Players
- Commercial/professional, rack-mounted deck.
- Remotely controllable.
- Tascam CD200
- Media Player Docking Station
- Loudspeakers – limiter required for max. volume to prevent damage or audio spikes.
- Where appropriate, active loudspeaker systems are

preferred:
- Yamaha DXR-series
- QSC K-series
- Digital Signal Processors (DSPs)
- Programmable, via Ethernet, using drag/drop GUI.
- Available with both digital and analog inputs and outputs.
- Biamp Flex, Tesira
- Rane HAL
- Symetrix SymNet
- Power Amplifiers - 2 channel. Anti-feedback (software or a device) with a min. 10 filter
- QSC, Crown, Yamaha
- Power Amplifiers - 70 volt.
- QSC, Crown, TOA, Yamaha
- Assistive Listening Systems
- Listen Technology, Sennheisser
- Control System
- Programmable, touchscreens or button panels as appropriate, ability to connect to devices via Ethernet, RS232, and contact closure.
- Extron, Crestron, AMX
- Microphones: wireless, handheld speech, vocal performance, instrumental performance, choir, direct boxes, computer interfaces.
- Shure, AudioTechnica,
- Mixing Console
- Allen & Heath Q16

27 41 19 COMMONS / STUDENT CENTER / CAFETERIA AV SYSTEMS
- Loudspeakers
- Ceiling, Pendant: SoundTube 8-inch or 12-inch coaxials
- Power Amplifiers - 2 channel.
- QSC, Crown, Yamaha
- Power Amplifiers - 70 volt.
- QSC, Crown, TOA (classroom use only), Yamaha
- CD Players
- Commercial/professional, rack-mounted deck.
- Remotely controllable.
- Tascam CD200
- Media Player Docking Station
- Assistive Listening Systems
- ASL as appropriate for space.
- Listen Technology, Sennheisser
- Control System
- Preferred: Programmable, touchscreens or button panels as appropriate, ability to connect to devices via Ethernet, RS232, and contact closure.
- Extron, Crestron, AMX
- Microphones
- Shure, Audio Technica,
- Mixing Console
- Allen & Heath

27 41 20 FOOTBALL STADIUM SOUND SYSTEMS
- 1. CD Players
- a. Commercial/professional, rack-mounted deck.
- b. Remotely controllable.
- c. Tascam CD200
- 2. Media Player Docking Station
- 3. Loudspeakers
- a. High-output, high-Q, rated for outdoor use.
- b. Community
- 4. Digital Signal Processors (DSPs)
- a. Programmable, via Ethernet, using drag/drop GUI.
- b. Available with both digital and analog inputs and outputs.
- Biamp Nexia, Flex, Tesira
- Rane HAL
- Symetrix SymNet
- Power Amplifiers - 2 channel.
- QSC, Crown, Yamaha
- Power Amplifiers - 70 volt.
- QSC, Crown, Yamaha, TOA
- Assistive Listening Systems
- RF (Do not use Infrared outdoors)
- Listen Technologies
- Control System
- Programmable, touchscreens or button panels as appropriate, ability to connect to devices via Ethernet, RS232, and contact closure.
- Extron, Crestron, AMX
- Microphones: wireless, handheld speech, computer interfaces.
- Shure, Audio Technica, Audix
- Mixing Console
- Allen & Heath

27 41 21 DIGITAL SIGNAGE
- Flatscreen video displays
- Sources: Network (streaming, pushed web pages)
- Broadband (CATV) is not required.
- Apple TV (or “Smart” TVs)

27 51 10 VOIP SCHOOL PHONE, INTERCOM, PUBLIC ADDRESS, AND CLOCK / BELL SYSTEMS
- 12” Clock/Speaker
- Clock/ Speaker - Valcom VIP-431-A-IC
- Cat 6 cabling
- Recessed Mount Backbox - Valcom VB-R19
- Outdoor Horn - Valcom Flexhorn V-1080-

GY
- Zone Controller
- Zone extender - Valcom VIP-801-IC
- Power supply - Valcom VP-6124
- Lay-In Ceiling Speakers
- IP Speaker – Valcom VIP-422A-IC
- Analog Speaker - Valcom V9022A-2
- Ceiling Speakers
- Speaker - Valcom V-1920C
- Metal Bridge and Backbox - Valcom V-9916M
- Surface Mount Speakers - Valcom V-1052C

27 53 13 MASTER CLOCK SYSTEMS
- There should be a Master Clock in every school.
- Clocks synchronous, 120 volt or 24 volt (verify and match existing condition), with one and 12 hour correction for wired clocks and 2 and 8 AM and PM correction for wireless clocks.
- All added clocks shall be wireless. .
- Wireless clocks to be powered by 120 or 24 VAC line power or 5-year battery pack.
- “AA” lithium replacement batteries.

DIVISION 28 - ELECRONIC SAFETY AND SECURITY

28 00 00 SECURITY SYSTEMS BASIC REQUIREMENTS
- The District has established Kantech by TYCO as the PPS District standard access controller (KT-400).
- Access controller (KT-400).
- Card Readers : Provide 2N Helios IP Force at main entries, ADA entries and card readers at secondary exterior entry doors, entries nearest to teacher parking lots, annex and modular buildings and playgrounds.
- Lock-Down Alarm: Provide lock-down button at front desk to lockdown the school.

28 05 28 PATHWAYS FOR ELECTRONIC SAFETY AND SECURITY
- “Wiremold V700, V2000, and/or V2400” series raceway to be used (series based on fill rate) or approved equal in spaces open to the public. Correct, un-modified series accessories shall be used at all times. No “500” series allowed.

28 13 00 ACCESS CONTROL
- Access Controller: Access controller is to be KT-400 from Kantech.
- Card Reader: Card reader to be HID RP-40, model number 920PTNNEK for most installations. Where installation on a mullion is required, use HID RP-15, model number 910PTNNEG.

28 16 00 INTRUSION DETECTION
- Intrusion Panel
- DSC 4020 main panel. Supply “CLSH” cabinet lock, Elk “TRG1640” transformer, and 7-12 battery.

28 23 00 VIDEO SURVEILLANCE
- Network Video Recorder (NVR): Kantech Intevo model number INTEVO-ADV-3TB. NVR must have at least a 32 gigabyte SSD boot drive and at least a 3 terabyte hard drive on board with at least two eSATA ports for additional storage.

28 31 00 FIRE DETECTION AND ALARM
- Brand Name Specification: In compliance with PPS-49-0870(3) and ORS 279C.345(2), PPS has exempted fire alarm products and systems from the requirements of Public Purchasing Rule PPS-49-0870(1) and established a brand name specification for fire alarm products and systems.

28 31 13 FIRE ALARM CONTROL PANELS
- For elementary and middle schools - Potter PFC-6800 with latest firmware version.
- SLC Expander – Potter SLCE-127

28 31 23 REMOTE ANNUNCIATOR
- Remote annunciator – Potter RA-6500/R

28 31 43 FIRE ALARM DETECTION SENSORS - HEAT AND SMOKE
- Heat Detectors (135 to 174 degrees ROR)
- Potter RHA heat detector Required Locations
- Heat Detectors (135-185 degrees fixed temperature)
- Potter FHA heat detector. Required Locations
- Smoke Detectors
- Potter PSA smoke detector.
- HVAC Duct Smoke Detectors
- Potter DDA duct detector. Provide with MS-KA/P/R relay and remote test switch.

28 31 53 PULL STATIONS
- Provide Potter APS-DA pull stations for addressable systems.

28 31 63 NOTIFICATION APPLIANCES

28 31 63 SHOP DRAWINGS

28 31 63 AS-BUILT DRAWINGS

28 31 63 DOCUMENTATION CABINET
- A lockable metal 15” x 13” x 4” cabinet will be installed near the FACP when a new fire alarm system is installed or the FACP on an existing system is replaced. 1. Provide Mier Products “BW-DocBox” or district approved equal.

DIVISION 31 - EARTHWORK

31 11 00 CLEARNING AND GRUBBING

31 13 00 TREE, SHRUB, AND STUMP REMOVAL

31 14 13 SOIL STRIPPING AND STOCKPILING

31 22 00 GRADING

31 23 00 EXCAVATION AND FILL

31 23 33 TRENCHING AND BACKFILL

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 12 16 ASPHALT
- Min. 6” compacted gravel base of 1-1/2” minus crushed rock, with a 1” cushion course of 3/4” minus crushed rock.
- Asphalt concrete surfacing min. 3” in depth and composed of Oregon State Highway Division’s Class C fine bin mix asphalt concrete.
- New paving two (2) layers of 1-1/2” thickness. Refer to PPS District Standard Drawing No. S-129.
- Overlay paving compacted 1-1/2” thickness of Modified Class “C” asphalt.
- Where the paving is in a fire lane, the gravel base should be a minimum of 9” and two lifts of asphalt at 2” each.
- Playgrounds and Walkways
- 4” gravel base, 1” cushion course and 1-1/2” of asphalted concrete meeting Oregon State Highway Division’s Class D modified mix.

32 20 03 ALPHALT DESIGN
- The wearing service of hot asphalt concrete (HMAC) roads shall be Level 2, 1/2-inch dense graded HMAC for local roads and level 3 1/2-inch dense graded HMAC for arterials, collectors and commercial roads. Minimum total thickness of asphalt concrete

pavement section shall be three (3) inches. A minimum of two lifts is required with a minimum lift thickness of 1-1/2-inches and a maximum lift thickness of three (3) inches.

32 12 43 POROUS FLEXIBLE PAVEMENT

- Uncompact native subgrade, non-woven geotextile, aggregate choker course, clean aggregate base course.

32 15 00 AGGREGATE SURFACING

- 1” deep compacted decomposed basalt (not pea gravel) over 4” deep compacted 3/4” minus crushed rock over compacted subgrade.
- For higher use paths that will get bicycle or other heavier traffic, use 2” and 6” depths in place of those above.

32 16 00 REMOVING PAVEMENT

32 16 13 CONCRETE CURBS, GUTTERS, AND SIDEWALKS

- Form Material: Wood or steel, straight, and of sufficient strength to resist springing during depositing and consolidating concrete.
- Wood forms shall be two inch nominal surfaced plank or approved plywood forms.
- Steel forms shall be of approved section with a flat surface at top.
- Benders or thin plank forms may be used on curves, curb returns or grade changes.
- Back forms for curb returns may be 1/2-inch benders, for full height of curb cleated together.
- Portland cement - Concrete Compressive Strength: 3,000 psi in 28 days.
- Use no additives to cause rapid heating or setting.
- Entrained air shall be a required additive in amount of five percent, plus or minus one percent.
- Preformed Expansion Joint: Conform to requirements of AASHTO M 153 or AASHTO M 213, except material furnished under AASHTO M 213 shall be tested in conformance to ASTM D 1751 and shall be 1/2 inch.
- Use fillers conforming to AASHTO M 213, except binder.
- Curing Compound: White pigmented curing compound conforming to requirements of ASTM C 309.

32 18 00 ATHLETIC AND RECREATIONAL SURFACING

- Synthetic Grass Surfacing
- Shock Pads: Portland Public Schools requires shock pads to be installed under all new artificial turf fields to increase safety and minimize injuries due to falls and head injuries.
- Shock pads shall include a full replacement, non-exclusionary warranty for a minimum of 20 years including a minimum of one replacement of the turf system above the pad.
- Warranty shall guarantee a maximum GMax of 160 throughout the duration of the warranty regardless of field maintenance.
- Playground surfacing.
- The district has a preference for rubber surfacing installed on existing hard surfaces or over compacted gravel.
- The District does allow loose fill, including engineered wood fiber with District approval.
- All new play equipment and surfaces must meet ADA-AG requirements and also HIC and ASTM standards.
- Acceptable products: Rubber Tiles, Poured-in-Place Rubber, Artificial Turf Surfacing, SMARTE Surfacing - SMARTE is a hybrid playground surface that incorporates secured, recycled rubber mulch in special “pillows” that are topped by a unitary layer.
- Ground surface that incorporates secured, recycled rubber mulch in special “pillows” that are topped by a unitary layer.
- Artificial Mulch Surfacing: District does not allow
- Installation of playground surfacing.
- All playground surfacing must comply with ASTM F1292 Standard, ASTM 1951 standard, ASTM 1487 standard specification for
- Install over minimum 4” thick, 6”x6”, 10 gauge welded wire mesh-reinforced concrete slab or compacted gravel.
- Slope concrete slab and surfacing minimum 1/4” per foot for drainage.
- Engineered Wood Fiber (only in existing pits per item 3 above).
- Tracks: Latex and Polyurethane track surfaces are acceptable

32 30 00 SITE IMPROVEMENTS

32 30 10 SCHOOL AND COMMUNITY LED SITE IMPROVEMENTS

32 31 13 CHAIN LINK FENCING AND GATES

- Top rail and terminal post must be schedule 40 pipe.
- The locking system for the gate must have a hole no smaller than 7/16” for the lock.
- All chain link fences will require a mow strip along the entire length of the fence that is located in lawn.
- Mow strip shall be 12” wide concrete, measuring from outside edge of post, 12” wide on each side adjacent to turf. 6” wide on any side adjacent to planting beds to adequately surround post.
- No mow strip required if there is no turf on either side of fence.
- Consider galvanized, aluminum, welded wire mesh, wrought iron or powder coated fencing. Do not use vinyl or vinyl

coated.
- Suggested alternative fence: CWS Fence
- Swing Gate
- A swing gate is the district standard for use in all parking and driveway applications.

32 90 00

- Chain gates may not be used.
- Provide wide gates for access closure to replace bollards and chains: ODOT Gate

32 91 00

- Chain Gate
- 3-1/2 inch IPS schedule 40 pipe.
- 3’-9” above grade, 2’ below grade set in concrete.
- 1/2” eyelet welded 3’6” above grade.
- 3/16” proof coil chain permanently affixed to either post. The owner will provide gate lock for other end.
- Openings greater than 24 feet require removable intermediate post

32 92 00

- Bollards
- Provide removable bollards at the entrances to playgrounds where fencing is not located. Bollards per District detail S-162 (Appendix A) shall be set 60” on center.

32 93 00
32 93 33
32 93 43

- Any bollard installed in turf or landscape should have a 12” concrete mow strip around it measuring from outside edge of post.

32 76 00

32 80 00 IRRIGATION SYSTEMS
- Provide 3/4” ball valve vents and drains for winterizing system in accessible valve boxes.
- Piping Material: PVC Schedule 40.System mains and laterals min. 18 inches below grade and mainline burial 24 inches under vehicular
- Irrigation Heads
- Design system for sprayer type heads regardless of specific heads utilized. “MP rotator spray” heads are acceptable to be utilized, but District needs ability to change back to a sprayer type in the future if rotator spray heads do not work for us. Hunter, Rainbird or approved equal.
- “Hunter” type stainless steel riser, 6” pop up, “I-40” or “I-25” heads for large areas of turf (or district approved equal).
- Consider using low flow nozzles like the Hunter SRM.
- Pressure compensating heads
- Check valves at bottom of slope
- Checks valves on all heads in athletic field

GENERAL PLANTING
- Irrigation is preferred for lawn and field turf for maintenance and Integrated Pest Management.

SOIL PREPARATION FOR PLANTING
- 100% of topsoil shall pass a 1/4” mesh screen.
- Loosen subgrade of planting beds to a minimum depth of 6-inches; minimum depth of amended top soil is 6in.” depth of amended top soil is 6in.”
- Minimum 24-inch depth of amended topsoil. Trees

33 30 00

- Sandy loam soil with 10 to 20 % fine grade plant compost to a depth to support root structure.

TURF
- Grass seed shall be “Oregon Blue Tag” or approved equal, free of weed seed.

33 47 26

PLANT MATERIALS

33 49 00

SHRUBS

33 49 00

TREES

PLANTING ACCESSORIES

DIVISION 33 - UTILITIES

33 10 00 WATER UTILITIES
- Public: Material: Ductile Iron. Manufacturing Standard: Class 150, Class 52
- Private: Material: Ductile Iron, HDPE, Concrete, Copper, Conform to manufacturer’s requirements for class of pipe regarding cover over top of pipe.
- Valves
- Gate Valves shall conform to AWWA C500-86 bronze body with inside screw, non-raising stem, solid wedge, screw-in-bonnet.
- Meters, Backflow Devices, and Vaults
- Current recommended clearance standards as follows: 8” min. between vault and device. 12” min. between floor of vault and bottom of device c. 3” min. between top of OPENED OS&Y valves and inside bottom of vault lid.
- Fire Hydrant Assembly
- No hydrant shall be installed within 5’ of any above ground utility.
- Each hydrant shall have an auxiliary valve and valve box that will permit repair of the hydrant without shutting down the main supply.
- Hydrant shall have 2 – 2 ½” ports and 1 4-1/2” port. Fire hydrants to conform to City Standards.
- Vaults
- Current recommended clearance standards as follows: 8” min. between vault and device
- 12” min. between floor of vault and bottom of device 3” min. between top of OPENED OS&Y valves and inside bottom of vault lid.

33 30 00 SANITARY SEWER
- Material: HDPE, Concrete. Conform to Manufacturer’s requirements for class of pipe regarding cover over top of pipe.

STORMWATER MITIGATION

33 49 00 STORM DRAINAGE STRUCTURES AND SYSTEMS

33 49 00 STORM DRAINAGE STRUCTURES
- Manhole lids anchored in place with brass or stainless steel screws.

DIVISION 34 - TRANSPORTATION

34 00 00 VEHICULAR ACCESS AND PEDESTRIAN SAFETY
- Ensure adequate and safe access for students, staff and visitors, walking, entering and circulating on the campus.

34 10 00 TRANSPORTATION

DIVISION 40 - PROCESS INTEGRATION

40 17 00 OXYGEN AND ACETYLENE PIPE AND FITTINGS
- Industrial arts welding & cutting
- Remote Emergency Shut Off with in Bottle Storage.
- Schedule 40 steel, butt welded.
- Certified welders.
- Acetylene equipped with flash arresters at outlets.
- Sign identifying Emergency Shut Off.
- Valves/Gas Lines – Science rooms
- AGA full port ball valves with “Teflon” seats
- Class rooms; install natural gas solenoid valves

wired to shut-off with classroom lights.
- Natural gas outlets; needle valve, similar to “Chicago 981 with 901 w/ lever handle”.

DIVISION 42 - PROCESS HEARING, COOLING, AND DRYING EQUIPMENT

42 14 33 CERAMICS AND GLASS MELTING FURNACES (KILNS)

- Standards derived from National Electric Code, current Oregon Mechanical Specialty Code, PPS Facilities Maintenance, and Kiln Manufacturer.
- Acceptable kiln manufacture: Skutt or District Approved Equal.
- Minimum room size to be 10’-0” x 10’-0”.
- Kiln shall be rated for available supply voltage.
- 2. Minimum Kiln circuit wire size shall be #6 THHN or THWN.
- Dedicated circuit required for each Kiln
- Load study shall be completed before connecting kiln
- NEMA 6-50 plug for single phase, NEMA 15-50 for three-phase, or direct wired.
- Minimum 3-pole lockable safety disconnect for 1-phase kilns
- or 4-pole lockable safety disconnect for 3-phase kilns.
- An “EnviroVent” downdraft vent system
- Additional Criteria
- Facility must possess the following:
- Noncombustible materials.
- Fire rating door of 90 minutes minimum.
- Fully sprinkled.
- Early warning fire alarm detection connected to the FACP
- A 105 degree F high temperature limit switch

DIVISION 44 - POLLUTION CONTROL EQUIPMENT

44 11 16 INDUSTRIAL DUST COLLECTORS

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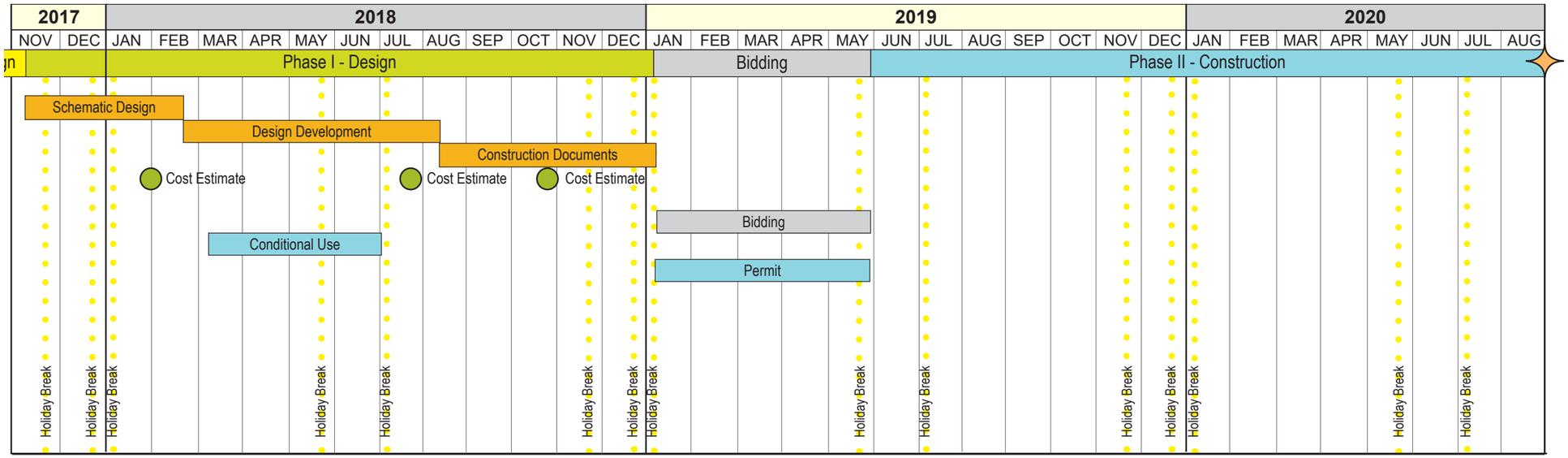
Part 4 - Schedule

4.1 Project Schedule



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Part 5 - Cost Estimate

END OF VOLUME 1