



433 E Ransom St
Kalamazoo, MI

Schematic Design Narrative

GRPS Aberdeen Elementary School

Grand Rapids Public Schools
Grand Rapids, MI



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Acknowledgements



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Specifications
Construction Administration
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Food Service
Reitano Design Group



Technology & Security
Communications by Design



Sustainability
Catalyst

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SCHEMATIC DESIGN NARRATIVE

INTRODUCTION

The new Aberdeen Elementary School in Grand Rapids, Michigan, is envisioned as a modern, efficient, and inspiring educational facility to consolidate the current Aberdeen Academy and Palmer Elementary Schools. Serving 450 scholars in grades PK-5, the two-story structure, with a gross floor area of 63,000 square feet, will be constructed on the existing Aberdeen site while keeping the current school operational during construction. This project represents a significant investment in the community's educational future, offering a state-of-the-art learning environment that fosters collaboration, creativity, and growth.

This project is part of the Grand Rapids Public Schools Facilities Master Plan with the goal to ensure that school resources are streamlined toward scholar achievement. The Facility Master Plan will invest, enhance, upgrade and revitalize the school facilities to serve the scholars of the Grand Rapids Public Schools in more effective, efficient, and equitable ways.

The design process has sought feedback on the educational facility programming and schematic design options from many stakeholders including the Facilities and Operations team, the Academic Team, including school principals, educators, department leaders, community members, and representatives of the City of Grand Rapids, such as the Engineering Department, Fire Department, Parks and Recreation, and Planning departments. The Schematic Design Phase will include tours of other state of the art facilities and community meetings to seek further input from parents, scholars and other community members.

The Schematic Design Narrative is the next step in the design and construction process. It is a description of the project, based on the visioning process, to expedite the preparation and review of the Schematic Design and Design Development submittals. The purpose of this document is to communicate the scope of work required for construction to the Grand Rapids Public Schools, the Construction Manager Miller-Davis, and the project cost estimators from Blundall & Associates, to ensure that the scope, schedule and budget are in alignment.

The Schematic Design Narrative presents the basic information, criteria, logic, evaluations and considerations developed in each category of design to prepare the Schematic Design (SD) plans. It documents the reasoning and decisions made during the SD phase. The SD phase finalizes the overall interior and exterior concept in terms of general size and location of spaces; the type of construction; the kinds of mechanical, electrical and plumbing systems; and the general characteristics of the technology systems and sustainability goals to achieve LEED Certification.

Upon completion of the SD phase the process moves to Design Development (DD) where the specifics of each building component are defined. During the DD phase a Design Development narrative will be prepared as the basis for the construction documents used during the building of the structure.

ARCHITECTURAL DESIGN NARRATIVE

BACKGROUND

The proposed Aberdeen Elementary School consists of a new structure located southeast of the existing Aberdeen Academy. The primary occupancy group of the building shall be Group E – Educational, with non-separated accessory groups for Group A - Assembly A-2 (Dining) and A-3 (Gymnasium), and Group B – Offices, resulting in a mixed-use occupancy facility. The proposed program includes spaces to support administrative offices, 3 sections of classrooms for each grade level, Special Needs, Title 1 and Reading coaches, Music, Art, Physical Education, a Makerspace, a Library/Media Center, Food Services, and support spaces.

The two-story facility will be 63,000 GSF and consists of a program of spaces to support 450 scholars in grades PK-5. The building will be non-combustible construction meeting Type II-B construction requirements, primarily a steel structural frame with some load bearing concrete masonry walls, a steel roof deck and composite steel and concrete floors. The dividing walls between offices and classrooms will primarily be metal studs and gypsum wallboard. Walls in the gymnasium will primarily be of concrete masonry units. The exterior cladding of the building will be a combination of brick veneer and metal panels. The roof will be a single ply membrane roofing material. The building will be fully sprinklered with a fire suppression system. Although not yet fully adopted.

It is a goal to salvage portions of the existing terracotta features from Aberdeen Academy for reinstallation on the new Aberdeen Elementary School.

The building will be designed to meet LEED Certification requirements with a minimum of 40 points required.

SITE

The site will have one new main parking lot for staff and visitors with a total of 78 parking spaces which will include a pickup and drop-off area at the main entrance for parents. There will be a separate bus area to support Aberdeen as a bus transfer location to accommodate approximately 7-9 buses at a time. A service drive to the south will support receiving, recycling, and trash service.

The locations of emergency vehicle access, water supply, hydrant locations, and the Fire Department Connection (FDC) shall be reviewed and approved by the Grand Rapids Fire Department.

The site layout will maintain the existing softball and soccer fields on the southwest corner of the site adjacent to Aberdeen Park.

The existing Aberdeen Academy will remain in use throughout construction with access to parking, parent pick up and drop-off areas, bussing, deliveries, and outdoor play areas which will be fenced off to provide separation from construction areas.

MATERIALS AND FINISHES

EXTERIOR

Exterior Walls and Glazing Systems:

1. Typical exterior wall construction consists of brick masonry cavity wall with cold-formed metal framing with cavity insulation and air/water barrier. Exterior wall at Gymnasium and Cafeteria to have CMU cavity wall with brick masonry veneer. Exterior cladding to be as follows:
 - a. 4" brick masonry veneer at 70% of exterior wall area
 - b. Brick will be utility size
 - c. Aluminum composite metal panel with Kynar 500 finish at 10% of exterior wall area
2. Typical exterior wall to have 8" CMU, with 12" CMU at high-bay spaces
3. Exterior glazing systems consist of thermally broken aluminum windows, storefronts, and curtainwalls.
 - a. Exterior glazing systems to be 30% of exterior wall area
 - b. Basis of Design for aluminum storefronts: Special-Lite SL-450/SL-600
 - c. Exterior glazing to be 1" insulation glazing with low-e coating on the #2 surface. Typical insulating glazing unit to have tempered glazing, with laminated glazing at the main entrance vestibule.
4. Coping, flashing and counterflashing shall be aluminum and be finished to match in appearance exposed aluminum items such as windows, doors, grilles, and louvers.

Doors:

1. Exterior doors at aluminum glazing systems to be thermally broken aluminum doors, Basis of Design is Special-Lite SL-15.
2. Exterior service doors and frames to be thermally broken hollow metal. Exterior overhead doors to be insulated steel with custom color finish.

Roofs:

- A. Low sloped roofs to have 1/4" per foot slope, minimum and to have fully-adhered 60 mil EPDM roofing. Roofing assembly to also include sheathing, vapor barrier, coverboard and minimum R-30 insulation above metal deck.
- B. For roofing accessories, assume walkway pads, thermally broken roof hatches, and galvanized roof ladders.

INTERIOR

Interior Construction

1. Partitions: Refer to Acoustics section of the narrative for STC requirements.

- a. Fixed Partitions:
 1. CMU Partitions:
 - a. All gymnasium partitions to be CMU partitions that extend to the underside of deck above, and will have a two-inch high joint at the deck filled with acoustical sealant for sound. Provide ground face CMU units at corridor side of all corridor partitions.
 - b. Interior face of CMU walls/partitions to be ground face CMU at Gymnasium
 - a. Alternate: Painted CMU Partitions at Gymnasium
 - c. Exception for fire-resistance-rated partitions – or smoke partitions: The joint will be filled with firestopping.
 2. Firestopping will be installed where fire-resistance-rated wall assemblies are through-penetrated.
 - b. Metal-Stud Partitions:
 1. All other demising partitions to be metal-stud partitions. The studs will be fabricated from steel of standard thicknesses and formed into channel shapes of various depths based on the required vertical span. The metal surface will be electro-galvanized for corrosion-resistance.
 2. All Metal-stud partitions will include acoustical batt insulation and acoustically rated seal at at head and base.
 3. Metal studs partitions are to extend to the underside of deck above and stop a minimum of 1 inch from the deck and will engage – but not be secured to – a deep-leg channel secured to the structure above.
 4. Refer to Interior Finishes for gypsum board properties.
 - c. CMU Wall Furring:
 1. 3/4" channels and 5/8" gypsum board.
 2. Furring to extend minimum 4" above the ceiling plane.
 3. Pending: delete drywall furring
2. Interior Doors:
 - a. Swinging Doors:
 1. Solid-core wood doors will be provided in hollow-metal frames with selected hardwood face veneer and vision panels. Stained finish.
 2. Hollow metal doors will be Level 3 and Physical Performance Level A (extra heavy duty), Model 2 (Seamless) or Model 3 (Stile and Rail). Painted finish.
 3. Exception at openings as required by the authorities having jurisdiction): Doors, frames, and door hardware will be fire-resistance-rated to the required hourly rating.
 - b. Frames: 0.053 inch thick (16 gauge) HM frames.
 - c. Interior doors and sidelites, and interior windows will be glazed with tempered glazing, unless fire-rating is required.
 - d. Hardware shall be heavy-duty grade with necessary ratings and ADA egress hardware. Provide automatic door operators at main entrance vestibule.

3. Operable Partitions and Doors
 - a. Manually operated, folding glass panel, paired panels
 1. Basis-of-Design: Modernfold, Acousti-Clear, STC 45.
 - b. Overhead Rolling Grilles, motorized
 1. Servery
 2. Basis of Design: Cornell Visionaire Model ESG10

4. Fittings:
 - a. Visual Display Boards:
 1. Markerboards will be balanced, high-pressure, factory-laminated markerboard assemblies of three-ply construction consisting of a backing sheet, a 3/8-inch thick particleboard core with a 0.005-inch thick aluminum-foil backing, and 0.021-inch thick, porcelain-enamel face sheet with a high-gloss finish
 - a. Basis-of-Design: Claridge: LCS Elite
 2. Tackboards will be polyester fabric factory-laminated to 7/16-inch thick fiberboard or 1/2-inch thick mineral fiber board.
 - a. Basis-of-Design: Claridge: Edge Wrapped Tackboard
 - b. Custom display cases will be in the wall at the art room area. They will include:
 1. Recessed cabinet with anodized extruded-aluminum angle trim.
 2. Glazed doors.
 - c. Signage:
 1. Dimensional building letters identifying the building will be provided on the exterior of the building.
 2. Interior panel-style signage will be provided:
 - a. In the main entrance corridor.
 - b. At corridor intersections.
 - c. Adjacent to individual door openings.
 - d. Handrails: See STAIR CONSTRUCTION below.
 - e. Toilet and Bath Accessories: Coordination will take place between GRPS and the design team to implement GRPS provided accessory specifications and OFCI (Owner furnished, contractor installed) and CFCI (contractor furnished, contractor installed) items. Manufacturer and model numbers shall be provided to the design team for Owner furnished items. The following will be provided
 1. Soap dispensers (OFCl)
 2. Toilet roll dispensers (OFCl)
 3. Paper towel dispensers and disposal units (OFCl)
 4. Sanitary Napkin Disposal (OFCl)
 5. Waste receptacles (CFCI)
 6. Stainless-steel framed mirrors (CFCI)
 7. ADA Grab Bars (CFCI)
 8. Electric Hand Dryers (CFCI)

9. Mop and broom holders. (CFCI)
- f. Cubbies & Lockers to be provided for students and at shared staff work areas. Types and locations to be determined in design development.
- g. Gym wall pads to be provided at Gymnasium
- h. Telescoping Stage at Gymnasium – add BOD Information (alternate)

Casework

1. Classroom Casework:
 - a. Provide 10LF per classroom (per GRPS standards)
 - b. Finishes: all base, upper and storage cabinets to be plastic laminate with solid surface countertop, include 4" solid surface backsplash.
 - c. Casework to be constructed of hardwood-plywood and hardwood. Wood veneer with Quartz or manufactured stone countertops to be provided at specialty millwork and high-profile areas. Minimum standard for all other areas to be solid surface and any counters with a sink. Refer to Food Service section for additional information.

Stair Construction

2. Stair Construction:
 - a. Stringers will be structural steel channels with welded 1/8-inch thick cover plate, unless otherwise noted.
 - b. Treads and landings will be 2-inch deep concrete-filled metal pans. The underside of treads will be concealed with 1/4-inch thick steel plate.
 - c. Stainless steel handrails at all stair locations
 - d. Steel guardrails and handrails all other locations. Painted.
 - e. Guardrails:
 1. Height: 42-inches above adjacent tread or landing elevation.
 2. Top Rail: 2-inch diameter
 3. Vertical Post: 1 1/4-inch diameter
 4. Infill between Posts: Perforated metal at balcony and learning stair, pickets at exit/circulation stairs, unless otherwise noted.
 - f. Handrails: 1 1/4-inch inside diameter and tube handrails attached with 3/4-inch diameter bent bar to vertical posts of adjacent guardrails, as indicated.
 1. Exception at Walls: Attach to walls with standard support brackets.
3. Stair Finishes:
 - a. Typical Landings and treads will be covered with resilient flooring with rubber nosings. Refer to Interior Finishes section for more information.
 - b. Circulation stair adjacent to Learning Stair to be polished concrete with integral metal stair nosing, Basis-of-design: Schluter – TREP-EFK.

Interior Finishes

- A. Materials must meet low-emitting criteria, be sourced sustainably, have recycled content, and be installed with energy efficiency in mind, clearly stating the relevant LEED credit and requirements for each material category ensure compliance LEED v4.1 rating system.
- B. In addition to the Interior Finish Table requirements, the following will be implemented as general design features throughout project:
1. **Corner Guards:** Provide full height recessed corner guards at all high traffic gypsum wall board external corners.
 2. **Wall Protection:** Impact-resistant wall covering at select circulation spaces, janitor closets, and select back of house spaces.
 3. **Wall Base:** Provide rubber wall base of 4" high at all gypsum board and CMU walls. Burnished block and tiled walls to not receive wall base.
 4. **Corridor Walls:**
 - i. Any non-CMU/ground face block walls to receive Scuffmaster Paint (SP). Assume large sections of tack surface (TS).
 5. **Drinking Fountains:** All walls behind drinking fountains must have ceramic tile finish up to 4'-0" AFF minimum.
 6. **Acoustic Panels:** Acoustic wall panels and ceiling treatments such as baffles, wall panels, acoustic deck and others may be used at specific areas such as Gymnasium, Commons, Music Room. Amount and locations will be determined during Design Development Phase.
 - a. **Kitchen/Servery:** Provide one full height ceramic tile wall in Servery, all other walls to be epoxy painted CMU.
 - b. **Transitions Strips:** Metal transition strips to be used at flooring material changes, wall tile exposed edges and at floor to wall tile transitions.
- C. Wall Finishes:
1. Metal-stud partitions will be finished with 5/8-inch thick Tyle X abuse/mold-resistant gypsum panels, complying with ASTM C1629, Level 2 requirements.
 - a. Exception for portions of walls above 8-10 feet: The Contractor will be allowed to use moisture and mold resistant gypsum board.
 2. At the top of fire-resistance rated partitions:
 - a. Gypsum Wallboard: A 1 1/2-inch high joint will be provided at the deck above – and the joint will be filled with firestopping (or mineral wool) based on the required hourly rating.
 3. Level 04 finish required at flat paint locations. Level 05 finish required at all semi-gloss paint and wall-covering locations.
 4. High performance coating required at exposed steel structure in central LRC/Commons area.
 5. Ceramic wall tile will be provided at (2) wet walls, half-heights in all single-user restrooms.
 6. Ceramic wall tile will be provided on all group restroom walls, half-height.
 7. Assume 300SF of tackable wall surface in each classroom (TS) and tile at backsplash where casework occurs in classrooms.

8. Wall graphics:
 - a. Assume areas of custom graphics printed on type II wallcovering applied over level 5 gypsum wall finish in Cafeteria and Commons.
9. Acoustical wall treatment:
 - a. Cafeteria will consist of areas of acoustic wall treatment.
 - b. Pending: Assume 1500SF of tackable surface in commons area
10. Commons Feature Wall:
 - a. The commons will feature a 2-story feature wall with wood or other accent material (900 sf):
 1. **Base Bid:** Rulon – Panel Grille
 2. **Bid Alternate 1:** Soelberg – Raggio Plywood Panels
 3. **Bid Alternate 2:** Turf – Scanline Panels (custom image)

D. Floor Finishes

1. Corridor/Circulation Floor Finish:
 - a. **Base Bid:** Polished Concrete
 - b. **Bid Alternate 1:** Rubber Tile, RT
 - c. Note: Polished concrete finish not recommended at concrete topping at precast planks at second floor slab, review with district.
2. Cafeteria Floor Finish:
 - a. **Base Bid:** Polished Concrete
 - b. **Bid Alternate 1:** Rubber Tile, RT
3. Core Academics Classrooms will have CPT-02 carpet tile, assume area of resilient floor at casework/sink locations.
4. Sealed concrete in mechanical, building service and storage areas.
5. Polished Concrete: Desired level of aggregate exposure is “salt-and-pepper”. Grind concrete to desired aggregate exposure and polished to 800 grit. Grinding and polishing steps are all at least 3 passes:
 - a. 50 grit wet
 - b. 120 grit wet
 - c. 220 grit wet
 - d. 400 grit wet
 - e. Hardener-Densifier
 - f. 800 grit dry
 - g. Concrete Dye
 - h. Top Coat
 - b. Porcelain tile will be used in restrooms.
 - c. Gymnasium Floor will be a synthetic system.

E. Ceiling Finishes:

1. Refer to Basis of Design Finish Table and Room Finish Schedule below for typical ceiling types.
2. Commons Ceiling will be composed of various ceiling materials:
 - a. 3,000 SF: Painted exposed structure / MEP

- b. 1,500 SF: Arktura – SoundAngle Baffles or Turf – Plate Clouds
3. Assume the following typical ceiling heights:
- a. Offices 9'-0"H
 - b. Restrooms 8'-0"H
 - c. Core Learning Spaces 10'-0"
 - d. Circulation 10'-0"H with areas of 9'-0"
4. Gypsum board ceilings, soffits, and bulkheads will be used at various locations. Gypsum board will be painted.
5. In general, mineral fiber panels with a highly light-reflective and sound-absorptive surface will be laid in exposed 24- by 24-inch grids of inverted T-shaped metal. Acoustical ceilings are to be 2'x2'lay-in acoustical ceiling tile, see finish table below for more information.
6. There will be painted exposed structure in areas such as the gymnasium, commons, and mechanical room.
7. Provide 50% ceiling coverage of Specialty Ceiling Type 3 (see table below) at Music.
- i. Pending: revise to 25% at gymnasium, music room and cafeteria

Interior Room Finishes

Finish Abbreviations:

Basis of Design Finish Table		
Material Type	Manf.	Product
Typical Carpet Tile, Student Spaces, CPT-01	Tarkett	Create Balance, Powerbond
Typical Carpet Tile, Staff Spaces, CPT-02	Tarkett	Cache Tweed, Powerbond
Typical Carpet Tile, Student Accent, CPT-03	Tarkett	ColorKnit, Powerbond
Accent Carpet Tile, Breakout, CPT-04	Forbo	Flotex Planks - Refract Planks
Walk-Off, CPT-05	Tarkett	Abrasive Action II, Powerbond
Floor Tile, TL-01	Virginia Tile	Modern Oasis, 12x24
Wall Tile, TL-02	Virginia Tile	Chroma, 3x10
Wall Tile, Specialty Accent, TL-03	Virginia Tile	Beachgroup Glass, Palms Mosaic
Resilient Floor, RF-01	Forbo	Marmoleum Modular
Rubber Tile, RT	Nora	Environcare Rubber Tile, 3mm
Rubber Stair Tread + Landings, RST	Nora	Noramant 926 Stairtreads
Polished Concrete, PLC	<i>See Description Above</i>	
Sealed Concrete, SCE	<i>See Description Above</i>	
Resinous Flooring, EPXF	Dur-A-Flex	Dur-A-Chip
Athletic Gym Flooring, AGF	Robbins	Synthetic -Pulastic
Wood Flooring (Learning Stair)	Nydree	Maple Acrylic Hardwood
Paint, P	Benjamin Moore	Ultraspec 500
Tack Surface, TS	Forbo	Pinboard Linoleum
Scuffmaster Paint, SP	Scuffmaster	ScrubTough
High Performance Coating, HPC	Benjamin Moore	Corotech High Performance Coatings
Typical Acoustic Ceiling Tile, ACT-01	Rockfon	Education Plus 2'x2'
Scrubtable Acoustic Ceiling Tile, ACT-02	Rockfon	Education Plus 2'x2'
Kitchen Acoustic Ceiling Tile, ACT-03	Rockfon	Hygienic Plus 2'x2'
Specialty Ceiling Type 1	Arktura	SoundAngle Baffles
Specialty Ceiling Type 2	Turf	Slice
Specialty Ceiling Type 3 - Music Accent	Kinetics Noise Control	Pyramidal Sound Diffuser 2'x2'
Wood Ceiling	Rulon	Aluratone 700 Acoustic Wood Wall Panels

INTERIOR ROOM FINISH SCHEDULE

	FLOOR											WALL				CEILING						
	Carpet Tile, CPT-01	Carpet Tile, CPT-02	Carpet Tile, CPT-03	Carpet Tile, CPT-04	Walk-off Carpet Tile, CPT-05	Floor Tile, TL-01	Resilient Floor, RF-01	Rubber Tile, RT-01	Polished Concrete	Sealed Concrete	Resinous Flooring, EPXF	Athletic Gym Flooring, AGF	Paint, P	High Performance Coating, HPC	Porcelain/Ceramic Tile	Specialty Accent Finish	ACT-01	ACT-02	ACT-03	Gypsum Board Ceiling	Exposed Structure, Paint	Specialty Ceiling
ADMINISTRATIVE SPACES																						
Principal's Office		X										X				X						
Asst. Principal Office		X										X				X						
Conference Room		X										X				X						
Reception/Waiting		X										X				50%						50%
Secretarial Stations		X										X				X						
Mailroom/File Storage		X										X				X						
Mailboxes		X										X				X						
Staff Restroom						X								X		X						
Social Worker		X										X				X						
Itinerant Offices		X										X				X						
ISS Room		X										X				X						
Vault/Records Storage		X										X				X						
Coat Closet		X										X								X		
Communications Closet		X										X								X		
Health Office							X					X				X						
Sick Beds							X					X				X						
Restroom						X						X		X								
GRADE LEVEL - CORE ACADEMIC SPACES																						
Pre-Kindergarten Classrooms		75%					25%					X				X						
Kindergarten Classrooms		75%					25%					X				X						
1st-2nd Grade Classrooms		75%					25%					X				X						
3rd-5th Grade Classrooms		75%					25%					X				X						
Classroom Storage							X					X				X						
Unisex Restrooms (PreK/K)						X								X						X		
Special Ed Classrooms		X										X				X						
Speech Room		X										X				X						
Unisex Restrooms						X								X						X		
Book/Equipment Storage							X					X				X						
MEDIA CENTER																						
Reading Room/Circulation		X										X				X						
Media Specialist Office		X										X				X						
Workroom/Equipment Room		X										X				X						
SPECIAL NEEDS SERVICE SPACES																						
OT/PT Room							X									X						
Speech Rooms		X										X				X						
Psychologist		X										X				X						
Conference Room		X										X				X						
Sensory Room/Time-out/tutorial							X					X			X	X						
Restroom w/ Shower								X				X		X						X		

	FLOOR										WALL				CEILING							
	Carpet Tile, CPT-01	Carpet Tile, CPT-02	Carpet Tile, CPT-03	Carpet Tile, CPT-04	Walk-off Carpet Tile, CPT-05	Floor Tile, TL-01	Resilient Floor, RF-01	Rubber Tile, RT-01	Polished Concrete	Sealed Concrete	Resinous Flooring, EPXF	Athletic Gym Flooring, AGF	Paint, P	High Performance Coating, HPC	Porcelain/Ceramic Tile	Specialty Accent Finish	ACT-01	ACT-02	ACT-03	Gypsum Board Ceiling	Exposed Structure, Paint	Specialty Ceiling
TITLE 1 & READING SPACES																						
Reading Resource Storage		X										X					X					
Title 1 (1) & Resource Rooms (3)		X										X					X					
MUSIC SPACES																						
Music Room w/Storage	X																X					X
Instrument Storage							X										X					
ART																						
Art Classroom								X				X				X						
Kiln									X			X									X	
PHYSICAL EDUCATION SPACES																						
ES Gymnasium											X	X									X	X
ES Gymnasium Storage						X						X									X	
Teacher Office						X						X				X						
STUDENT DINING & FOOD SERVICE SPACES																						
PX-5 Student Dining/ Commons								X				X		X		X						X
Commons Storage						X										X						X
Food Service Kitchen										X				X	X				X			
Girls Restrooms					X							X	X							X		
Boys Restrooms					X							X	X							X		
RESTROOMS																						
Girls Restrooms					X							X	X							X		
Boys Restrooms					X							X	X							X		
Staff Restrooms					X							X	X							X		
CIRCULATION																						
Typical Circulation/Corridors								X				75%			25%	75%			25%			
Stairs						X						X									X	
ENGINEERING & CUSTODIAL SPACES																						
Receiving/Storage/Trash/Office/Bldg Stor./Repair								X				X										X
Custodial Closets								X				X										X
Cleaning Equipment Closet								X				X										X
Technology (Head End Room)								X				X										X
Electrical Room								X				X										X
Mechanical Room								X				X										X
Electrical Distribution Rooms								X				X										X
Lawn/Maintenance Equipment (Outdoor Storage)								X				X										X

ROOM LIGHTING SCHEDULE

	LIGHTING TYPE											
	2X2 Troffers	1X4 Troffers	Recessed Linears	Suspended Linears	Recessed Downlights	Suspended 2x2 Troffers	Decorative Pendant, Large	Decorative Pendant, Small	High Bay Suspended Fixtures	Wall Mounted Linears	RGBW Specialty Lighting	Decorative Wall Sconce
ADMINISTRATIVE SPACES												
Principal's Office		X										
Asst. Principal Office		X										
Conference Room			X									
Reception/Waiting					X		X					
Secretarial Stations					X							
Mailroom/File Storage	X											
Mailboxes	X											
Staff Restroom					X							X
Social Worker		X										
Itinerant Offices		X										
ISS Room		X										
Vault/Records Storage	X											
Coat Closet					X							
Communications Closet					X							
Health Office		X										
Sick Beds									X			
Restroom					X							X
GRADE LEVEL - CORE ACADEMIC SPACES												
Pre-Kindergarten Classrooms			X									
Kindergarten Classrooms			X									
1st-2nd Grade Classrooms			X									
3rd-5th Grade Classrooms			X									
Classroom Storage	X											
Unisex Restrooms (PreK/K)					X							X
Special Ed Classrooms			X									
Speech Room			X									
Unisex Restrooms					X							X
Book/Equipment Storage	X											

	LIGHTING TYPE											
	2X2 Troffers	1X4 Troffers	Recessed Linears	Suspended Linears	Recessed Downlights	Suspended 2x2 Troffers	Decorative Pendant, Large	Decorative Pendant, Small	High Bay Suspended Fixtures	Wall Mounted Linears	RGBW Speciality Lighting	Decorative Wall Sconce
MEDIA CENTER												
Reading Room/Circulation				X			X					
Media Specialist Office		X										
Workroom/Equipment Room	X											
SPECIAL NEEDS SERVICE SPACES												
OT/PT Room			X									
Speech Rooms			X									
Psychologist		X										
Conference Room			X									
Sensory Room/Time-out/tutorial											X	
Restroom w/ Shower					X							
TITLE 1 & READING SPACES												
Reading Resource Storage	X											
Title 1 (1) & Resource Rooms (3)	X											
MUSIC SPACES												
Music Room w/Storage			X									
Instrument Storage	X											
ART												
Art Classroom				X								
Kiln	X											
PHYSICAL EDUCATION SPACES												
ES Gymnasium								X				
ES Gymnasium Storage						X						
Teacher Office		X										
STUDENT DINING & FOOD SERVICE SPACES												
PK-5 Student Dining/ Commons				X								
Commons Storage	X											
Food Service Kitchen	X											
Girls Restrooms					X							X
Boys Restrooms					X							X

	LIGHTING TYPE											
	2X2 Troffers	1X4 Troffers	Recessed Linears	Suspended Linears	Recessed Downlights	Suspended 2x2 Troffers	Decorative Pendant, Large	Decorative Pendant, Small	High Bay Suspended Fixtures	Wall Mounted Linears	RGBW Speciality Lighting	Decorative Wall Sconce
RESTROOMS												
Girls Restrooms					X							X
Boys Restrooms					X							X
Staff Restrooms					X							X
CIRCULATION												
Typical Circulation/Corridors						X						
Stairs												
ENGINEERING & CUSTODIAL SPACES												
Receiving/Storage/Trash/Office/Bldg Stor./Repair						X						
Custodial Closets						X						
Cleaning Equipment Closet						X						
Technology (Head End Room)						X						
Electrical Room						X						
Mechanical Room						X						
Electrical Distribution Rooms						X						
Lawn/Maintenance Equipment (Outdoor Storage)						X						

BUILDING PROGRAM

28
1/16/2025

over/(under target gross building area)
60,006 sf
2,088

Pending
Accepted
Rejected

Program of Spaces	Suggested					Enhancement	Existing	Comments	Initial Program Area	Area (sf) Reduction/Increase	W+/DLR/MD Reduction Comments	Owner Comments	
	TS	# per T.S.	Cap. @ 100%	Quantity	SF								Total
Administration-Total	0			19		2,792	0	0	3,012				
Principal's Office				1	150	150			250	-100	Developed 01/03/2025	Reviewed 01/16/2025	
Principal's Restroom				0	56	0			0	0	Reduce Office by 100 sf	Accepted	
Assistant Principal's Office				1	150	150			150	0	Per District; confirm		
Conference Room				1	200	200			200	0			
Security Officer				0	100	0			0	0	Not needed.		
Reception/Waiting Area				1	150	150			150	0			
Secretarial Stations				1	150	150			150	0			
Work Area				0	450	0			0	0			
Tech & Data Area				0	200	0			0	0			
Workroom/Mailroom/File Storage				1	600	600			700	-100	Including faculty Dining square footage from below	Reduce Workroom/Mailroom/File Storage	Accepted
Mailboxes				1	20	20			20	0			
Community Room				0	175	0			0	0			
Staff Restroom				2	56	112			112	0			
Social Worker				1	120	120			120	0	Special Needs area, not in the main office.		
Itinerant Office (Mental Health Therapist, CPS)				2	150	300			300	0	from 5 to 2; confirm with Matt, Private Offices		
Family Room (Conference Room)				0	500	0			0	0			
Restroom				0	56	0			0	0			
Parent Liaison Office				0	150	0			0	0			
ISS Room				1	210	210			210	0			
Vault/Records Storage				1	100	100			100	0			
Coat Closet				1	25	25			25	0			
Communications Closet				1	25	25			25	0			
Health Office				1	120	120			120	0	Add as req'd.		
Sick Beds (2)				1	200	200			220	-20	Add as req'd.	Reduce Sick Beds by 20 sf	Accepted
Rest Room				1	160	160			160	0	Add as req'd.		
Grade Level Core Academics -Total	18	25	448	38		22,811	0	0	26,811	-4,000			
Pre-Kindergarten	2	28	0	2	1,070	2,140			2,200	-60	Reduce by 30 SF	Accepted	
Unisex Restrooms (Pre-Kindergarten)				2	56	111			111	0			
Kindergarten	3	28	84	3	1,070	3,210			3,300	-90	Reduce by 30 SF	Accepted	
Unisex Restrooms (Kindergarten)				3	56	168			168	0			
Breakout Area				0	500	0			500	-500	Eliminate Break out room (1)	Accepted	
Classrooms Grade 1-2 w/storage	5	28	140	5	870	4,350			5,400	-1,050	Reduce by 30 SF & 1 room	Accepted	
Swing Classroom/Breakout Room	0	0	0	1	870	870			0	870	Add 1 room (870 sf)	Accepted	
Unisex Restrooms (1st Grade & 1 room for 2nd Grade)				4	56	224			224	0	Extra offers flexibility		
Breakout Area				0	500	0			1,000	-1,000	Eliminate Break out rooms (2)	Pending	
Classrooms Grade 3-5 w/storage	8	28	224	8	870	6,960			8,100	-1,140	Reduce by 30 SF & 1 room	Accepted	
Swing Classroom/Breakout Room	0	0	0	1	870	870			0	870	Add 1 room (870 sf)	Accepted	
Breakout Area				0	500	0			1,500	-1,500	Eliminate Break out rooms (3)	Pending	
Special Education Classroom (Three ASD (9 Students), One Level 3 Resource 15-18, Self Contained)				4	700	2800			3000	-200	Provide three ASD rooms, one Level 3 Resource Room	Reduce room size by 50 sf	Accepted
Speech Room (8 students, Pre-K)				1	700	700			750	-50	Should be same 750 SF. Confirm.	Reduce room size by 50 sf	Accepted
Unisex Restrooms				3	86	258			258	0	per SPED room		
Book/Equipment Storage				1	150	150			300	-150	Eliminate 1 room	Accepted	
Media Center -Total	0			4		2,450	0	0	2,500	-50			
Reading Room/Circulation				1	1,825	1,825			1,825	0	Design as collaborative space		
Media Specialist Office				1	150	150			200	-50	Reduce Media Specialist Office by 50 sf	Accepted	
Workroom/Equipment Room				1	250	250			250	0	Combined		
Equipment Room				0	200	0			0	0			
Breakout Rooms				1	225	225			0	225	0	Eliminate Break Out Room	Pending
Computer Area				0	1,200	0			0	0			
Restroom/Support				0	56	0			0	0	Not needed. Allocate to SPED classrooms.		

New Aberdeen Elementary School PK-5 School (Capacity = 450, 28 Scholars/TS)

1/16/2025

over/(under target gross building area)
60,006 sf
2,088

Pending
Accepted
Rejected

Program of Spaces	Suggested						Enhancement	Existing	Comments	Initial Program Area	Area (sf) Reduction/Increase	W+/DLR/MD Reduction Comments	Owner Comments
	TS	# per T.S.	Cap. @ 100%	Quantity	SF	Total							
Special Needs Services-Total	0	0	0	3		750	0	0	Spaces to be clustered	1,400	-650		
ES Resource Hallway Team Zones				0	200	0				0	0		
OT/PT Room/Sensory				0	400	0				400	-400	See Sensory Room (shared)	Accepted
Speech Rooms				0	150	0			increased from 1 to 2	300	-300	See Speech Room above (duplicate)	Accepted
Special Education Office				0	150	0			not required	0	0		
Secretarial Area				0	175	0			not required	0	0		
Special Ed Office (& Psychologist)				1	200	200				150	50		
Conference Room				0	225	0				225	-225	Not required as part of this suite	Accepted
Sensory Room/Time-out/tutorial Room/OT/PT				1	400	400			one of two spaces with ISS, to serve ISS, Timeout, Behavior Office and Sensory Lab	125	275	See OT/PT room	Accepted
Life Skills Laboratory				0	400	0				0	0		
Behavior Management Office				0	125	0			not required	0	0		
Restroom w/ Shower/Laundry (Place in ASD Classroom)				1	150	150				200	-50	Reduce Restroom w/ Shower by 50 sf	Accepted
Reading Coaches - Total	0	0	0	4		700	0	0		1,100	-400		
Reading Resources Coach Office				0	250	0			not required	0	0		
Reading Resource Storage				1	100	100				300	-200	Reduce by 200	Accepted
Resource & Speech Rooms (3)				3	200	600			divisible	800	-200	Reduce by 1 room (Small groups of 2-2)	Accepted
Professional Development Classroom				0	175	0			not needed. One of the larger spaces above needs to double for PD for 40-50 staff (Media Center or Commons)	0	0		
Elementary Music - Total	0	0	0	2		1,300	0	0	Confirm with fine arts	1,400	-100		
Music Room w/Storage				1	1,100	1,100			Music to open up to commons or gymnasium as platform.	1,200	-100	Reduce Music Room w/Storage by 100	Accepted
Instrument Storage				1	200	200				200	0		
Practice Room				0	100	0				0	0		
Physical Education-Total	1	0	0	3		5,580	0	0		5,780	-200		
ES Gymnasium	1			1	5,180	5,180				5,180	0	Reduce Gym size by 2,000 sf	Rejected: Owner requires 74x50' co
ES Gymnasium Storage				1	300	300				500	-200	Reduce Gym Storage by 200 sf	Accepted
ES Gymnasium Retractable Stage				0	400	0				0	0	Potential Add Alternate	Pending: Owner wants to include Fo
Additional Gymnasium Bleacher Seating				0	1,140	0				0	0		
Changing Room (Boys & Girls)				0	900	0				0	0		
Kindergarten Creative Play Gymnasium				0	4,800	0				0	0		
Kindergarten Gymnasium Storage				0	375	0				0	0		
Teacher Office				1	100	100				100	0		
Art -Total	0	0	0	3		1,300	0	0		1,400	-100		
Art Classroom w/Outdoor Patio				1	1,100	1,100				1,200	-100	Reduce Art Classroom by 100 sf	Accepted
Art Storage				1	100	100				100	0		
Art Kiln Room				1	100	100				100	0		
Science Room - Total	0	0	0	1		850	0	0		850	0		
Maker space - Move to Media Center				1	850	850			Change to Maker Space/Robotics/Testing Room, Multi-function	850	0	Eliminate Maker Space 850 sf	Pending
Science Storage				0	100	0				0	0		
Guidance -Total	0	0	0	0		0	0	0		0	0		
Counselor Office (Mental Health Therapist)				0	100	0			Use itinerant offices	0	0		
Conference Room				0	150	0			Mental Health Office moved to main office.	0	0		

28
1/16/2025

over/(under target gross building area)
60,006 sf
2,088

Pending
Accepted
Rejected

Program of Spaces	Suggested					Enhancement	Existing	Comments	Initial Program Area	Area (sf) Reduction/Increase	W+/DLR/MD Reduction Comments	Owner Comments
	TS	# per T.S.	Cap. @ 100%	Quantity	SF							
Student Dining and Food Service -Total	0		0	5		4,330	0	0	5,000	-670		
PK-5 Student Dining / Commons (3 Lunch Periods)				1	2,250	2,250			2,250	0	Reduce Cafeteria by 750 sf (= 10 sf per	Rejected
Commons Storage				1	200	200			200	0		
Stage				0	2,000	0			0	0		
Stage Storage				0	200	0			0	0		
Food Service Kitchen (production)				1	1,200	1,200			1,850	-650	Reduce Serving and Kitchen by 650 sf	Accepted
Production Area					576				0	0		
Serving Area					540				0	0		
Dry Food Storage					180				0	0		
Refrigerated Walk-In Storage					180				0	0		
Warewashing					144				0	0		
Office					80				0	0		
Locker/Toilet					150				0	0		
Faculty Dining				0	400	0			0	0	Square footage added to workroom in Administration area	
Girls Restrooms (8 Fixtures)				1	340	340			350	-10	Reduce Restroom size by 10 sf	Accepted
Boys Restrooms (8 Fixtures)				1	340	340			350	-10	Reduce Restroom size by 10 sf	Accepted
Restrooms -Total	0			7		1,528	0	0	1,624	-96		
Girls Restrooms (8 Fixtures)				2	340	680			700	-20	Reduce Restroom size by 10 sf	Accepted
Boys Restrooms (8 Fixtures)				2	340	680			700	-20	Reduce Restroom size by 10 sf	Accepted
Staff Restroom				3	56	168			224	-56	reduce Staff Restrooms by 1	Pending
Engineering and Custodial-Total	0			7		2,650	0	0	2,850	-200		
Receiving Dock (200 NSF Exterior Space)				1	0	0			0	0		
Receiving/Storage/Trash/Office/Bldg Stor./Repair				1	1,050	1,050			1,250	-200	Reduce area by 200 SF, Owner Suggest	Accepted
Head Custodial Office				0	120	0			0	0	Square Footage added to receiving above	
Maintenance/Repair Area				0	250	0			0	0	Square Footage added to receiving above	
Building Storage				0	900	0			0	0	Square Footage added to receiving above	
Custodial Closets				4	30	120			120	0		
Cleaning Equipment Closet				1	80	80			80	0		
Technology (Head End Room)				1	200	200			200	0		
Sprinkler Room				0	100	0			0	0		
Electrical Room				1	200	200			200	0		
Mechanical Room				1	800	800			800	0		
Electrical Distribution Rooms				4	25	100			100	0		
Lawn/Maintenance Equipment (Outdoor Storage)				1	100	100			100	0		
Total Net SF					PK-5	47,041	0	0	53,727	-6,686	Net Area	Pending
Circulation and Construction					32.00%	15,693	0	0	17,193	-2,140	2,140	SF Reduction
Total	19	448	96			62,094	0	0	70,920	-8,826		
Functional Capacity				x	SF/Student	PK-5 Allowable Area	Enhancement Allowable Area	Total PK-5 & Enhancement	PK-5 Allowable Area			
Total Capacity @ 28 Scholars / TS	0.0	448		x	139	62,094	0	62,094	70,920	-8,826		8,826 Total Area Reduction
+Over/(Under)	(2)					59,771	0	per the WSFD	62,094	Gross Building Area Total (after reductions)		
Target Capacity	450					60,006	@ \$516.61/SF	Target Area	2,088	OVER/UNDER target gross building area of 60,006 sf		

28
1/16/2025

over/(under target gross building area)
60,006 sf
2,088

Pending
Accepted
Rejected

Program of Spaces	Suggested					Enhancement	Existing	Comments	Initial Program Area	Area (sf) Reduction/Increase	W+/DLR/MD Reduction Comments	Owner Comments
	TS	# per T.S.	Cap. @ 100%	Quantity	SF							
Total	19	448	96			62,094	0	0	70,920	-8,826		
Functional Capacity				x	SF/Student	PK-5 Allowable Area	Enhancement Allowable Area	Total PK-5 & Enhancement	PK-5 Allowable Area			
Total Capacity @ 28 Scholars / TS	0.0	448		x	139	62,094	0	62,094	70,920	-8,826		8,826 Total Area Reduction
+Over/(Under)	(2)					59,771	0	per the WSFD	62,094	Gross Building Area Total (after reductions)		
Target Capacity	450					60,006	@ \$516.61/SF	Target Area	2,088	OVER/UNDER target gross building area of 60,006 sf		

CODE SUMMARY NARRATIVE

OVERVIEW

The governing codes enforced by Michigan Department of Licensing and Regulatory Affairs (LARA) current construction codes are as follows:

*Bureau of Construction Codes (BCC)

- Construction of School Buildings Act 306 of 1937
- **2021 Michigan Building Code-International Building Code 2021 (IBC 2021 with amendments), effective April 9, 2025
- 2021 Michigan Plumbing Code, effective March 12, 2024
- 2021 Michigan Mechanical Code, effective March 12, 2024
- 2023 Michigan Electrical Code based on the 2023 National Electrical Code (NEC) w/ Part 8 State Amendments, effective date March 12, 2024
- 2015 Michigan Energy Code, effective date September 20, 2017 (note: Michigan will adopt an updated Energy Code in April 2025)
- Boiler Code, effective May 3, 2023
 - ASME Boiler and Pressure Vessel Code, section I, II, III, IV, V, VII, IX, X, XI, 2019 edition
 - ASME code B31.1, 2018 edition
 - ASME code CSD-1, 2018 edition
 - 2019 National Board Inspection Code
 - 2016 PA 407 Skilled Trades Regulation Act
- Elevator Code, effective July 11, 2014
 - 2010 ASME A17.1 Safety Code for Elevators and Escalators
 - 2011 ASME A18.1 Safety Standard for Platform Lifts and Stairway Chairlifts
 - 2009 ASME A90.1 Safety Standard for Belt and Manlifts
 - Elevator Safety Board General Rules

Bureau of Fire Services (BFS)

- 2012 Michigan Life Safety Code New and Existing School, College, and University Fire Safety Rules; 2012 NFPA 101 Life Safety Code with Michigan amendments, effective May 19, 2016
- 2010 NFPA 13, 13D & 13R
- 2013 NFPA 72 Fire Alarm Code

* Note: The Bureau of Construction Codes (BCC) under LARA typically has jurisdiction for all school projects in Michigan unless that jurisdiction has been delegated locally. It is the design team's understanding that the agency having jurisdiction (AHJ) on this project regarding the building codes is the City of Grand Rapids Code Compliance department.

The project must be reviewed by the Bureau of Fire Services (BFS) regarding the 2012 NFPA 101 Life Safety Code with Michigan amendments, including review by the Grand Rapids Fire Department for rule 6 of the Life Safety Code.

Accessibility and universal design are governed by both 2009 ICC A117.1 Accessible and Usable Buildings and Facilities and the Michigan Barrier Free Design Law of Public Act 1 of 1966 as amended.

****Note:** LARA filed the new 2021 Michigan Building Code on December 10, 2024, and it is scheduled to take effect statewide on April 9, 2025.

BUILDING OCCUPANCY USE TYPE

The building occupancy use group will be defined in both Michigan Building Code as follows.

- Educational Group E (Elementary School grades PK through 5) (MBC 2021)
- Additional accessory, non-separated occupancy groups to include:
 - Storage Group S-1 Accessory (Moderate-hazard storage) Group A-2 Accessory (Dining)
 - Assembly Group A-3 Accessory (Multi-Purpose Gym, Media Center)
 - Business Group B Accessory (Administration)

Per NFPA 101-6.1.14 each portion of the building shall be classified as to its use in accordance with Section 6.1. The building shall comply with the most restrictive requirements of the occupancies involved unless separate safeguards are approved (6.1.14.3.2). Therefore, the Occupancy Use Type for NFPA 101 shall be as follows:

- Mixed-Occupancy – Educational and Assembly (NFPA 101-2012)
As a mixed-occupancy facility, the maximum dead-end corridor length is 20'-0".

BUILDING CONSTRUCTION TYPE

Per 2021 Michigan Building Code Chapter 6, the building will be classified as construction Type II-B. The fire rating requirements from Table 601 are as follows:

Building Element	Rating in HRS
Primary Structural Frame	0
Bearing Walls-Exterior	0
Bearing Walls-Interior	0
Nonbearing Walls	0
Floor Construction	0
Roof Construction	0

BUILDING HEIGHT LIMITATIONS

Per 2021 Michigan Building Code, Table 506.2 the allowable area for a Group E, fully sprinklered, multi-story building of Type II-B construction is as follows:

- Limitation on building area: 43,500 ft²
- 43,500 ft² for Educational Occupancy Classification
- First floor of the new Aberdeen Elementary School to be within the 43,500 SF allowable area.

Per Michigan Building Code 2021, Table 504.4 the allowable number of stories for a sprinklered building of Type II-B construction classified as an Educational Occupancy is as follows.

- Limitation on number of stories: 3
- Anticipated number of stories: 2

Per Michigan Building Code 2021, Table 504.2 the allowable building height above grade for a sprinklered building of Type III-B construction classified as an Educational Occupancy is as follows.

- Limitation on building height: 75' above grade plane Anticipated building height: 41'-6"

VERTICAL OPENING PROTECTION

Under NFPA 101 Life Safety Code, all vertical openings between floors must be protected. This includes openings at shaft enclosures, stairways, elevators, and high-volume spaces. Several potential design options are available for providing this protection, including full enclosure, partial enclosure, convenience opening, communicating space, and atrium.

Full enclosure with rated walls will be provided at the egress stairs and at the elevator shafts. With a fully sprinklered facility, it is anticipated 1-HR full enclosures will be required at the egress stairs and elevator shaft.

It is anticipated that a high-volume space will be provided at the media center, providing connection between the first and second floors.

Per NFPA 101 Life Safety Code, this two-story high-volume space will be treated as a communicating space. A communicating space in a fully sprinklered building shall be separated from the remainder of the building by a 1-hour smoke barrier with 20-minute rated opening protection. The corridor partition types for the first second floors shall be a 1-hour smoke barrier. Occupants within the second floor area must be provided with at least one means of egress without traveling vertically through the communicating space. Two classrooms on the second floor will require additional egress doors, and all classroom doors in that corridor will require closers.

MEANS OF EGRESS

Occupant loads will be calculated based on 2021 Michigan Building Code, table 1004.1.2.

Per 2021 Michigan Building Code, table 1006.3.1, the minimum number of exits required will be based on the total occupant load calculated per story. A total occupant load of between 500 and 1000 is anticipated at this point that will require 3 exits. Current plans anticipate 3 exit stairs discharging directly to grade from the second level with an additional 5 exits from the first level.

Minimum corridor width of 72" is required by both the Life Safety Code and the 2021 Michigan Building Code. Egress stairs shall be sized to 0.2 inches per occupant and corridors and egress doors shall be sized to 0.15 inches per occupant.

Travel distance access to the exits is restricted to a maximum of 250' for a fully sprinklered building per Michigan Life Safety Code 2012, section 14.2.6.3. The maximum for dead end corridors in a fully sprinklered building is 50'. Maximum common path of travel is limited to 75' for a fully sprinklered building. The maximum dead-end corridor length is 20'-0" as a mixed-occupancy facility.

MINIMUM INTERIOR FIRE-RESISTANT RATINGS

Minimum fire resistance ratings for interior partitions shall be as follows:

- 1-Hour Fire Barrier:
 - Egress Stair enclosure partitions and elevator shaft enclosure
 - Storage areas greater than 100 ft²
 - Storage areas for contents requiring a rated enclosure
 - Separation between Assembly and Educational Occupancy (per NFPA 101, 6.1.14.4)
- Smoke Partitions (per 2012 Michigan Life Safety Code, Section 8.4)
 - Corridors at classroom wings.
 - Typical classroom doors are exempt from having closers at smoke partition corridors.
- 1-Hour Fire Curtains (per 2012 Michigan Life Safety Code, Section 8.6.6(4))
 - Second Level only at the high-volume space over the Media Center.
 - Openings which are not smoke rated are to be protected with smoke curtains.

SITE & LANDSCAPE DESIGN NARRATIVE

LOCATION

- A. General: The location of the proposed Aberdeen Elementary School is on the existing school site at 928 Aberdeen Street NE in Grand Rapids, MI. The existing school site is approximately 8.7 acres. The replacement school is proposed to be constructed at the southeast corner of the site and designed in a way to allow the existing school to remain in operation until the new school is completed. The original school will be demolished after construction to allow the construction of the parking lot, bus loop, car drop-off drives, and other sitework.
- B. The proposed bus loop will accommodate 7-9 buses. Transportation staff indicated that the Aberdeen school will also serve as a bus hub site. Students may be brought to Aberdeen, dropped off and will wait for another bus to take students to their assigned school locations.
- C. Service and delivery vehicles will access the site from a proposed drive from Evelyn Street from the street just south of the site. The service area will accommodate trash and recycling enclosure. The service area will also accommodate deliveries of meals prepared off site.
- D. Existing Site Trees: An effort will be made to save as many existing trees as possible on site including the existing Honeylocust trees along the Aberdeen Street Right-of-Way. The site also has other significant trees that will be saved where possible. There is an existing Memorial tree in the playground area that will need to be protected or relocated.
- E. Maintain existing public sidewalks along Aberdeen and Diamond streets.

SITE IMPROVEMENTS

- A. General Site Grading: The proposed school will be two stories. The design intent is to have the main school entry located at the upper level of the site. The proposed dimension from lower floor to upper floor is about 13'-4". The main entrance will be on the north side of the building, connected to the parking lot, bus drop, and playground by a pedestrian bridge. Transitional grading and site fill may be required along the car drop-off drive to accomplish the transition to existing site grades.
- B. Stormwater Management: The proposed school will be two stories. The design intent is to have the main school entry located at the upper level of the site. The proposed dimension from lower floor to upper floor is about 13'-4". The main entrance will be on the north side of the building, connected to the parking lot, bus drop, and playground by a pedestrian bridge. Transitional grading and site fill may be required along the car drop-

off drive to accomplish the transition to existing site grades.

- C. Parking: The proposed parking area will accommodate 78 cars as required by the district. Two additional spaces will be provided in the service area for maintenance.
- D. The proposed parent drop-off loop will accommodate up to 40 cars if all drive lanes are used. The parking lot pavement section will consist of 8 inches of crushed aggregate and 3 inches of asphalt installed in two lifts.
- E. Site Bridge: A site bridge will be provided, connecting the parking lot and parent drop off walks to the main school entry. The bridge will be about 20 feet wide with an overhead canopy system to provide protection from rain and snow. A snow melt system will also be provided in the bridge surface.
- F. Bus Drop Loop: The bus loop drive will be about 28 feet wide with concrete curb and gutter with a pavement section consisting of 8 inches of crushed aggregate and 6 inches of asphalt installed in several lifts. A 10' feet wide curbside walkway will accommodate student access to the buses and provide a connection to the main entry to the school at the north side of the building.
- G. Trash Enclosure: A single wythe masonry enclosure designed to accommodate one 6 CY trash and one 6 CY recycling container at about 12-foot depth, 25-foot wide, and 8-foot height screen wall with gates.
- H. On-Site Walks: Concrete walks will be constructed along the car and bus drop areas providing clear access to the school. These walks will be 10-feet in width. Other site walks will be a minimum of 6 feet width.
- I. Site Stair: Provide a new concrete site stair with snow melt system just west of the new school near the kindergarten classrooms providing pedestrian access from the existing playground and parking areas down to the lower level and proposed playground area for school and public access and use. Preferred rise dimensions are 5 inches minimum, 7 inches maximum with no more than 10 steps per run. Treads shall have a non-slip finish, 11 inches deep minimum.
- J. School Crossing: Provide access from the school to the public sidewalks along Aberdeen Street to the north and Diamond Avenue to the east. Maintain existing public walks within the ROW of these streets during construction.
- K. Site Furnishings: Provide and install bike parking loops to accommodate at least 20 bicycles. Provide 6-length metal benches with powder coat finish at the main entry and at the bus loop to accommodate students waiting for cars and buses. Provide metal seating and waste receptacles at the main entry, bus waiting area, and at the playground entry. Site Furnishings shall be selected as a designed family of furnishings from a single manufacturer per District standards.

- L. Play Areas: Provide and install cushioned soft play areas with fixed play equipment and cushioned fall surfacing to meet an 8-foot fall height. Synthetic turf surfacing with sand infill over a 3-inch minimum thickness fall pad over a 5-inch thick, clean aggregate drainage layer and non-woven filter fabric over compacted subgrade will be installed in the existing playground and new playground areas.
- M. Sub-surface drainage pipes will be provided below the cushioned synthetic turf at the soft play areas. Drainage will be handled internally through the cushioned material into a 5-inch depth clean drainage aggregate base with 6-inch HDPE perforated pipes that will connect to the storm drainage system. Provide the following age-appropriate play areas.
 - i. Pre-Kindergarten and Kindergarten Play: Assume the new play area west of the new school to be developed with new surfacing and equipment for PreK and K.
 - ii. 1st Grade – 5th Grade Play: Assume the existing playground area and equipment will be evaluated for use by 1st through 5th elementary students.
- N. Court Play: The court play area will consist of a standard asphalt pavement section that will be striped for court games such as basketball, hopscotch, foursquare, funnel ball and dodge ball. Basketball goals will be installed along the western edge of the court play area. Funnel ball goals will also be provided.
- O. Entry Plaza: A new concrete entry plaza will be located at the school entrance supplemented with landscaping, benches, and a waste receptacle. Provide and install stainless steel protection bollards along the parent car drop drive to protect students from potentially errant vehicles while waiting to be picked up in front of the school.
- P. Outdoor Courtyards: Provide an outdoor art classroom area with concrete surfacing separated from the outdoor playground with plantings and a low fence. Provide an outdoor dining patio south of the building just outside of the Commons Area. This area will be enclosed with a low fence, low plantings, and will include a walkway extending to the public right-of-way to provide code required egress.
- Q. Monument Sign: A new stone and masonry monument sign will be located at the northeast corner of the site. The sign will be internally lit.
- R. Chain Link Fencing: All fencing shall be black PVC coated Class 2B with a steel core of 9-gauge. Provide 4 feet high fencing around the Pre-K, 6-foot height fence between the playground and the road, and 12 feet high fence with a 4 feet hood for basketball backstops. Provide 6 feet height PVC black coated chain link fencing around the Pre-K, Grades 1-5 soft play, and court play areas as shown on the Site Plan.

SITE LANDSCAPE IMPROVEMENTS

- A. Landscape plantings of low shrubs and groundcover plantings will be designed to provide seasonal color and visual interest. Plant materials will be selected to provide a

variety of textures and fragrances to enhance the patron's experience.

- B. Overstory Trees: Plantings of shade trees will be located to provide shade for parking and play areas, and the south and west facade of the building to reduce solar heat gain. The planting layout will serve to reinforce the drives and pedestrian circulation.
- C. Ornamental Trees: Plantings of ornamental trees will be located to further reinforce site lines and circulation patterns. These trees will provide seasonal interest and color from spring blooms to fall foliage.
- D. Shrubs, Ornamental Grasses, and Perennials: Planting beds of these materials will be focused on main building entries and along the new pedestrian spine at the round-about and existing upper parking lot. Plantings will be selected for low maintenance, drought tolerance and will provide seasonal interest for foliage and bloom colors.
- E. Plantings at Site Bridge: Provide low groundcover on the existing slopes below the bridge and a dry creek bed with aggregate to provide low maintenance and a graceful design solution that accommodates positive site drainage.
- F. Limestone Seating Blocks: Provide and install 2' W. by 6' L. by 18" H. Limestone seating blocks with sawed tops and bottoms with natural split sides will be in addition to the proposed metal benches in locations per the Drawings.
- G. Planting Bed Mulch: Planting beds will have a 3-inch depth of natural shredded hardwood mulch. A chemical weed barrier will be installed over the planting soil and on top of the mulch to prevent and control weed growth.
- H. Concrete Maintenance Curb: A 12-inch wide by 6" thick reinforced concrete mow strip will be provided around the building wall, below site fencing, and to edge planting beds areas to reduce trimming maintenance and promote drainage away from the building. This concrete curb will also be constructed at the perimeter of the cushioned play areas as a nailer board for attachment of the cushioned synthetic turf system.
- I. Turf Seeding: Install turf seed with hydromulch cover overall disturbed site lawn areas. Install turf sod on the multi-purpose athletic fields to allow for playability when the school opens. Turf seed will be a drought tolerant tall turf type Fescue blend with 10% Bluegrass.
- J. Maintenance and watering of all existing and proposed landscape areas will be required during construction and will continue for 60 days following Substantial Completion.
- K. Existing Tree Protection: Provide temporary tree protection fencing consisting of chain link fencing for all existing trees to remain during construction. Fencing to be installed at the dripline of all trees or groupings of trees to remain.

- L. Irrigation System: Provide an in-ground smart control sustainable irrigation system for the multi-purpose soccer and softball field natural grass areas. Other site lawn and planting areas will not be irrigated.
- M. Existing Athletic Fields: The existing athletic field areas may be used for construction staging and will need to be restored with 6-inches of amended topsoil mix, fine graded, and sodded with a Fescue/Bluegrass mix. The play fields will have an automatic in-ground irrigation system for establishment.

SITE RELATED TECHNICAL SPECIFICATION SECTIONS

SPECIFICATIONS

Division 10 – Specialties

Section 107516 Flagpoles

Division 31 – Earthwork

Section 310000 Site Clearing
Section 312000 Earth Moving
Section 313116 Termite Control

Division 32 – Exterior Improvements

Section 321216 Asphalt Paving
Section 321313 Concrete Paving
Section 321373 Paving Joint Sealants
Section 321723 Pavement Markings
Section 321726 Tactile Warning Surfaces
Section 321813 Playground Protective Surfacing
Section 321816 Playground Equipment
Section 322200 Cushioned Playground Base Construction
Section 322020 Concrete Play Court Surfacing
Section 323113 Chain Link Fences and Gates
Section 323300 Site Furnishings
Section 323500 Site Screening Devices
Section 328400 Planting Irrigation
Section 329113 Soil Preparation
Section 329200 Turf and Grasses
Section 329300 Plants
Section 329600 Transplanting



Division 33 – Utilities



Section 331415	Site Water Distribution Piping
Section 333100	Facility Sanitary Sewers
Section 334100	Storm Utility Drainage Piping
Section 334600	Sub Drainage



Depth in Feet		Elev.	USCS	GRAPHIC	Water Levels ▼ During Drilling ▽ After Completion	Auto-Hammer Used for SPT	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
DESCRIPTION												
0												
			SW				1	2	3			
							2	2	4			
5			SW				3	5	13			
							4	6	13			
10												
15												
20												
25												
30												
35												





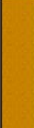

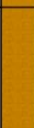
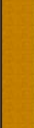
Depth in Feet		Elev.	USCS	GRAPHIC	Water Levels ▼ During Drilling ▽ After Completion	Auto-Hammer Used for SPT	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
DESCRIPTION												
0			SC		TOPSOIL - 5 inches Clayey SAND, loose, brown, fine to medium grained, trace gravel, moist.		1	3	4			
5			SW		SAND, loose to medium dense, light brown, fine to medium grained, trace gravel, moist.		2	2	4			
							3	3	7			
							4	4	9			
10												
15												
20												
25												
30												
35												

DRIESENKA & ASSOCIATES, INC. Engineering · Surveying · Testing		SB-5										
Project Name: GRPS - Aberdeen Academy 928 Aberdeen Street NE Grand Rapids, Michigan			Date Started : December 9, 2024			Drilling Company : Midwest Envirotech						
Project No. 2431017.3A			Date Completed : December 9, 2024			Field Sampling : J. Spaans						
Client Name: Grand Rapids Public Schools			Hole Diameter : 6-inches			Reviewed By : S. Ellison						
			Drilling Method : Hollow-Stem Auger			GW Encountered : Dry						
			Sampling Method : Split-Spoon Sampler			GW Completed : Dry						
Depth in Feet	Elev.	USCS	GRAPHIC	Water Levels		Auto-Hammer Used for SPT	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
				▼ During Drilling	▽ After Completion							
0				TOPSOIL - 6 inches								
		SW		SAND, loose, brown, fine to medium grained, trace gravel, trace clay, moist.			1	2 2 3	5			
		SP		SAND, loose, brown, fine grained, trace gravel, moist.								
				SAND, loose to medium dense, brown, fine to medium grained, trace gravel, moist.			2	4 4 3	7			
5							3	2 4 4	8			
		SW					4	7 7 8	15			
10							5	5 5 8	13			
15							6	9 15 23	38			
		SW		SAND, dense, brown, medium to coarse grained, trace gravel, moist.								
20							7	25 15 18	33			
		SW		SAND, dense, brown, fine to coarse grained, some gravel, trace clay, moist.								
25							8	12 14 29	43			
		SP		SAND, very dense, light brown, fine grained, moist.								
30							9	10 18 23	41			
35												

Depth in Feet		Elev.	USCS	GRAPHIC	Water Levels ▼ During Drilling ▽ After Completion	Auto-Hammer Used for SPT	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
DESCRIPTION												
0												
			SW				1	2 3 4	7			
			SW				2	3 3 4	7			
5							3	3 3 4	7			
							4	3 7 9	16			
10												
15			SW				5	7 8 8	16			
20							6	9 13 11	24			
25							7	7 11 16	27			
			SW				8	18 18 50+	50+			
30												
35												

Depth in Feet		Elev.	USCS	GRAPHIC	Water Levels ▼ During Drilling ▽ After Completion	Auto-Hammer Used for SPT	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
DESCRIPTION												
0			SW									
							1	4 7 6	13			
							2	3 3 3	6			
5			SW				3	4 7 8	15			
							4	11 13 11	24			
10												
							5	8 8 11	19			
15			SW									
							6	13 50+	50+			
20			Refusal at 19.3'									
25												
30												
35												

Depth in Feet		Elev.	USCS	GRAPHIC	Water Levels ▼ During Drilling ▽ After Completion	Auto-Hammer Used for SPT	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
DESCRIPTION												
0												
					TOPSOIL - 11 inches							
			SW		SAND, loose to medium dense, brown, fine to medium grained, trace gravel, moist.		1 3 4 5	9				
							2 3 3 2	5				
5			SW		SAND, loose to medium dense, light brown, fine to medium grained, trace gravel, moist.		3 1 3 4	7				
							4 6 6 7	13				
			SP		SAND, medium dense, light brown, fine grained, moist.		5 6 9 12	21				
			SW		SAND, dense, brown, fine to coarse grained, trace gravel, moist.		6 7 11 16	27				
			SW		SAND, very dense, light brown, fine to coarse grained, a little gravel, moist.		7 4 12 50+	50+				
							8 50+	50+				
			SP		SAND, very dense, light brown, fine grained, moist.		9 13 18 27	45				
35												

DRIESENKA & ASSOCIATES, INC. Engineering · Surveying · Testing		SB-12										
Project Name: GRPS - Aberdeen Academy 928 Aberdeen Street NE Grand Rapids, Michigan		Date Started : December 10, 2024		Drilling Company : Midwest Envirotech		Date Completed : December 10, 2024		Field Sampling : J. Spaans		Reviewed By : S. Ellison		
Project No. 2431017.3A		Drilling Method : Hollow-Stem Auger		GW Encountered : Dry		Sampling Method : Split-Spoon Sampler		GW Completed : Dry				
Client Name: Grand Rapids Public Schools												
Depth in Feet	Elev.	USCS	GRAPHIC	Water Levels		Auto-Hammer Used for SPT	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
				▼ During Drilling	▽ After Completion							
0				TOPSOIL - 2 inches								
		SW/Fill		Possible Fill - SAND, very loose to loose, brown, fine to medium grained, trace gravel, moist.			1	5 3 3	6			
5		SW/Fill		Possible Fill - SAND, loose, dark brown, fine to medium grained, trace gravel, trace silt, trace clay, moist.			2	2 2 1	3			
		SP		SAND, medium dense, light brown, fine grained, moist.			3	1 2 4	6			
10		SW/Fill		SAND, dense to very dense, light brown, fine to medium grained, trace gravel, trace cobble, moist.			4	2 2 3	5			
15		SW		SAND, dense to very dense, light brown, fine to medium grained, trace gravel, trace cobble, moist.			5	5 6 9	15			
20		SP		SAND, dense to very dense, light brown, fine grained, moist.			6	5 11 17	28			
25		SP		SAND, dense to very dense, light brown, fine grained, moist.			7	31 20 19	39			
30		SP					8	8 15 20	35			
35							9	9 15 20	35			

Depth in Feet		Elev.	USCS	GRAPHIC	Water Levels ▼ During Drilling ▽ After Completion	Auto-Hammer Used for SPT	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
DESCRIPTION												
0												
					TOPSOIL - 8.5 inches							
			SW/Fill		Possible Fill - SAND, very loose to medium dense, brown, fine to medium grained, trace gravel, trace organic material, moist.		1	4 5 6	11			
							2	3 2 1	3			
5			SW/Fill		Possible Fill - SAND, loose, dark brown, fine to medium grained, trace gravel, trace silt, trace clay, moist.		3	2 2 2	4			
			SW		SAND, loose, brown, fine to medium grained, trace clay, trace gravel, moist.		4	1 2 2	4			
10			SW		SAND, medium dense, brown, fine to coarse grained, trace gravel, moist.		5	2 4 6	10			
15			SW		SAND, medium dense, light brown, fine to medium grained, a little gravel, moist.		6	10 7 8	15			
20			SW		SAND, medium dense, light brown, fine to medium grained, trace gravel, moist.		7	5 5 13	18			
25												
30												
35												

Depth in Feet		Elev.	USCS	GRAPHIC	Water Levels ▼ During Drilling ▽ After Completion	Auto-Hammer Used for SPT	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
DESCRIPTION												
0												
					TOPSOIL - 8 inches							
			SW/Fill		Possible Fill - SAND, very loose to loose, brown, fine to medium grained, trace gravel, moist.		1	3 4 3	7			
							2	2 1 1	2			
5			SW/Fill		Possible Fill - SAND, very loose, dark brown, fine to medium grained, trace gravel, trace silt, trace clay, moist.		3	2 1 2	3			
							4	3 4 4	8			
10			SW		SAND, loose to medium dense, brown, fine to coarse grained, trace gravel, moist.		5	4 3 5	8			
							6	4 2 13	15			
20			SM		Silty SAND, medium dense, brown, fine grained, trace gravel, moist.		7	7 12 13	25			
							8	13 5 5	10			
25			SW		SAND, medium dense to dense, light brown, fine to medium grained, trace gravel, moist.		9	5 4 6	10			
30												
35												

Depth in Feet		Elev.	USCS	GRAPHIC	Water Levels ▼ During Drilling ▽ After Completion	Auto-Hammer Used for SPT	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
DESCRIPTION												
0												
					TOPSOIL - 9 inches							
			SP/Fill		Possible Fill - SAND, very loose to medium dense, brown, fine grained, trace gravel, moist.		1	3 6 4	10			
							2	3 2 1	3			
5			SW/Fill		Possible Fill - SAND, very loose to loose, dark brown, fine to medium grained, trace gravel, trace silt, trace clay, moist.							
			SP		SAND, loose, brown, fine grained, trace gravel, moist.		3	1 3 4	7			
							4	3 3 4	7			
10			SW		SAND, loose to medium dense, brown, fine to medium grained, moist.							
							5	4 4 6	10			
15			SW		SAND, medium dense, light brown, fine to coarse grained, trace gravel, moist.							
			SW		SAND, very dense, light brown, medium to coarse grained, some gravel, moist.		6	6 25 2	49			
20			CL		Silty CLAY, hard, brown, moist.							
							7	4 5 5	10			
25			SP		SAND, loose to medium dense, light brown, fine grained, moist.							
							8	4 3 4	7			
30												
			SP		SAND, medium dense, light brown, fine grained, trace gravel, moist.		9	3 4 5	9			
35												

DRIESENKA & ASSOCIATES, INC. Engineering · Surveying · Testing		SB-16											
Project Name: GRPS - Aberdeen Academy 928 Aberdeen Street NE Grand Rapids, Michigan				Date Started : December 10, 2024		Drilling Company : Midwest Envirotech							
Project No. 2431017.3A				Date Completed : December 10, 2024		Field Sampling : J. Spaans							
Client Name: Grand Rapids Public Schools				Hole Diameter : 6-inches		Reviewed By : S. Ellison							
				Drilling Method : Hollow-Stem Auger		GW Encountered : Dry							
				Sampling Method : Split-Spoon Sampler		GW Completed : Dry							
Depth in Feet	Elev.	USCS	GRAPHIC	Water Levels		Auto-Hammer Used for SPT		Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
				▼ During Drilling	▽ After Completion								
0				TOPSOIL - 3.5 inches									
		SP		SAND, loose to medium dense, brown, fine grained, trace gravel, moist.				1	3 5 5	10			
5								2	4 4 5	9			
								3	3 3 4	7			
10		SW		SAND, medium dense, light brown, fine to medium grained, trace gravel, moist.				4	4 6 8	14			
15		SW		SAND, medium dense, light brown, medium to coarse grained, trace gravel, moist.				5	8 7 8	15			
20		SW		SAND, dense, light brown, fine to medium grained, trace gravel, trace cobble, moist.				6	18 20 13	33			
				Refusal at 20'									
25													
30													
35													

Depth in Feet		Elev.	USCS	GRAPHIC	Water Levels ▼ During Drilling ▽ After Completion	Auto-Hammer Used for SPT	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
DESCRIPTION												
0												
					TOPSOIL - 7 inches							
					SAND, very loose to loose, brown, fine to medium grained, trace gravel, moist.		1	2 2 3	5			
							2	3 2 2	4			
		SW					3	2 2 3	5			
							4	2 1 1	2			
		SW			SAND, medium dense, light brown, fine to coarse grained, a little gravel, moist.		5	5 7 8	15			
		SW			SAND, medium dense to dense, brown, fine to medium grained, trace clay, some gravel, moist.		6	20 11 10	21			
							7	16 21 12	33			
		SP			SAND, medium dense to very dense, light brown, fine grained, trace gravel, moist.		8	8 9 12	21			
							9	14 31 23	54			
35												

Depth in Feet		Elev.	USCS	GRAPHIC	DESCRIPTION	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
					Water Levels ▼ During Drilling ▽ After Completion	Auto-Hammer Used for SPT					
Project Name: GRPS - Aberdeen Academy 928 Aberdeen Street NE Grand Rapids, Michigan			Date Started : December 9, 2024 Date Completed : December 9, 2024 Hole Diameter : 6-inches		Drilling Company : Midwest Envirotech Field Sampling : J. Spaans Reviewed By : S. Ellison GW Encountered : Dry GW Completed : Dry						
Project No. 2431017.3A			Drilling Method : Hollow-Stem Auger		Sampling Method : Split-Spoon Sampler						
Client Name: Grand Rapids Public Schools											
0			SW/Fill		TOPSOIL - 4 inches	1	3	5			
			SW/Fill		Fill - SAND, loose, dark brown, fine to medium grained, trace gravel, trace clay, trace silt, trace organic material, moist.	2	2	4			
5			SC/Fill		Fill - Clayey SAND, loose, dark brown, fine to medium grained, trace organic material, trace gravel, moist.	3	2	5			
			SW		SAND, loose to medium dense, brown, fine to medium grained, trace gravel, moist.	4	2	6			
10			SW		SAND, very dense, light brown, fine to medium grained, a little gravel, trace clay, trace silt, moist.	5	2	4			
15			SW			6	3	9			
20			SW			7	50+	50+			
25					Refusal at 24'						
30											
35											

STRUCTURAL ENGINEERING NARRATIVE

INTRODUCTION

Grand Rapids Public Schools will construct a new elementary school on the same grounds as the existing Aberdeen Elementary School. The new building will be two stories tall and will not connect to the existing structure in any way. In addition to classrooms, the new building will have a main corridor, gym, gym storage, cafeteria, kitchen, music room, art room, offices, learning center, mechanical room, stairs, and an ADA-compliant elevator. Further, exterior canopies are anticipated as well as a bridge on the north end.

ENGINEERING DESIGN DATA

The following structural design criterion will be used for the design of the structure:

Design Stresses

CONCRETE STRENGTH

LOCATION	28 DAYS	DENSITY	EXPOSURE CLASSES
INTERIOR FOOTINGS	3000 PSI	145 PCF	F0, S0, P0 AND C0
INTERIOR SLABS AND WALLS	4000 PSI	145 PCF	F0, S0, P0 AND C0
EXTERIOR FOOTINGS	4500 PSI	145 PCF	F2, S0, P0 AND C1
EXTERIOR WALLS	4500 PSI	145 PCF	F3, S0, P0 AND C1
EXTERIOR UN-REINFORCED SLABS	4500 PSI	145 PCF	F3, S0, P0 AND C2
EXTERIOR REINFORCED SLABS	5000 PSI	145 PCF	F3, S0, P0, AND C2

BAR REINFORCEMENT	ASTM A615 GR. 60 (Fy= 60 KSI)
WELDABLE BAR REINFORCEMENT	A706 GR. 60 (Fy= 60 KSI)
WELDED WIRE REINFORCEMENT:	ASTM A1064 (Fy= 70 KSI)
POLYPROPYLENE FIBERS:	ASTM C1116
STEEL FIBERS:	ASTM A820

STRUCTURAL STEEL

W-SHAPES:	ASTM A992 (Fy= 50 KSI)
HSS RECTANGULAR:	ASTM A500 GR. C (Fy= 50 KSI)
HSS ROUND:	ASTM A500 GR. C (Fy= 50 KSI)
PIPE:	ASTM A53 GR. B (Fy= 35 KSI)
'M' AND 'S' SHAPES	ASTM A572 GR. 50 (Fy= 50 KSI)
ANGLES:	ASTM A572 GR. 50 (Fy = 50 KSI)
CHANNELS:	ASTM A992 (Fy = 50 KSI)
PLATE:	
LESS THAN 1" IN THICKNESS:	ASTM A36 (Fy= 36 KSI)VE
1" IN THICKNESS OR GREATER:	ASTM A572 GR. 50 (Fy= 50 KSI)

FASTENERS

HIGH STRENGTH BOLT (USE GROUP 120 U.N.O.)

GROUP 120	ASTM F3125 GRADES A325, F1852 AND ASTM A354 GR. BC
GROUP 144	ASTM F3148 GRADE 144
GROUP 150	ASTM F3125 GRADES A490, F2280 AND ASTM A354 GR. BD
GROUP 200	ASTM F3043 AND F3111

HEAVY HEX NUTS AND WASHERS SHALL CONFORM TO RCSC "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS" LATEST EDITION TABLE 2.2 AND TABLE 2.3.

COMMON BOLT:	ASTM A307 GR. A
HEX NUTS:	A563 GR. A
WASHERS:	ASTM F844
ANCHOR RODS:	ASTM F1554 GR. 55
THREADED RODS:	ASTM A193 GR. B7 (Fy= 105 KSI)
STEEL STUDS:	ASTM A108
DEFORMED BAR ANCHORS:	ASTM A1064

MASONRY:

NORMAL WEIGHT	CONCRETE DENSITY = 135 PCF
COMPRESSIVE STRENGTH OF MAS.	$f'_m = 2000$ PSI
COMPRESSIVE STRENGTH OF CMU	= 2000 PSI
COMPRESSIVE STRENGTH OF GROUT	= 2500 PSI
MORTAR SHALL BE TYPE M BELOW GRADE AND TYPE S ABOVE GRADE.	
BAR REINFORCEMENT	ASTM A615 GR. 60 (Fy= 60 KSI)
WELDABLE BAR REINFORCEMENT	A706 GR. 60 (Fy= 60 KSI)
WELDED WIRE REINFORCEMENT	ASTM A1064 (Fy= 70 KSI)

STRUCTURAL DESIGN REQUIREMENTS

GRAVITY LOADS:

ROOFS

TYPICAL ROOF LIVE LOAD	20 PSF
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FLOORS

CLASSROOMS	40 PSF
STAIRS AND MAIN FLOOR CORRIDORS	100 PSF
CORRIDORS ABOVE FIRST FLOOR	80 PSF
LOBBY AND MEETING ROOMS	100 PSF
STORAGE	125 PSF

SLAB ON GRADE

LIVE LOAD	100 PSF
-----------	---------

SNOW LOADS:

GROUND SNOW LOAD	$P_g = 35$ PSF
FLAT-ROOF SNOW LOAD	$P_f = 27$ PSF
SNOW EXPOSURE FACTOR	$C_e = 1.0$
SNOW LOAD IMPORTANCE FACTOR	$I_s = 1.1$
THERMAL FACTOR	$C_t = 1.0$
DRIFTING AND/OR SLIDING SNOW HAS BEEN INCLUDED.	
WIND LOADS:	
ULTIMATE WIND SPEED	120 MPH
RISK CATEGORY	2
WIND EXPOSURE	B
INTERNAL PRESSURE COEFFICIENT	0.18
SEISMIC DESIGN DATA:	
RISK CATEGORY	3
SEISMIC DESIGN CATEGORY	D
SPECTRAL RESPONSE COEFFICIENTS	
$S_s = 0.07$	
$S_1 = 0.043$	
$SD_s = 0.075$	
$SD_1 = 0.069$	
SITE CLASS	D
BASIC SEISMIC-FORCE-RESISTING SYSTEM	
INTERMEDIATE REINFORCED MASONRY SHEARWALLS	
STEEL SYSTEMS NOT SPECIFICALLY DETAILED FOR SEISMIC RESISTANCE.	
DESIGN BASE SHEAR	$C_s * W$ KIPS
SEISMIC IMPORTANCE FACTOR	$I_e = 1.25$
SEISMIC RESPONSE COEFFICIENT	$C_s = 0.03125$
RESPONSE MODIFICATION FACTOR	$R = 3.0$

SOILS AND FOUNDATIONS

For all soil-related information, refer to the geotechnical report by Driesenga & Associates, IN., Project No. 2431017.3A, dated 12/31/24.

Isolated spread footings and strip footings are anticipated for use on this project. Exterior footings will extend a minimum of 3'-6" below grade to prevent frost heave.

In general, exterior strip footings supporting a CMU/brick cavity wall will be 24 inches wide by 12 inches thick with a concrete stem wall. The stem wall will be notched to form a brick ledge. The elevation of the brick ledge will change to follow the grade. The concrete stem wall's expansion, contraction, and construction joints will align with the brick joints (25'-0" max spacing). At the auditorium, the wall footings will be wider to support the heavier loads. The north side will have a bridge with much more significant footings and wall reinforcement than elsewhere.

All slabs-on-grade will be 4" concrete reinforced with 6x6-W1.4x1.4 WWR on granular fill over a 10-mil vapor barrier with saw cuts no greater than 15'-0" o.c. The slab in the gym will be recessed to accommodate the wood floor. Supported exterior slabs, or stoops, will be provided at all entrances.

STRUCTURAL SYSTEMS

Main Corridor

The corridor space will have higher-end finishes with architectural features and lots of natural light through clear-story windows. The walls will be non-load bearing metal studs. The roof framing will combine custom steel trusses and beams with a metal deck.

Gymnasium

The gymnasium framing will feature steel joists with an acoustic metal deck. Currently, it is proposed to use 12" CMU load-bearing walls to the roof level on all sides. Punched openings will be used for windows. Masonry lintels will be utilized at most openings. Where joists run parallel to CMU walls, cast-in anchor channels embedded in the masonry wall will be used. Additional structural considerations for items such as basketball nets and volleyball poles must be included.

Cafeteria

The cafeteria framing will feature steel joists with an acoustic metal deck. Walls will be constructed of non-load-bearing metal studs. The roof will have a metal deck on steel joists, with beam and column construction.

Kitchen

The kitchen will abut the cafeteria, and the framing will feature steel joists with a metal deck. Walls will be constructed of non-load-bearing metal studs. The roof will have a metal deck on steel joists, with beam and column construction.

Music Room

The music room roof framing will have a metal deck on steel joists, with beam and column construction. Non-load-bearing metal studs and drywall will be utilized for wall construction. Refer to the acoustics narrative for the required sound transmission class (STC) ratings of the walls.

Art Room

The art room framing will have a metal deck on steel joists, with beam and column construction. Non-load-bearing metal studs and drywall will be utilized for wall construction. Refer to the acoustics narrative for the required sound transmission class (STC) ratings of the walls.

Classrooms, Offices, and Learning Center

The floor framing will be an 8" precast concrete plank with a 2" concrete topping. Steel beams and columns will support the plank, which will be dapped so that the top of the steel beams will be 2" below the finished floor.

Roof framing will have a metal deck on steel joists, with beam and column construction. Non-load-bearing metal studs and drywall will be utilized for wall construction. Refer to the acoustics narrative for the required sound transmission class (STC) ratings of the walls.

Mechanical Room and Elevator Shaft

The mechanical room and elevator shaft will use 8" reinforced CMU load-bearing walls to the roof level. Masonry lintels will be utilized at most openings. The roof will be steel joists with a metal deck.

Exterior Canopies

Exterior canopies will be detached from the building. Exposed framing will be galvanized.

Lateral Systems

Generally, moment or braced frames will be utilized. Reinforced CMU shear walls will be utilized where possible.

Bridge

The bridge on the north side will be constructed of a 16" precast concrete plank with a 2" concrete topping. Above the 2" topping will be a waterproof membrane, 2" rigid insulation, and a 4" minimum wearing slab. The wearing slab will increase in thickness as you travel from the sides toward the center at a 1/8" per foot slope. At the end of the bridge, on the parking lot side, there will be a concrete abutment. At the end of the bridge, on the school side, the plank will rest on a concrete wall. The guardrail for the bridge will be attached to the side of the precast concrete plank and not the wearing slab.

MECHANICAL / ELECTRICAL / PLUMBING NARRATIVE

1.00 GENERAL

1.01 Introduction

- A. The purpose of the Mechanical, Electrical, Plumbing and Fire Protection (MEP) System Narrative document is to outline the assumptions for the MEP design over the course of the project. It will also be utilized to provide system options for review with the team and to document the decisions.
- B. General Conditions
 - 1. The contractor shall guarantee the entire installation for a period of one (1) year after acceptance. All repair or replacement of faulty equipment shall be done at no cost to the Owner.

1.02 Codes and Standards

All work shall be done in accordance with all applicable local, state, and federal codes (1/24/17 updated code requirements).

- 1. The systems shall be designed and installed in accordance with:
 - 2021 Michigan Building Code (2021 International Building Code)
 - 2015 Michigan Plumbing Code (2015 International Plumbing Code)
 - 2015 Michigan Mechanical Code (2015 International Mechanical Code)
 - 2015 Michigan Energy Code (2015 International Energy Conservation Code)
 - Michigan Fire Prevention Code
 - 2012 International Fire Code
 - 2015 International Fuel Gas Code
 - NFPA 70 (NEC), 2017 Edition
 - 2000 Illuminating Engineering Society Guidelines
 - Life Safety Code NFPA 101
 - ADA Accessibility Guidelines
 - Illumination Engineering Society Lighting Design Handbook 9th Edition

1.03 Record Documents and Training

- A. Record documents shall be required for the project. The following information supplements the project manual requirements.
- B. The record document and training requirements shall include the following:
 - A. Coordination drawings will be coordinated with other trades prior to installation.
 - B. MEP record drawings, digital PDF's.
 - C. MEP Operational and maintenance manual.
 - D. Performance testing.

- E. Mechanical System Commissioning (IMC 2009 and above)
- F. Owner training in operation and maintenance of the installed systems and shall be video recorded.

2.00 MECHANICAL HVAC SYSTEMS:

A. General Design Criteria

- 1. Outdoor Design Conditions:
 - a Summer: 91°F db / 74°F wb
 - b Winter: -10°F
- 2. Indoor Design Temperature Conditions:
 - a Summer: 75°F
 - b Winter: 70°F

B. Heating Plant

- 1. Two (2) natural gas-fired high efficiency condensing hot water boilers, each sized to handle 2/3 of the entire system load, will be located in the Mechanical Room. Combustion air inlets and flue gas outlets will be routed through the roof.
 - a. Capacity: Two (2) @ **2,000,000** BTU Each.
 - b. Unit to be manufactured by AERCO with alternatives allowed in the spec.
 - c. The heating water system will serve cabinet heaters, unit heaters, and VAV reheat coils.
 - d. Two (2) base-mounted end suction pumps (**120 GPM each at 90 ft head**) with variable frequency drives (VFDs), each sized to handle **70%** of the system load, will be used to distribute the heating water throughout the building addition.
 - 1. Pumps based on Bell & Gossett.
 - e. Hot water supply temperature will be reset based on outside air temperature.
 - f. The 1/2" and larger: insulated steel piping, butt-welded or flanged joints, butterfly valves.
 - 1. 2" and smaller: insulated copper piping, soldered joints, ball valves.
 - 2. 2-1/2" and larger: insulated steel piping, butt-welded or flanged joints, butterfly valves.

C. Ventilation and Air-Conditioning Systems:

1. Outdoor, Package, Rooftop Units will be utilized to provide air-conditioning and ventilation for the facility requirements.
 - a. Units to be manufactured by Trane with alternatives allowed in the spec.
 - b. Units to be provided with supply fan with VFD, filter sections, DX cooling coil, hot water heating coil, VFD Relief fan and integral controls with BacNet connection.
 1. Single Zone VAV (SZVAV) AHUs shall serve the gymnasium.
 2. Multi-Zone VAV AHUs shall distribute air to VAV Boxes serving classroom and office spaces.
 3. Units to be provided with energy recovery if required by the energy code (reference ASHRAE 90.1).
 4. All Units to be provided with demand control ventilation with return air CO2 sensors except those which utilize energy recovery.
 5. Filters: Units shall be provided with the following filters:
 - a. 4" Thick, Merv 13 evaporator coil filter.
 - b. 2" thick, Merv 8 OAI Filter.
 - c. 2" thick, Merv 8 Heat Wheel Exhaust Filter (where applicable).
 6. Unit Capacity:

1 Gymnasium:	Two 7.5 ton cooling, 150 MBH heating, 3,000 cfm Rooftop units.
2 Art/Music:	One 10-ton cooling, 200 MBH heating, 4,000 cfm RTU.
3 Cafeteria Area:	One 10-ton cooling, 200 MBH heating, 4,000 cfm RTU.
4 South First Floor Wing:	One 25-ton cooling, 500 MBH heating, 10,000 cfm RTU.
5 Northeast First Floor:	One 25-ton cooling, 500 MBH heating, 10,000 cfm RTU.
6 Northwest Second Floor:	One 17.5-ton cooling, 200 MBH heating, 7,000 cfm RTU.
7 Second Floor Admin:	One 10-ton cooling, 200 MBH heating, 4,000 cfm RTU.
8 Second Floor South Wing:	One 30-ton cooling, 600 MBH heating, 12,000 cfm RTU.

D. Exhaust Systems:

1. Exhaust fan systems shall be provided with ducted exhaust grilles for the following areas:
 - a. Toilet Rooms: Roof-Mounted centrifugal fan with ECM motor tied to BAS to operate in occupied mode.
 - b. Janitor's closets - Roof-Mounted centrifugal fan with ECM motor tied to BAS to operate in occupied mode.

- c. Electrical Rooms with Transformers - Roof-Mounted centrifugal fan with ECM motor tied to BAS to operate in occupied mode.

E. Ductwork Systems:

- 1. All ductwork to be galvanized sheet metal conforming to SMACNA standards for construction.
 - a. Supply Air Ductwork:
 - 1. Rectangular supply air ductwork to be internally lined with 1.5" thick acoustic lining.
 - 2. Round exposed supply air ductwork to be 1" lined double wall ductwork with perforated inner liner. Exposed ductwork shall be provided with paint lock coating.
 - 3. Round concealed Supply air ductwork will be galvanized sheet metal wrapped with 1.5" thick fiberglass insulation with vapor barrier.
 - b. Return Air Ductwork:
 - 1. Rectangular return air ductwork to be internally lined with 1.5" thick acoustic lining.
 - 2. Round concealed return air ductwork will be galvanized sheet metal with no insulation.
 - c. Exhaust air ductwork will be galvanized sheet metal. Transfer ducts and return boots will be insulated with ½" acoustical lining.
- e. Variable Air Volume (VAV) Boxes (with hot water heating coils):
 - 1. VAV Boxes Shall have hot water reheat sized at a 30°F delta T at 50% cooling airflow.
 - a. VAV Boxes serving spaces with exterior walls shall be complimented with a perimeter heating system, either fin tube radiators or radiant ceiling panels.
 - f. Provide fire/smoke and fire dampers in new ductwork passing thru the rated walls.

F. Natural Gas System:

- 1. Provide new Natural Gas Service, roughly 6,000 CFH, to serve the Boilers and Water Heaters, Rooftop Units and miscellaneous gas loads.
- 2. Route low pressure gas (11 in-wg) piping to boilers, domestic water heaters, etc.
- 3. All gas piping will be standard weight black steel. All valves will be plug valves. Piping to be welded for 2-1/2" and larger piping.

G. Supplemental Cooling Units

1. Supplemental Cooling Units shall be provided with a dedicated thermostat and controls necessary to provide year-round cooling. The unit will be ceiling mounted within the MDF. The unit will utilize refrigerant for cooling, to maintain the required room temperature. This system will require an air-cooled, low ambient condensing unit located outside.
 - a. IT Room 1 Ton nominal cooling capacity.
- H. Supplemental Space Heating Equipment – Hot Water:
1. VAV boxes to have hot water heating coils.
 2. Cabinet Heaters to be provided in vestibules and other areas with high infiltration.
 3. Unit heaters to be provided in mechanical, utility, and stagecraft receiving areas.
 4. Radiant Ceiling Panel in classrooms.
 5. Convector as necessary.
- I. Building Automation System
1. New Direct Digital Control (DDC)/Building Automation System (BAS) shall be provided for the facility. The system shall be web-based and can be monitored from outside of the facility. The DDC control system will provide energy management and building automation system control for HVAC systems. Systems shall be manufactured and installed by one of the following:
 - a. Trane Tracer (Basis of Design)
 - b. Johnson Controls, Inc. (Metasys) as installed by the local branch office.
 - c. Schneider Electric Controls - by Precision Controls, Inc.
 - d. Honeywell.
 - e. Siemens
 2. Main BAS panel to be located in mechanical room. Each AHU to be equipped with on-board touchscreen BAS panel.
 3. Space thermostats to be provided with temperature adjustment and occupancy override capability.
 4. Provide Thermostat Guards for gymnasium/lobby.
 5. Space CO₂ sensors to be provided measure space occupancy and control OAI.
 6. Air Handling Units to have controls with BACnet interface for connection to BAS. Temperature control sequences to include:
 - a. VAV Static Pressure reset, Supply Air Temperature reset, Demand Control ventilation, Modulating hot water control, modulating chilled water control, Economizer, VAV control.

- b. Supply and Return air Duct Smoke Detectors and Test stations to be provided for AHU systems.
- 7. Exhaust Fans Control:
 - a. Toilet Room areas to run continuous during occupied hours.
 - b. Electric equipment spaces shall be controlled by reverse acting thermostats - BAS monitoring ON/OFF status.
- 8. The temperature control sequences will be verified at substantial completion.
- 9. Building Automation System (BAS) to monitor equipment status and alarms of all HVAC systems, domestic water circulating pump, and exterior lighting control.

3.00 PLUMBING SYSTEMS

A. Domestic Water Service

- 1. Provide new 4" domestic water service (separate from existing building) served by a reduced pressure zone backflow preventer. All piping will be Type L copper with soldered joints. Shutoff valves will be of the gate valve style.
 - a. Provide a separate service tap for landscape watering system.

B. Domestic Water Distribution System

- 1. Provide new domestic water piping system and connect to each fixture requiring same. Shut-off valves shall be provided ahead of each individual fixture.
- 2. It is assumed that a domestic water booster pump will not be required for the site.
- 3. Domestic cold, hot and hot water recirculating water piping as required to all new plumbing fixtures and equipment requiring the same. Piping will be Type L copper with soldered joints.

C. Domestic Hot Water Heater

- 1. Tank type sealed combustion natural gas fired domestic water heating unit(s) will be utilized. Hot water heaters shall be located in mechanical rooms.
 - a. Quantity two (2) at 199,000 BTUH
 - b. Unit to be equivalent to as manufactured by Bradford-White.

D. Sanitary and Vent Piping

- 1. Above ground sanitary drains and vent pipes, shall be cast iron hub and spigot piping and fittings or cast iron hubless piping and fittings.
 - a. PVC piping installed in plenum ceiling spaces shall not be permitted.

2. Below ground sanitary drains and vent piping inside of building shall be service weight hub and spigot cast iron soil piping and fittings or Schedule 40 PVC piping and fittings. Sanitary piping downstream of the boiler discharges shall be cast iron hub and spigot piping and fittings as listed above or CPVC piping rated for 200-degree F water temperature.

E. Storm Water Piping:

1. Primary and secondary roof drains will be piped to interior piping system constructed of service weight hub and spigot cast iron piping and fittings.

a. PVC piping in plenum ceiling spaces shall not be permitted. Storm piping will be routed five (5) feet outside the building below grade. See Civil drawings for site storm sewer system.

2. Horizontal storm pipes shall be insulated with 1" thick fiberglass insulation with ASJ jacket.

F Plumbing Fixtures:

1 Manufacturers shall be based on GRPS Design Specifications.

2 Water closets vitreous china, wall-hung type, low flow (1.28 gallon per flush) water closets. Electronic sensor (battery operated) type flush valves.

3 Urinals – vitreous china, wall hung, low flow (1/8 gallon per flush) urinals. Electronic sensor (battery operated) type flush valves.

4. Lavatories – undermount integral to countertop. Electronic sensor (battery operated) type faucets. Aerator rated for 0.5 GPM.

5. Wash fountains – integral electric instantaneous water heater.

6. Sinks – Self Rimming stainless steel, gooseneck faucet, wrist blade handles.

7. Electric Water Coolers – Dual Level, wall mounted, refrigerated with bottle filler.

8. Locker room showers - 1.0 GPM shower heads, adjustable metered timer on/off button – central tempered mixing valve.

9. Mop Basins – molded stone, service sink type wall mounted faucet.

10. Plumbers Box – washers and refrigerators.

11. Floor Drains to be provided in toilet areas, locker rooms, shower drying areas and mechanical rooms.

12. Floor Sinks to be provide at domestic and fire protection services.

13. Non-freeze sill-cocks to be provided every 150 foot around the exterior of the building.

4.00 FIRE PROTECTION SYSTEM

- A. A new 6" fire protection water service will be installed in the Mechanical Room. Fire protection service shall be provided with back flow preventer.
- B. The facility will be protected by a fully sprinkled wet pipe system. Density coverage will be based on NFPA hazard requirements.
- C. The water main will be protected from the sprinkler system by a double check detector backflow preventer.
- D. It is anticipated that the system will have two (2) fire protection zones.
- E. Recessed sprinklers will be specified in areas with finished ceilings and upright pendent sprinklers will be utilized in all exposed areas. Exposed sprinkler heads located in gymnasiums will be provided with guards.
- F. A fire protection booster pump system is not currently anticipated for this project.

5.00 ELECTRICAL SYSTEMS

5.01 Electrical System Design

A. General

1. Conduit

- a. Minimum conduit size - interior spaces: 3/4".
- b. Minimum conduit size - underground and exterior: 3/4".
- c. Minimum conduit size - technology: 1".
- d. Flexible conduit: 3/4". 1/2" allowed for lighting whips, maximum 6'-0" length.
- e. Installation Schedule:
 - 1. Dry Interior Locations: Electrical metallic conduit EMT. 2) Wet Locations: Ridged metallic conduit (RMC).
 - 2. Underground Exterior: PVC (not encased in concrete)
 - 3. Equipment Connections - Dry Locations: Flexible metallic conduit (FMC).
 - 4. Equipment Connections - Wet Locations: Liquid-tight flexible metallic conduit (LFMC).
 - 5. Armor-clad (AC) cable is prohibited.
 - 6. The use of END (not-metallic) conduit shall not be permitted without written approval of the GRPS Project Manager.

f. EMT Fittings:

1. Smaller than 2": Steel set screw.
2. 2" and larger: Steel set screw.

g. Special Instructions:

1. Where rigid non-metallic conduit (RNC) is used below grade, below a slab, etc., a transition to rigid galvanized steel conduit shall be installed before conduit exits earth. The metallic conduit shall extend a minimum of 6" into the surface, concealing the non-metallic conduit.
2. Group conduits in parallel runs where practical and use conduit racks or trapeze hangers constructed of steel channel, suspended with threaded solid rods or wall mounted from metal channels with conduit straps or clamps. Provide space in each rack or trapeze for 25% additional conduits.

h. Sizing criteria: The conduit fill ratio shall not exceed 30% for all raceways. (Note: Code indicates a maximum fill ratio of 40%.)

i. Concrete Housekeeping Pads:

1. Concrete bases for all floor-mounted equipment and wall-mounted equipment that is surface mounted and extends to within 6" of the finished floor unless shown otherwise on the drawings, shall be 4" thick concrete.
2. Housekeeping pad will be provided for floor mounted equipment.

2. Wire

- a. Branch Electrical Circuits: THHN/THWN insulated stranded copper, minimum size no. 12AWG.
- b. Exterior and Underground Branch Circuits: Stranded copper.
- c. Feeders: Stranded copper.
- d. Service Conductors: Stranded copper.

B. Electrical Service and Distribution

1. The addition will be served by a new electrical service, sized to accommodate new electrical loads associated with the addition. Incoming electrical service will consist of distribution from the local utility company.
2. The electrical service entrance will be covered with a warning/tracer tape and 3 inches of concrete.
3. A utility company electrical service transformer with a secondary service of 277/480V, 3 phase, 4-wire will be pad-mounted type and located outside the building and coordinated with the utility company.

4. Secondary service metering will be provided in accordance with the local utility company requirements.
5. Equipment mounted on grade will be equipped with a concrete pad. The concrete pad shall be equipped with a 12-inch mow strip on all sides of the equipment.

C. Power Distribution System

1. The electrical service shall be sized at 1600A @ 277/480V, 3 phase, 4 wire, located in Electrical Room. The switchboard shall be circuit breaker type. Distribution equipment including switchboards, panel boards, transformers, etc., shall be of copper material.
2. Both single-phase protection as well as surge suppression equipment shall be provided. The single-phase protection will be provided at all poly phase equipment rather than at the service.
3. 480-volt power shall be utilized for all 3-phase equipment such as HVAC pumps, rooftop units, plumbing, and fire protection pumps, owner equipment, etc.
4. A 208/120-volt general power panel will be provided for the general spaces. All electrical distribution panels, transformers, etc., shall be located in mechanical rooms or separate electrical closets wherever possible.
5. Power Receptacles for Typical Areas:
 - a. Provide separate 120-volt circuit for all general receptacles, including television, etc.
 - b. All new corridor power receptacles to be on separate circuits.
6. Motors of 3/4 horsepower and larger will be served at 208-volt, 3-phase. Individual starters and controls will be provided for each motor.
7. Approved distribution equipment:
 - a Eaton.
 - b Schneider Square D.
 - c S&C
 - d Park Metal

D. Emergency and Standby Power

1. An Emergency generator is planned for the life safety system and optional standby power.
 - a. An estimated size of 250kW natural gas generator.
2. The generator will have two Automatic transfer switches.
 - a. One dedicated for life safety loads such as lighting, fire alarm, security and other life safety loads.

- b. One dedicated for optional standby power for items such as, environmental rooms, prime hood exhaust fans, IT closets, food service coolers, freezers, health service refrigeration systems.
- E. Grounding and Bonding
 1. Grounding Conductors
 - a. Material: Copper.
 - b. Equipment Grounding Conductors: Insulated with green-colored insulation.
 2. Connection Products
 - a. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.
 - b. Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.
 3. Technology Rooms
 - a. Grounding Bus: Install in technology equipment rooms. Use insulated spacer: space 1 inch from wall and support from wall 6 inches above finished floor, unless otherwise indicated.
- F. Lighting Systems
 1. Lighting levels for this project will meet current IES recommended lighting levels.
 2. New lighting design shall conform to the requirements of the Michigan Energy Code (IECC 2015) including individual room control (automated), daylighting control (automated), appropriate energy consumptions, etc.
 3. LED luminaires will be used for general lighting. LED down lights will be used where appropriate.
 4. Typical lighting level shall be designed for minimum 50 foot-candles, maintained average. This equates to approximately 1.4 to 1.6 watts per square foot.
 5. Typical Office Lighting shall utilize 2' x 2' or 2' x 4' recessed.
 6. Corridor lighting shall be recessed 2' x 2' or 2' x 4' fixtures controlled from central locations.
 - a. Lighting circuitry in the corridors shall allow for 50% or more of the lighting to be switched off during class periods or no occupancy detected.
 7. Exit lighting fixtures shall be L.E.D. type (at less than 2 watts per fixture) with wire guards in areas where subject to damage.
 8. Display lighting will be provided in display cases located in the main corridors and in the main entry lobby.
 - a. Gymnasium lighting fixtures shall be high bay LED sourced luminaire, depending on final lighting levels desired by Owner.

i. Gyms will have multiple levels of switching.

9. Stage shall have a commercial level (not theatrical) track lighting system, allowing for fixtures to be manually aimed and dimmed by the user.
10. All interior spaces and corridors will be controlled by dual technology ceiling mounted occupancy sensors and daylight sensors where required by energy code.
11. Site and parking exterior lighting to utilize Lithonia D series LED light fixtures controlled via photocells “on” / time clocks and photocells “off”. The lighting specified shall be for both aesthetic and security lighting.
 - a. Provide power and data to new monument signs at the north lobby plaza (front entry lawn).
 - b. Provide flagpole lighting for all flagpoles.
12. Emergency lighting to be supplied via life safety Emergency panel.
13. Lighting controls
 - a. All lights shall be controlled by Acuity lighting control software and may be tied into the building automated system (BMS).
 - b. Exterior lighting shall have an outdoor lighting input into BMS system.

G. Fire Alarm Systems

1. An addressable fire alarm system shall be provided with all code required devices including visual strobes in occupied spaces, smoke duct detectors, magnetic door holders and closures, etc. The preferred location of door hold open devices shall be in the door closure, not in the wall. This will be verified prior to completion of design documents.
2. System initiation will consist of individually addressable analog smoke and heat detectors, as well as addressable fire pull stations.
3. Smoke detection will be provided in corridors, public areas, and offices.
4. Carbon Monoxide (CO) detection shall be provided where natural gas is used as an energy source for heating applications.
5. Heat detectors will be provided in areas not appropriate for smoke detectors.
6. Pull stations will be provided in corridors, the Mechanical Room and at exterior exits.
7. A remote annunciator will be located at the Main Building Entrance.
8. System notification will consist of ADA and NFPA compliant visual only devices and combination audio/visual devices using speakers and voice alarms.
9. Door holders with magnetic release mechanisms will be provided as required.

H. Technology Systems

1. "AVD" Technology Systems:
 - a. Audio Communication/Telephone System:
 1. Rough-in only. 1" conduit from wall device to above accessible ceiling space.
 - a. Telephone equipment raceways and boxes shall be provided by Electrical Contractor. Cabling, terminations, network electronics shall be coordinated with low-voltage designer.
 - b. Intercom system raceways and boxes shall be provided by Electrical Contractor. Cabling, terminations, network electronics shall be coordinated with low-voltage designer.
 - b. Data Cable Distribution System: (designed based upon Panduit equipment).
 1. Rough-in only. 1" conduit from wall device to above accessible ceiling space.
 - a. "Ethernet" raceways and boxes shall be provided by Electrical Contractor. Cabling, terminations, network electronics shall be coordinated with low-voltage designer.
 2. Access Control and Video Surveillance System
 - a. Rough-in only. 1" conduit from wall device to above accessible ceiling space.
 1. Access Control System locations, wiring and equipment shall be coordinated with low-voltage designer.
 2. A door entry system shall be set up for rough-in only with equipment and wiring to be coordinated with low-voltage designer.
 3. A video surveillance system shall be set up for rough-in only with equipment and wiring to be coordinated with low-voltage designer.
 - I. Miscellaneous Systems and Installation Requirements:
 1. New toilet rooms will be provided with electric hand dryers with electronic sensor on/off control.
 2. The rough-in shall include J-hooks for the owner's vendor to utilize for data/telephone/catv/etc. installation. Fire Alarm system wiring shall be routed in conduit.
 3. Power and rough-in for theatrical lighting and sound equipment shall be provided and coordinated with theatrical lighting designer.

TECHNOLOGY & SECURITY NARRATIVE

BACKGROUND

This project will consist of designing and specifying technology systems for a new elementary school. GRPS Standard, high quality products will be used for the basis of design. The following information outlines key portions of the design. All systems are to be installed to BICSI standards and in accordance with applicable codes and relevant standards including NEC 2017.

SITE UTILITIES

Existing single-mode fiber optic cable from the existing building service entrance at the public right-of-way to the new facility on the same physical site. The exact routing and configuration of this pathway will be determined during design.

TELECOMMUNICATIONS SYSTEM

Distribution: The building will be wired to the GRPS standard for telecommunications using Category 6, unshielded, twisted pair products. See attached references from the GRPS technology design standards documents.

Technology equipment will be located within a designated IT closet per the GRPS technology design standards, with constant mechanical cooling. An MDF with a quantity of required IDF locations (all classified as Technology Closet locations – TC) will be coordinated with the design team and connected to each other with fiber optic cable compliant with the GRPS technology design standards.

Cable pathways will be provided by the electrical contractor and coordinated with the technology consultant to match the GRPS design standards.

The components of the telecommunications distribution system are as follows:

- Data and telephone service entrance.
- Plywood backerboard and equipment racks/cabinets.
- Split-system cooling equipment.
- Data and Voice modular patch panels.
- Data network equipment.
- Head-end equipment for the Security systems.
- Head-end equipment for the Paging, Clock, & Bell systems.
- Head-end equipment for the Video Surveillance and Digital Signage systems.

- UPS equipment delivering consistent adequate power until the generator provides relief power in the event of an electrical utility outage.

Phones: Existing telephone stations will be moved from the existing building to the new facility.

Wireless Access Points: GRPS technology design standards compliant wireless access points (WAPs) will be installed in areas determined during the next design phase. They will be located to provide adequate coverage of normally occupied spaces and common areas in use during events.

SURVEILLANCE CAMERA SYSTEM

Surveillance camera components compliant with the GRPS technology design standards will be provided. New cameras will be installed on both the exterior and interior to cover entrances, common areas, and high-risk areas as defined in the GRPS technology design standards.

Licensing and server(s) will be specified per the GRPS technology design standards to support the new cameras.

ACCESS CONTROL SYSTEM

Access control system components will be provided as an extension of the existing system per the GRPS technology design standards. The installation will include readers, REX devices and door position sensors. Additionally, door position sensors will be installed at all exterior door openings as defined by GRPS technology design standards. Hardware to be provided includes electric strikes / latch retractors. Video door station “phones” will be provided per the GRPS technology design standards. Specific access control locations will be determined in the next design phase. See attached diagram references from the GRPS technology design standards documents.

PUBLIC ADDRESS SYSTEM

A public address system per the GRPS design standards will be provided. This system will provide intelligible audio public address to all areas of the building and selected exterior spaces (entrance, parking lot, playground, etc.) via wall or ceiling mounted speakers. The system provides voice address, bell and emergency notification. The System will provide visual alerting strobes in spaces of typically high-noise (gymnasium, cafeteria, music room, etc). Speakers will be provided in locations determined in the next design phase.

CLOCKS

GRPS does not do a central clock system but instead will have autonomous atomic clocks.

AUDIO VIDEO

It is assumed the building will have audio-video systems compliant with the GRPS technology design standards in the following spaces and will be confirmed as the design progresses:

- Gymnasium
 - Wired and wireless microphones
 - Projection capability
 - Bluetooth input source capability
- Music
 - Same design system as classrooms, plus Audio recording and Playback functionality.
- Lobby
 - Flat panels for displaying electronic messages
- Classrooms
 - Interactive whiteboard
 - Voice audio enhancement system
 - Document camera
 - Wireless video presentation
- Conference Room(s)
 - Flat panel monitor for video display
 - Wireless video casting
 - Virtual meeting system with collaboration PC
 - Cable connections to furniture “flip top” in the room

Speakers (as required) will be separate from the PA system between the rooms. See attached elevation and diagram references from the GRPS technology design standards documents.

FOOD SERVICE NARRATIVE

INTRODUCTION

Reitano Design Group (RDG) is engaged as part of the Wightman/DLR Group design team to design the physical components of the foodservice program for the LEED certified New Aberdeen Elementary School. We are to collaborate with stakeholders to match the design of the spaces to the foodservice program goals for this facility and the community.

DESIGN CRITERIA

The food served in schools plays a significant role in our scholar's academic success and can provide a firm base for their overall health throughout their life. Recent research confirms this belief. Scholars who eat enough food and the right food achieve higher academically, attend school more consistently, and develop better eating habits.

We have proven results that confirm that if we change the presentation of the food, the serving space for receipt of the food offerings, and the dining space where our children consume the food, participation will increase significantly. Although the mechanism will change from elementary level to middle school to high school, the goal remains the same – entice our children to eat healthier.

The foodservice program at New Aberdeen Elementary School will provide universal meals under the National School Lunch Program (NSLP). Lunch will be available to 450 students over 3 lunch periods, the breakfast program will serve a reduced number of students. Grades being served include Pre-K thru 5.

Considering the kitchen and dining areas as potential learning environments can open opportunities to integrate curriculum. Flexible spaces and equipment can support not only school meals, but also wellness education and community events where applicable.

PROPOSED EQUIPMENT

Following district standards and preferences, we will develop a design for a heat and serve operation that will support universal breakfast and lunch. Consideration will also be given to supporting school breakfast and lunch throughout the summer months.

Two serving lines with four hot wells and space for ambient/cold items will be provided. One milk cooler is required per serving line. A shared fresh choice bar and power for a single cashier will be provided to support both lines. In the production space, we will include dry, cold and frozen storage space, a double stack convection oven, two mobile heated holding cabinets, a three-compartment sink and prep surfaces. Adjacency to an exterior door for secure deliveries as well as proximity and a clear level path to exterior waste receptacles will be explored.



CODES AND STANDARDS

All applicable local codes, standards, and regulations including, but not limited to: Michigan Food Code, National Sanitation Foundation (NSF) and American's with Disabilities Act (ADA).

ACOUSTIC NARRATIVE

GENERAL

This narrative summarizes acoustical criteria required by the Grand Rapids Public Schools (GRPS), best practice guidelines for acoustical design, and preliminary recommendations for the new GRPS Aberdeen Elementary School project.

ACOUSTICAL CRITERIA SUMMARY

The project will also be pursuing LEED certification under the LEED V4.1 rating system. In addition to the LEED V4.1 criteria, the district has also used Collaborative for High Performance Schools (CHPS) standards as a baseline. Where criteria conflicts, we will initially hold design to the higher design, and will note as such.

The LEED acoustics criteria does not cover all room types included in the Elementary School Program. For all other spaces the acoustic criteria are based on other industry standards and guidelines, including but not limited to:

- ANSI Standard S12.60.2010 Performance Criteria, Design Requirements, and Guidelines for Schools
- ASHRAE HVAC Applications Handbook
- NRC-CNRC Construction Technology Update No. 51, Acoustical Design of Rooms for Speech (2002)

Criteria for reverberation time (T60), sound isolation (STC), and background noise (NC & dBA) from HVAC systems are provided in Tables 1, 2a, & 3 respectively.

Table 1: Reverberation Time Criteria (500-1,000 Hz)

Room	T60 (s)
Admin Private Offices	0.6
Conference Rooms	0.6
Reception	0.7
Admin Shared Offices	0.6
Clinic Treatment Area	0.6
Core Learning Space, Volume < 10,000 cf	0.6
Core Learning Space, Volume < 20,000 cf	0.7
Core Learning Space, Volume > 20,000 cf	0.7 - 1.0
Neighborhood Corridors / Collab	1.0 - 1.5
Special Needs	0.4
Learning Star	1.2
Reading Room	0.8

Music Room	0.7*
Gymnasium	1.2*
Dining/Commons	1.2*
Food Prep, Serving Area	0.8

*criteria may vary as room volume is finalized

Core learning spaces include: In School Suspension (ISS), Pre-Kindergarten, Kindergarten, Classrooms Grade 1-2, Classrooms Grade 3-5, Art Classroom, and Maker Space. Special Needs include OT/PT Room, and Sensory Room/Time-out/tutorial Room.

Table 2: LEED Minimum composite sound transmission class ratings for adjacent spaces

Adjacency combinations		Wall STC Rating
Room 1	Room 2	
Core Learning Space	Core Learning Space	50
	Restroom	53
	Corridor, staircase	45
	Office, Conference Room	45
	Music Room	60
	Mech Room*	60
	Gymnasium	60
	Dining/Commons	60
Admin Offices, Conference Rooms	Admin Offices, Conference Rooms	50
	Reception	45
Clinic Treatment Area	Health Office	50
	Corridor, Waiting	45
Athletics Offices, Conference Rooms	Dressing Rooms, Lockers	50
	Gymnasium	55
Music Room	Music Office	50
	Restroom	60
	Gymnasium	60

*Minimum STC has to be met unless proven that the equipment noise in conjunction with the sound isolation performance of the partitions and doors will not exceed the maximum background noise requirements of the adjacent space

- Operable partitions to meet the same STC rating as the wall they are replacing.
- Entry doors between Core Learning Spaces and Corridors, Stairways, or Offices shall achieve STC 30 ratings in their operable condition. This requires the use of perimeter acoustical gaskets and door bottoms/sweeps.

- All Exterior windows must be rated at least STC 35 unless site noise levels can be documented to justify a lower rating.
- Below is the additional criteria from CHPS.

Table 3: District Standards according to CHPS criteria

Source Room	Receiving Room	Min. STC Rating
Classroom, ICSW, SER	Classroom, ICWS, SER	43
Public Restrooms	Classroom, ICWS, SER	53
Corridor	Classroom, ICWS, SER	38
Staircase	Classroom, ICWS, SER	40
Mechanical Equipment Room	Classroom, ICWS, SER	60
Office	Classroom, ICWS, SER	40
LAR	Classroom, ICWS, SER	60

- Operable partitions shall have the same STC rating as the wall they replace.
- Interior glazing in walls with STC 40 or higher shall have the same minimum STC requirement as the wall.
- Communicating doors between Classrooms must meet STC 40 ratings.
- Impact Insulation Class (IIC) ratings for floor-ceiling assemblies of normally occupied room located above core learning spaces must meet IIC 45 minimum performance.

Table 4: Background Noise Level Criteria

Room	NC	dBA
Core Learning Space	30	35
Special Needs	25	30
Neighborhood Corridors, Collab	40	45
Dining/Commons	40	45
Admin Offices, Conference Rooms	30	35
Clinic Treatment Area	30	35
Gymnasium	45	50
Weight Room, Training Room	35	40
Music Room	30	35
Reception	40	45
Reading Room	30	35
Mechanical Room*	-	85

*District specs note that background noise levels should not be over 85 dB 3ft from equipment.

Note that LEED and ANSI use the A-weighted decibel, dBA, as their metric for background noise in Core Learning Spaces whereas it is more common in industry to use Noise Criteria, NC. We have provided both criteria types for spaces not included in the scope of LEED review.

PRELIMINARY RECOMMENDATIONS AND GUIDELINES

ROOM ACOUSTICS

Core Learning Spaces

Acoustic Panel Ceilings (APC) used in Core Learning Spaces should be rated NRC 0.7 as a minimum.

An alternative compliance method for reverberation in Core Learning Spaces is to utilize an area equal to the total ceiling area minus lighting and HVAC elements that meets an NRC 0.7 rating. This greatly simplifies the LEED calculation and documentation process. If gypsum board soffits or bulkheads are designed into the project, supplemental wall panels would be needed so that the total amount of absorption in the room is equal to the ceiling area.

Admin Spaces

Typical office spaces and small conference rooms meet reverberation time design goals with ceiling tile rated NRC 0.6 or greater. This is assuming carpet tile floor finish.

Exposed Structure High Volume Spaces

For spaces that have very high ceilings and large volumes such as Competition Gym, Practice Gym, Commons, Neighborhood Corridors, and potentially Art classrooms, Weight Rooms, etc. we recommend a combination of a highly absorptive roof deck and impact resistant absorptive wall materials.

We recommend an acoustical metal deck with a noise reduction coefficient (NRC) rating of 0.9+.

Additionally, we recommend consideration of absorptive CMU blocks such as those by Proudfoot, Trenwyth, or others within the gyms. These blocks are offered in a variety of configurations and can be selected to provide good low frequency sound absorption as well as structural capacity.

With the acoustical deck, approximately 20%-25% of available wall surface area as absorptive CMU block is recommended for the Competition Gym. Less absorptive roof decks result in needing a higher quantity of absorptive CMU block. Similar quantities would be needed for other large volume spaces.

If absorptive CMU blocks are not used, other impact resistant wall panels such as Tectum or Kinetics Noise Control SportsBoard Elite can be used.

Treatment Estimates

Table 5: Treatment Estimates

Room	Ceiling Treatment (% of total ceiling area)	Absorptive Wall Panels (% of total floor area)
Admin Private Offices	100	Difference
Conference Rooms	100	Difference
Reception		
Admin Shared Offices		
Clinic Treatment Area		
Core Learning Space, Volume < 10,000 cf	75	20 (1")
Core Learning Space, Volume < 20,000 cf	75	20 (1")
Core Learning Space, Volume > 20,000 cf	75	20 (1")
Neighborhood Corridors / Collab	100	
Special Needs	100	20
Reading Room	100	Difference
Music Room	75	500sqft (2")
Gymnasium	2000sqft	2500sqft (2")
Dining/Commons	100	Difference
Food Prep, Serving Area	100	Difference

Acoustical Materials Basis of Design:

- APC: typical NRC 0.7 mineral board tile
- APC: for Special Needs, NRC 0.9 mineral board tile and a reduction in wall panels
- Acoustic Metal Deck: typical NRC 0.9

SOUND ISOLATION

Wall constructions which satisfy specific STC requirements are detailed below, based on the use of 20 gage metal studs spaced 16" on center, as assumed at this early stage of design based on anticipated floor to floor heights.

Note that achieving sound isolation goals is more difficult with heavy gage metal studs (18 – 20 ga.) compared to light gage metal studs (25 ga.), and highly isolating walls may require additional layers of gypsum board, resilient channels or clips, and/or staggered or dual stud configurations. The wall types below are all assumed to be 20 EQ studs, if this is not the case wall types will need to be adjusted to meet criteria.

Type 1: STC 40

- Single row 3-5/8" 18-20 gage metal stud wall, studs @ 16" o.c.
- One layer 5/8" thick Type X gypsum board on each side of the stud
- 3" fiberglass batt insulation within the wall cavity

Type 2: STC 45

- Single row 3-5/8" 18-20 gage metal stud wall, studs @ 16" o.c.
 - One layer 5/8" thick Type X gypsum board on one side of the stud
 - Two layers 5/8" thick Type X gypsum board on opposite side of the stud
 - 3" fiberglass batt insulation within the wall cavity
- OR
- 8" Hollow Normal Weight CMU

Type 3: STC 50

- Single row 3-5/8" 18 – 20 gage metal stud wall, studs @ 16" o.c.
- Two layers 5/8" thick Type X gypsum board each side of the stud
- 3" fiberglass batt insulation within the wall cavity

Type 4: STC 55

- Staggered 3-5/8" 18 – 20 gage metal studs in 6" stud track,
- One layer 5/8" thick Type X gypsum board on one side of the stud
- Two layers 5/8" thick Type X gypsum board on opposite side of the stud
- 3" fiberglass batt insulation within the wall cavity

Type 5: STC 60

- Double rows 3-5/8" 18 – 20 gage metal stud wall, studs @ 16" o.c., with 1" air gap between rows of studs
 - One layer 5/8" thick Type X gypsum board on one side of the stud
 - Two layers 5/8" thick Type X gypsum board on opposite side of the stud
 - 6" fiberglass batt insulation within the wall cavity
- OR
- 8" normal weight CMU (hollow or grout filled) with metal stud furring wall w/ 1" air gap between studs and CMU
- One layer 5/8" thick Type X gypsum board on the outer side of the stud
 - 3" fiberglass batt insulation within the wall cavity
- OR
- 12" normal weight CMU, grout filled

Exposed Structure High Volume Spaces

Additional Notes

STC ratings assume that the wall extends and seals to the bottom of structure above. If walls terminate at the ceiling grid or 6” above the ceiling grid, the STC performance of the wall will be limited to the CAC rating of the ceiling tile.

Penetrations such as for ductwork, piping, and communications cabling must be completely sealed in a resilient manner. When possible, avoiding outlets, backboxes, etc. within the same stud cavity for a partition is preferred. Backbox enclosures and putty pads are ideal and may be required in some conditions as well.

Sound rated doors will be required in some instances and will be placed strategically throughout the project as plans develop. The most likely locations are mechanical equipment rooms near noise sensitive spaces, music practice rooms, and music performance spaces.

The addition of glazing and storefront systems will lower the composite sound transmission rating of a gypsum partition. Glazing systems and adjacent gypsum partitions should be designed so that the composite STC ratings of the partition achieves the criteria listed in Table 2.

HVAC NOISE AND VIBRATION

Where possible, ducts should be sized to limit maximum air velocities as indicated in Table 5 below, to ensure that regenerated noise due to air movement does not cause the design noise criteria to be exceeded. District standards note the inclusion of duct silencers as opposed to internal lining whenever possible. When necessary to meet criteria however, all ductwork serving acoustically sensitive areas (NC 25 / 30 dBA per Table 3) should be internally lined with 1” thick acoustical lining.

Table 6: Design Guidelines for Maximum Air Velocities in Ducts (fpm)

Noise Criterion - NC		45	40	35	30	25
Duct in shaft or above drywall ceiling	Rectangular	3500	3000	2500	2100	1700
	Circular	5000	4250	3500	3000	2500
Duct above suspended acoustic ceiling (ACT)	Rectangular	2500	2125	1750	1475	1200
	Circular	4500	3750	3000	2500	2000
Duct located within occupied space/open ceiling	Rectangular	2000	1725	1450	1200	950
	Circular	3900	3250	2600	2150	1700

Noise Criterion - NC		45	40	35	30	25
Supply Diffuser - 'free' velocity	-	625	560	500	425	350
Return Grille - 'free' velocity	-	750	675	600	500	425

Notes:

1. These are guidelines only.
2. Velocities in branch ducts should be approximately 80% of values listed.
3. Velocities in final runouts to outlets should be 50% of values listed, or less.
4. These velocity guidelines assume good airflow conditions. The presence of elbows, fittings, or abrupt duct transitions may require air to run at lower velocities.

Avoid duct penetrations into STC 60 and higher walls whenever possible. Best practice includes routing ducts through corridors and branching out individually to classrooms, office, practice rooms, etc. over the doorway where possible. Avoid single duct runs through multiple consecutive classrooms, offices or other learning spaces.

If volume control boxes are incorporated, ideally, they would be located remote from the room being served (above corridors). If located within the room being served, units should be selected with a manufacturer's noise rating 10 NC points below noise criteria listed in Table 3 above.

Supply air diffusers and return air grilles should be selected with manufacturer's noise rating 10 NC points below the HVAC design noise criterion of the area served. Where possible, connections to diffusers should utilize lined flex-duct to reduce any noise generated by flow through individual takeoffs.

As far as is practical, HVAC systems serving acoustically sensitive occupied areas (NC 25 / 30 dBA per Table 3) should be "self-balancing." Balancing dampers should not be located immediately upstream of diffusers. There should be a minimum of 5 feet of acoustical flexible duct or internally lined sheet metal duct between the damper and the connection to the diffuser. Dampers should not be incorporated into grilles, and diffuser blades should not be used for balancing of the air system.

Vibration

Generally, all reciprocating and rotating equipment shall be vibration isolated from the building structure.

All equipment will need to be vibration isolated per industry standard (e.g. ASHRAE). All piping connected to reciprocating equipment should be vibration isolated for 50 feet of pipe length from equipment. Heat exchangers and expansions tanks shall also be vibration isolated per ASHRAE standards.

Ductwork connections to air handling equipment shall be flexible.

Electrical systems contain various components that create noise. Unlike noise from the HVAC system, which is typically broadband in nature, electrical components tend to generate highly tonal noise. Such noise can be annoying or distracting even at moderate noise levels. As such, noise and vibration control measures will be incorporated into the design of the electrical system. Typically, these would include the use of vibration isolators for transformers. Specific recommendations and specifications will be provided as the design develops.

SUSTAINABILITY NARRATIVE

INTRODUCTION

It is a goal to design the new Aberdeen Elementary School to meet LEED Certification with a minimum of 40 required points. LEED (Leadership in Energy and Environmental Design) is a global certification program that promotes the construction of buildings that are better for the planet and our health. LEED encourages the use of building methods and materials that make occupants healthier and more productive, keep indoor air clean, save water and electricity, reduce carbon emissions, and dispose of waste properly. Below is a list of targeted LEED points that might be achieved as identified during the sustainability workshops.

POTENTIAL LEED POINTS

To ensure a minimum of 40 points for LEED Certification, it is important to focus on achievable, cost-effective strategies that align with common practices in sustainable school design. Below are the points from each category that are most likely to be achieved, targeting Aberdeen's goal to meet the baseline for LEED certification:

1. Integrative Process (1 point)
 - a. IP Credit: Integrative Process (1 point)
 - i. Early collaboration among stakeholders can usually be achieved. Requires early analysis of energy and water systems.
2. Location & transportation (6 points)
 - a. LT Credit: Sensitive Land Protection (1 point)
 - i. Project is located on a previously developed site.
 - b. LT Credit: Surrounding Density and Diverse Uses (2 points)
 - i. Schools are often located in residential areas with nearby amenities.
 - c. LT Credit: Bicycle Facilities (1 point)
 - i. Adding bike storage although a shower will not be added.
 - d. LT Credit: Reduced Parking Footprint (1 point)
 - i. Reducing parking space and encouraging carpooling can help meet this requirement.
 - e. LT Credit: Electric Vehicles (1 point)
 - i. Requires installation of EV supply equipment to be installed for 5% of parking spaces.
3. Sustainable Sites (7 points)
 - a. SS Prerequisite: Construction Activity Pollution Prevention (Required)
 - i. Requires compliance with EPA requirements of local guidelines for erosion and sedimentation control and best construction practices.
 - b. SS Credit: Site Assessment (1 point)
 - i. Conducting a site analysis is typically part of the initial planning phase and is cost-effective.
 - c. SS Credit: Heat Island Reduction (2 point)

- i. Using cool roofing materials and light-colored paving can help achieve this credit.
 - d. SS Credit: Rainwater Management (2 points)
 - i. Implementing basic rainwater management techniques such as bioswales or permeable surfaces may help to meet this credit.
 - e. SS Credit: Open Space (1 point)
 - i. Schools often have open space for recreation, so designing this space effectively can achieve this credit.
 - f. SS Credit: Light Pollution Reduction (1 point)
 - i. Design site lighting to meet moderate ambient lighting requirements for backlight, uplight, and glare.
- 4. Water Efficiency (5 points)
 - a. WE Prerequisite: Outdoor Water Use Reduction (Required)
 - i. Implementing drought-resistant plants and efficient irrigation strategies will assist in meeting this requirement.
 - b. WE Prerequisite: Indoor Water Use Reduction (Required)
 - i. Installing low-flow fixtures can achieve water use reductions.
 - c. WE Credit: Indoor Water Use Reduction (3 points)
 - i. Further reductions in water use can be achieved with efficient fixtures, often leading to cost savings over time.
 - d. WE Credit: Outdoor Water Use Reduction (1 point)
 - i. Additional reductions in irrigation can be achieved by using native landscaping.
 - e. WE Credit: Water Metering
 - i. Install water submeters to understand water usage of project for data management, cost implications, and future planning.
- 5. Energy & Atmosphere (6 points)
 - a. EA Prerequisite: Fundamental Commissioning and Verification (Required)
 - i. Required to ensure that mechanical, plumbing, and electrical systems are installed and operate as intended.
 - b. EA Prerequisite: Minimum Energy Performance (Required)
 - i. Meeting minimum energy performance standards is essential and can often be done through efficient HVAC, insulation, and lighting design.
 - c. EA Prerequisite: Building-Level Energy Metering (Required)
 - i. Installing basic energy meters is a minimal cost for tracking energy use.
 - d. EA Credit: Enhanced Commissioning (3 points)
 - i. Further support the design, construction, and eventual operation of a project that meets the owner's project requirements for energy, water, indoor environmental quality, and durability.
 - e. EA Credit: Optimize Energy Performance (2 points)
 - i. Schools can often achieve significant energy efficiency through insulation, energy-efficient lighting (like LEDs), and effective, coordinated HVAC systems.
 - f. EA Credit: Enhanced Refrigerant Management (1 point)
 - i. Select mechanical equipment that uses refrigerants with no ozone depletion potential (ODP) and low global warming potential (GWP)

6. Materials & Resources (5 points)
 - a. MR Prerequisite: Storage and Collection of Recyclables (Required)
 - i. Recycling programs are standard in many schools.
 - b. MR Prerequisite: Construction and Demolition Waste Management Planning (required)
 - i. Ensure a CWM Plan is created and identifies 5 waste systems for diversion.
 - c. MR Credit: Construction and Demolition Waste Management (1-2 points)
 - i. Diverting construction waste through recycling and reuse is achievable with effective planning and contractor coordination.
 - d. MR Credit: Building Life-Cycle Impact Reduction (1-2 points)
 - i. Reusing materials or designing for future reuse can contribute to this credit.
 - ii. Performing a Whole Building Life Cycle Analysis for the structure and enclosure can also contribute to this credit.
 - e. MRC Environmental Product Declarations v4.1 (1-2 points)
 - i. Ensure specifications include LEED requirements and installed products are sourced from manufacturers that meet disclosure criteria.
 - ii. Typically target a minimum of 40 products to achieve exemplary performance.
 - f. MRC Sourcing of Raw Materials v4.1 (1-2 points)
 - i. Ensure specifications include LEED Requirements and installed products are sourced from manufacturers that meet responsible sourcing and extraction criteria.
 - ii. Prioritize high-cost items and/or prevalent items (steel, concrete, glass, roofing, gyp board, flooring, insulation) per the LEED calculation.
 - g. MRC Material Ingredients v4.1 (1-2 points)
 - i. Ensure specifications include LEED requirements and installed products are sourced from manufacturers that meet disclosure criteria.
 - ii. Seek products that have independent, third party validation of their ingredients via a label, such as Declare, Cradle to Cradle, Health Product Declarations, etc.
 - iii. Ideally the team will target 20 products which qualify.

7. Indoor Environmental Quality (10 points)
 - a. IEQ Prerequisite: Minimum Indoor Air Quality Performance (Required)
 - i. Ensuring good air quality through proper ventilation is standard practice for schools.
 - b. IEQ Prerequisite: Environmental Tobacco Smoke (ETS) Control (Required)
 - i. Prohibiting smoking inside and near the building is a basic requirement.
 - c. IEQ Prerequisite: Minimum Acoustic Performance (Required)
 - i. Design classrooms and core learning spaces that facilitate teacher-to-student and student-to-student communication through effective acoustic design. Consider HVAC background noise, exterior noise, and reverberation time.
 - d. IEC Credit: Enhanced IAQ Strategies (2 points)
 - i. Promote occupants' comfort, well-being, and productivity by improving indoor air quality via entryway systems, interior cross-contamination prevention, filtration of outdoor air, installation of CO2 monitors in breathing zone, etc.
 - e. IEQ Credit: Low-Emitting Materials (3 points)
 - i. Protect the health, productivity and comfort of installers and building occupants by specifying and installing materials that meet low-emitting criteria: paints,

coatings, adhesives, sealants, flooring, wall panels, ceilings, and insulation.

- f. IEQ Credit: Construction IAQ Management Plan (1 point)
 - i. Develop and implement an indoor air quality (IAQ) management plan for the construction and preoccupancy phases of the building.
 - g. IEQ Credit: Thermal Comfort (1 point)
 - i. Provide thermal comfort controls to enable occupants to adjust air temperature, radiant temperature, air speed, and/or humidity.
 - h. IEQ Credit: Indoor Lighting (1 point)
 - i. Provide high quality lighting to promote occupants' productivity, comfort, and well-being.
 - i. IEQ Credit: Daylight (1-3 points)
 - i. Designing for natural light can enhance indoor environmental quality, reducing the need for artificial lighting and improving test scores for students.
 - j. IEQ Credit: Views (1 point)
 - i. Designing for views to the outdoors and a connection to nature enhances student productivity and improves test scores.
8. Innovation (6 points)
- a. IN Credit: LEED Accredited Professional (1 point)
 - i. A LEED Accredited Professional is already part of the project team.
 - b. IN Credit: Innovation (5 points)
 - i. Achieving an innovation point is possible if the project team implements an exceptional strategy or goes beyond a credit requirement.

Potential Total: 41- 43 points; 40 Minimum required for certification.

This selection of credits prioritizes cost-effective strategies used in school designs, ensuring both environmental and budgetary goals are met, while targeting the minimum 40 points required to achieve LEED certification.

LEED SCORECARD



LEED v4.1 BD+C: Schools
Project Checklist

Y ? N

1			Credit	Integrative Process	1
8	0	0	Location and Transportation		15
			Credit	LEED for Neighborhood Development Location	15
			Credit	Sensitive Land Protection	1
			Credit	High Priority Site and Equitable Development	2
3			Credit	Surrounding Density and Diverse Uses	5
3			Credit	Access to Quality Transit	4
1			Credit	Bicycle Facilities	1
1			Credit	Reduced Parking Footprint	1
			Credit	Electric Vehicles	1
5	0	0	Sustainable Sites		12
Y			Prereq	Construction Activity Pollution Prevention	Required
Y			Prereq	Environmental Site Assessment	Required
1			Credit	Site Assessment	1
			Credit	Protect or Restore Habitat	2
1			Credit	Open Space	1
2			Credit	Rainwater Management	3
1			Credit	Heat Island Reduction	2
			Credit	Light Pollution Reduction	1
			Credit	Site Master Plan	1
			Credit	Joint Use of Facilities	1
5	0	0	Water Efficiency		12
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
2			Credit	Outdoor Water Use Reduction	2
3			Credit	Indoor Water Use Reduction	7
			Credit	Optimize Process Water Use	2
			Credit	Water Metering	1
6	0	0	Energy and Atmosphere		31
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
			Credit	Enhanced Commissioning	6
6			Credit	Optimize Energy Performance	16
			Credit	Advanced Energy Metering	1
			Credit	Grid Harmonization	2
			Credit	Renewable Energy	5
			Credit	Enhanced Refrigerant Management	1

6			0			0			Materials and Resources		13
Y			Prereq			Storage and Collection of Recyclables				Required	
2			Credit			Building Life-Cycle Impact Reduction				5	
2			Credit			Environmental ProductDeclarations				2	
			Credit			Sourcing of Raw Materials				2	
			Credit			Material Ingredients				2	
2			Credit			Construction and Demolition Waste Management				2	
8			0			0			Indoor Environmental Quality		16
Y			Prereq			Minimum Indoor Air Quality Performance				Required	
Y			Prereq			Environmental Tobacco Smoke Control				Required	
Y			Prereq			Minimum Acoustic Performance				Required	
			Credit			Enhanced Indoor Air Quality Strategies				2	
2			Credit			Low-Emitting Materials				3	
			Credit			Construction Indoor Air Quality Management Plan				1	
			Credit			Indoor Air Quality Assessment				2	
1			Credit			Thermal Comfort				1	
1			Credit			Interior Lighting				2	
2			Credit			Daylight				3	
1			Credit			Quality Views				1	
1			Credit			Acoustic Performance				1	
2			0			0			Innovation		6
1			Credit			Innovation				5	
1			Credit			LEED Accredited Professional				1	
0			0			0			Regional Priority		4
			Credit			Regional Priority: Specific Credit				1	
			Credit			Regional Priority: Specific Credit				1	
			Credit			Regional Priority: Specific Credit				1	
			Credit			Regional Priority: Specific Credit				1	
41			0			0			TOTALS		Possible Points: 110

Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110

