



AITKIN SCHOOLS IMPROVEMENTS

SCHEMATIC DESIGN SUBMITTAL
SEPTEMBER 2026



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PHASE SIGN-OFF

JLG 260263 - Aitkin Schools Improvements
Schematic Design Phase Sign-off
September 2026

Attached are the Schematic Design phase documents for your review and approval.

Please provide signature below stating that you have reviewed the probably cost, the documents noted above are approved, and JLG Architects and consultants can move into the next phase of design. If necessary, please provide any concerns or questions that need to be addressed prior to moving into the next phase of design or as part of the next phase of design.

_____ ISD #1 (Owner) Signature	_____ Date
_____ ICS (Program Manager) Signature	_____ Date
_____ JLG Architects (Architect)	_____ Date
_____ CMTA (Engineering Consultant to ICS) Signature	_____ Date
_____ Northland Consulting Engineers (Engineering Consultant to ICS) Signature	_____ Date

PROJECT OVERVIEW

The scope improvements represent critical investments necessary to provide a safe, functional, and reliable learning environment for students and staff at Rippleside Elementary School and Aitkin High School. This work is intended to serve as the first phase of the District’s long-term facilities plan, addressing the most immediate and pressing needs while establishing a foundation for future improvements. While this phase does not transition the building to modern, 21st-century learning environments, it has been developed with consideration of long-term goals. The selected improvements have been evaluated against multiple future renovation scenarios and are intentionally aligned to integrate seamlessly into a comprehensive remodel or require only minimal modification as future phases are implemented. Consistent with community input, which did not support construction of a new elementary facility at this time, future phases will focus on a broader remodeling effort, potentially including additions. The development and direction of those future improvements will continue to be guided by listening sessions and ongoing community engagement as the District advances its long-term planning efforts. The following points highlight major aspects of the scope, but are not meant to be inclusive of the project.

RIPPLESIDE ELEMENTARY SCHOOL SCOPE

- **Mechanical & Ventilation Systems:** Replace outdated AHU and RTU as well as recommissioning three existing AHUs.
- **Ceilings & Lighting:** Install new acoustical ceilings and LED lighting in areas where mechanical systems are replaced.
- **Secure Entry:** Renovate the main entry and vestibule with to create new entry sequencing that routes through admin.
- **Office Refresh:** Update the reception and office areas with new paint and flooring.
- **ADA Accessibility:** Replace the failing lift at the 1957 “the Hill” section with a new, code-compliant system.
- **SPED Learning Areas:** Install interior partition walls within a large classroom to create smaller, dedicated learning spaces for Special Education.
- **Hazardous Abatement:** Remove asbestos insulation from HVAC systems/piping and abate hazardous flooring/mastic, replacing them with new finishes.
- **Exterior Doors:** Replace failing exterior door slabs, frames, and hardware throughout the building.
- **Roofing:** Remove ballast and recover roof sections identified as “Immediate Need” or “Recommended” with new cover board and adhered EPDM.

AITKIN HIGH SCHOOL SCOPE

- **Parking Lot Paving:** Pave the northeast parking lot (currently gravel/Class 5 aggregate) to reduce maintenance and improve safety.
- **Roofing:** Remove ballast and recover roof sections identified as “Immediate Need” or “Recommended” with new cover board and adhered EPDM.

PROJECT SCHEDULE

SCHEMATIC DESIGN	July 16, 2026 to September 16, 2026
DESIGN DEVELOPMENT	September 21, 2026 to November 4th, 2026
CONSTRUCTION DOCUMENTS	November 17th, 2026 to December 11th, 2026
BIDDING	December 21st, 2026 to January 14th, 2027
CONSTRUCTION	June 2027 to August 2027

PROJECT ESTIMATE

ICS				AREA: SF			
		Document Date:		9/14/2026		Area 1	
		Project Start:		Summer '27		Area 2	
		Project Completion:		Fall '27		Area 3	
		% Cost Escalation:				Area 4	
				Area 5			
Owner: Aitkin School District		PM Estimating:		Brandon Miller		Area 6	
Project: Aitkin School District						Area 7	
Location: Elem & High School						Area 8	
Designer: JLG, CMTA, NCE						Area 9	
						Area 10	
		CONSTRUCTION BUDGET					
Aitkin School District		Schematic Design					
ITEM DESCRIPTION		QTY	UOM	UNIT COST	COST/SF	TOTAL COST	
BUILDING DEMOLITION						\$57,590.00	
BUILDING STRUCTURE						\$38,207.00	
EXTERIOR ENCLOSURE - SHELL						\$2,152,027.00	
INTERIOR CONSTRUCTION						\$455,951.90	
SPECIALTIES & EQUIPMENT & FURNISHINGS						\$750.00	
SPECIAL CONSTRUCTION						\$63,000.00	
MECHANICAL						\$2,293,098.00	
ELECTRICAL						\$491,173.00	
SITE WORK						\$1,698,675.00	
TOTALS		ESTIMATE TOTALS				\$7,250,471.90	
		CONTRACTOR OVERHEAD AND PROFIT			5.00%	\$362,523.60	
		ESTIMATE CONTINGENCY			2.00%	\$145,009.44	
		% COST ESCALATION			5.00%	\$362,523.60	
		GRAND TOTAL			\$8,120,528.53		
TOTALS W/ ALTERNATES		ESTIMATE TOTALS W/ ALTERNATES					
		CONTRACTOR OVERHEAD AND PROFIT					
		ESTIMATE CONTINGENCY					
		% COST ESCALATION					
		GRAND TOTAL W/ ALTERNATES					
BUDGET							
		CONSTRUCTION BUDGET					
		OVER/UNDER BASE SCOPE ESTIMATE					
		OVER/UNDER BASE & ALTS ESTIMATE					

RIPPLESIDE ELEMENTARY - EXISTING PLAN



RIPPLESIDE ELEMENTARY - EXISTING CONDITIONS



INSIDE RECEPTION



OUTSIDE RECEPTION



MAIN ENTRY



SPED - FACING NORTH

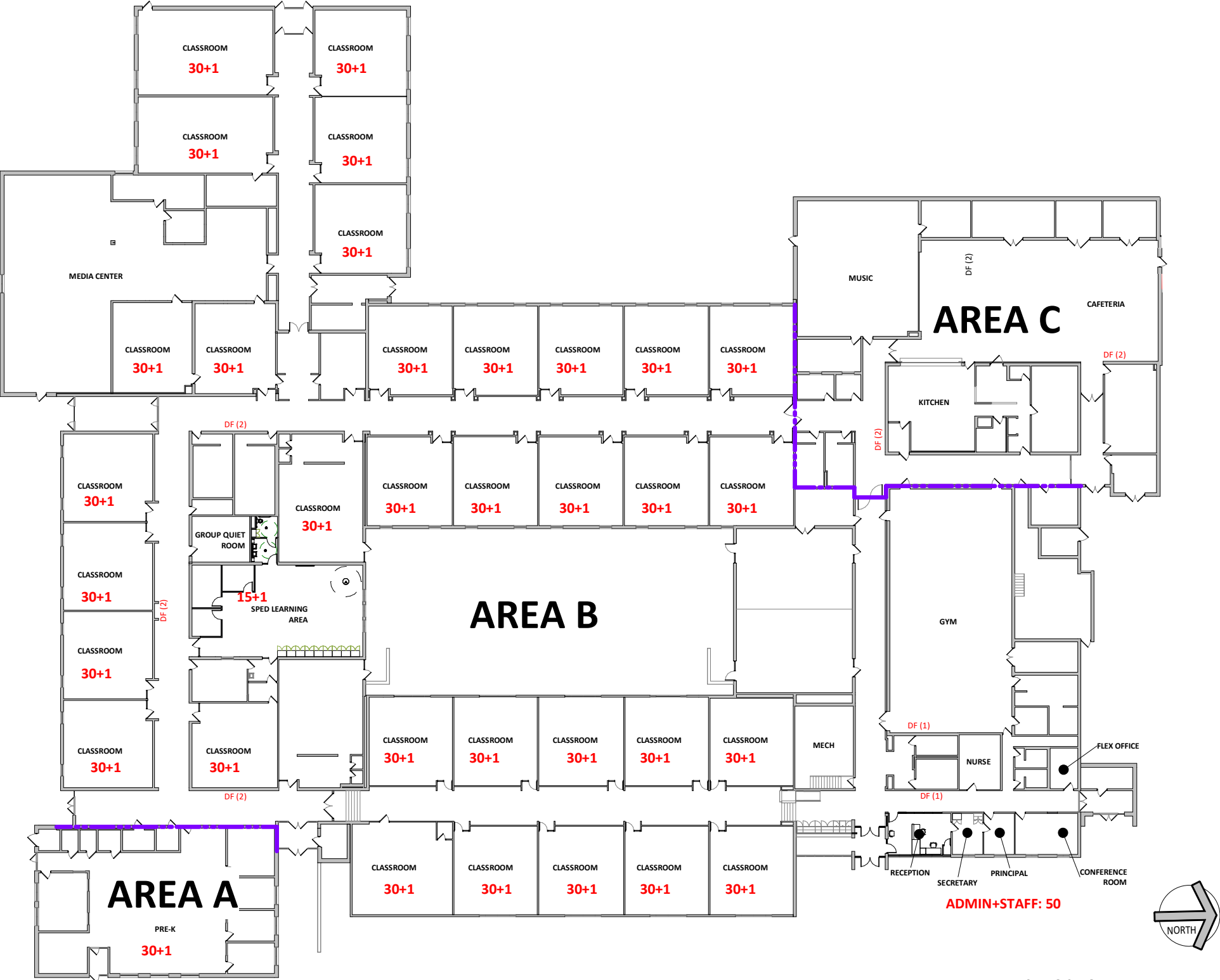


SPED - FACING NORTHWEST



GROUP QUIET ROOM

RIPPLESIDE ELEMENTARY - LIFE SAFETY PLAN



- EXISTING 2 HOUR FIRE WALL
- NEW 2 HOUR FIRE WALL
- ## PLUMBING FIXTURE OCCUPANT COUNT

AITKIN RIPPLESIDE ELEMENTARY PRELIMINARY CODE ANALYSIS

APPLICABLE BUILDING CODES:
2020 MINNESOTA BUILDING CODE
2020 MINNESOTA CONSERVATION CODE FOR EXISTING BUILDINGS
2020 MINNESOTA STATE FIRE CODE
2020 MINNESOTA MECHANICAL AND FUEL GAS CODE
2024 MINNESOTA ENERGY CODE
2020 MINNESOTA PLUMBING CODE
2020 MINNESOTA ACCESSIBILITY CODE

OCCUPANCY CLASSIFICATION: GROUP E
CONSTRUCTION TYPE: IIB
AUTOMATIC SPRINKLER SYSTEM: FULLY SPRINKLERED

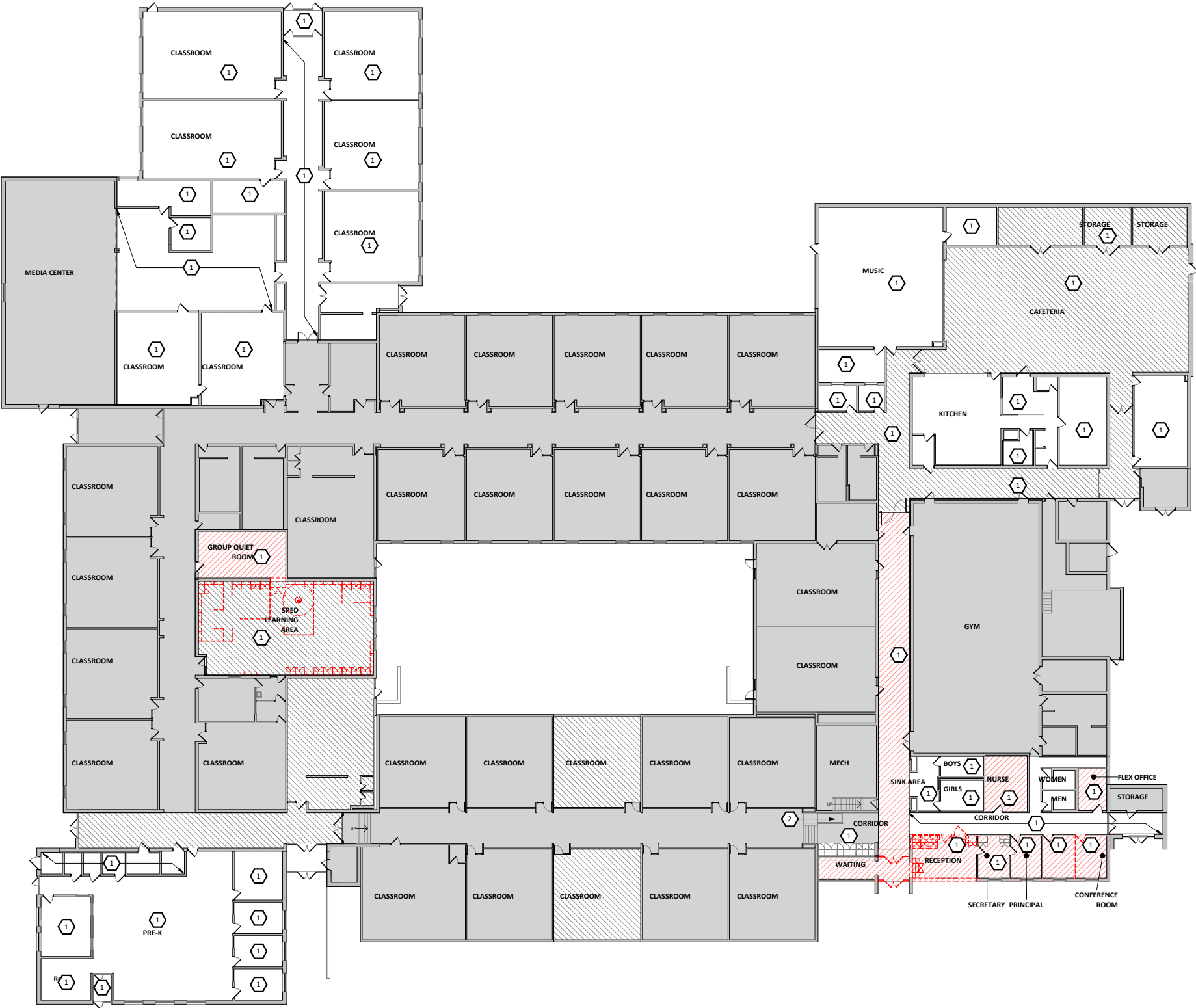
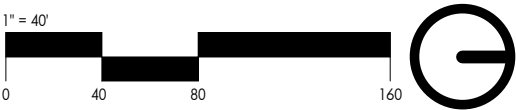
AREA A
ALLOWABLE AREA: 58,000 SF
ACTUAL AREA: 6,661 SF
AREA B
ALLOWABLE AREA: 58,000 SF
ACTUAL AREA: 67,816 SF EXISTING NON-COMPLIANT
AREA C
ALLOWABLE AREA: 58,000 SF
ACTUAL AREA: 11,084 SF

PLUMBING FIXTURES:
ACTUAL OCCUPANTS: 1,167 STUDENTS AND FACULTY
E-EDUCATIONAL

PLUMBING FIXTURES REQUIRED:
MEN (584 OCCUPANTS)
WC: 1 PER 50 = 584/50 = 12 REQUIRED
LAV: 1 PER 50 = 584/50 = 12 REQUIRED
WOMEN (584 OCCUPANTS)
WC: 1 PER 50 = 584/50 = 12 REQUIRED
LAV: 1 PER 50 = 584/50 = 12 REQUIRED
DRINKING FOUNTAINS: 1 PER 100 = 12 REQUIRED
SERVICE SINKS: 1 SERVICE SINK

PLUMBING FIXTURES PROVIDED:
MEN (584 OCCUPANTS)
WC: 14 PROVIDED
LAV: 9 PROVIDED
WOMEN (584 OCCUPANTS)
WC: 13 PROVIDED
LAV: 9 PROVIDED
DRINKING FOUNTAINS: 12 PROVIDED
SERVICE SINKS: 1 PROVIDED

RIPPLESIDE ELEMENTARY - DEMO PLAN



- EXISTING WALL/OBJECT TO REMAIN
- EXISTING WALL/OBJECT TO BE REMOVED
- EXISTING DOOR TO REMAIN
- EXISTING DOOR TO BE REMOVED
- DEMO EXISTING FLOORING
- FLOORING DEMO BY ABATEMENT CONTRACTOR
- DEMOLITION KEYNOTE

ALL DEMOLITION WORK REQUIRED IS NOT NECESSARILY LIMITED TO WHAT IS SHOWN ON THE DEMOLITION PLANS. THE INTENT IS TO REMOVE ALL MECHANICAL, ELECTRICAL AND ARCHITECTURAL ITEMS AS REQUIRED TO FACILITATE NEW CONSTRUCTION.

REFER TO FINISH SCHEDULE FOR ADDITIONAL FINISH WORK REQUIRED IN OTHER AREAS THAT ARE NOT DOCUMENTED TO RECEIVE AND DEMOLITION/REMOVAL WORK INDICATED ON DEMOLITION PLANS (TYPICAL).

DEMOLITION LEGEND

KEYNOTES - DEMOLITION		
NO	NOTE	REV.
1	REMOVE AND DISCARD EXISTING ACT CEILING; SEE RCP FOR EXACT EXTENTS	
2	REMOVE EXISTING LIFT	

RIPPLESIDE ELEMENTARY - NEW CONSTRUCTION PLAN



FLOORPLAN LEGEND

- NEW CONSTRUCTION
- RENOVATION
- LIGHT RENOVATION (CEILING AND/OR FLOORING REPLACEMENT) SEE FINISH PLAN AND RCP
- OUT OF SCOPE/EXISTING TO REMAIN

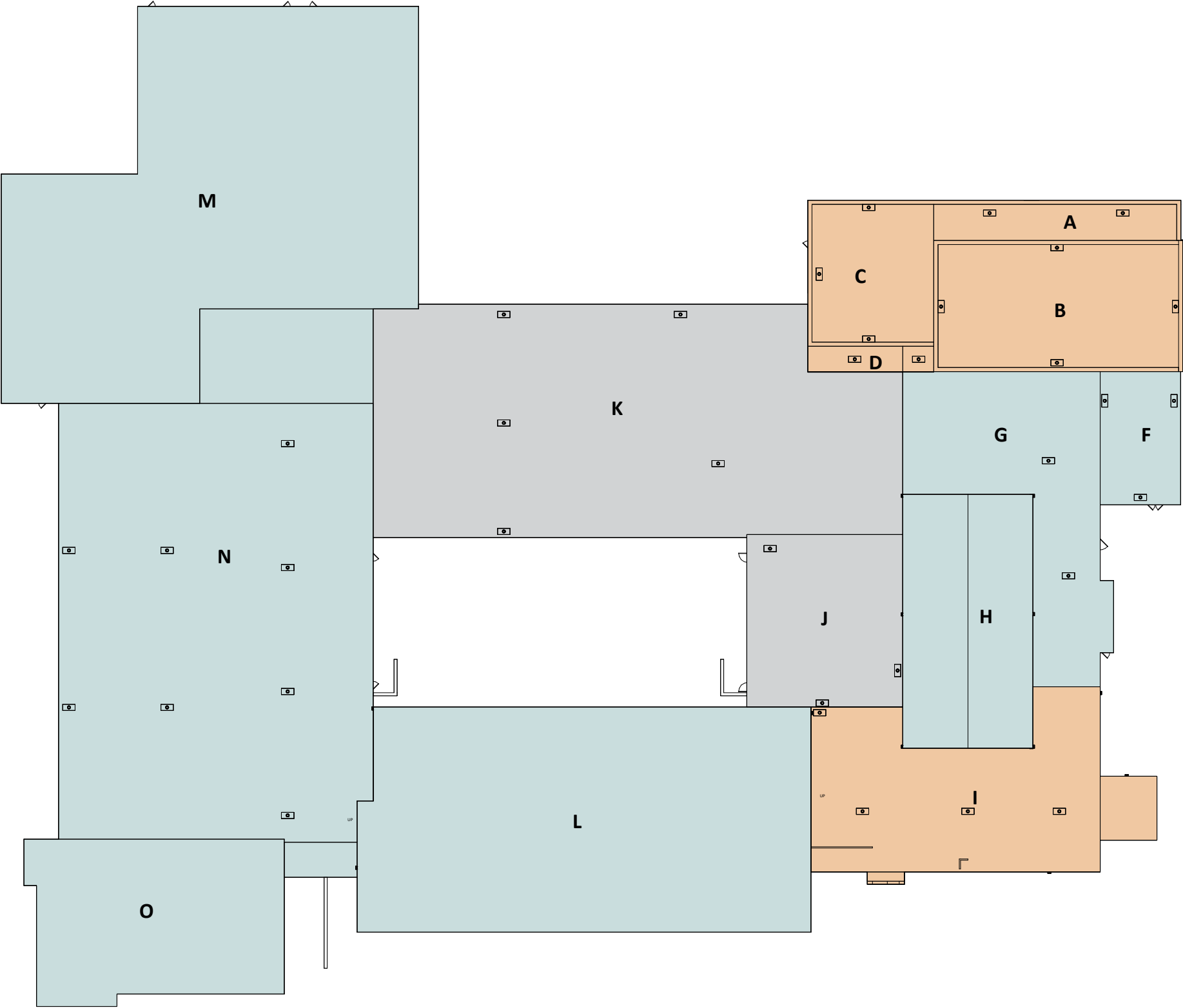
ADDITIONAL SCOPE NOTES

PROJECT INCLUDES ALLOWANCE FOR THE REPLACE OF 6 FAILING EXTERIOR DOORS

SEE DEMO PLANS AND FINISH PLANS FOR INFORMATION RELATED TO ABATEMENT AND FLOORING REPLACEMENT

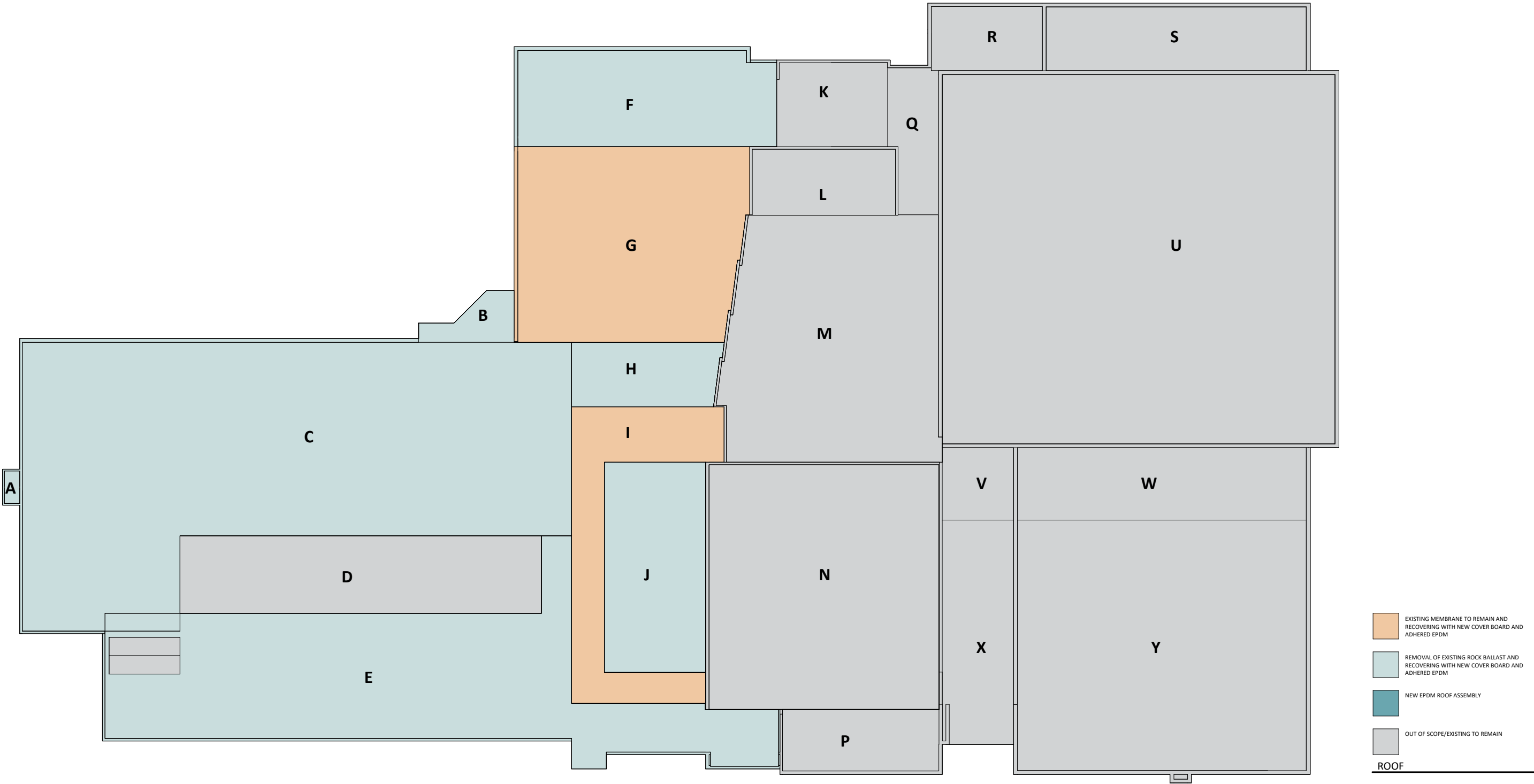
SEE DEMO PLANS AND REFLECTED CEILING PLAN FOR INFORMATION RELATED TO CEILING REPLACEMENT TIED TO THE IAQ SCOPE

RIPPLESIDE ELEMENTARY - NEW ROOF PLAN



- LEGEND**
- EXISTING MEMBRANE TO REMAIN AND RECOVERING WITH NEW COVER BOARD AND ADHERED EPDM
 - REMOVAL OF EXISTING ROCK BALLAST AND RECOVERING WITH NEW COVER BOARD AND ADHERED EPDM
 - OUT OF SCOPE/EXISTING TO REMAIN

AITKIN HIGH SCHOOL - NEW ROOF PLAN



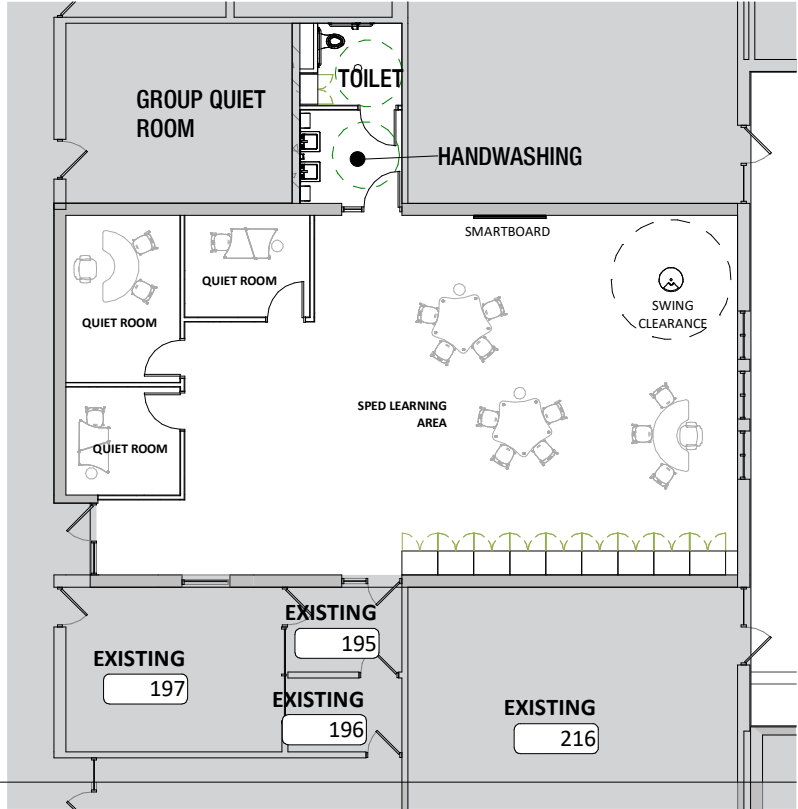
RIPPLESIDE ELEMENTARY - NEW FINISH PLAN



RIPPLESIDE ELEMENTARY - NEW CEILING PLAN

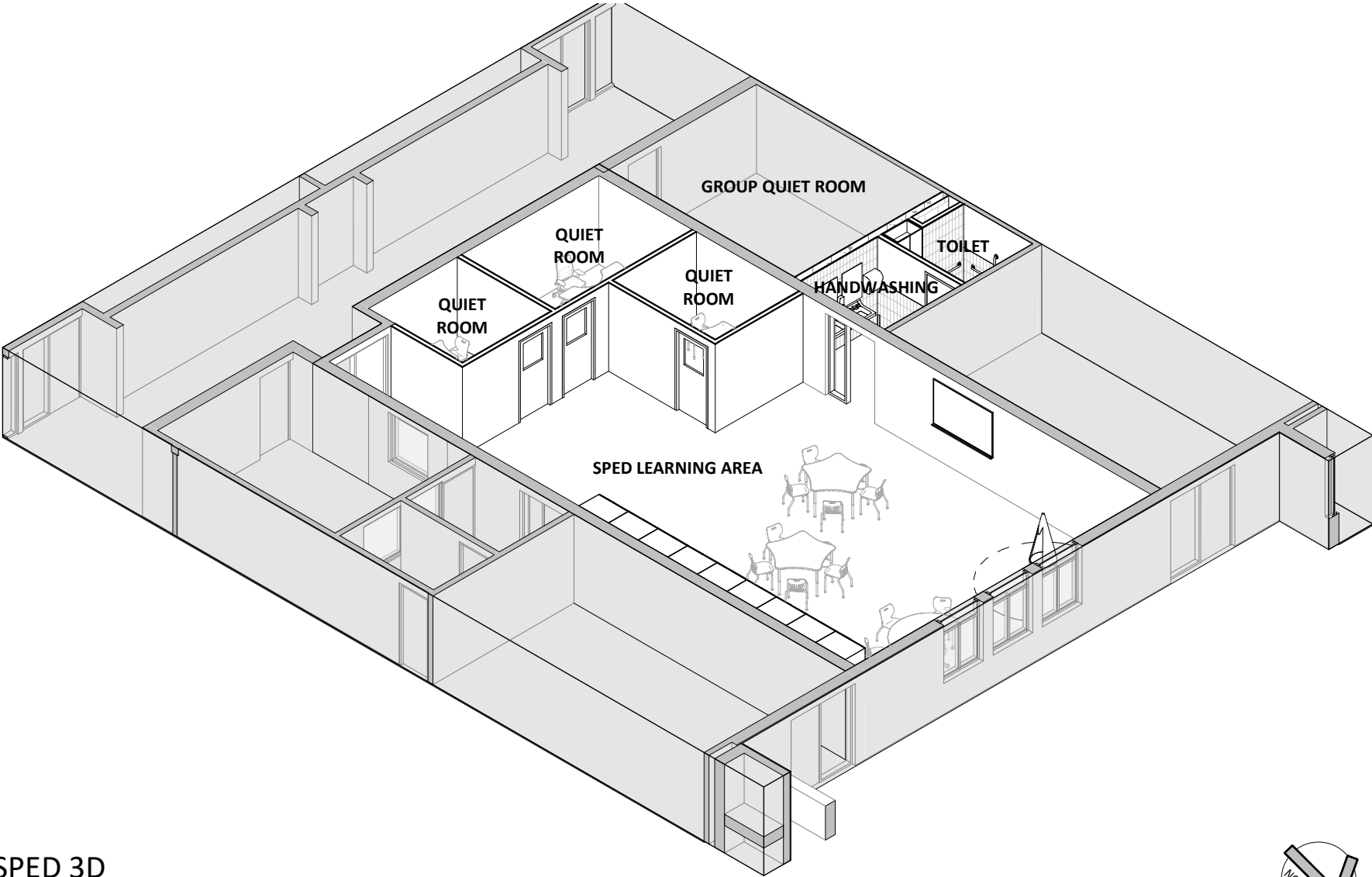


RIPPLESIDE ELEMENTARY - SPED SUITE

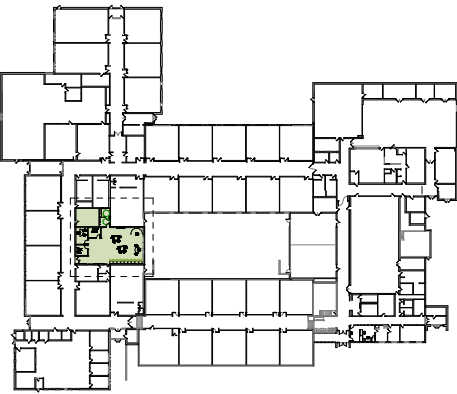


SPED SUITE

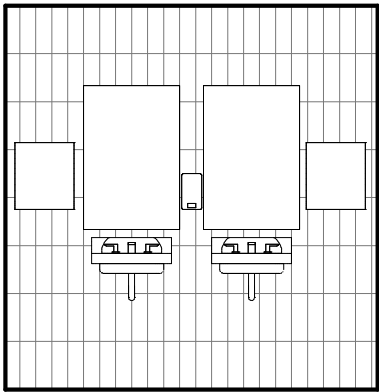
FURNITURE SHOWN FOR SCALE ONLY



SPED 3D

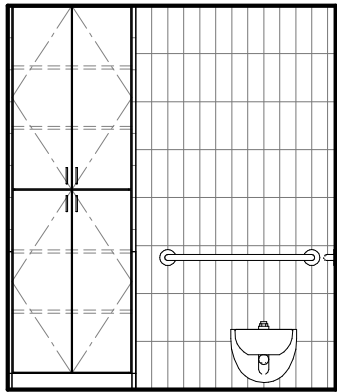


KEY PLAN

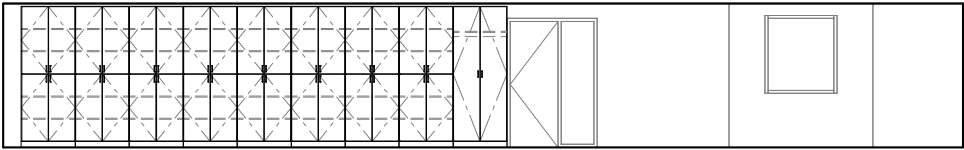


PAPER TOWEL AND SOAP DISPENSER BY OWNER

3 SINK AREA

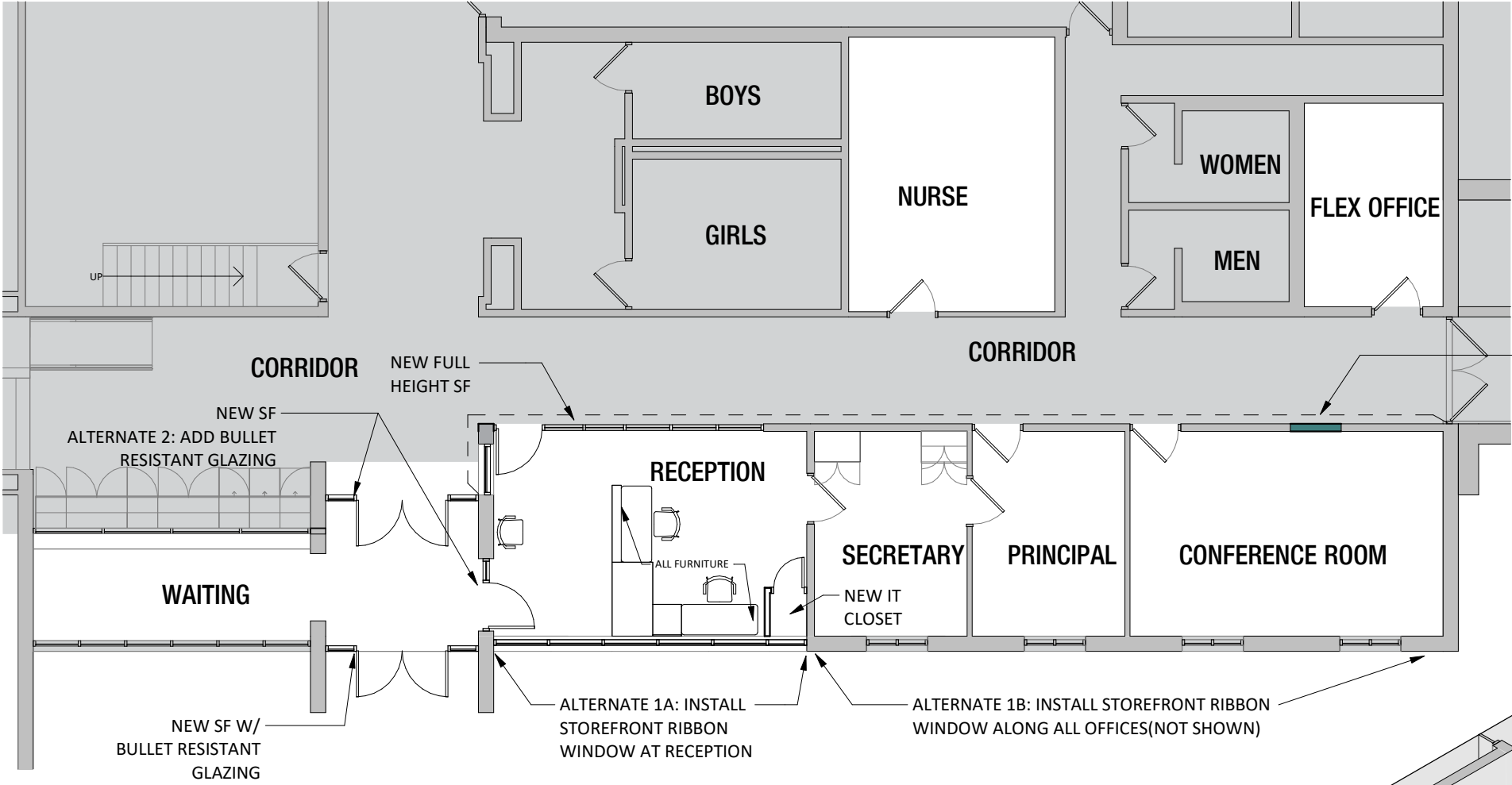


4 TOILET ROOM

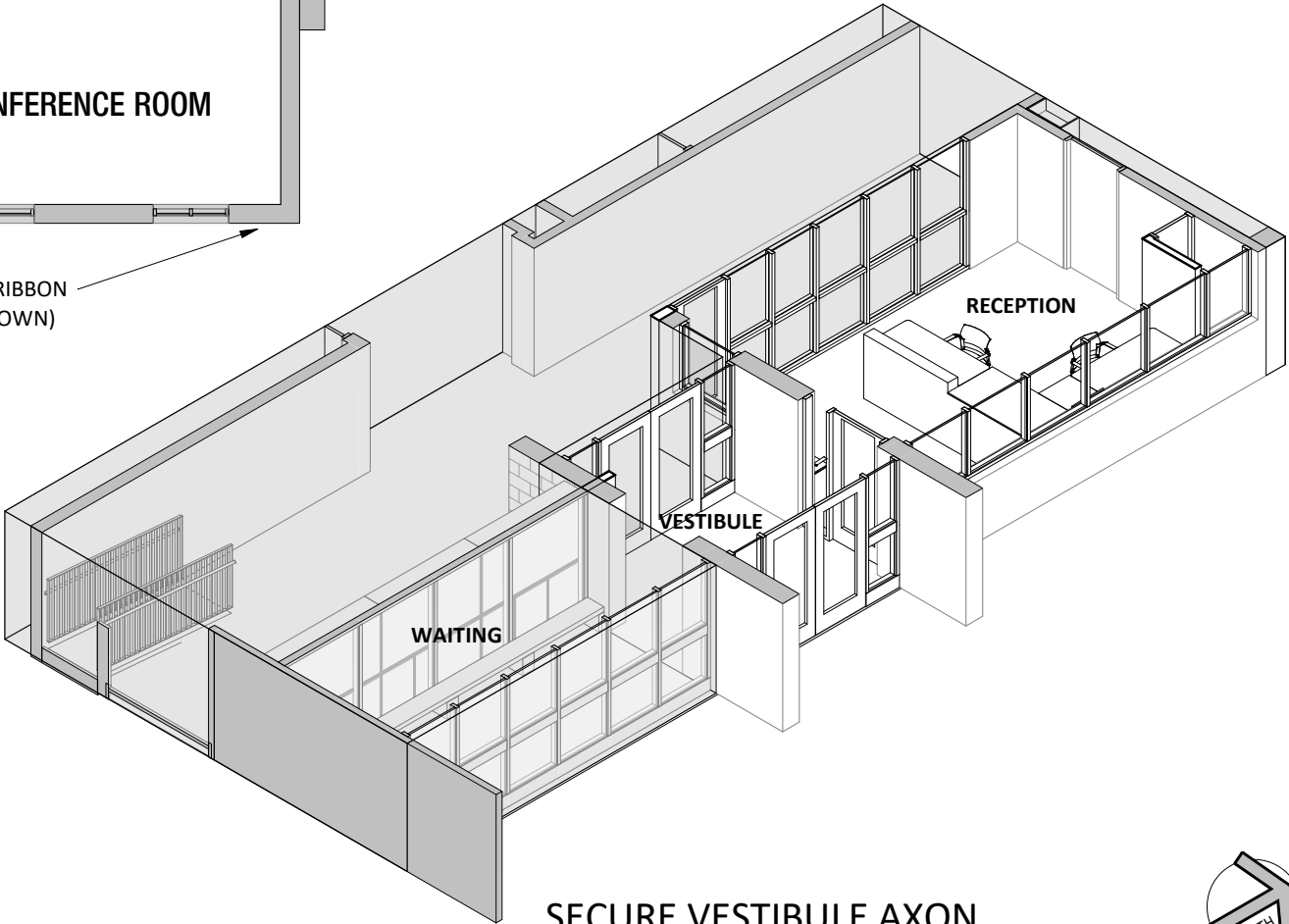


6 EAST ELEVATION
SD202 SCALE: 3/32" = 1'-0"

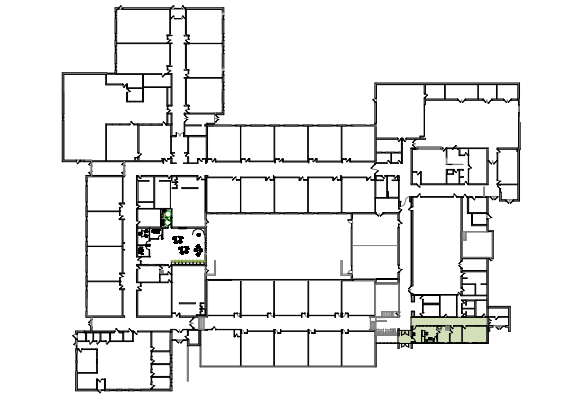
RIPPLESIDE ELEMENTARY - ENTRY AND ADMIN



SECURE ENTRANCE & RECEPTION



SECURE VESTIBULE AXON



KEYPLAN

PART 1. CIVIL GENERAL INFORMATION

1.1 OVERVIEW

The site improvements to the Aitkin Public schools include but are not limited to the following.

- 1. Highschool Parking Lot Improvements. (See Exhibit 1)
 - a. Demolition of existing aggregate surfaced parking lot and construction new paved parking lot providing concrete curb and gutter perimeter.
 - i) Approximately 38 parking spaces.
- A. High School Parking lot is located at southwest corner of the 3rd St NW & 2nd Ave NW intersection.
- B. City of Aitkin, Aitkin County, Minnesota.
- C. The areas of anticipated construction work are not located within a Special Flood Hazard Area (100 Year Floodplain).

1.2 TECHNICAL CRITERIA

- A. Codes: The following is a partial list of applicable codes governing the systems described herein:
 - 1. 2020 Minnesota Plumbing Code
 - 2. 2020 Minnesota Accessibility Code
 - 3. Aitkin, Minnesota Code or Ordinances, passed 7-20-2026
 - 4. Authorization to Discharge Stormwater Associated with Construction Activity Under the National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Program. Permit No: MNR100001, August 1, 2023.

1.3 SCOPE

- A. This narrative document summarizes the concepts for the major design elements including Temporary Erosion and Sediment Control (Division 01), Site Earthwork (Division 31), Site Exterior Improvements (Division 32), and Site Utilities (Division 33)
- B. Temporary Erosion and Sediment Control (Division 01) included in this document:
 - 1. Performance Requirements
 - 2. BMPs
- C. Earthwork (Division 31) included in this document:
 - 1. Site Clearing
 - 2. Site Grading
 - 3. Site Excavation
 - 4. Site Trenching
 - 5. Site Fill
- D. Exterior Improvements (Division 32) included in this document:
 - 1. Site Asphalt Paving
- 2. Site Concrete Paving
- E. Site Utilities (Division 33) included in this document:
 - 1. Site Stormwater Gravity Piping
 - 2. Site Manholes and Structures

PART 2. TEMPORARY EROSION AND SEDIMENT CONTROL (DIVISION 01)

2.1 PERFORMANCE REQUIREMENTS

- A. Stormwater discharge from construction activities shall meet the Authorization to Discharge Stormwater Associated with Construction Activity Under the National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Program. Permit No: MNR100001, August 1, 2023.
- B. A Stormwater Pollution Prevention Plan meeting the requirements of 2.1.A. will be prepared by the Contractor.
- C. A Notice of Intent (NOI) application shall be submitted to the Minnesota Pollution Control Agency.
- D. Land exposure shall be minimized in terms of area and time.
 - 1. Natural vegetation shall be retained whenever feasible.
- E. Erosion of soil and deposition of sediment on other properties caused by stormwater leaving the site and construction activities shall be prevented.
- F. Windblown soil from leaving the project site shall be prevented.

2.2 BMPs

- A. Best Management Practices (BMPs) shall be provided prior to disturbance of existing surface cover.
 - 1. Temporary Silt Fence at perimeter edge of soil stockpiles and locations to prevent sediment from leaving the site.
 - 2. Temporary Sediment Filters within existing and new stormwater manhole inlet grates.
 - 3. Temporary Tracking Control prior to construction vehicles entering public paved roadways.
 - 4. Temporary Concrete Washouts at defined locations on site for concrete truck washouts.
 - 5. Temporary Pumped Sediment Control Devices to control sediment discharge in any dewatering or pumped water application.
 - 6. Temporary Fiber Rolls at concentrated surface stormwater discharge locations.
 - 7. Temporary Slope Erosion Protection at locations susceptible to erosion.
 - a. Shall include Bonded Fiber Matrix mulch and/or Erosion Control Blankets.
- B. Inspection of preventive measures will be performed weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall on site, and daily during prolonged rainfall.
 - 1. Any BMP deficiencies will be repaired immediately.
- C. Temporary measures will be removed after permanent vegetation has been established.

PART 3. EARTHWORK (DIVISION 31)

3.1 SITE CLEARING

- A. Existing vegetation (sod, trees, and shrubs) will be removed as necessary to meet construction requirements.
 - 1. Will not be burned, buried, or left on site.

3.2 SITE GRADING

- A. Existing topsoil will be salvaged for reuse onsite.
 - 1. Debris, roots, branches, and stones in excess of 1/2 inch in size will be removed.

CIVIL NARRATIVE CONT.



- 2. Salvaged topsoil will be placed to new finish grade elevations in areas not designated for pavement or landscape mulch/rock.
- a. Including all areas graded as part of this project as well as all adjacent turf areas disturbed by construction.
- b. Provided to 6 inch depth, minimum.
- c. Using hydraulic power box rake or similar mechanical equipment to remove soil lumps, rocks, and debris.
- d. Rake, chain drag and lightly roll areas in preparation of seed or sod bed.
- B. Subgrade Preparation
 - 1. Compaction density will meet ASTM D698-Standard Proctor.
 - 2. The pavement subgrade soils will be scarified a minimum of 8 inches and recompacted to a minimum of 95% of maximum dry density.
 - a. Soils will be moisture conditioned as necessary after scarifying and prior to recompacting.

3.3 SITE EXCAVATION

- A. Existing utilities will be located prior to beginning work.
- B. Excavation will accommodate construction operations.
 - 1. Areas that are over-excavated and load-bearing surfaces that are disturbed in accordance with Site Fill requirements will be corrected.
 - 2. Surface runoff will be prevented from entering excavation areas.

3.4 SITE TRENCHING

- A. Existing utilities will be located prior to beginning work.
- B. Trenches will be excavated as necessary for new utility installations.
- C. Trenches will be backfilled to match new finish subgrade elevations.
 - 1. Site bedding will be provided adjacent to utility piping per the plan details.
- a. Will be free of silt, clay, loam, and organic material.
- 2. Soil fill will be placed and compacted in equal continuous layers not exceeding 8 inches loose lifts when heavy, self-propelled compaction equipment is used.
- a. 4 to 6 inches in loose thickness placement when hand-guided equipment (i.e., Jumping jack, plate compactor, etc.) is used.
- b. Material will be compacted to a minimum of 95% of maximum density per ASTM D698 within pavement subgrade areas.
 - i) May reduce minimum to 90% at all other locations.
- c. Optimum moisture content of fill materials will be maintained to attain required densities.

3.5 SITE FILL

- A. Fill material will consist of non-organic subsoil excavated on-site.
- B. Fill to finish subgrade contours and elevations indicated on the grading plan using unfrozen materials.

- 1. Soil fill will be placed and compacted in equal continuous layers not exceeding 8 inches loose lifts when heavy, self-propelled compaction equipment is used.
- a. 4 to 6 inches in loose thickness placement when hand-guided equipment (i.e. Jumping jack, plate compactor, etc.) is used.
- b. Compact material to a minimum of 95% of maximum density per ASTM D698 within pavement subgrade areas.
 - i) May reduce minimum to 90% at all other locations.
- c. Maintain optimum moisture content of fill materials to attain required densities.

PART 4. EXTERIOR IMPROVEMENTS (DIVISION 32)

4.1 SITE ASPHALT PAVING

- A. Plant mixed asphalt pavement shall be provided meeting the State’s Department of Transportation Design and Construction Specifications.

4.2 SITE CONCRETE PAVING

- A. Concrete materials for pavements, sidewalks, curb & gutters shall include the following:
 - 1. Type I Portland Cement
 - 2. Fine and coarse aggregates meeting ASTM C33.
 - 3. Class C or F fly ash meeting ASTM C618.
 - 4. Air-Entraining admixtures meeting ASTM C260 in areas subjected to freezing temperatures.
 - 5. Water Reducing admixtures meeting ASTM C494.
- B. A curing compound will be applied to prevent moisture loss at the finished surface.
 - 1. Shall be Type 2, Class A meeting ASTM C309.
- C. Joint sealants will be applied to Isolation and Construction Joints.
 - 1. Shall be a one-part, cold applied, silicone sealant meeting ASTM D5893.
- D. The mix design will meet the following:
 - 1. 4500 PSI compressive strength in accordance with ASTM C39 at 28 days.
 - 2. The maximum amount of fly ash will be 30% of cementitious materials by weight.
 - 3. The minimum amount of cement will be 564 LB/CY.
 - 4. The maximum water-cement ratio will be 45 percent by weight.
 - 5. The total air content, for areas subject to freezing, will be 7% (mix design target), determined in accordance with ASTM C173.
- a. Placed concrete will be within -1.5 to +2 percentage points of this target value.
- E. Concrete surfaces will receive a light broom texture perpendicular to the direction of travel.
 - 1. Sidewalk paving will receive troweled radiused edges of 1/4 inch.
- F. Tolerances:

CIVIL NARRATIVE CONT.



- 1. Maximum variation of surface flatness shall be ¼ inch in 10 ft.
- 2. Maximum variation from true position shall be ¼ inch.

PART 5. SITE UTILITIES (DIVISION 33)

5.1 SITE STORMWATER GRAVITY PIPING

- A. Pipe shall be one of the following:
 - 1. ASTM D3034, SDR 35 PVC
 - 2. ASTM D1785, Schedule 40 PVC
 - 3. ASTM C76, Concrete Pipe
- B. Pipe Accessories:
 - 1. Concrete Apron shall meet the Minnesota Department of Transportation Standard Plate 3100G.

5.2 SITE MANHOLES AND STRUCTURES

- A. Modular precast concrete manhole sections with tongue-and-groove joints with masonry transition to lid frame, covers, anchorage, and accessories.
 - 1. Reinforced precast concrete in accordance with ASTM C478, with resilient connectors complying with ASTM C923.
- B. Inlet Casting shall be one of the following:
 - 1. East Jordan Iron Works, Inc. Model 5113Z frame and 5113M grate.
 - 2. Neenah Foundry Co. R-2573 with Type "C" grate.
 - 3. Or equal.
- C. Chimney Seal.
 - 1. External seal when casting diameter matches structure barrel diameter.
 - a. For large diameter structures with concrete cover, provide internal chimney seal.
 - 2. Shall be by one of the following manufacturers:
 - a. Cretex Specialty Products.
 - b. Or equal.

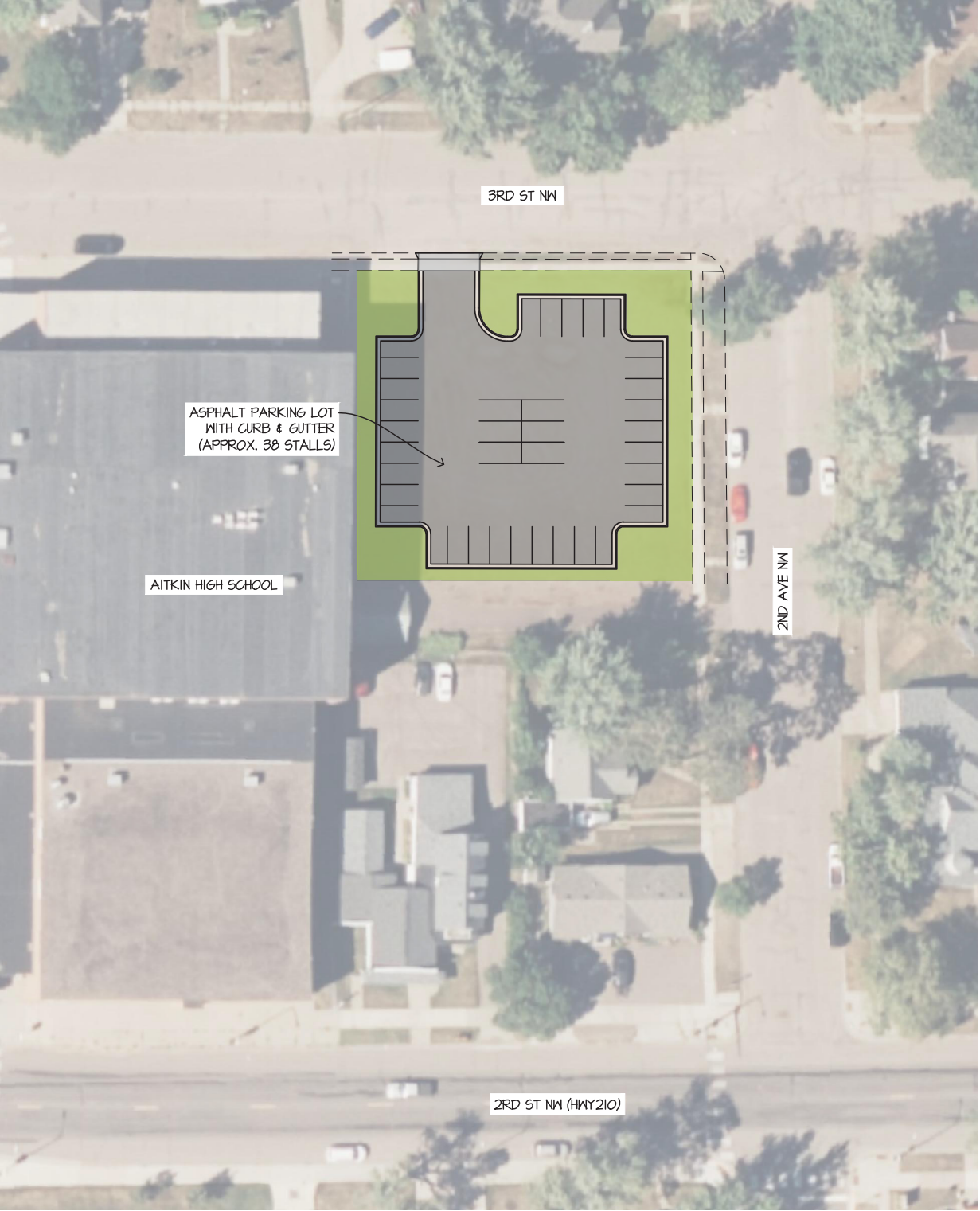
Respectfully,
CMTA, Inc.

Adam Johnson, PE
Attachment: Exhibit 1 – HS Parking Lot

CIVIL PLANS



ELEMENTARY SCHOOL



HIGH SCHOOL



MECHANICAL NARRATIVE

PROVIDED BY CMTA



PART 1. MECHANICAL GENERAL INFORMATION

1.1 OVERVIEW

Rippleside Elementary School, located in Aitkin, Minnesota, is an approximately 78,200 square foot facility that serves approximately 475 students and 40 staff. The building was originally constructed in 1957, with multiple additions completed in 1965, 1981, 1988, 1992, 1993, 1995, and 2001. The facility serves a variety of functions and includes classrooms, administrative offices, gymnasium spaces, a media center, kitchen, teacher support areas such as breakrooms, restrooms, and a dedicated daycare wing. The building will be designed to comply with the State Energy Code and the systems will improve energy efficiency and create an improved environment for learning. The facility will include the following areas:

1. General Classrooms
2. Special Education
3. Music/Band/Choir
4. Physical Education & Athletics
5. Media/Technology
6. Support Spaces
7. Food Service
8. Faculties/Circulation

MECHANICAL SYSTEMS will include: Hot water boiler plant and distribution, air cooled chiller plant and distribution, dedicated outside air rooftop units with hot water heat and chilled water for cooling/dehumidification, rooftop air handling units with hot water heat and chilled water for cooling/dehumidification, kitchen hood/exhaust fan/make-up air unit, ductwork, HVAC hydronic water piping and direct digital temperature controls system.. Minimal domestic water plumbing changes will be completed to add a restroom to the SPED classroom and will be extended from existing piping connections. Changed to fire protection piping and sprinkler heads are limited to adjustments to address floor plan changes.

1.2 SCOPE

- A. This narrative document summarizes the design concepts for the major mechanical systems including Fire Protection (Division 21), Plumbing (Division 22), and HVAC (Division 23)
- B. Fire Protection Systems (Division 21) included in this document:
1. Sprinkler Piping
 2. Sprinkler Heads
- C. Plumbing systems (Division 22) included in this document:
1. Plumbing Piping
 2. Sanitary and Storm Piping
 3. Plumbing Fixtures
- D. HVAC (Division 23) included in this document:
1. Hydronic Water Piping
 2. Natural Gas Distribution System
 3. Heating Water Plant
 4. Chilled Water Plant
 5. Perimeter Supplemental Heating Equipment
 6. Ductwork & Distribution

7. Indoor Air Handling Units
8. Rooftop Air Handling Units
9. Recommissioning
10. Variable Air Volume Boxes
11. Kitchen HVAC Equipment
12. Exhaust Fans and Systems
13. Testing and Balancing.
14. Temperature Control Systems

1.3 TECHNICAL CRITERIA

- A. Codes: The following is a partial list of applicable codes governing the systems described herein:
1. International Building Code (IBC) (edition and amendments currently adopted by the State of Minnesota and city of Aitkin).
 2. International Mechanical Code (IMC) (edition and amendments currently adopted by the State of Minnesota and city of Aitkin).
 3. International Fire Code (IFC) (edition and amendments currently adopted by the State of Minnesota and city of Aitkin).
 4. International Energy Conservation Code (IECC) (edition and amendments currently adopted by the State of Minnesota and city of Aitkin).
 5. Plumbing Code (edition and amendments currently adopted by the State of Minnesota and city of Aitkin).
 6. NFPA 13 Installation of Fire Protection Systems

PART 2. SPRINKLER SYSTEMS (DIVISION 21)

2.1 SPRINKLER PIPING:

- A. Existing fire sprinkler system piping will be modified and relocated as required for new HVAC ductwork and piping.

2.2 SPRINKLER HEADS

- A. Existing sprinkler heads will be modified and relocated as required for new HVAC ductwork and piping.

PART 3. PLUMBING SYSTEMS (DIVISION 22)

3.1 PLUMBING PIPING

- A. Above ground piping - Tubing 1-1/2" size and smaller shall be Type L hard drawn copper. Tubing 2" size and larger shall be Type L hard drawn copper. Soft drawn copper tubing in small sizes may be used adjacent to fixtures and equipment.
- B. All water piping will be insulated with a minimum of 1" fiberglass insulation.

3.2 SANITARY AND STORM PIPING

- A. All sanitary from a point 5' outside the building to the final plumbing fixture is by this contractor.
- B. The roof drainage and overflow drainage systems are existing to remain.
- C. All underground piping will be schedule 40 PVC or no hub cast. All above grade piping will be no hub cast iron pipe. All above grade piping will be allowed to be schedule 40 PVC if the runs are not longer than 35' or in return air plenum spaces.

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D. The added restroom in the SPED classroom will be connected to existing sanitary service inside the building.

3.3 PLUMBING FIXTURES:

- A. All fixtures will be piped to allow for individual and room isolation valves for servicing.
- B. Plumbing fixtures will be similar to the following:
 - 1. Lavatory – wall hung vitreous china with battery operated motion sensors.
 - 2. Water Closets – wall hung vitreous china with battery operated flush valves.
 - 3. Floor drains – all toilet rooms will have floor drains provided.

PART 4. HVAC (DIVISION 23)

4.1 HVAC HYDRONIC WATER PIPING

- A. All piping for hydronic water system shall be run level or pitch up toward the end of the piping so that air in the system will move in the direction of water flow. Pitch of mains, where possible, shall be at least 1/4" in 25 feet. Pitch of lines shall be uniform and shall be installed so that entire system can be drained. Eccentric reducers shall be installed wherever pipe size is reduced in direction of flow. Reducers shall be installed with openings up, on topside of pipe to allow air to pass through. Radiation branches and mains fed by overhead mains shall be connected at the supply side through a plugged tee in place of an elbow to permit draining of radiation, branches or mains. Up feed risers supplying radiators above the supply main shall come off main either from top or side. Down feed risers supplying radiation below the supply main shall come off the bottom of the supply main.
- B. All piping for the hydronic water heating system shall be black mild steel pipe, ASA Schedule 40 thickness. Fittings shall be banded black cast iron 125-pound fittings. Grooved piping will be allowed.
- C. All hydronic water piping may be Type L hard drawn copper tubing at Contractor's option. Fittings for copper tubing shall be cast bronze or wrought copper solder fittings. All connections shall be made using 95-5 solder. Press fit fittings will be allowed.
- D. All piping exterior to the building for the air-cooled chiller shall be welded.
- E. The piping will be run in several reverse return loops in the building to allow for partial isolation of the system to keep the rest of the building operational during maintenance of specific equipment or spaces.
- F. The entire hot water hydronic piping system will have 30% propylene glycol installed in it for freeze protection. The entire chilled water hydronic piping system will have 30% propylene glycol installed in it for freeze protection.

4.2 NATURAL GAS DISTRIBUTION SYSTEM

- A. An existing natural gas distribution system serves the boilers, water heaters, kitchen equipment. No significant changes to this distribution system is anticipated. Piping material will be welded black iron. The gas meter shall be furnished by the utility provider.

4.3 HEATING WATER PLANT

- A. The existing heating water plant shall be re-used as part of this project. It is assumed that the plant is adequately sized for the HVAC modifications

4.4 CHILLED WATER PLANT

- A. The existing air-cooled chiller and pump package will be re-used as part of this project. It is assumed that the chiller is adequately sized for the HVAC modifications and extensions.

- B. The existing chilled water piping will be connected to and extended to the new HVAC air handling and rooftop units.

- C. The low temperature chilled water loop will be 42-degree F with a return water temperature of 57-degree F.

- D. The low temperature chilled water loop will distribute water from the chiller to the indoor air-handling units and rooftop air-handling units located throughout the building.

4.5 PERIMETER SUPPLEMENTAL HEATING EQUIPMENT

- A. In first floor exterior offices, hot water finned tube radiation will be installed on exterior walls.
- B. In stairwells, hot water cabinet unit heaters will be installed.
- C. In vestibules, hot water air curtains will be installed.
- D. In mechanical rooms, hot water unit heaters will be installed.

4.6 DUCTWORK & DISTRIBUTION

- A. Ductwork and fittings shall be constructed and supported in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, 1995 Edition with 1997 Addendum except as modified herein.
- B. Ductwork and fittings shall be fabricated from G60 galvanized steel sheets complying with ASTM A527.
- C. Ductwork in exposed areas will be spiral duct.
- D. All supply ductwork in spaces with ceilings will be insulated with 2" fiberglass insulation.
- E. All ductwork shall be built to 4" pressure class prior to VAV boxes, and 2" pressure class in all other instances.

4.7 INDOOR AIR HANDLING UNITS

- A. Air handling units will be packaged indoor units. They will consist of at least the following- direct drive exhaust fans with VFDs, MERV 8 and MERV 13 (for air-borne pathogen filtration) filter sections, heat recovery wheel where required by code or system type, chilled water cooling coil, hot water heating coil, and direct drive supply fans with VFDs.
- B. All units will be Variable Air Volume (VAV) style to maximize efficiency, and the cooling coils will be sized for 400 fpm to help the system achieve energy code compliance.
- C. All air handling units will have the outside air intake and relief air exhaust sized for 100% economizer.
- D. All units with over 30% minimum outside air will be provided with an enthalpy energy recovery wheel to meet state and local energy codes.
- E. New Indoor Air Handling Units will be provided for the following areas. Sizing of units will be verified and adjusted in DD.
 - 1. 2001 SW Classroom Addition – 1 multi-zone VAV unit, 5,000 cfm
 - 2. 1981 Music Wing – 1 multi-zone VAV unit – 4,500 CFM

4.8 ROOFTOP AIR HANDLING UNITS

- A. Rooftop air handling units will be packaged rooftop units, similar to Daikin model Skyline. They will consist of at least the following- direct drive exhaust fans with VFDs, economizer section, MERV 8 and MERV 13 filter sections, chilled-water cooling coil, hot water heating coil, and direct drive supply fans with VFDs.
- B. All units will be Variable Air Volume (VAV) style to maximize efficiency.
- C. All air handling units will have the outside air intake and relief air exhaust sized for 100% economizer.
- D. New Rooftop Air Handling Units will be provided for the following areas. Sizing of units will be verified and adjusted in DD.

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- 1. Childcare Center – 1 multi-zone VAV unit, 3,000 cfm
- 2. 1957 Original Gymnasium – 1 single zone VAV unit, 5,000 cfm
- 3. Cafeteria – 1 single zone VAV unit, 5,000 cfm

4.9 RECOMMISSIONING

A. The following air handling units are in good working order but would benefit from a recommissioning process.

- 1. AHU-1 (1965 Classroom Wing)
- 2. AHU-2 (1965 Classrooms and Supporting Areas)
- 3. AHU-3 (1957 Classrooms)

4.10 VARIABLE AIR VOLUME BOXES

A. All classrooms, offices, and support spaces will be provided with single duct variable air volume boxes. They will consist of air volume control terminal with damper assembly, externally mounted volume controller and control box, and hot water heating coil. VAV boxes will be zoned for areas of similar exposure and heating and cooling loads.

4.11 EXHAUST FANS AND SYSTEMS

- A. All bathrooms will be exhausted by a direct drive exhaust fan similar to a Greenheck model G. Bathroom exhaust will be combined to minimize the number of exhaust fans.
- B. All grease exhaust fans will be direct drive, similar to the Greenheck model CUE, provided with hinge kit. Grease exhaust fan will only be required if we provide a Type 1 kitchen hood which will be determined later in design.

4.12 TESTING AND BALANCING

A. All water and air systems will be tested by a 3rd part Testing and Balancing (TAB) agency. The TAB contractor will be either NEBB or AABC certified for balancing commercial HVAC and Plumbing systems.

4.13 AUTOMATIC TEMPERATURE CONTROLS

- A. A direct digital control (DDC) system will be installed on all HVAC equipment throughout the building. The DDC system will be by Johnson Controls, Inc.
- B. The DDC system will control all heating and air conditioning equipment to allow for automatic temperature control, seasonal adjustments, and maximize HVAC system efficiencies. In addition to controlling HVAC equipment, monitoring of critical air and water temperatures and system operations (fan/pump status), the system shall also alarm all equipment so maintenance personnel can maintain and troubleshoot all equipment.
- C. Equipment to be controlled and monitored includes:
 - 1. Domestic Hot Water Temperatures
 - 2. HVAC Hot Water and Chilled Water Temperatures
 - 3. Indoor Air Handling Units
 - 4. Rooftop Air Handling Units
 - 5. Kitchen HVAC Equipment
 - 6. Heating Water Plant
 - 7. Chilled Water Plant
 - 8. All Pumps

- 9. Variable Air Volume Boxes
- 10. Supplemental Perimeter Heating Equipment
- 11. All Fans
- 12. All Thermostats, CO2, Occupancy, and Humidity Sensors
- 13. All VFD for pumps and fans.

Respectfully,
CMTA, Inc.

Kalysta Davis, PE

ELECTRICAL NARRATIVE

PROVIDED BY CMTA



PART 1. ELECTRICAL GENERAL INFORMATION

OVERVIEW

Rippleside elementary school, located in Aitkin, Minnesota, is an approximately 78,200 square foot facility that serves approximately 475 students and 40 staff. The building was originally constructed in 1957, with multiple additions completed in 1965, 1981, 1988, 1992, 1993, 1995, and 2001. The facility serves a variety of functions and includes classrooms, administrative offices, gymnasium spaces, a media center, kitchen, teacher support areas such as breakrooms, restrooms, and a dedicated daycare wing. The building will be designed to comply with the state energy code and the systems will improve energy efficiency and create an improved environment for learning. The facility will include the following areas:

1. General Classrooms
 2. Special Education
 3. Music/Band/Choir
 4. Physical Education & Athletics
 5. Media/Technology
 6. Support Spaces
 7. Food Service
 8. Faculties/Circulation
- A. Site Lighting
1. Rippleside ES Parent Pick-up/Drop-off/Bus Parking/Staff/Parking - anticipate new site lighting, potential modifications to existing site lighting, landscape lighting, and potential lighted flag pole.
- B. High School - no electrical scope (building or parking lot).
- C. This narrative document summarizes the design concepts for the major electrical systems (Division 26), electronic communications systems (Division 27), and electronic safety and security systems (Division 28) to be included in the facility.
- D. This document is intended to serve as a basis to support discussion, further design, and aid in preliminary cost estimating as such it does not list every piece of electrical equipment required, or utilization equipment required to be provided with power.
- E. Electrical systems (Division 26) included in this document:
1. Low voltage power distribution system.
 2. Ground-mounted Photovoltaic System (estimated at 40kW).
 3. Convenience and special equipment power outlets.
 4. Interior and exterior lighting systems.
 5. Lighting control systems.
 6. Emergency interior and exterior lighting systems and egress signage (exit signs).
- F. Electronic communications systems (Division 27) included in this document:
1. Structured cabling for voice / data communication systems.
 2. Selective demolition and/or relocation of voice/data devices/cabling in areas to be renovated.
- G. Electronic safety and security systems (Division 28) included in this document:
1. Fire alarm system.
 2. Selective demolition and/or relocation of life-safety and security devices/cabling in areas to be

renovated.

3. Security System/electronic access control raceways and rough-ins.

PART 2. DESCRIPTION OF ELECTRICAL SYSTEMS

2.1 LOW VOLTAGE ELECTRICAL POWER DISTRIBUTION

- A. The main electrical service is not anticipated to be in scope. Existing panelboards will be maintained if amperage capacity and physical space capacity accommodates new mechanical equipment loads, new site lighting loads, and other general loads for remodeled spaces. Existing feeders and branch circuits replaced as required. Final determination of main electrical service and existing panelboards based on remodeled spaces, mechanical equipment selection, site lighting requirements, and site investigation.
- B. Panelboards
1. Not anticipated to be in scope, but as required:
 - a. Distribution panelboards will be circuit breaker type with copper or aluminum bus and lugs, 100% neutral bus, and ground bus.
 - b. Branch Circuit Panelboards will have bolt-on type branch circuit breakers, 20-ampere minimum, copper or aluminum bus, 100% neutral bus, and hinged cover construction.
- C. Raceways
1. Wiring will be in metal conduit except for under slab raceway which will be Schedule 40 PVC. Metal conduits will generally be electrical metallic tubing (EMT) except where exposed to damage where it will be a full-weight rigid galvanized steel conduit.
 2. A flexible metal conduit will be used at an equipment connection where required by the application.
- D. Wire and Cable
1. Feeder and branch circuit wiring for power, lighting, and control will be copper, 98% conductivity, stranded in sizes #8 AWG and larger, with 600-volt THW or THWN-THHN thermoplastic insulation. MC cable will be allowed for branch circuits. Home runs shall be in conduit, 3/4" minimum size. New service feeders or distribution feeders larger than 100 amps may be aluminum.
 2. The minimum wire size will be #12 AWG except #14 AWG for control circuits.
 3. Feeders will be designed to limit voltage drop to 2% as noted in ASHRAE 90.1.
 4. Voltage drop will be designed to not exceed 3% on branch circuits, 5% overall.
- E. Grounding systems shall be provided, as required, with 5 ohms maximum.
1. Bonding and grounding wires will be copper. Terminations will be bronze.
 2. Grounding electrodes will be 10'-0", 3/4" copper-clad steel.
- F. Wiring Devices
1. Duplex receptacles will be tamper resistant, 125-volt grounding types with cover plates to match existing.
 2. GFCI type receptacle will be provided where required by code.
 3. As required, existing ceiling devices to be secured and suspended during construction and then reinstalled in new ceilings.

2.2 GENERAL INTERIOR AND EXTERIOR LIGHTING SYSTEMS

- A. Interior and Exterior Lighting systems will be designed in accordance with the recommendations of the Illuminating Engineering Society (IES) and the requirements of the MN Energy Code.
1. IES and design team direction will be followed regarding light level recommendations where appropriate.

ELECTRICAL NARRATIVE CONT.



- This is not a code requirement but a design guideline.
- 2. NFPA 101 and IBC requirements for emergency lighting levels will be followed.
 - 3. The lighting power density requirements listed in the MN Energy Code for interior and exterior lighting will be followed.
 - B. Light sources for interior lighting are anticipated to be LED throughout.
 - C. Anticipated lighting design.
 - 1. Light fixtures will be selected to match the aesthetics of the building’s interior.
 - D. The following is a preliminary list of preliminary illumination levels:

Space	Horizontal Level
Kitchen/Cafeteria	50 FC
Office / Workstation	Variable 30 FC low to 50 FC high
Conference Rooms	Variable 30 FC low to 50 FC high
Lobby	10-20 FC daytime, 5 FC nighttime (Entry)
Corridors	10-20 FC
Bathrooms	15 FC
Classrooms	Variable 5 FC to 50 FC
Service Spaces	10-20 FC
Communication and Electrical Rooms	50 FC
Gymnasium/Auditorium	50 FC

2.3 LIGHTING CONTROL SYSTEMS

- A. Lighting control requirements listed in the MN Energy Code will be followed including automatic lighting shut-off, lighting reduction controls, and daylight control zones.
 - 1. In rooms with daylight zones, based on current energy codes, automatic photosensor control will be used to control lighting in daylight zones secondary to other lighting in the room.
 - 2. Individual rooms will be provided with stand-alone occupancy sensors. Generally, all rooms with occupancy sensors will include toggle switches or dimmer switches for manual control.
 - 3. In general, classrooms will be manual-on/auto-off with dimming.
 - 4. SPED lighting, such as tunable-white or RGW to be determined at future meetings.
 - 5. Corridors will be auto-on/auto-off with no dimming.
 - 6. Occupancy sensors will be used to control lighting in the janitor closet and restrooms.
 - 7. Minimal lights to remain on all night for security to be determined at future meetings.

- 8. Exterior lighting will be controlled via integrated photo sensors. Existing site lights and exterior building fixtures may need new photocell and/or time clock to meet energy code requirements.
- B. Mechanical rooms and electrical rooms will be controlled via manual switching for safety reasons.

2.4 EMERGENCY LIGHTING AND EGRESS SIGNAGE

- A. LED type exit signs will be provided to mark paths of egress.
- B. Emergency lights for paths of egress will be provided. Rippleside ES does NOT have a generator therefore emergency power for lights and exist signs will be provided via integrated batteries.
- C. The majority of the emergency lighting will be controlled with the general lighting in the area. A minimal number of emergency lights may be wired for 24/7 operation if preferred by owner.

PART 3. DESCRIPTION OF COMMUNICATION SYSTEMS

3.1 STRUCTURED CABLING FOR VOICE AND DATA COMMUNICATIONS

- A. Extend the existing system and provide new devices to accommodate the remodeled areas. Areas not being remodeled are outside the scope of the project, though some devices may need to be relocated or replaced to accommodate the remodel.
 - 1. New data racks NOT in scope.
- B. Cabling at the new facility will consist of Category 6 UTP cable for general cabling and Category 6a UTP cabling for Wireless Access Points (WAP’s).
- C. The Contractor will provide cabling pathways and power connections for new devices as required.
 - 1. Horizontal cabling will be provided as required for new LAN wireless access points where indicated on plan.
 - 2. Voice / Data outlets (New Locations)
 - a. Generally, two horizontal cables will be routed to each workstation (one for voice and one for computer).
 - 3. Horizontal cabling will be terminated on patch panels.
- D. As required, existing ceiling devices outside the scope of the project to be secured and suspended during construction and then reinstalled in new ceilings.

3.2 PAGING INTERCOM / PUBLIC ADDRESS SYSTEMS

- A. In general, NOT in scope. To accommodate the remodel, existing paging speakers and equipment may need to be relocated or secured and suspended above ceiling during construction and then reinstalled. As required, new paging speakers may be added and connected to the existing system to accommodate the remodel.

3.3 CLOCK SYSTEMS

- A. In general, NOT in scope. To accommodate the remodel, existing clocks and equipment may need to be relocated during construction and then reinstalled. As required, new clocks may be added and connected to the existing system to accommodate the remodel.

3.4 CLASSROOM TECHNOLOGY

- A. Requirements determined at future meetings.
- B. As required, existing ceiling devices to be secured and suspended during construction and then reinstalled in new ceilings.

3.5 AUDIO/VIDEO SYSTEMS

- A. Not currently in this project scope.

ELECTRICAL NARRATIVE CONT.

B. As required, existing ceiling devices to be secured and suspended during construction and then reinstalled in new ceilings.

PART 4. ELECTRONIC SAFETY AND SECURITY SYSTEMS

4.1 ELECTRONIC DOOR ACCESS CONTROL

A. Electrical contractor is rough-in only and design is based on Architectural plans, specifications, and input from owner's access control provider.

B. Power connections shall be provided to new door access and security equipment, as required.

4.2 FIRE ALARM SYSTEM

A. In general, NOT in scope. To accommodate the remodel, existing devices may need to be relocated during construction and then reinstalled. As required, new devices may be added and connected to the existing system to accommodate the remodel and support new mechanical equipment.

B. The existing monitoring method shall remain as-is.

C. Automatic detection and notification will be provided as required.

D. Smoke detectors will be provided in supply and return air ductwork of air handling units rated 2,000 cfm or greater and within 5' of any and all fire-smoke dampers.

E. Addressable relays will be used for control of fire-smoke dampers and air handling equipment.

F. Addressable relays will be used for supervision of fire sprinkler valves and switches.

G. Manual fire alarm boxes will be located only where required by code to reduce false alarms.

PART 5. TECHNICAL CRITERIA

5.1 CODES AND STANDARDS

A. The following is a partial list of applicable codes governing the systems described herein:

1. International Building Code (IBC).
2. International Mechanical Code (IMC).
3. International Fire Code (IFC).
4. State of Minnesota Energy Code.
5. NFPA 70 National Electrical Code.
6. NFPA 72 National Fire Alarm and Signaling Code.
7. NFPA 101 Life Safety Code.
8. Americans with Disabilities Act (ADA).

B. The following is a partial list of design and installation standards governing the systems described herein:

1. BICSI Telecommunications Distribution Methods Manual.
2. IES Lighting Handbook, Tenth Edition.
3. International Electrical Testing Association (NETA) Standards.
4. National Electrical Contractors Association (NECA) Standards.

Respectfully,
CMTA, Inc.

Chris Hacker

