

Horace Mann Elementary School

Schematic Design Phase

DRC / SBC Meeting

March 13, 2024



Raymond
Design Associates





Agenda

Final Schematic Design Summary:

- **Programming & Design**
Space Program
Massing
- **Site Improvements**
Access, Parking and Traffic
Stormwater
Exterior Lighting
Accessibility
- **Building Systems**
Structural & Geotechnical
Building Envelope & Sustainability
MEP Systems



Horace Mann Elementary School

Proposed Agenda

SD

Project Introduction, Site Plan, Floor Plans, Elevations & Renderings

Site Plan, Floor Plans, Elevations, Building Systems & Materials, Energy Model

Building Systems & Materials, Energy Model, Sustainability, Building Envelope (Roof, Wall, Windows, etc.)

Building Envelope and Final Summary Review

DRC Schematic Design Approval

Site Plan Approval

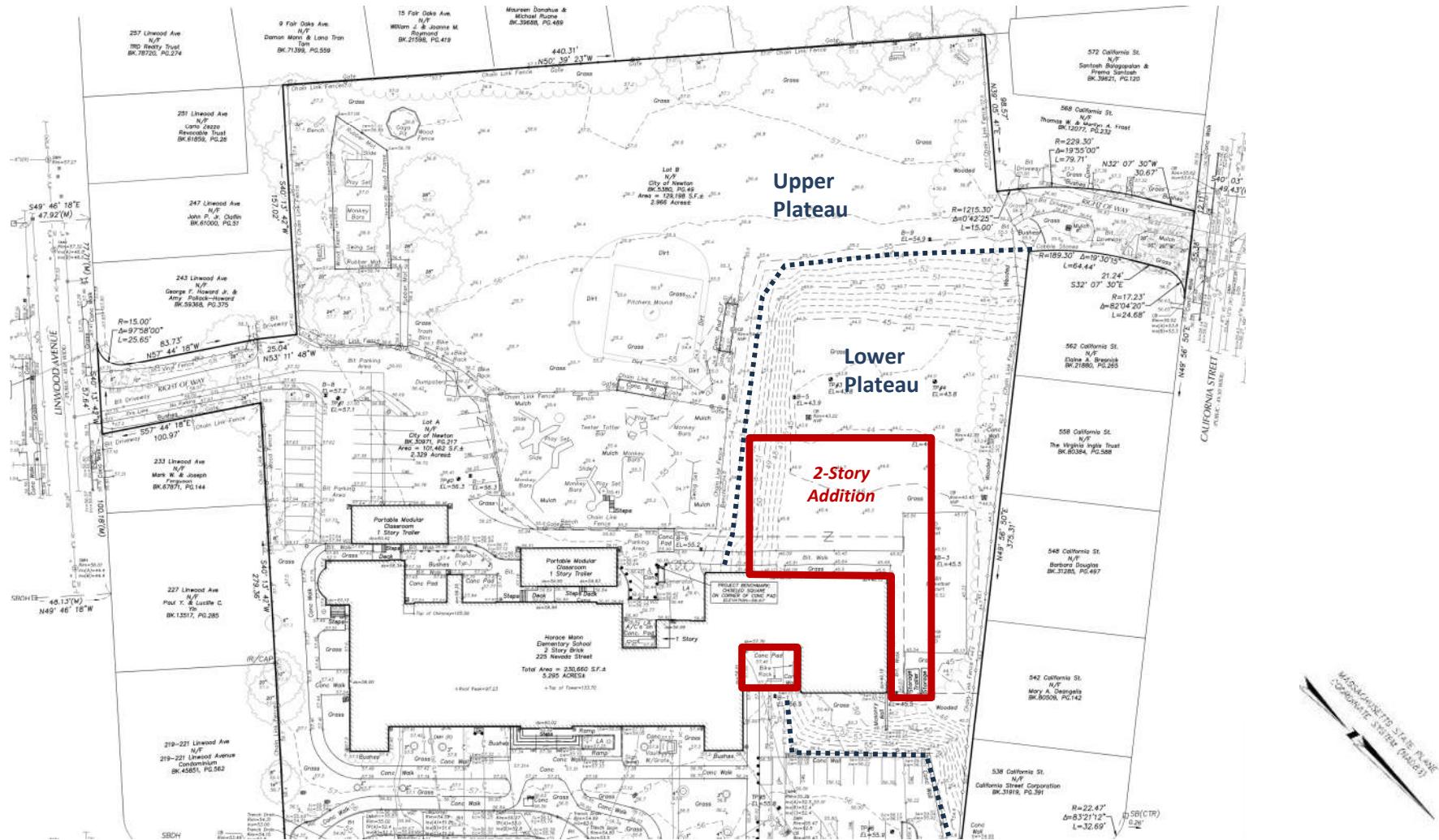
Proposed DRC/SBC Meeting Schedule



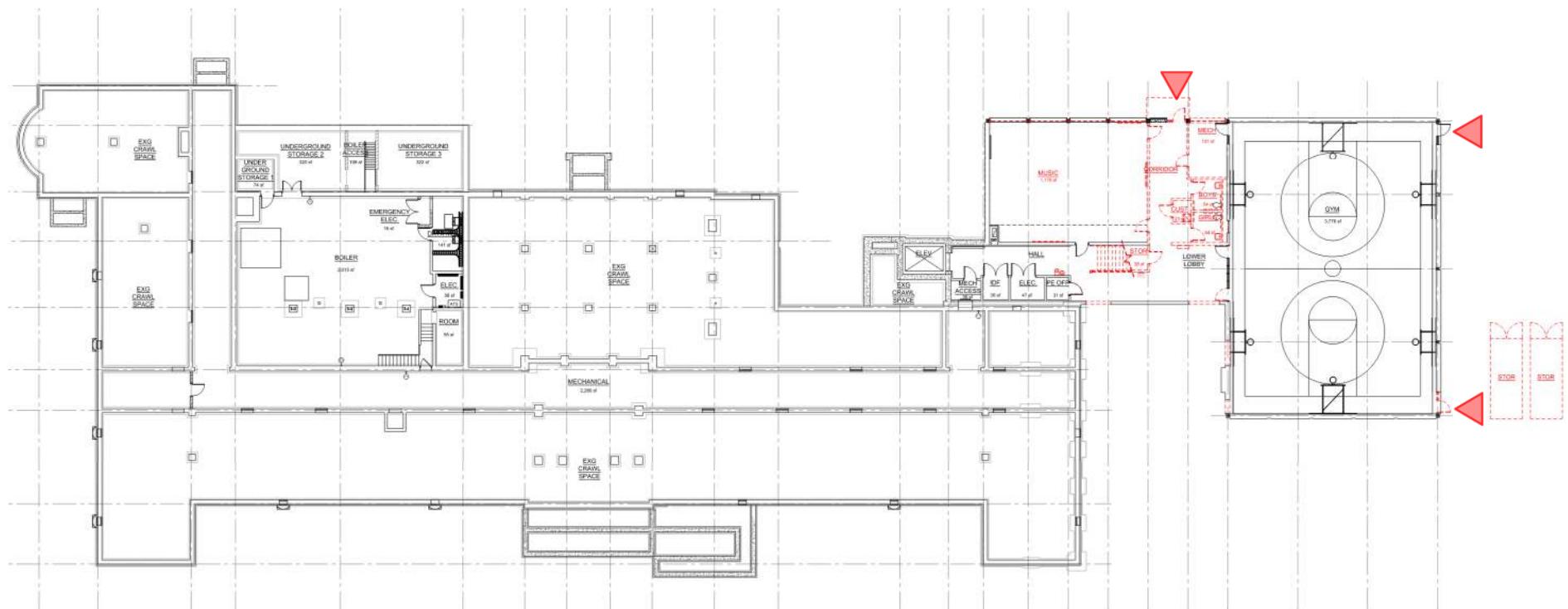
NV5

Programming & Design

Existing Site Conditions



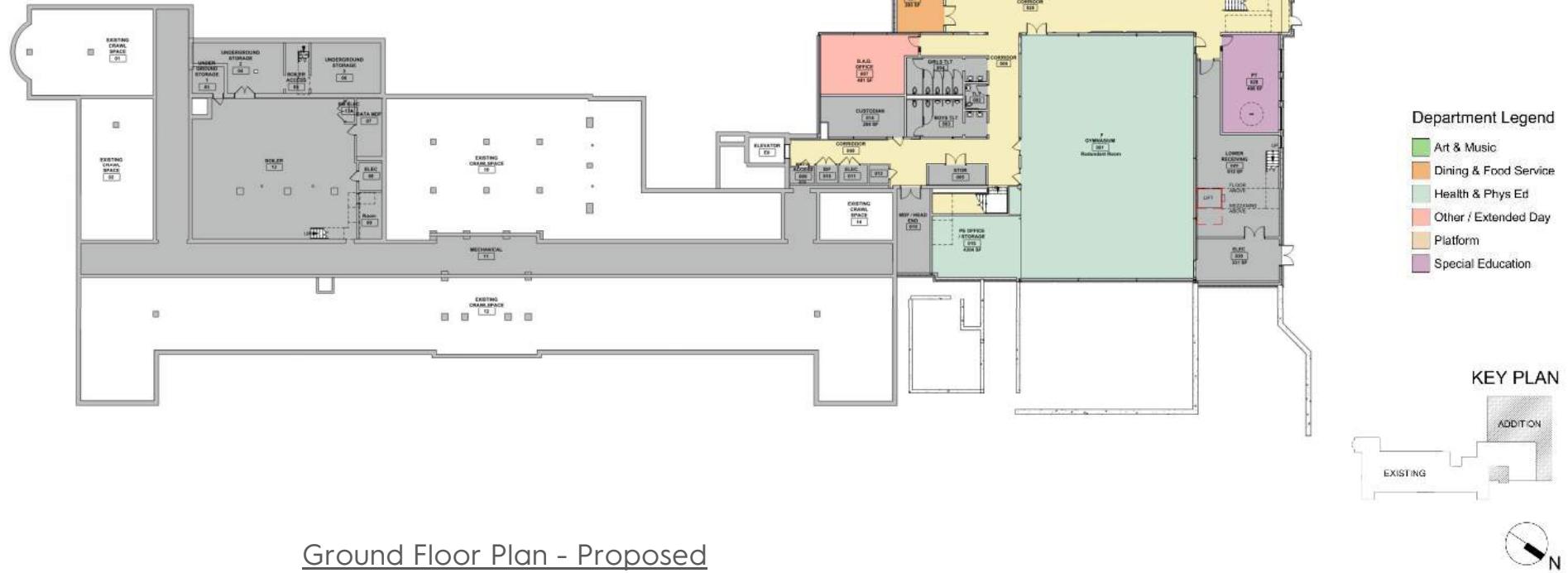
Existing Conditions / Demolition



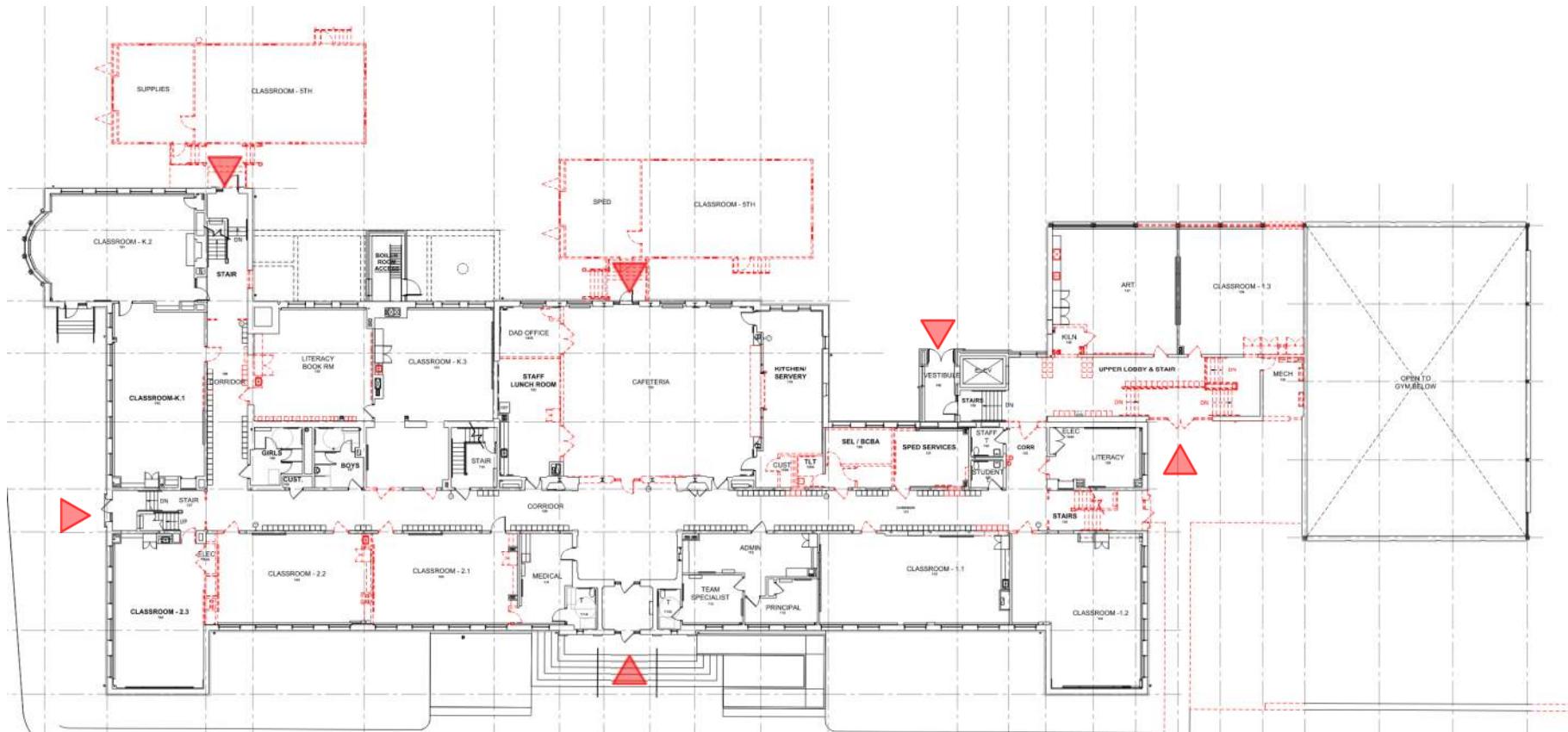
Ground Floor Plan

Ground Floor Programming Plan

Gymnasium & Cafetorium Locations



Existing Conditions / Demolition



First Floor Plan

First Floor Programming Plan

Early Elementary Neighborhoods
+ Activation of Ground Floor
Supports Collaboration & Connection
and Clusters of Learning



Department Legend

- Admin & Guidance
- Art & Music
- Core Academic Spaces
- Dining & Food Service
- Media Center
- Medical
- Special Education
- Support Services

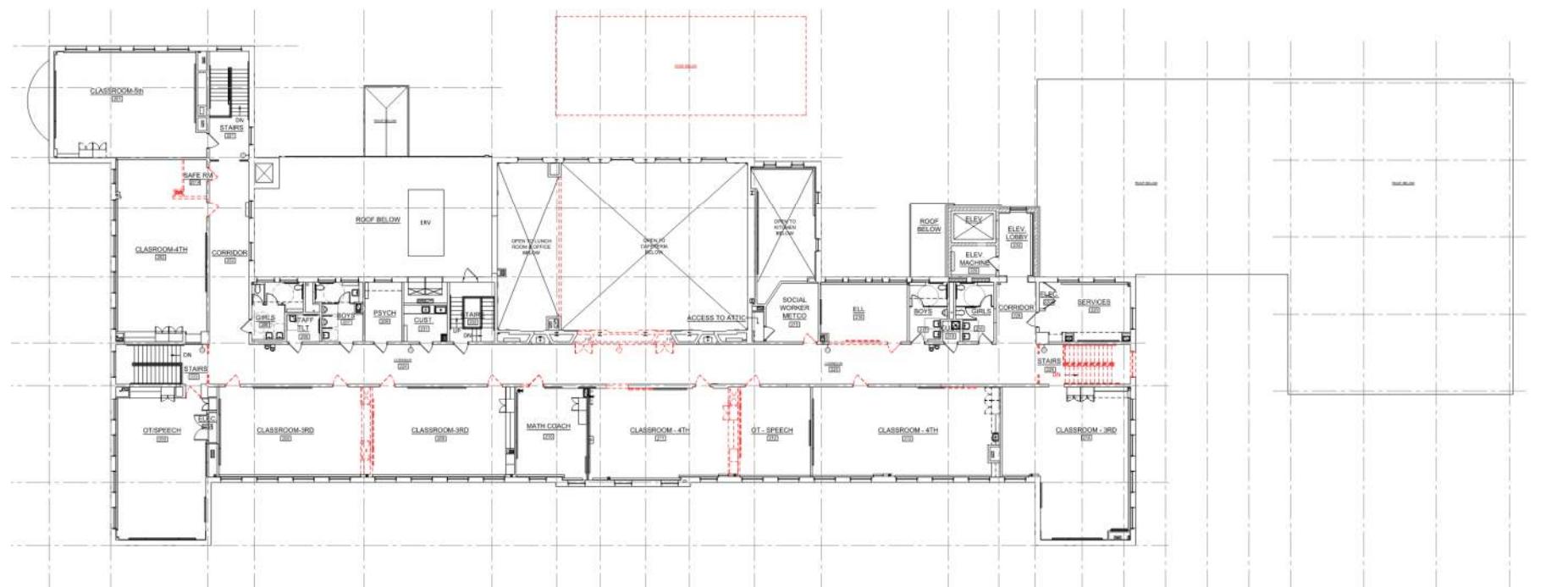
KEY PLAN



New Entry & Early Elementary Neighborhood
Supports Welcoming Arrival

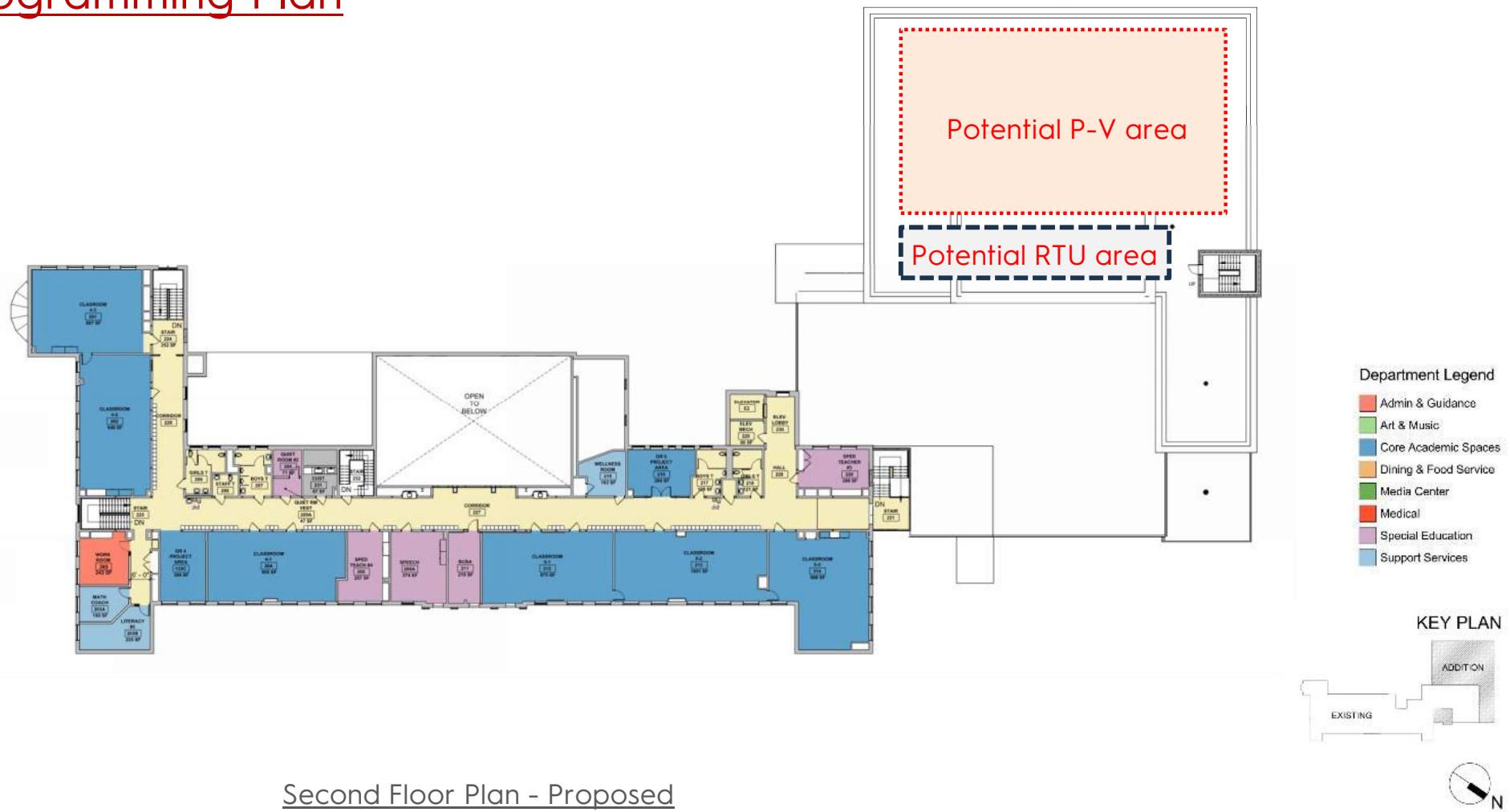
First Floor Plan - Proposed

Existing Conditions / Demolition



Second Floor Plan

Second Floor Programming Plan



Horace Mann		Existing Conditions				SD Option D.9.3	
ROOM TYPE	Location	ROOM NFA ¹	# OF RMS	Area Totals	DESIGN PROGRAM	Final Location	Square Footage at Completion

LITERACY CENTER / BOOK ROOM - While the space as shown at 766sf is below the target value of 900sf, this was discussed with and approved by the HM team. The smaller size is partially offset by the slightly oversized Literacy Specialist space which is 222sf versus the 175sf goal.

Literacy #1: Literacy Center / Book Room	Rm 142	704	1	704	900	Addition	766
Literacy #2: Literacy Specialist	Rm 124	269	1	269	175	EXIST. LIBRARY	222

GYMNASIUM - This was something we discussed early and often. Mark and his team felt that the gym was adequate, but that additional storage and a PE office would be needed. You'll see that we were generous with the PE office/storage at 474sf which is larger than what we have at Angier, Zervas, Cabot, Countryside, Franklin, and Lincoln-Eliot.

HEALTH & PHYSICAL EDUCATION				3,776	6,300		4,250
Gymnasium	Rm 001	3,776	1	3,776	6,000		3,776
Gym Storeroom	n/a	—			175	small Addition	474
Health Instructor's Office	Rm 012	—			125	included in above	

CAFETORIUM - The cafe is shown at 2,793sf, but lunch bunch at 153sf should be added to this size for comparison to the MSBA size recommendations. The total cafe size of 2,946sf for HM compares to the MSBA target of 2,970sf.

This wasn't done to shortchange HM by 24sf, but rather to align the cafe dimensions with the rest of the addition. We strived to maintain the cafe as close to the 2,970sf as possible because the gym is on the smaller end so that it can host large events.

DINING & FOOD SERVICE				2,756	6,200		6,069
Cafeteria / Dining	Rm 118	1,838	1	1,838	2,970	Addition	2,793
Lunch Bunch	n/a	—			150	Addition	153

PRINCIPAL'S OFFICE - In the MSBA space guideline, this space is called "Principal's Office with Conference Area." This is why the space would normally be 375sf-425sf. For HM, you'll notice that while the Principal's Office is 169sf, the conference room is 180% oversized at 405sf which helps make this plan work. This was reviewed with Mark and he is supportive.

ADMINISTRATION & GUIDANCE				1,172	1,713		2,199
Principal's Office	Rm 114	155	1	155	375	Rm 113	169
Conference Room	n/a	—			225	Rm 120 - 121	405

Like all Newton projects, the numbers will change slightly as we move the design forward. This means that we have the flexibility to refine the design and space sizes as we advance the design. We will keep the SC updated as the design advances through the various stages.

Front Accessible Entrance to Stair Addition



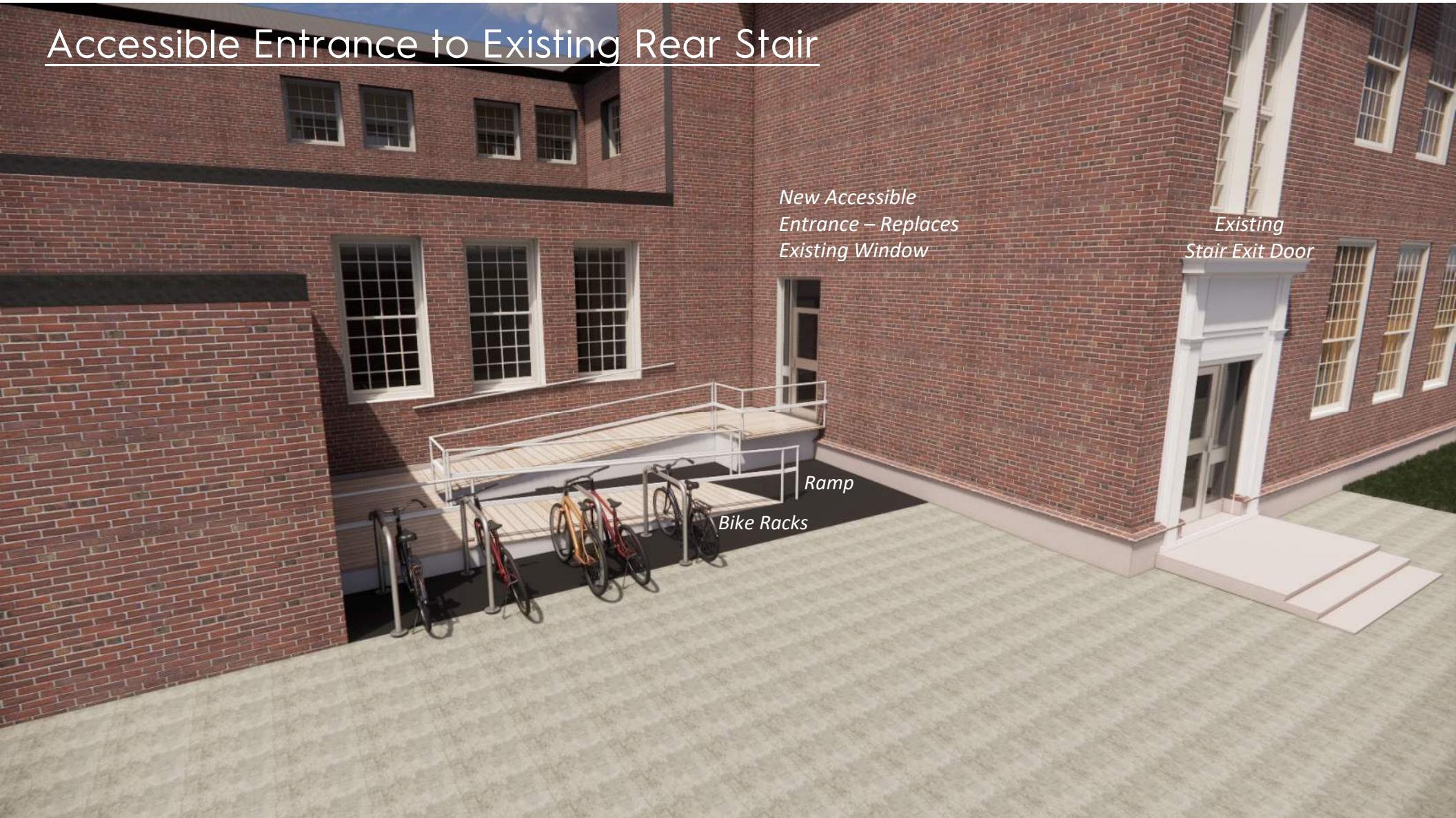
RDA

Front Accessible Entrance to Stair Addition



RDA

Accessible Entrance to Existing Rear Stair



Rear Entrance to Addition



RDA

Rear Entry Ramp



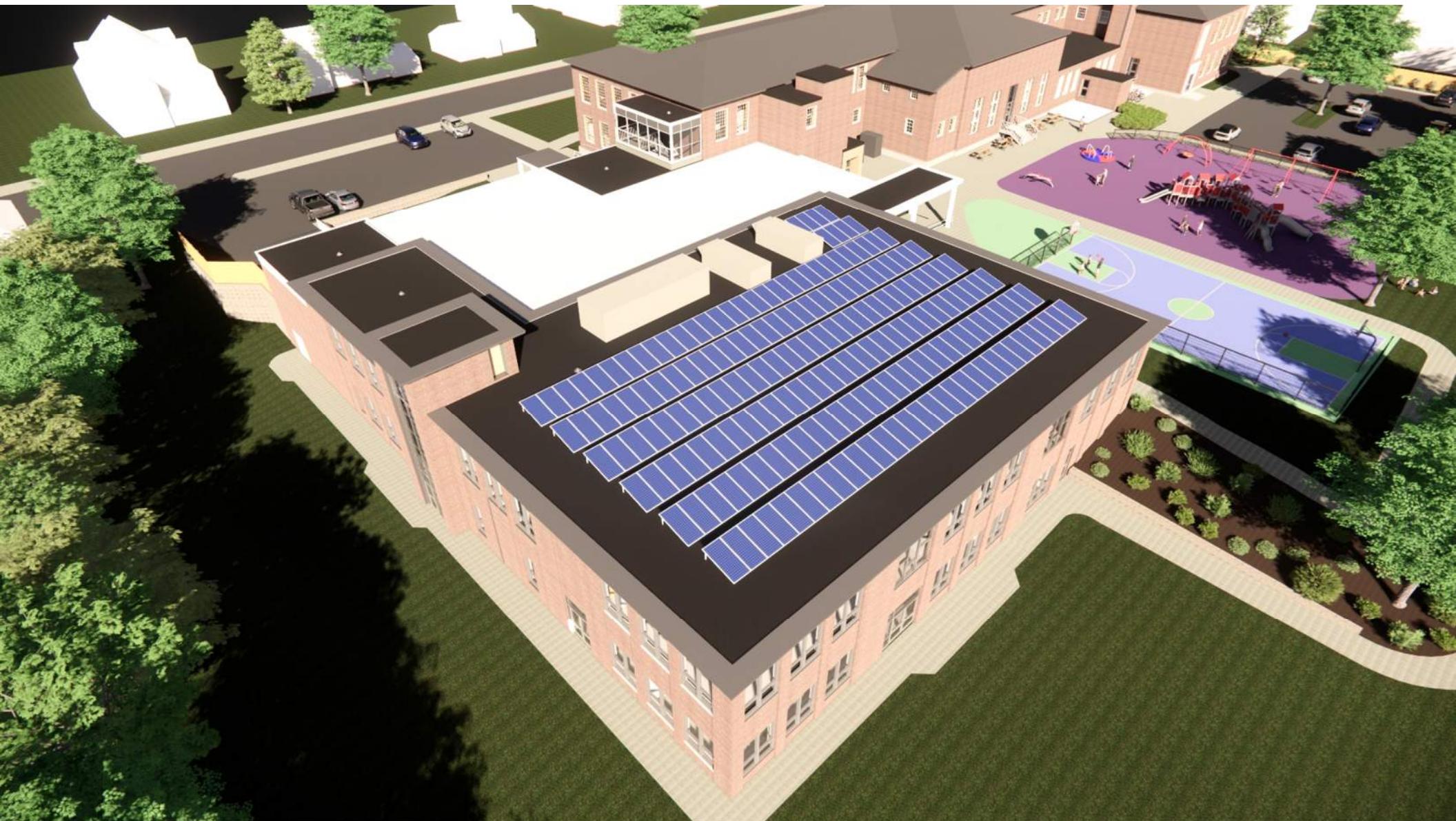
Cafeteria



Cafeteria



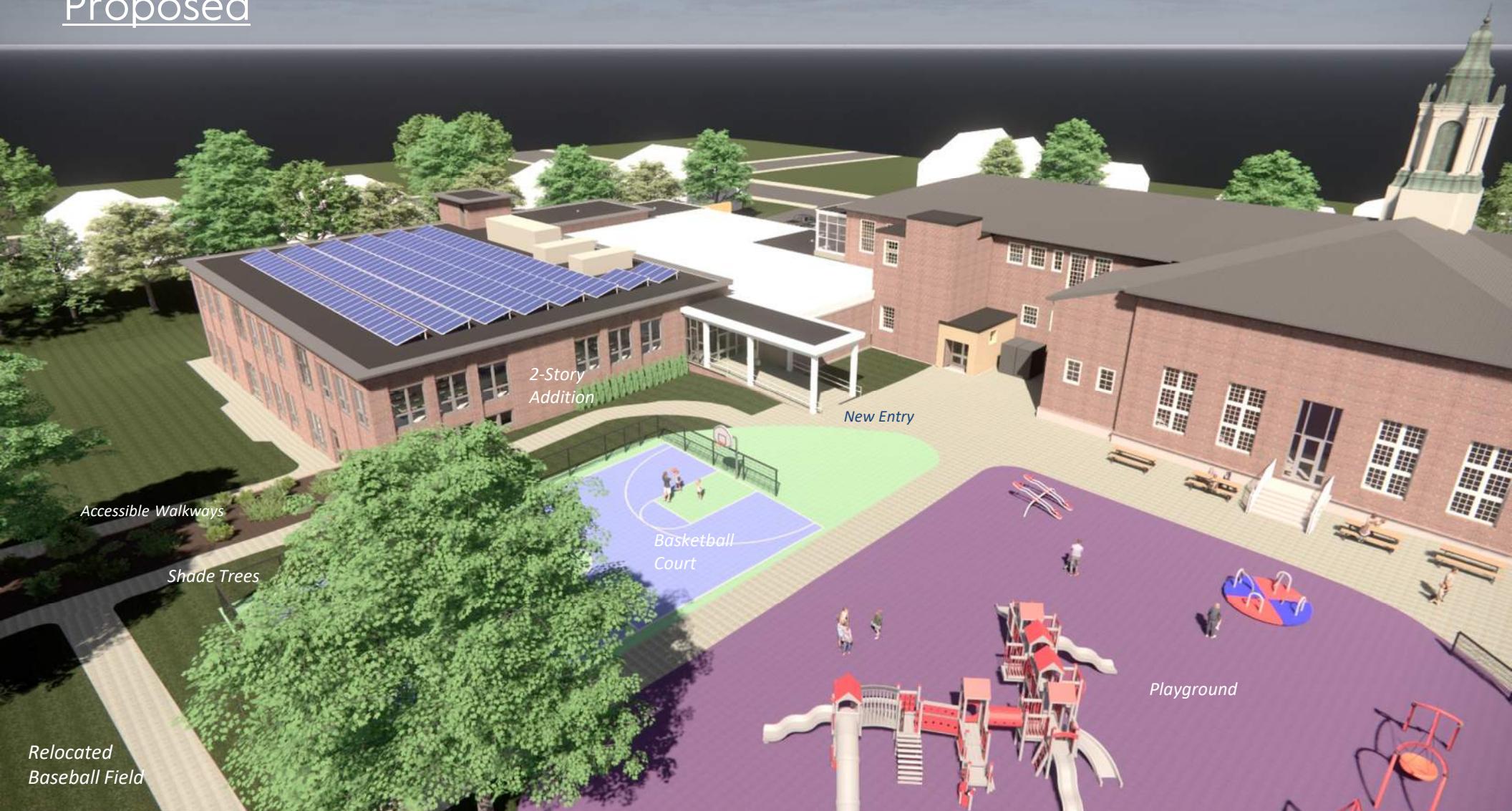




Existing



Proposed



Site Design / Site Plan Approval

Access, Parking and Traffic

Stormwater

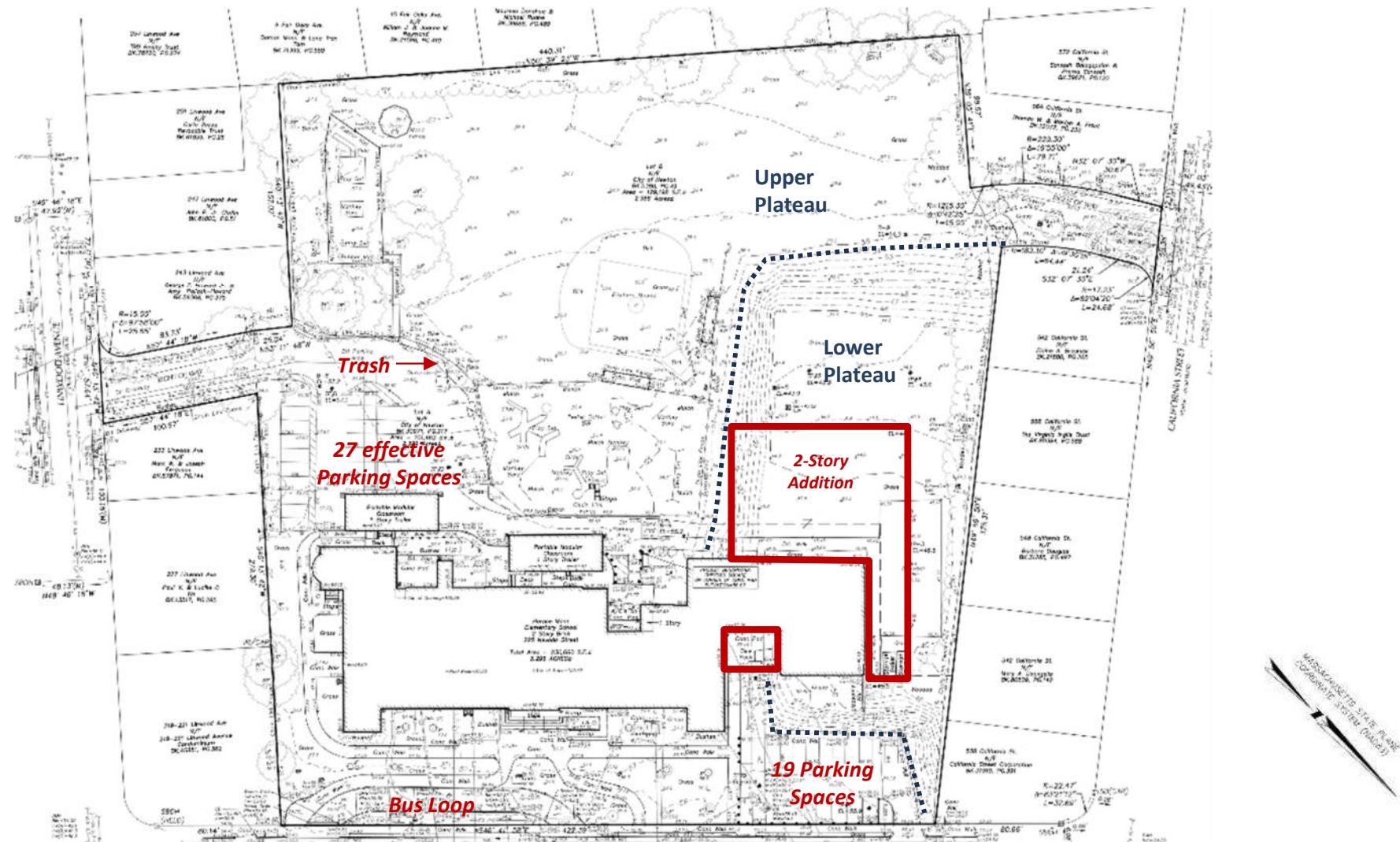
Exterior Lighting

Massing

Building Envelope & Sustainability

Accessibility

Existing Conditions

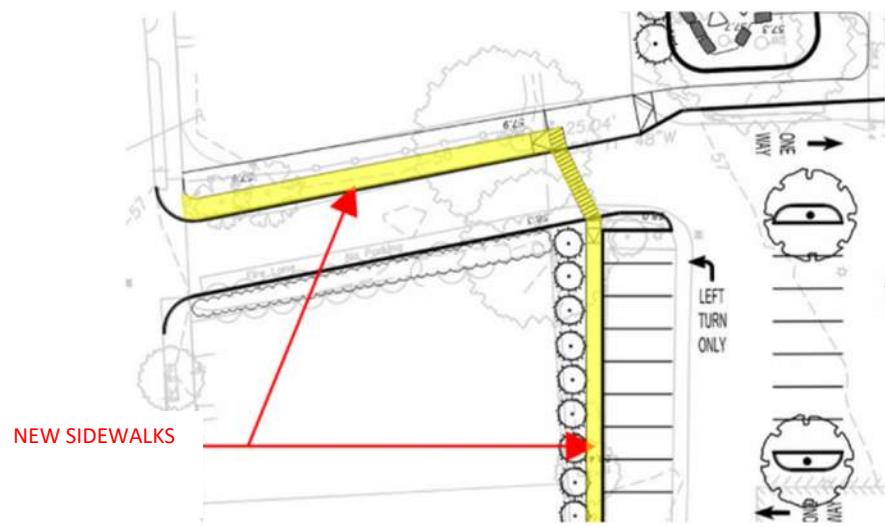


Site Improvements



- Emergency Access
- On-Site Parking (no net loss)
- Exterior Lighting
- New PIP Playground
- Hardsurface Play
- Relocated BB Field
- Retained Sledding Hill
- Accessibility
- Trees & Vegetation

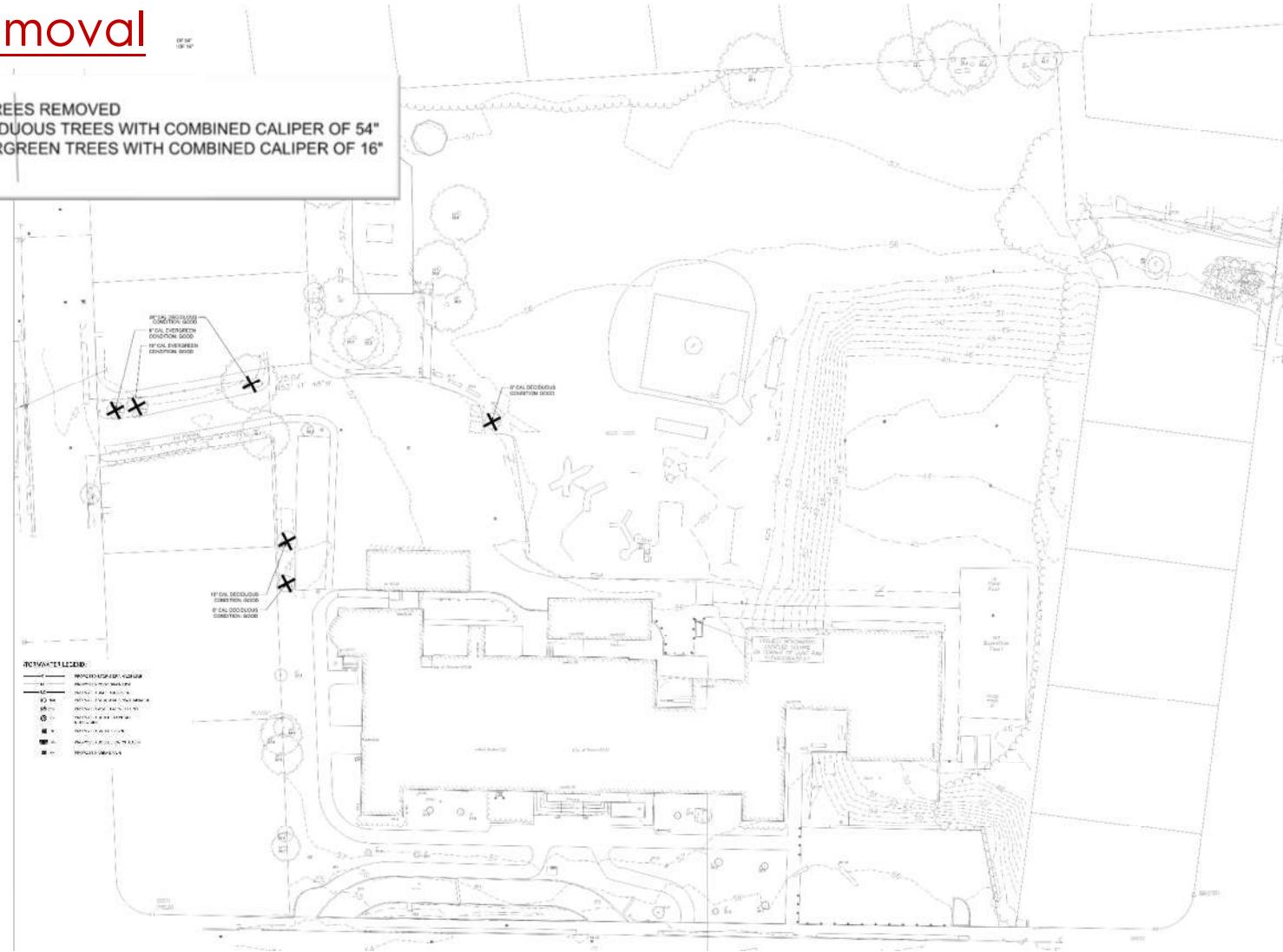
Linwood Ave Access Drive



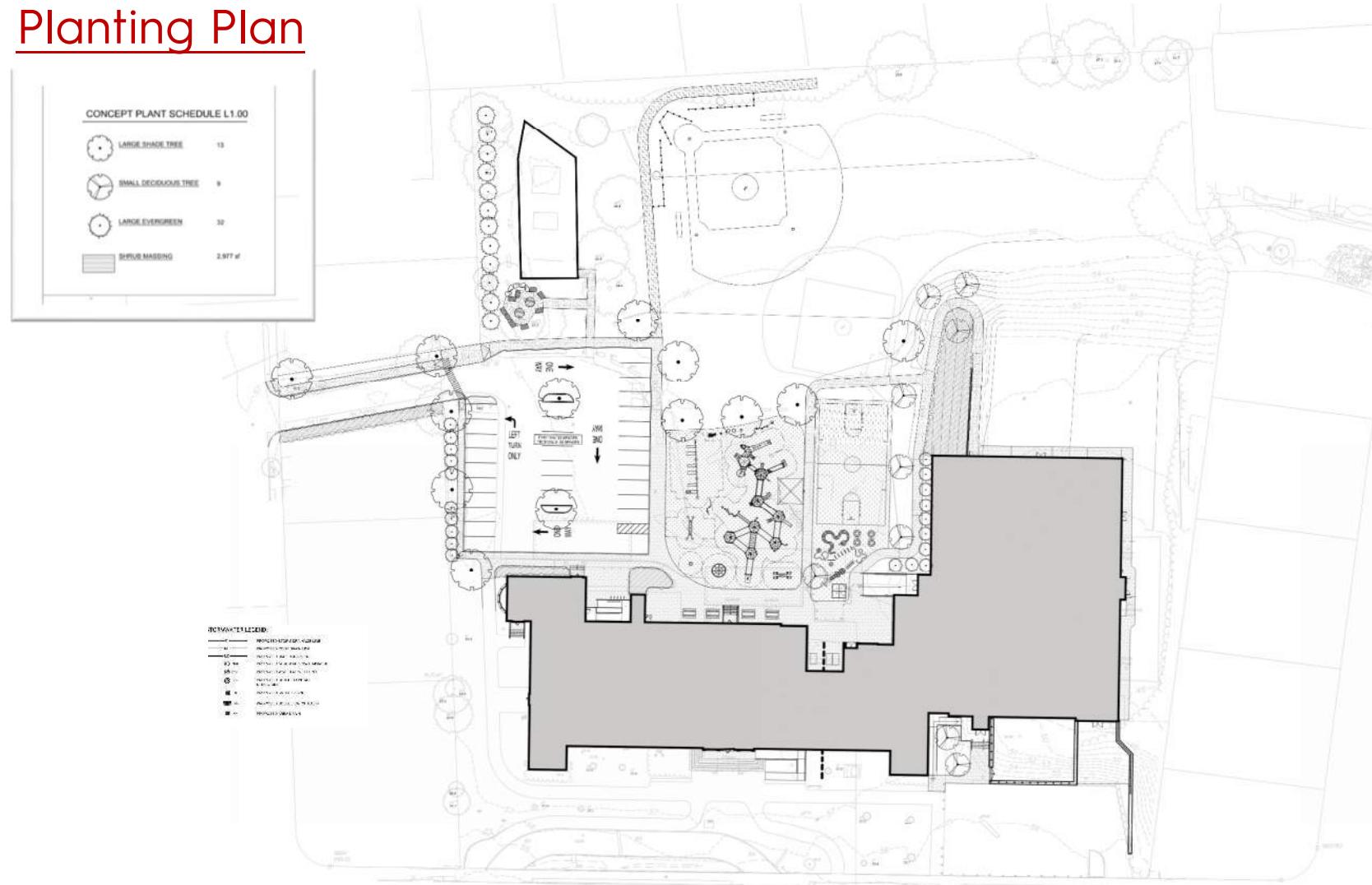
Tree Removal

(6) TOTAL TREES REMOVED

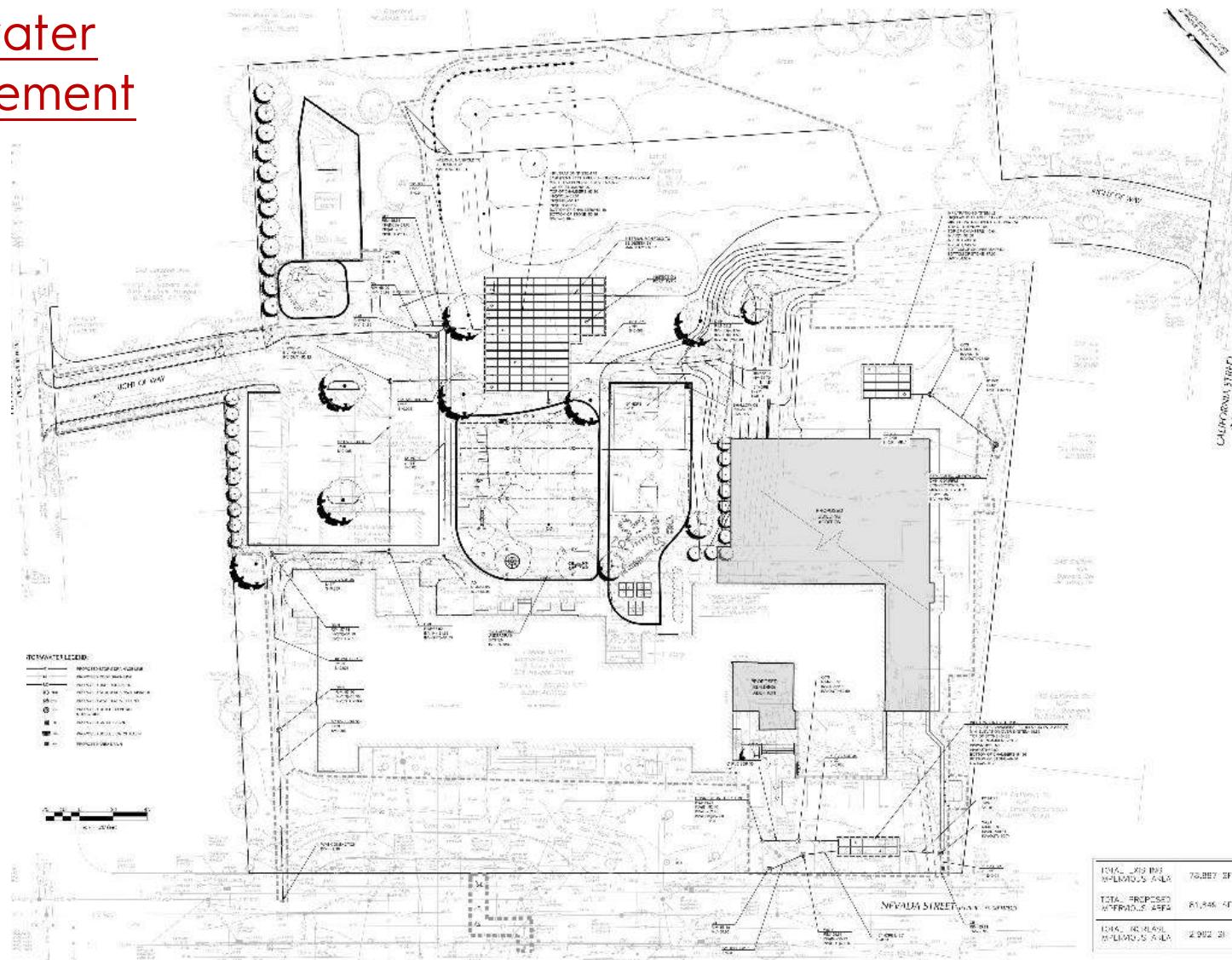
- (4) DECIDUOUS TREES WITH COMBINED CALIPER OF 54"
- (2) EVERGREEN TREES WITH COMBINED CALIPER OF 16"



Planting Plan



Stormwater Management



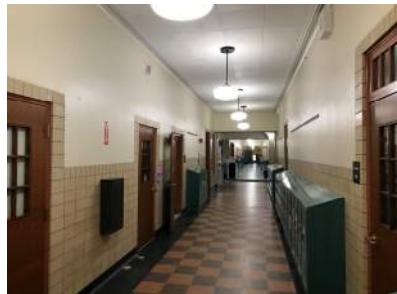
Building Systems

Structural Systems
Building Envelope & Sustainability Goals
MEP Systems

STRUCTURAL SYSTEMS

Renovation Area:

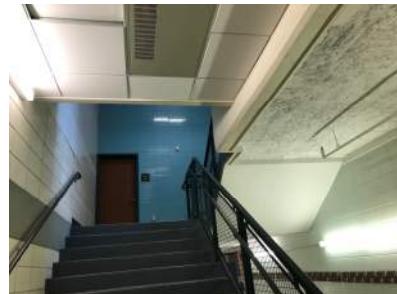
- Code Implications
- Level II Alterations



Modify Existing Openings



Stair Demo & Infill



Stair Demo & Infill

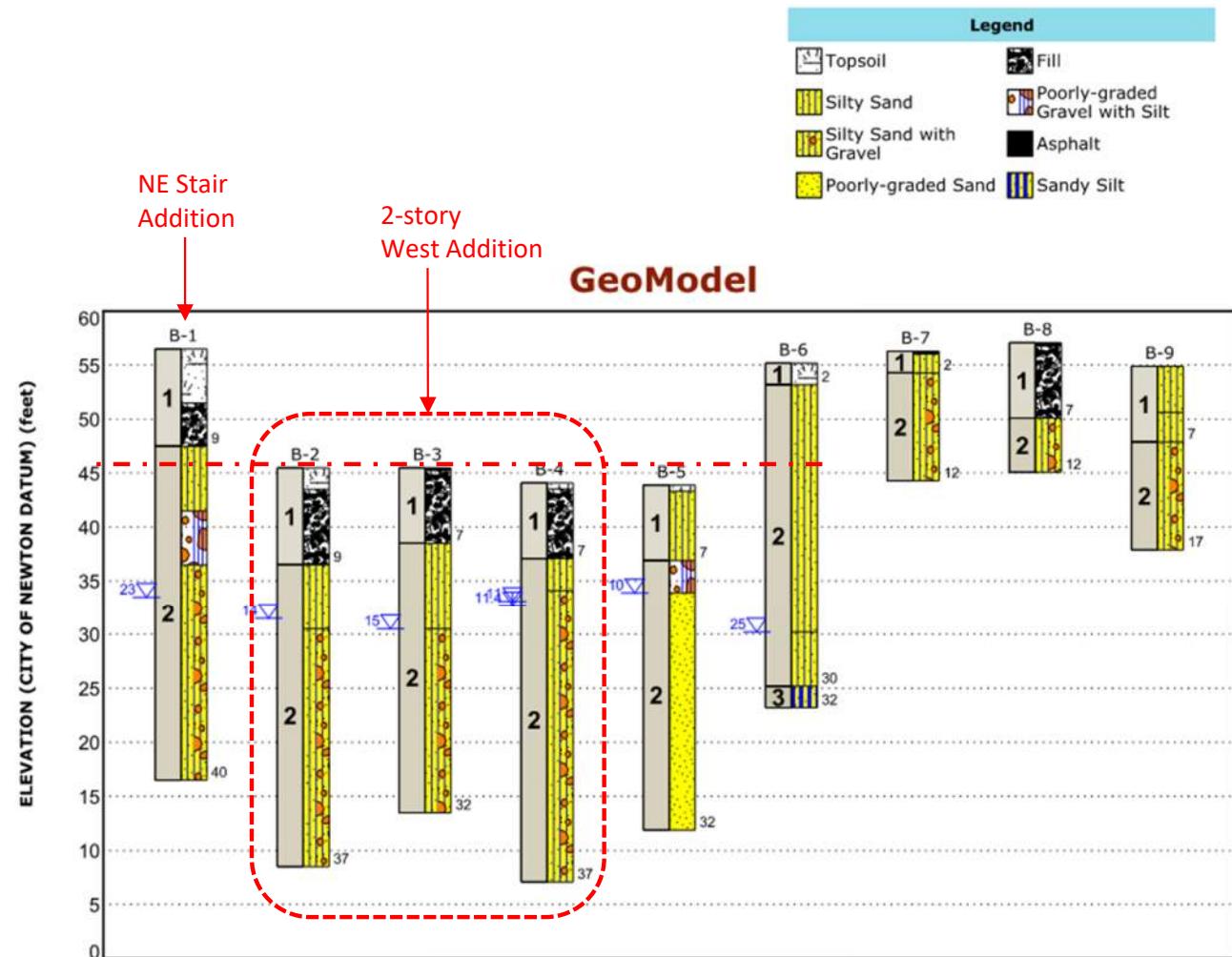
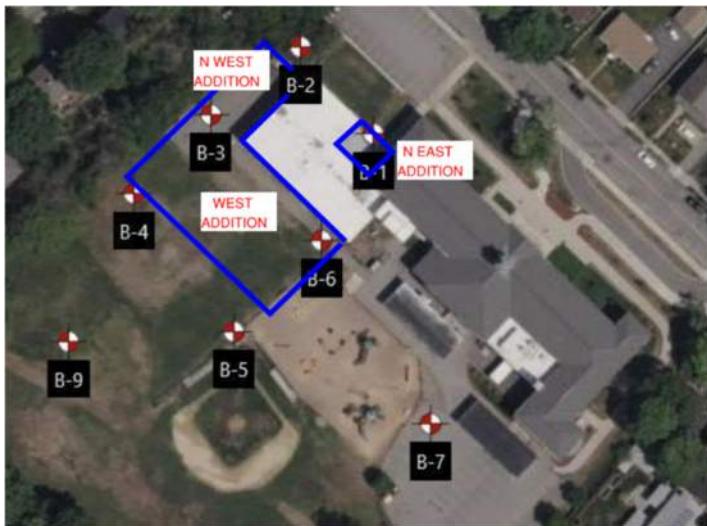


First Floor Demo Plan

STRUCTURAL SYSTEMS

New Work / Additions:

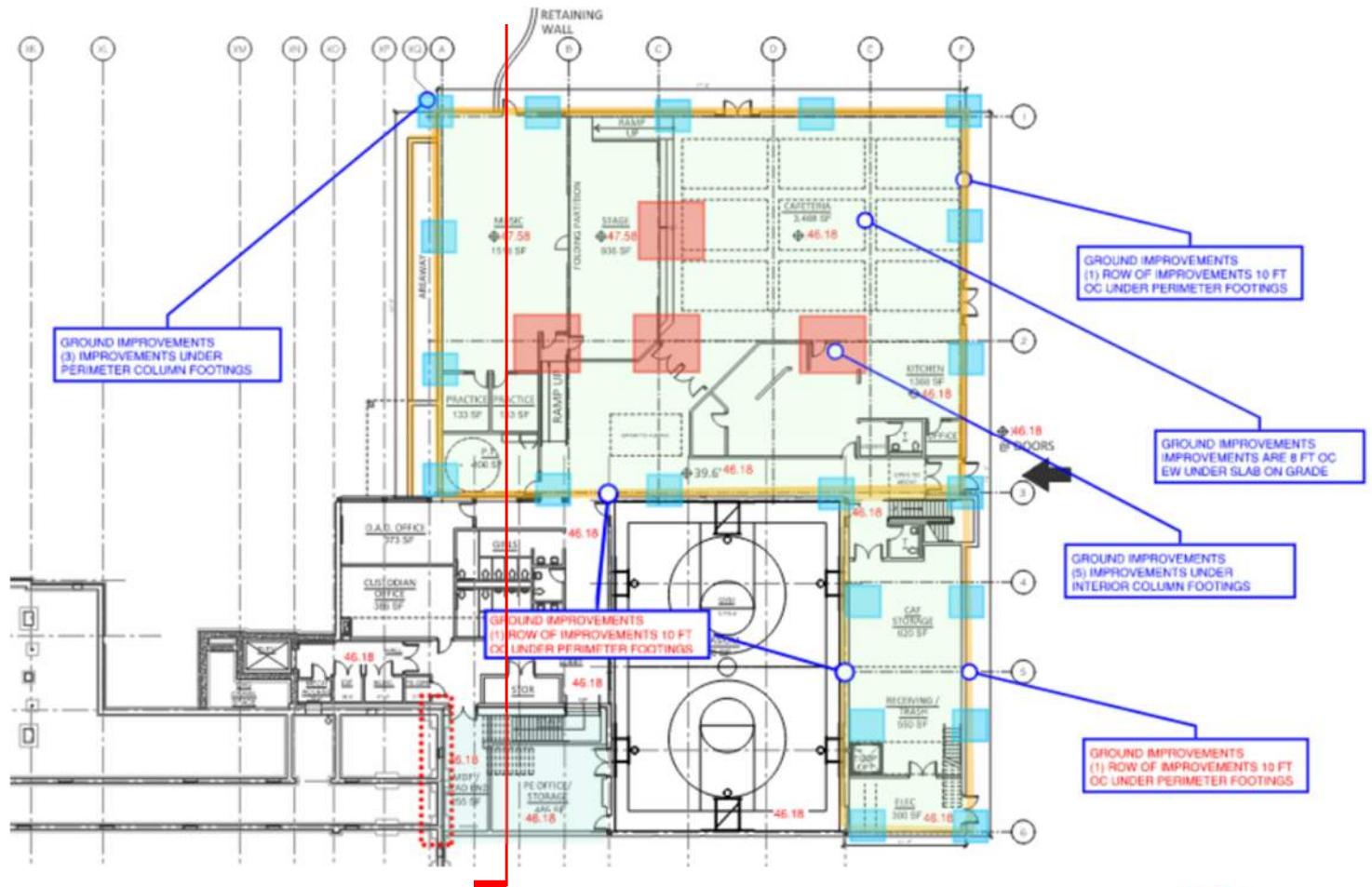
- Geotechnical Findings



STRUCTURAL SYSTEMS

New Work / Additions:

- Proposed Foundations

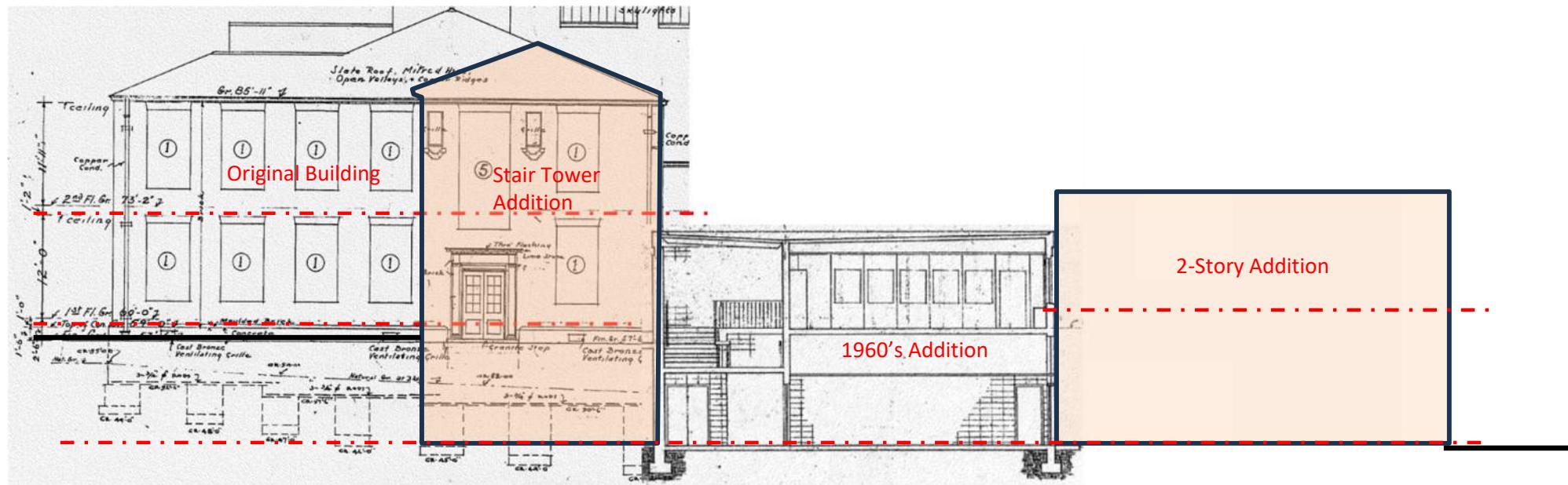


Building Section

STRUCTURAL SYSTEMS

New Work / Additions:

- Sustainability
- Foundations / Underpinning
- Floor Framing

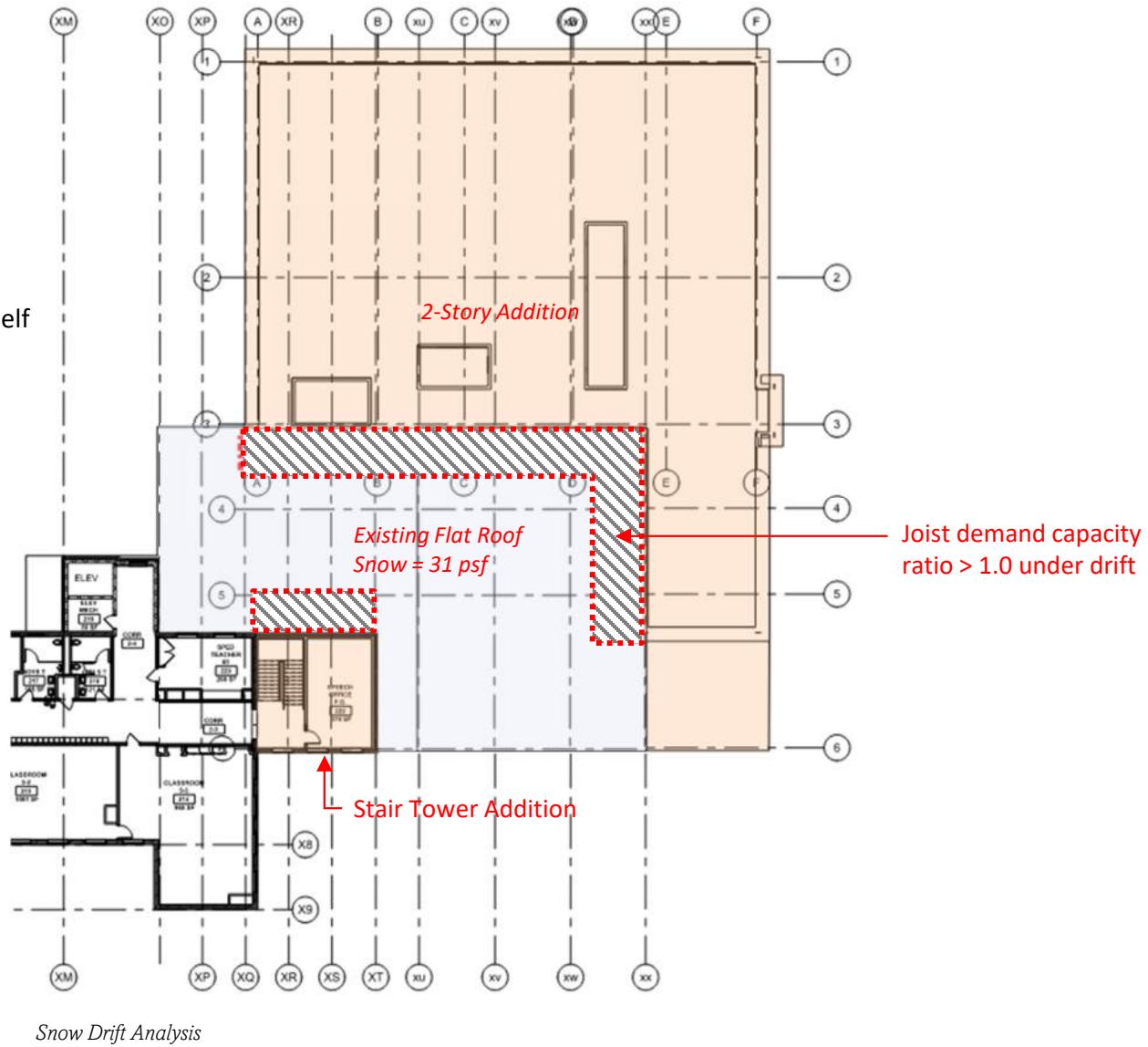


Building Section

STRUCTURAL SYSTEMS

New Work / Additions:

- Roof Framing
- Snowdrift



Sustainability Goals & Requirements

1. Massachusetts Stretch Code and Specialized Code Community
2. Newton's Approach to Sustainable School and Municipal Buildings
3. LEED for Schools



Specialized Code

Municipalities must vote to opt in to the Specialized Code. The code takes effect 6-11 months after adoption.

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IECC 2021
+ MA amendments
+ Stretch Code amendments
+Specialized Code appendices

Thornton **Tomasetti**

MA Energy Stretch and Specialized Code

1. New Construction Addition: Stretch Code and Specialized Code

- Targeted Performance Compliance pathway or Passive House certification
 - ≈R-50 roof, ≈R-25 wall, minimize thermal bridging, triple glazing, low air leakage, ≈80% effective air-to-air energy recovery
- Code minimum envelope via “Component Performance Alternative”
- C406 Additional Efficiency Requirements – 15 credits
- Specialized Code 3 pathways:
 - Zero Energy
 - All-Electric
 - Mixed Fuel

2. Existing Building Renovation: Stretch Code only

- Code minimum prescriptive requirements for altered portions only

Thornton Tomasetti

Memorandum

TO Raymond Design Associates, Inc.
FROM Thornton Tomasetti
DATE August 7, 2023
RE Horace Mann Elementary School MA Energy Stretch and Specialized Code Preliminary Assessment

New Construction Addition

To meet the energy efficiency requirements, the addition portion of the project will be required to comply with either the C401.2.1 Targeted Performance Compliance pathway or C401.2.2 Passive House Compliance pathway.

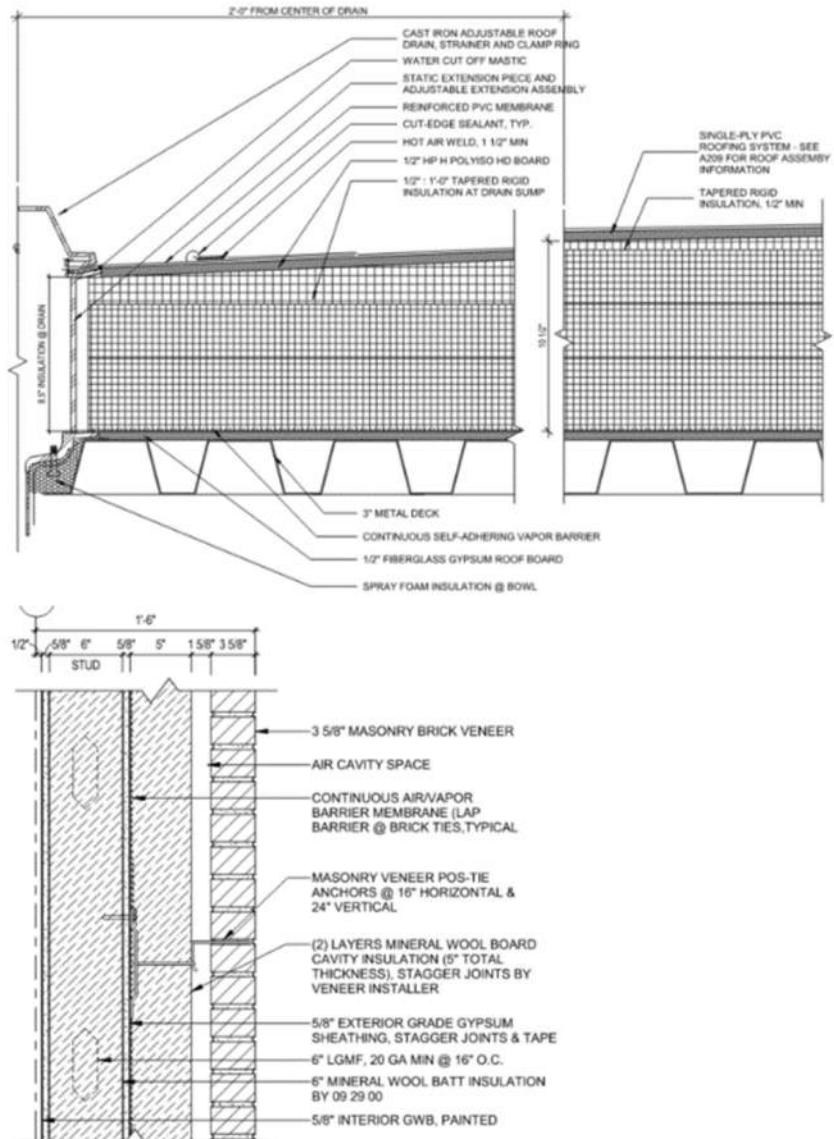
C401.2.1 Targeted Performance Compliance pathway: This pathway is required for schools larger than 20,000 ft² and have an average ventilation at full occupancy of 0.5 cfm/ft² or less. The heating thermal energy demand intensity (TEDI) target is 2.4 kBtu/ft²/yr and the cooling TEDI target is 20 kBtu/ft²/yr. To meet these stringent performance targets, we recommend the design team to target the following design parameters:

- =R-50 roof – this will mean a roof thickness of not less than 10 inches. Additional roof thickness may be required to provide slope to drain.
- =R-25 wall – This will result in approximately 6 inches of continuous mineral wool insulation in the wall cavity.
- Triple glazing windows – The project should also consider a double low-e coating on the triple glazing.
- Energy recovery ventilator (=80% effectiveness) providing ventilation for all spaces
- Heat recovery for kitchen exhaust (=50% effectiveness)
- Building envelope infiltration (air leakage) of 0.10 cfm/ft² at 75 Pa – This will require close attention to details between adjacent systems both in the design and construction process.

Please note the above parameters are not prescriptive for compliance; they are suggested preliminary recommendations to guide early design decisions in the feasibility phase. An energy model is required to confirm the actual performance required for compliance.

Existing Building Renovation

For the renovation portion of the project, the Stretch Code requires altered portions of an existing building to comply with requirements of Section 503 (of 2021 IECC) and the prescriptive sections C402 (envelope), C403 (mechanical), C404 (water heating) and C405 (electrical) without requiring unaltered portions of an existing building to comply. The renovation does not require an energy model.



HVAC SYSTEMS

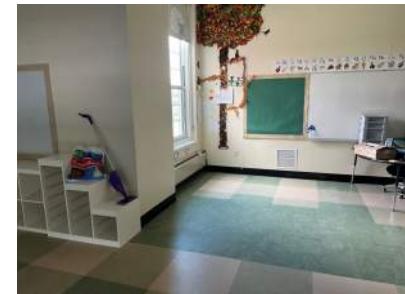
Scope of Work Summary:

Renovation Area:

- Reuse & renovate existing system
- Heating: HW Boiler plant (2013) serves radiation heating
- Ventilation: Heated ventilation air (w/o cooling) via ERV unit (2013) & overhead ducted systems
- Air Conditioning: Air source VRF (2019)
- ATC Controls: Delta Controls DDC System (2013, 2019)
- Provide HVAC modifications for Renovation areas
 - For Renovation Walls - Ductwork and piping relocations
 - Perimeter fin tube reconfigured for new room layouts.



Hot Water Boiler Plant



Perimeter FTR Heating



Rooftop Ventilation Unit



Attic - Ventilation Ductwork



VRF Heat Pump Units (Typical Indoor Units @ Left & Outdoor Units @ Center & Right)

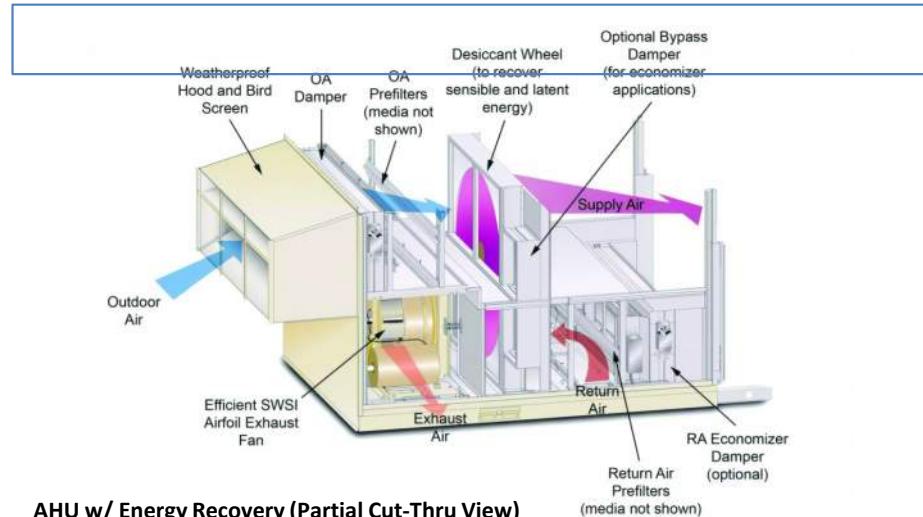


HVAC SYSTEMS

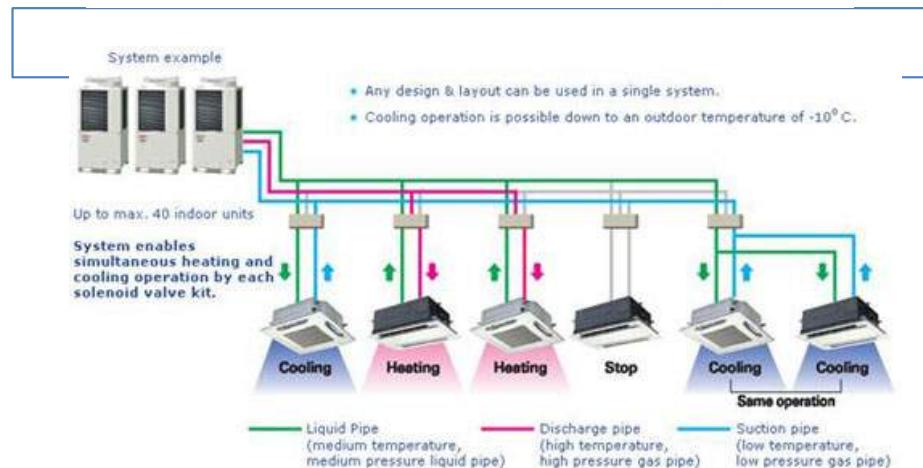
Scope of Work Summary:

Addition:

- Heating & Air Conditioning: Air Source Heat Pump VRF System
 - Indoor VRF units (combination ducted & ductless)
 - Minimize use of supplemental electric heat
- Ventilation: AHUs w/ Air Source Heat Pump heating cooling & supplemental (back up) electric heat and Energy Recovery:
 - VAVs for Demand Ventilation Control
 - New Units
 - Admin/Classrooms
 - Cafeteria
 - Gym
- Controls
 - Connect to existing BMS



AHU w/ Energy Recovery (Partial Cut-Thru View)



Air Source VRF Diagram

ELECTRICAL SYSTEMS OVERVIEW

- New electrical service and distribution equipment with back-feed to the existing building service equipment.
- New diesel generator with sound-attenuated enclosure.
- High-efficiency lighting system and networked Automated Lighting Control System
- Expansion of existing fire alarm system
- New Public Safety Radio Distributed Antenna System (DAS) to support addition and existing building.
- Electric Vehicle Charging Equipment (EVSE) stations.



New Utility Transformer



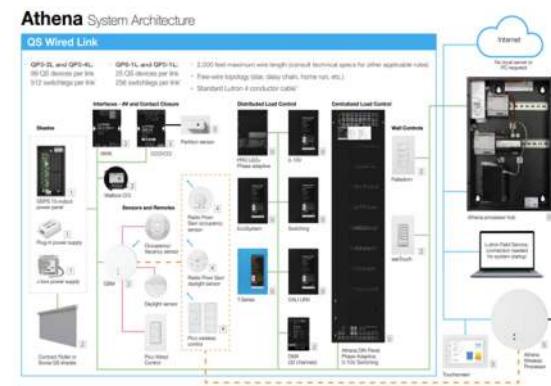
New Service Equipment



New Diesel Generator



New Lighting



New Automated Lighting Control System

FIRE PROTECTION SYSTEMS

Existing Building

- modify existing fire protection

Addition

- extend existing fire protection system



Existing Sprinkler Zone Control Valves



Existing Sprinkler Service Valves

PLUMBING SYSTEMS

Existing Building

- modify existing sanitary, vent, water, and storm piping

Addition

- new storm, sanitary, & kitchen shall be provided. Cold water shall connect to existing.



Manual Flush Valve
1.28 gpf Water Closet



Manual Flush Valve
0.125 gpf Urinal



Battery Sensor Faucet
0.07 Gallons per cycle



Drinking fountain
w/bottle filler

Questions & Comments



Raymond
Design Associates

N|V|5