VIII. Appendices

A. Renderings

View of main entrance

View along existing 900 wing

TSKP STUDIO

View of after-hours entrance

View along eastern edge of property

TSKP STUDIO

View along eastern edge of property - evening

View of eastern classroom wings

View along main north-south axis

View along east-west axis looking down on cafeteria

VIII. Appendices

B. Illustrative Plans

TSKP STUDIO

Main Building - First Floor Plan

Main Building - Second Floor Plan

TSKP STUDIO

Main Building - Third Floor Plan

Renovated 900 Wing

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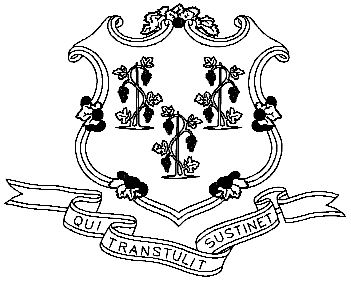
VIII. Appendices

C. Technical Drawings

STATE OF CONNECTICUT



DANIEL P. MALLOY, GOVERNER

DEPARTMENT OF PUBLIC WORKS
JAMES T. FLEMING
COMMISSIONER

DEPARTMENT OF CONSTRUCTION SERVICES
DONALD DEFRONZO
COMMISSIONER

FARMINGTON HIGH SCHOOL

STATE PROJECT NUMBER XXX

27 MAY 2020
SCHEMATIC DESIGN
VOLUME 1 OF 1

XXXX - CONSULTANT

XXXX - CONSULTANT

XXXX - CONSULTANT

XXXX - CONSULTANT

DRAWING LIST

LOCATION PLAN

APPROVALS

PUBLIC WORKS DATE

AGENCY DATE

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FARMINGTON HIGH SCHOOL

Farmington, CT

SCHEMATIC DESIGN DOCUMENTS

KEY PLAN

DRAWING TITLE

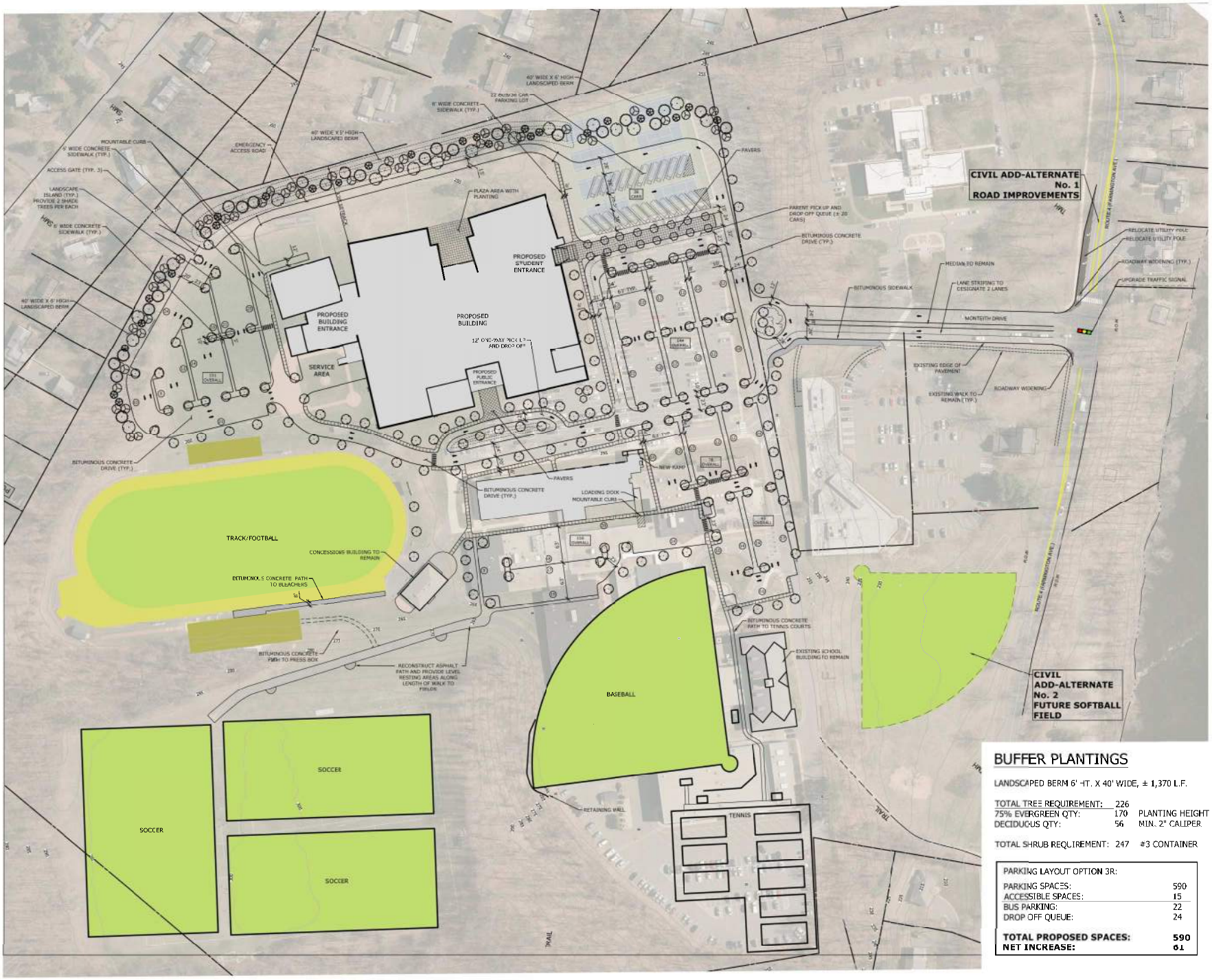
ILLUSTRATIVE SITE PLAN

STATE PROJ. NO.	
PROJ. NO.	19070/1
SCALE	
DATE	27 MAY 2020
DRAWN BY	Author
APPROVED BY	Approver

ISSUE DATES

NO.	DATE	PURPOSE

C1.0



BUFFER PLANTINGS

LANDSCAPED BERM 6' HT. X 40' WIDE, ± 1,370 L.F.

TOTAL TREE REQUIREMENT:	226	
75% EVERGREEN QTY:	170	PLANTING HEIGHT MIN. 6'
DECIDUOUS QTY:	56	MIN. 2" CALIPER
TOTAL SHRUB REQUIREMENT:	247	#3 CONTAINER

PARKING LAYOUT OPTION 3R:	
PARKING SPACES:	590
ACCESSIBLE SPACES:	15
BUS PARKING:	22
DROP OFF QUEUE:	24
TOTAL PROPOSED SPACES:	**590**
NET INCREASE:	**61**

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NEW CONSTRUCTION PRICING DOCUMENTS

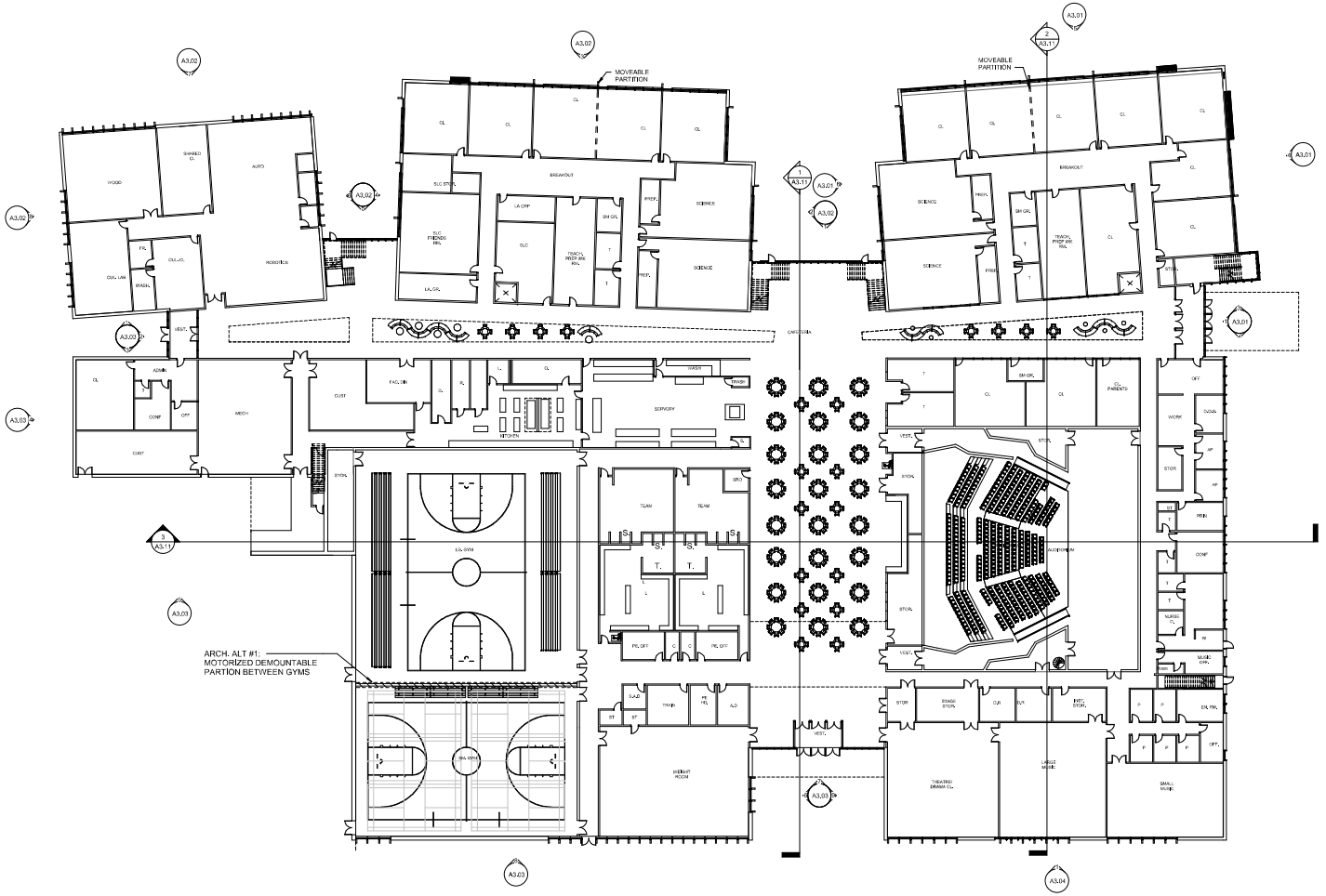
KEY PLAN

DRAWING TITLE

CONCEPTUAL SITE PLAN

STATE PROJ. NO	-
PROJ. NO	TSKP # 19201
SCALE	1" = 80'
DATE	15 Apr 2020
DRAWN BY	SRS
APPROVED BY	MTD

SP-3R



1 FIRST FLOOR PLAN
1" = 20'-0"

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SCHEMATIC DESIGN DOCUMENTS

KEY PLAN

DRAWING TITLE

FIRST FLOOR PLAN

STATE PROJ. NO.	
PROJ. NO.	19070/1
SCALE	1" = 20'-0"
DATE	10 April 2020
DRAWN BY	Author
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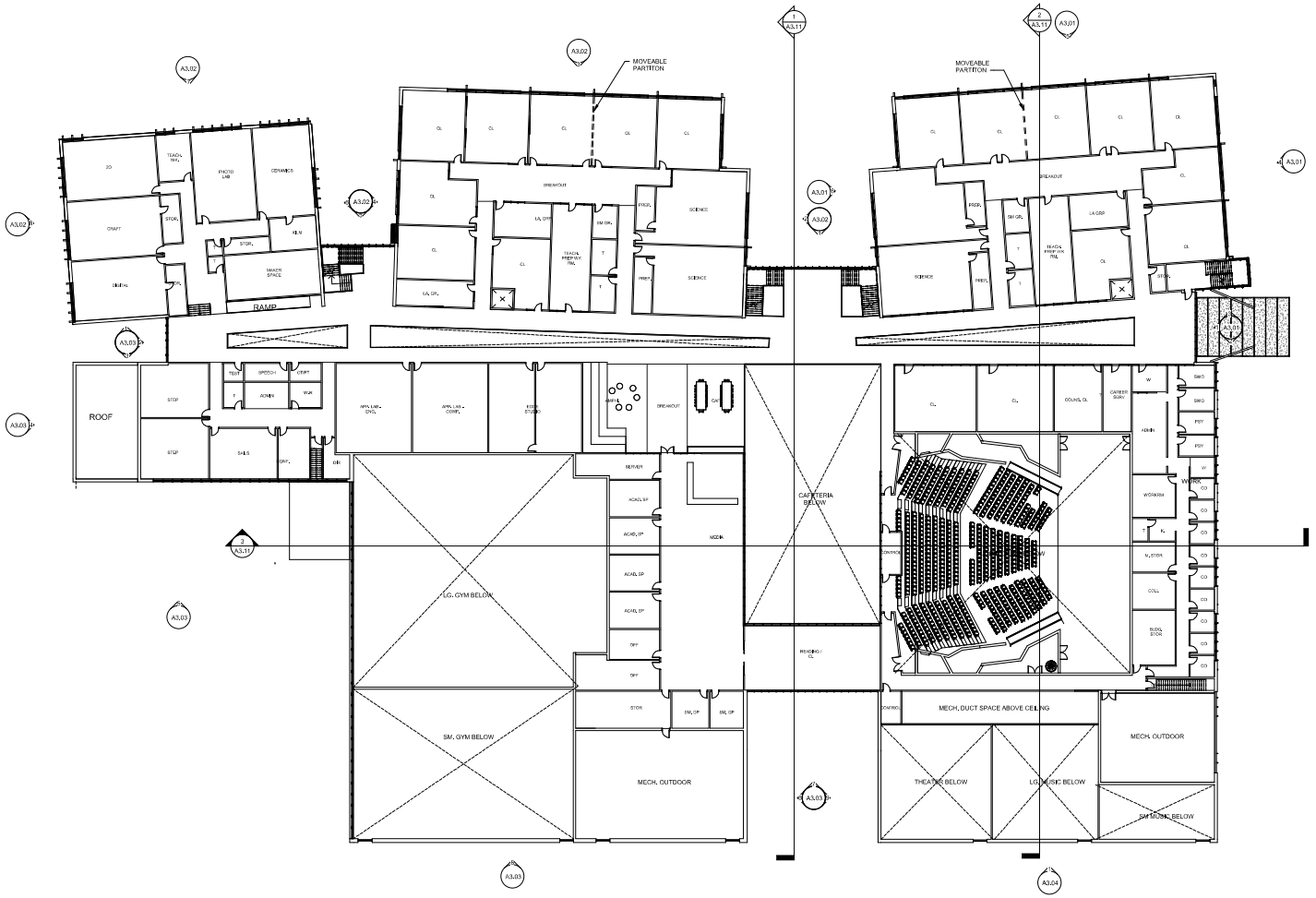
ISSUE DATES

NO.	DATE	PURPOSE

A1.11



1 SECOND FLOOR PLAN
1" = 20'-0"

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SCHEMATIC DESIGN DOCUMENTS

KEY PLAN

DRAWING TITLE
SECOND FLOOR PLAN

STATE PROJ. NO.	
PROJ. NO.	1907/01
SCALE	1" = 20'-0"
DATE	10 April 2020
DRAWN BY	Author
APPROVED BY	Approver

ISSUE DATES

NO.	DATE	PURPOSE

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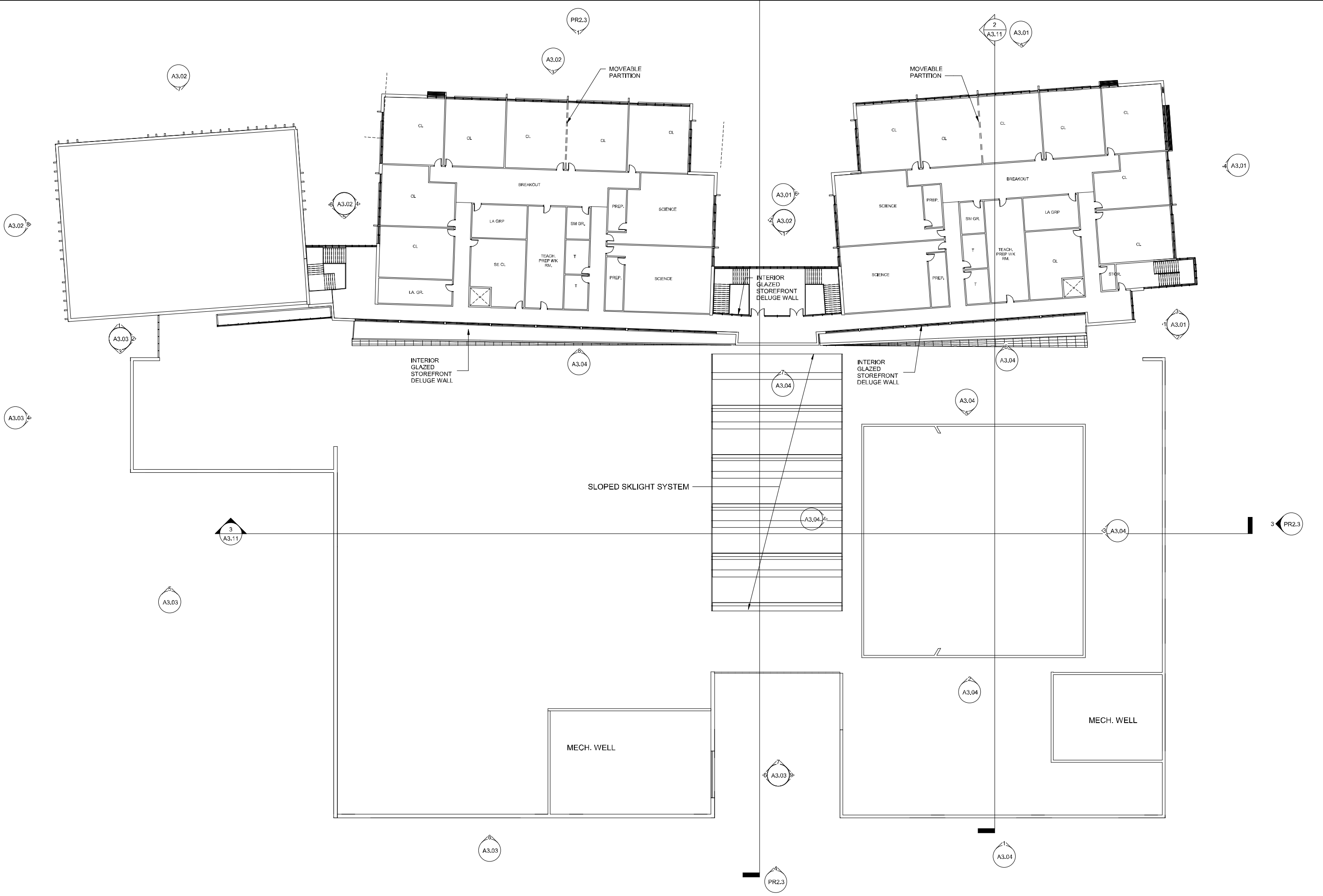

1 THIRD FLOOR PLAN
1" = 20'-0"

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SCHEMATIC DESIGN DOCUMENTS

KEY PLAN

DRAWING TITLE

THIRD FLOOR PLAN

STATE PROJ. NO.	
PROJ. NO.	190701
SCALE	1" = 20'-0"
DATE	10 April 2020
DRAWN BY	Author
APPROVED BY	Approver

ISSUE DATES

NO.	DATE	PURPOSE

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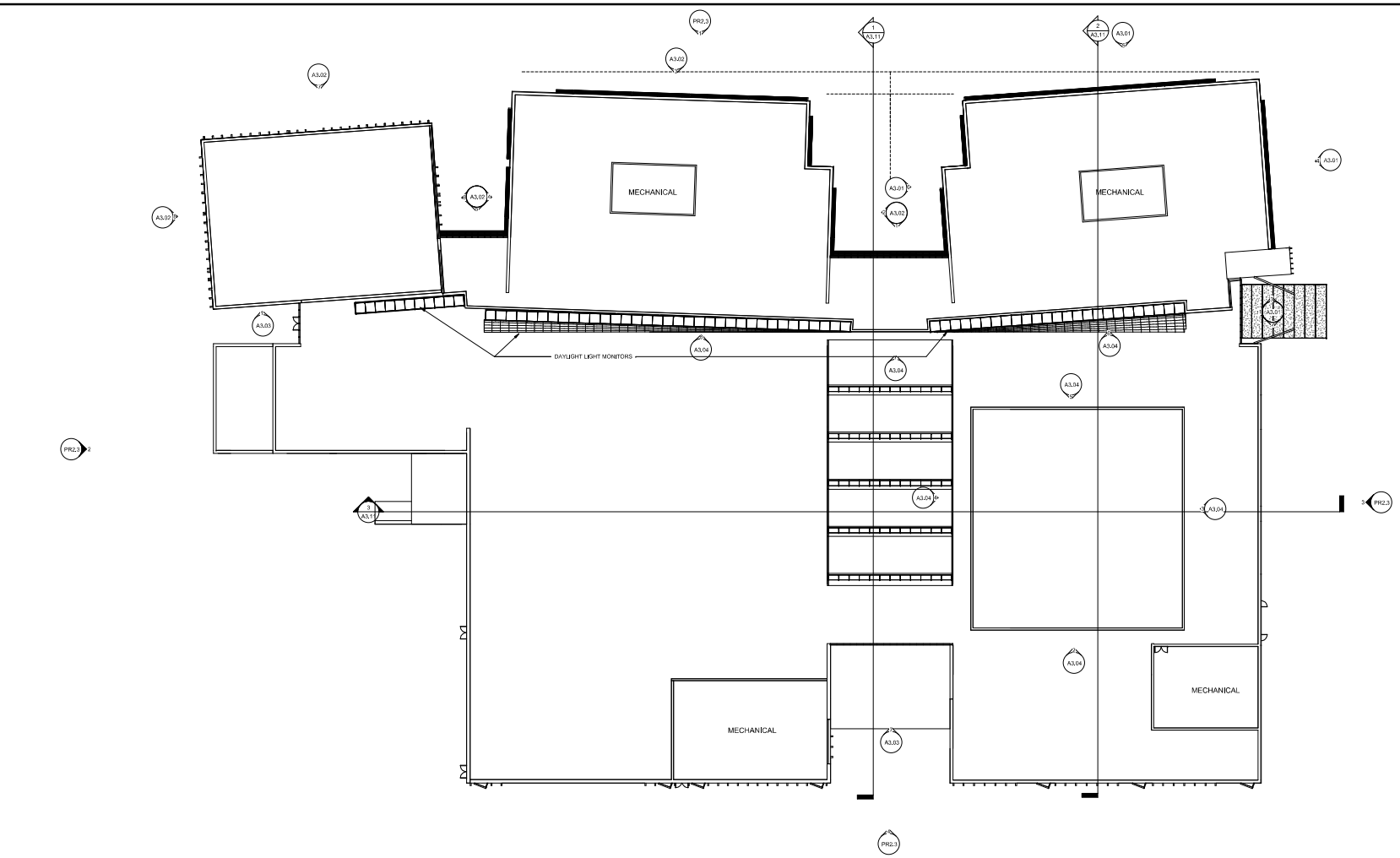

1 ROOF
1" = 20'-0"

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SCHEMATIC DESIGN DOCUMENTS

KEY PLAN

DRAWING TITLE
ROOF PLAN

STATE PROJ. NO.	
PROJ. NO.	19070/1
SCALE	1" = 20'-0"
DATE	27 MAY 2020
DRAWN BY	Author
APPROVED BY	Approver

ISSUE DATES

NO.	DATE	PURPOSE

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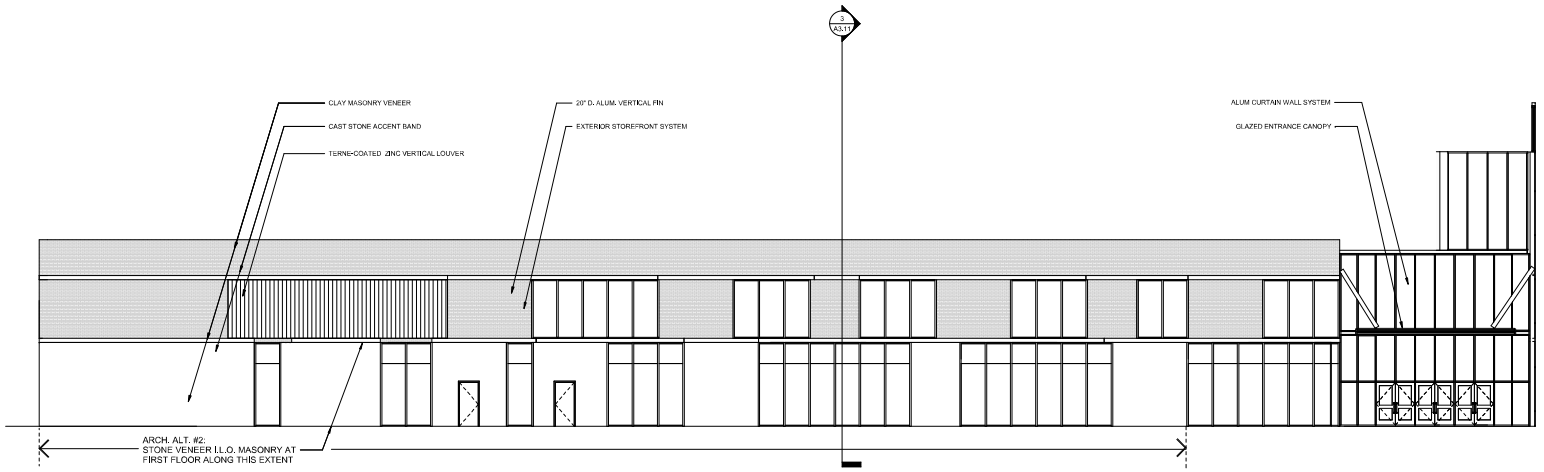
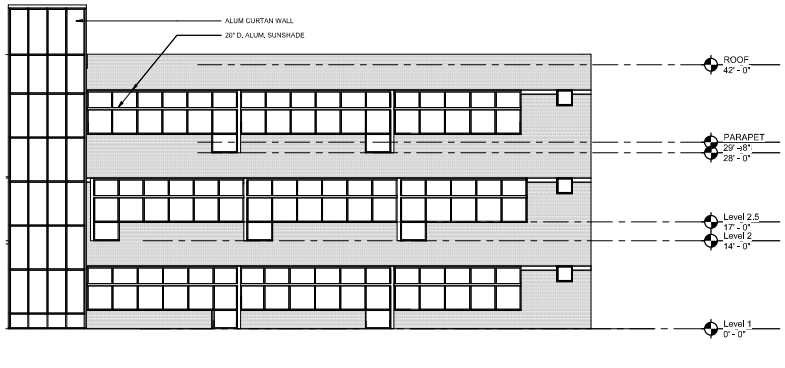
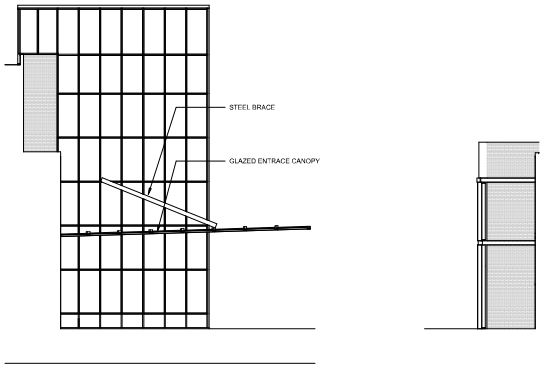


1 SOUTH ELEVATION 1
1/8" = 1'-0"

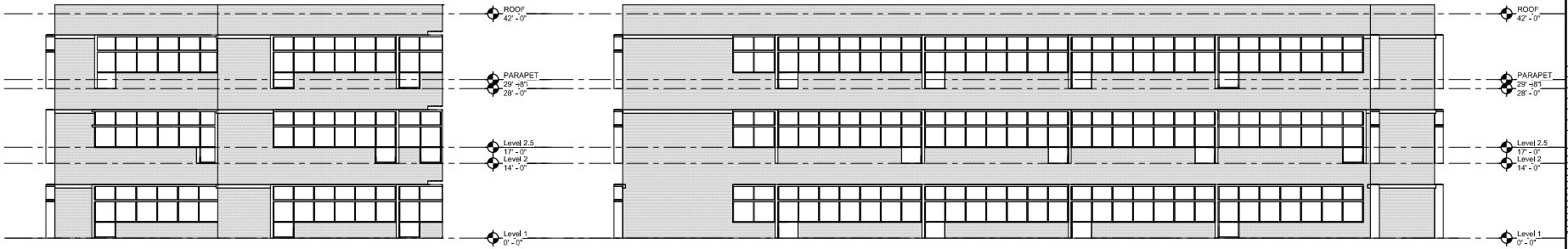


4 SOUTH ELEVATION 2
1/8" = 1'-0"



3 SOUTH ELEVATION 3
1/8" = 1'-0"

2 SOUTH ELEVATION 4
1/8" = 1'-0"



6 EAST ELEVATION 2
1/8" = 1'-0"

5 EAST ELEVATION 1
1/8" = 1'-0"

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SCHEMATIC DESIGN DOCUMENTS

KEY PLAN

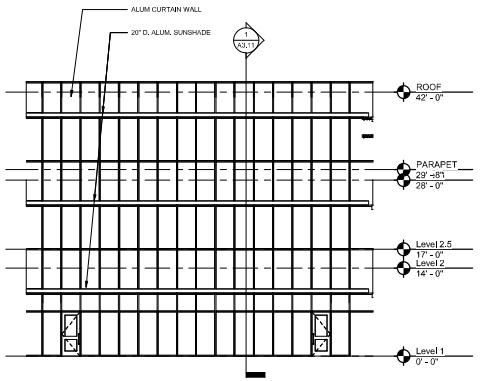
DRAWING TITLE
EXTERIOR ELEVATIONS

STATE PROJ. NO.	
PROJ. NO.	19070/1
SCALE	1/8" = 1'-0"
DATE	10 April 2020
DRAWN BY	Author
APPROVED BY	Approver

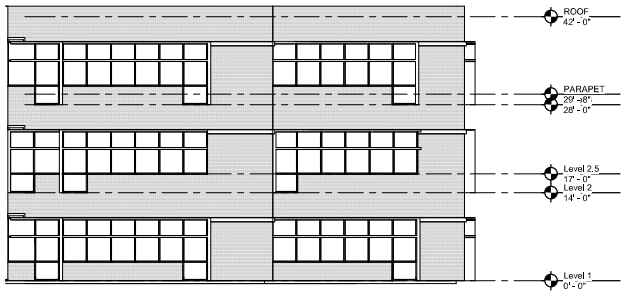
ISSUE DATES

NO.	DATE	PURPOSE

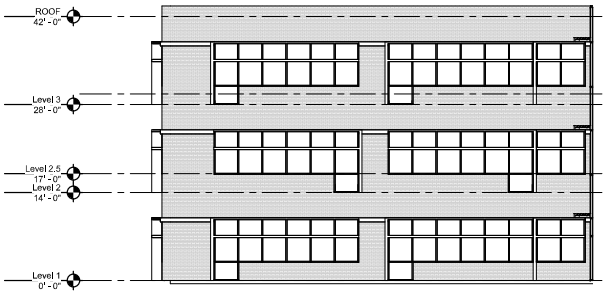
A3.01



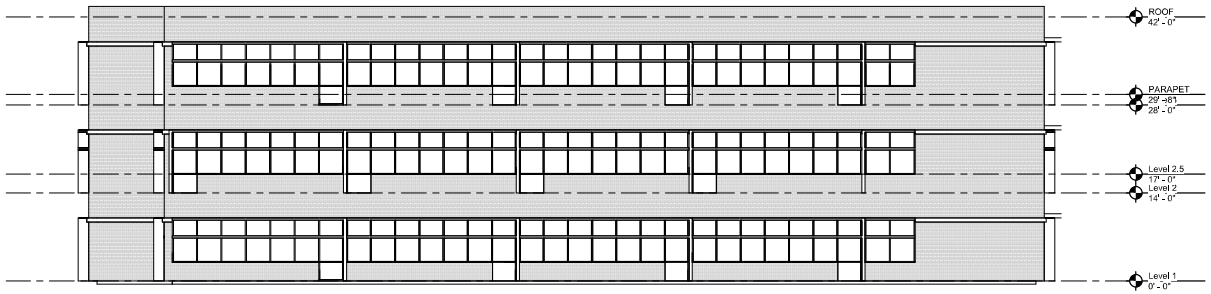
1 EAST ELEVATION 3
1/8" = 1'-0"



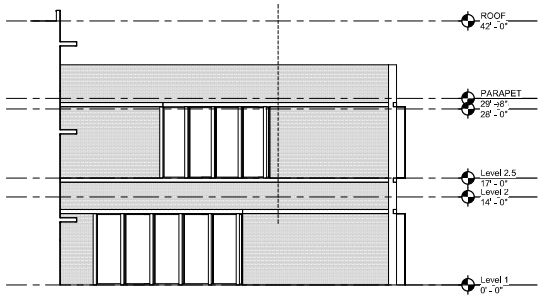
2 EAST ELEVATION 4
1/8" = 1'-0"



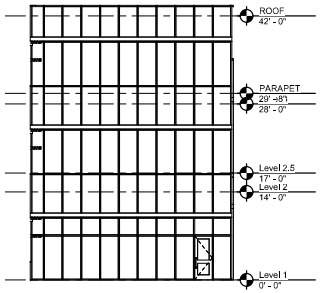
4 EAST ELEVATION 6
1/8" = 1'-0"



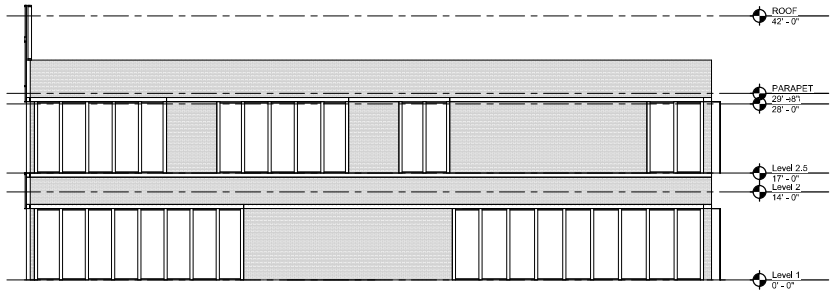
3 EAST ELEVATION 5
1/8" = 1'-0"



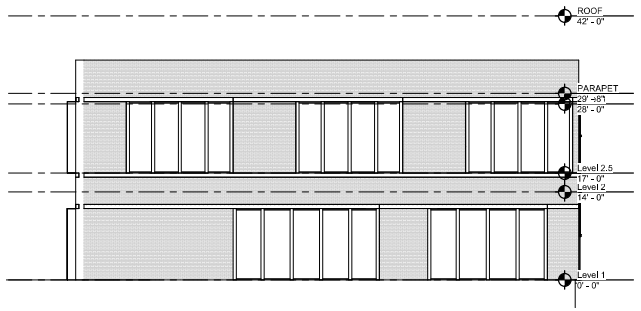
6 EAST ELEVATION 7
1/8" = 1'-0"



5 EAST ELEVATION 8
1/8" = 1'-0"



7 EAST ELEVATION 9
1/8" = 1'-0"



8 NORTH ELEVATION 1
1/8" = 1'-0"

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SCHEMATIC DESIGN DOCUMENTS

KEY PLAN

DRAWING TITLE

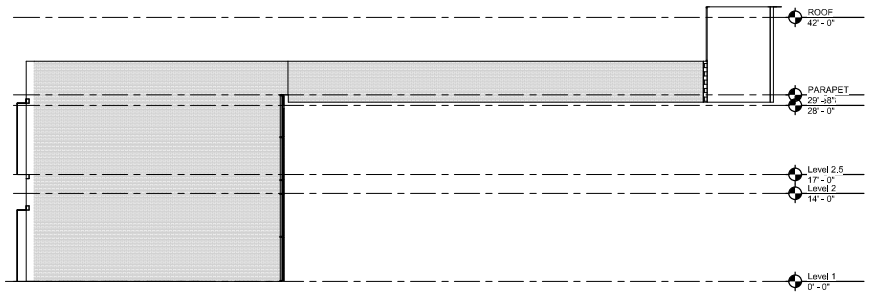
BUILDING ELEVATIONS

STATE PROJ. NO.	
PROJ. NO.	1907.01
SCALE	1/8" = 1'-0"
DATE	10 April 2020
DRAWN BY	Author
APPROVED BY	Approver

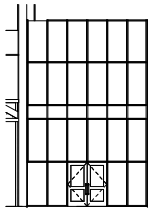
ISSUE DATES

NO.	DATE	PURPOSE

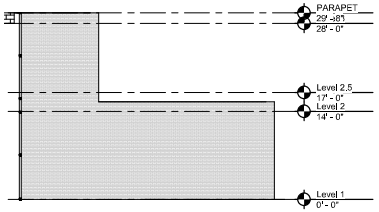
A3.02



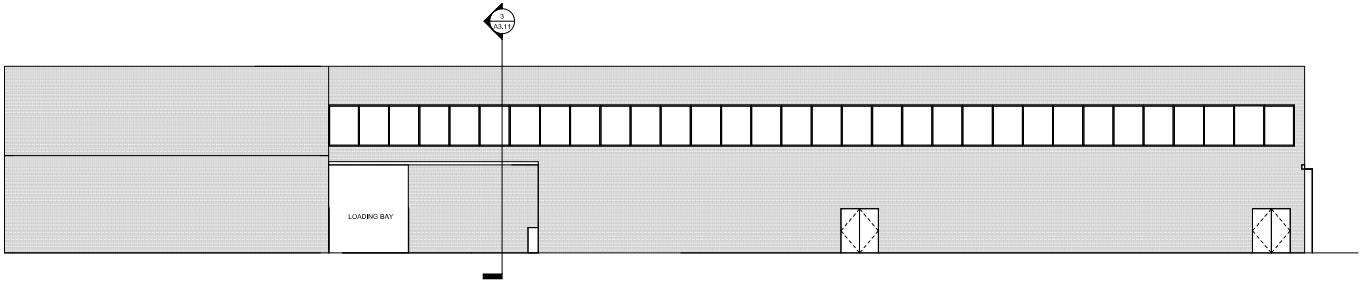
1 NORTH ELEVATION 2
1/8" = 1'-0"



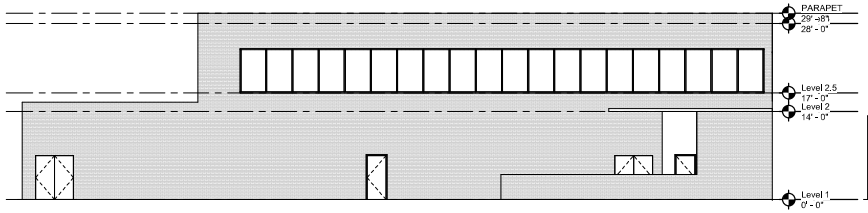
2 NORTH ELEVATION 3
1/8" = 1'-0"



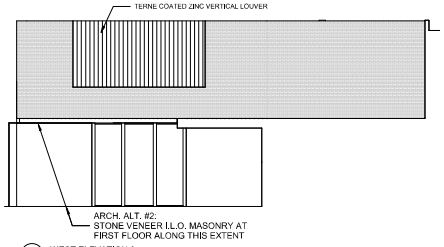
3 NORTH ELEVATION 4
1/8" = 1'-0"



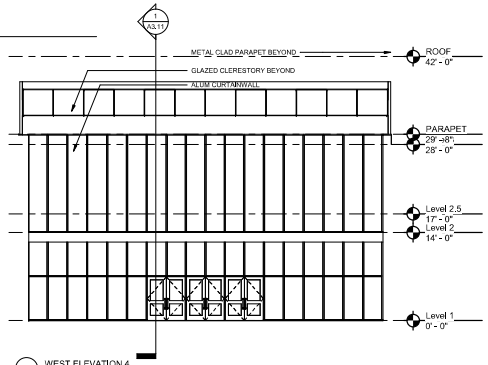
4 NORTH ELEVATION 5
1/8" = 1'-0"



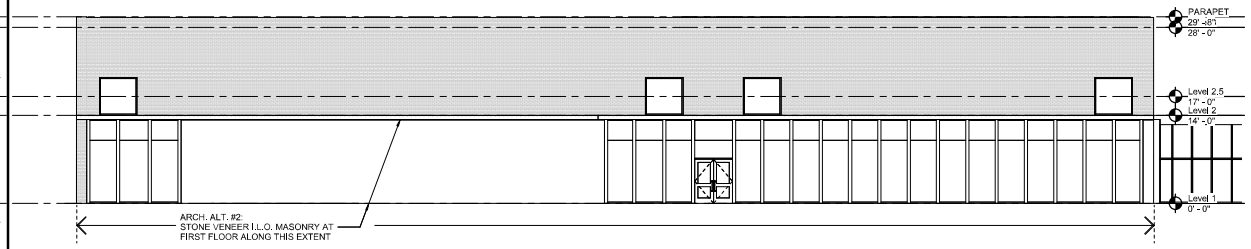
5 WEST ELEVATION 1
1/8" = 1'-0"



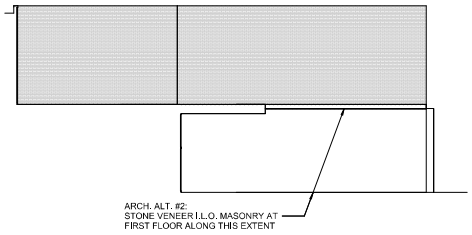
6 WEST ELEVATION 3
1/8" = 1'-0"



7 WEST ELEVATION 4
1/8" = 1'-0"



8 WEST ELEVATION 2
1/8" = 1'-0"



9 WEST ELEVATION 5
1/8" = 1'-0"

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SCHEMATIC DESIGN DOCUMENTS

KEY PLAN

DRAWING TITLE
BUILDING ELEVATIONS

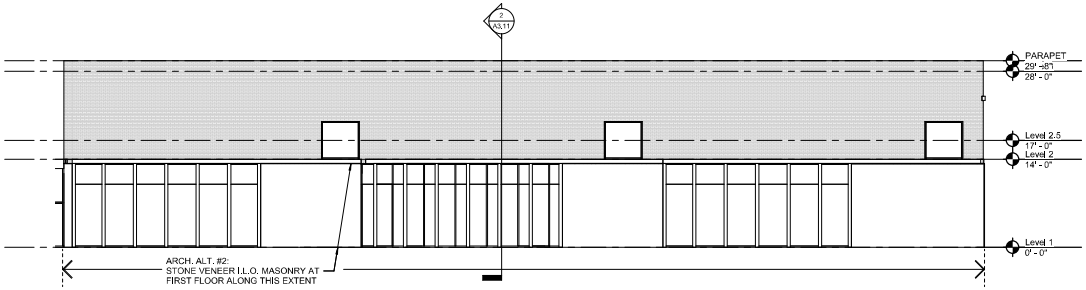
STATE PROJ. NO.	
PROJ. NO.	1907.01
SCALE	1/8" = 1'-0"
DATE	10 April 2020
DRAWN BY	Author
APPROVED BY	Approver

ISSUE DATES

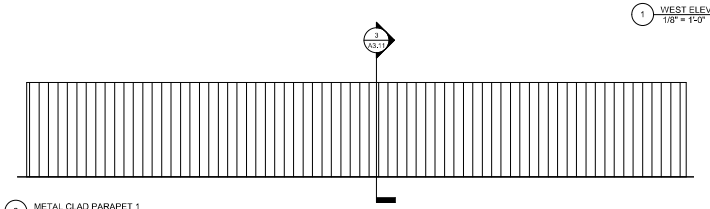
NO.	DATE	PURPOSE

A3.03

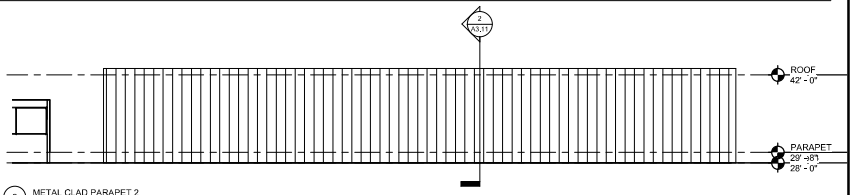
4/10/2020 1:40:41 PM C:\Users\mscott\Documents\190701-Farmington HS-Central\20191 TSK Option 1_mscott.rvt



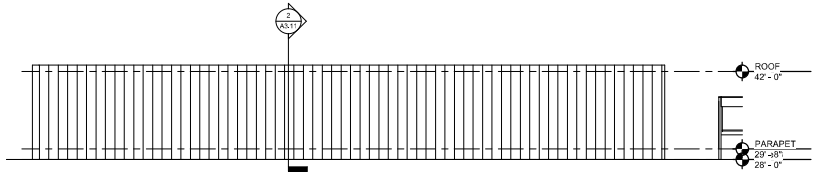
1 WEST ELEVATION 6
1/8" = 1'-0"



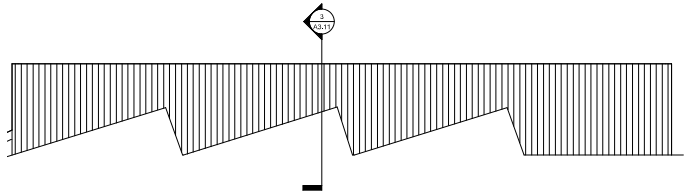
3 METAL CLAD PARAPET 1
1/8" = 1'-0"



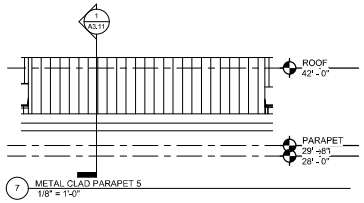
2 METAL CLAD PARAPET 2
1/8" = 1'-0"



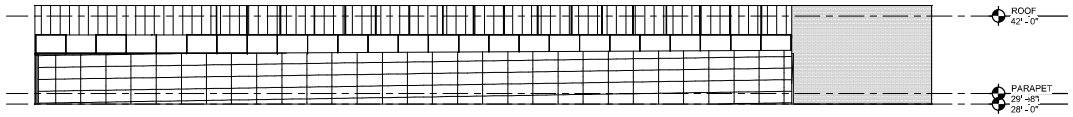
5 METAL CLAD PARAPET 3
1/8" = 1'-0"



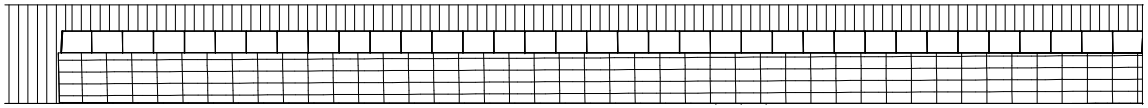
4 METAL CLAD PARAPET 4
1/8" = 1'-0"



7 METAL CLAD PARAPET 5
1/8" = 1'-0"



6 SLOPED GLAZING AT THIRD FLOOR B
1/8" = 1'-0"



8 SLOPED GLAZING AT THIRD FLOOR A
1/8" = 1'-0"

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FARMINGTON HIGH SCHOOL

Farmington, CT

SCHEMATIC DESIGN DOCUMENTS

KEY PLAN

DRAWING TITLE

BUILDING ELEVATIONS

STATE PROJ. NO.	
PROJ. NO.	1907/01
SCALE	1/8" = 1'-0"
DATE	10 April 2020
DRAWN BY	Author
APPROVED BY	Approver

ISSUE DATES

NO.	DATE	PURPOSE

A3.04

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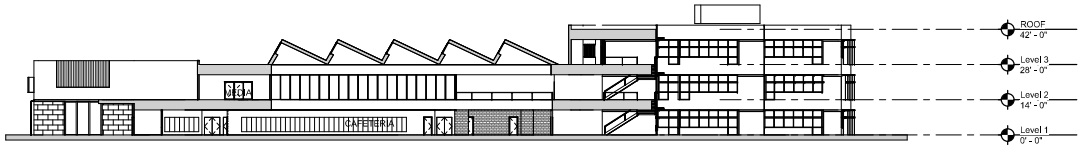
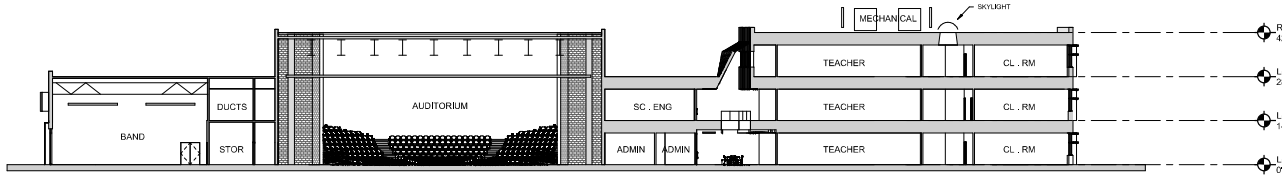
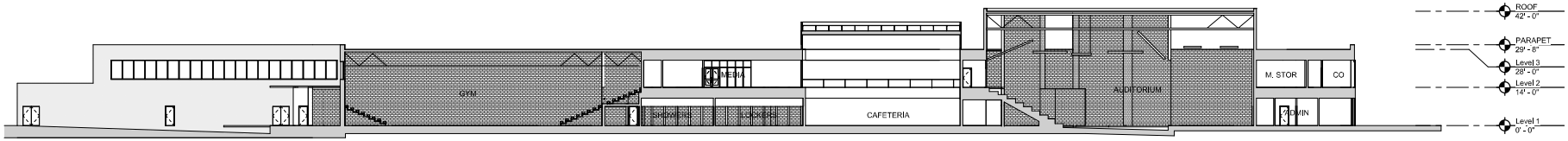


1 Section A
1" = 20'-0"



2 Section B
1/16" = 1'-0"



3 Section C
1/16" = 1'-0"

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Farmington, CT

SCHEMATIC DESIGN DOCUMENTS

KEY PLAN

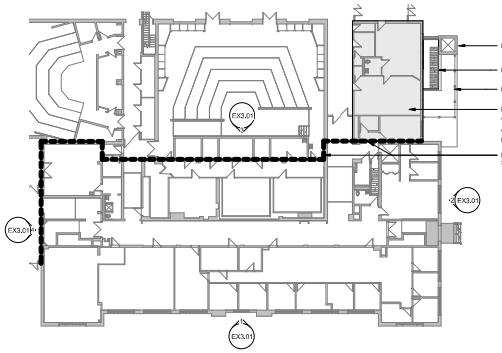
DRAWING TITLE
BUILDING SECTIONS

STATE PROJ. NO.	
PROJ. NO.	19070/1
SCALE	As indicated
DATE	27 MAY 2020
DRAWN BY	Author
APPROVED BY	Approver

ISSUE DATES

NO.	DATE	PURPOSE

A3.11



2 MAIN LEVEL - MOTHBALL OPTION
1" = 20'-0"

COURTYARD

COURTYARD

DEMOLITION KEY:

DEMOLISH BUILDING IN ITS ENTIRETY. REMOVE ALL SLABS ON GRADE, FOUNDATIONS, PIPING AND SERVICES; 158,320 GSF

SAME AS ABOVE, SEE CALL OUT FOR MOTHBALL OPTION SCOPE; 10,500 GSF

SELECTIVE DEMOLITION, SEE EX1.10 FOR SCOPE OF DEMOLITION

2 EX1.01

1 MAIN LEVEL - EXISTING
1" = 20'-0"

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PROJECT

SCHEMATIC DESIGN PRICING

KEY PLAN

DRAWING TITLE

FIRST FLOOR PLAN - EXISTING BUILDING DEMOLITION

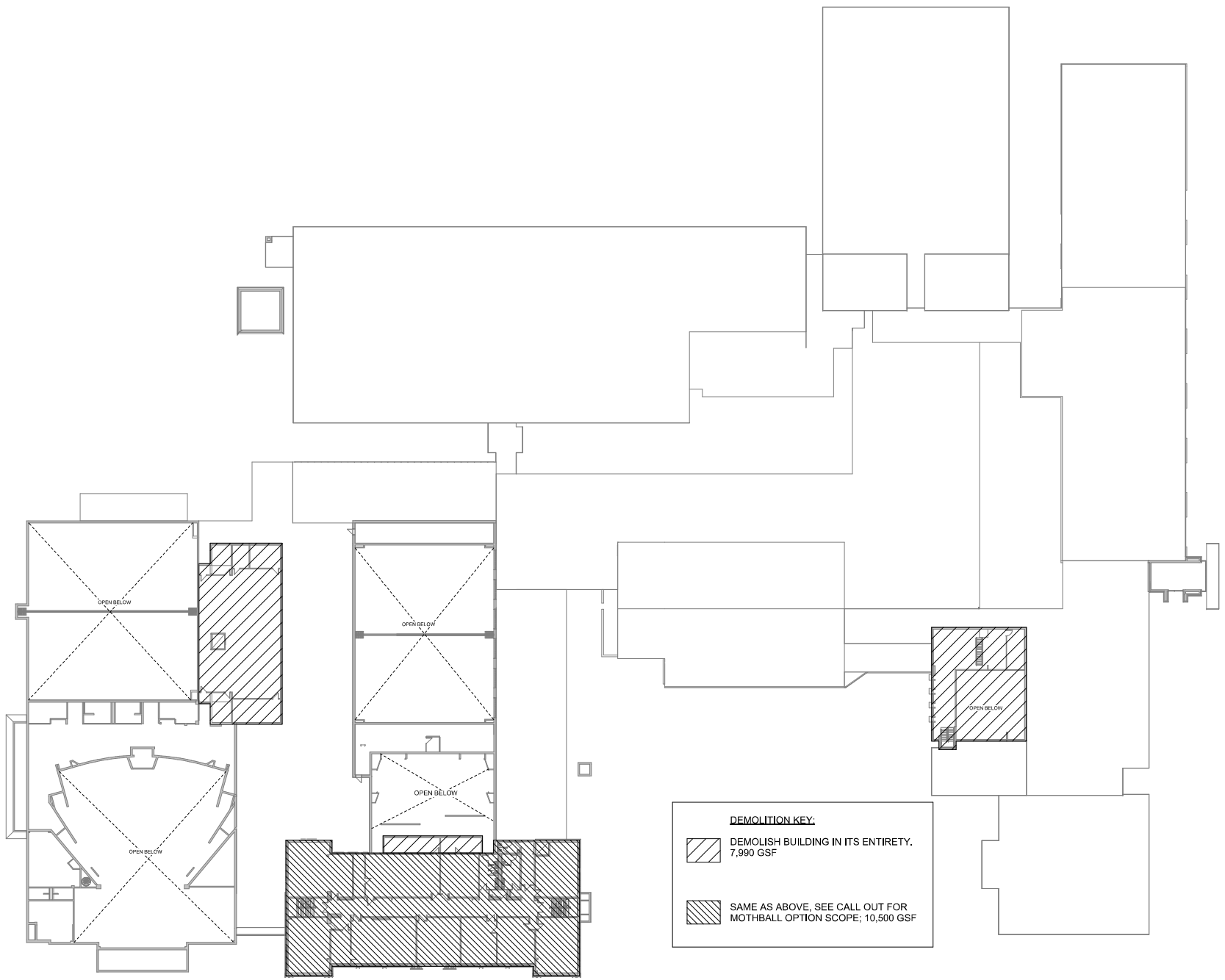
STATE PROJ. NO.	-
PROJ. NO.	TSKP #190701
SCALE	1" = 20'-0"
DATE	15 APRIL 2020
DRAWN BY	Author
APPROVED BY	Approver

ISSUE DATES

NO.	DATE	PURPOSE

EX1.01

4/15/2020 5:54:03 PM F:\Farmington High School\190701_DRAWINGS\REVIT\190701-Farmington High school\EXISTING.rvt



1 SECOND LEVEL 1928 - EXISTING
1" = 20'-0"

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PROJECT

SCHEMATIC DESIGN PRICING

KEY PLAN

DRAWING TITLE
SECOND FLOOR PLAN- EXISTING

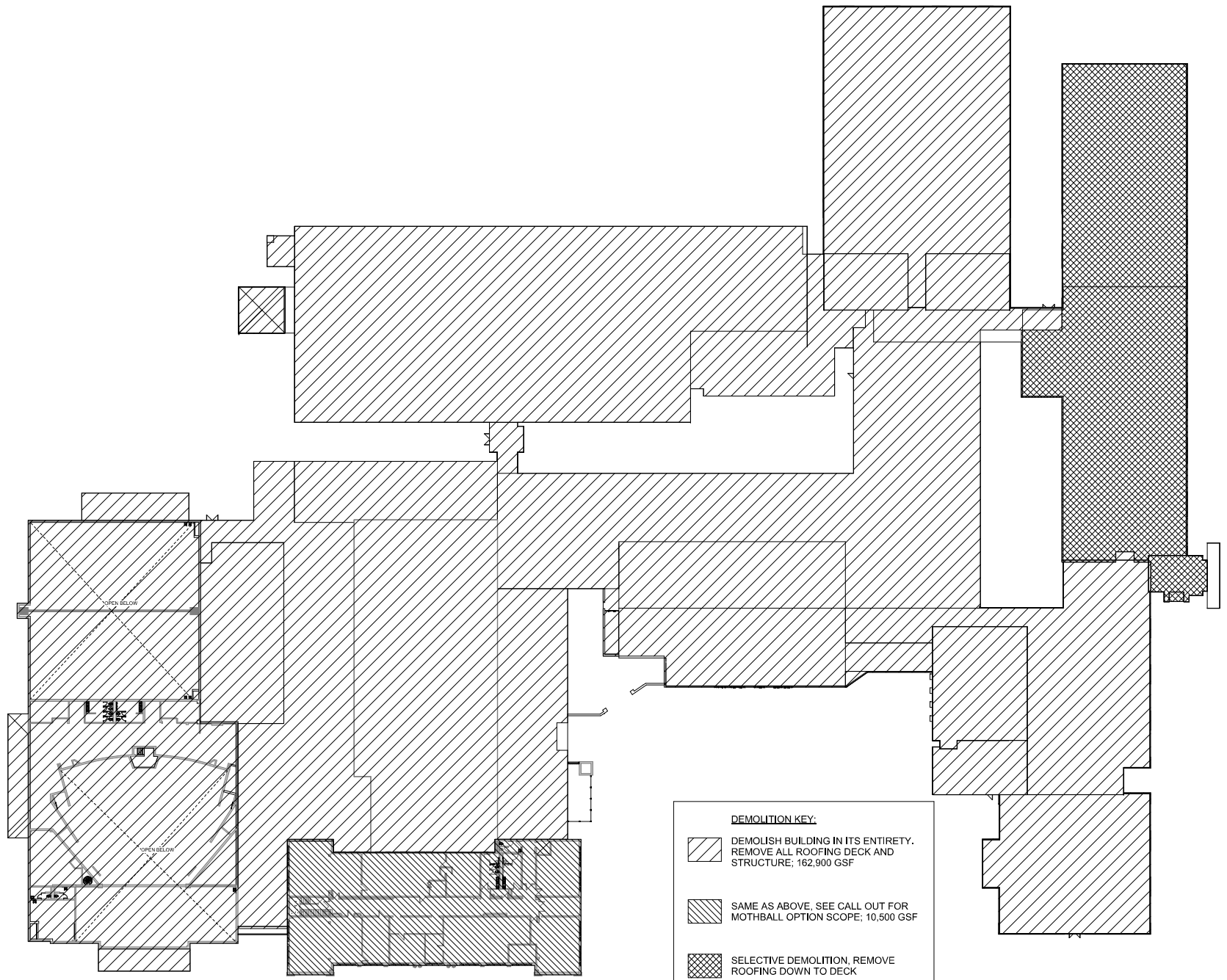
STATE PROJ. NO.	-
PROJ. NO.	TSKP #190701
SCALE	1" = 20'-0"
DATE	15 APRIL 2020
DRAWN BY	Author
APPROVED BY	Approver

ISSUE DATES

NO.	DATE	PURPOSE

EX1.02

4/15/2020 5:54:04 PM F:\Farmington High School\190701_DRAWINGS\REVIT\190701-Farmington High-central-EXISTING.rvt



1 THIRD LEVEL 1928- EXISTING
1" = 20'-0"

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PROJECT

SCHEMATIC DESIGN PRICING

KEY PLAN

DRAWING TITLE
THIRD FLOOR PLAN - EXISTING

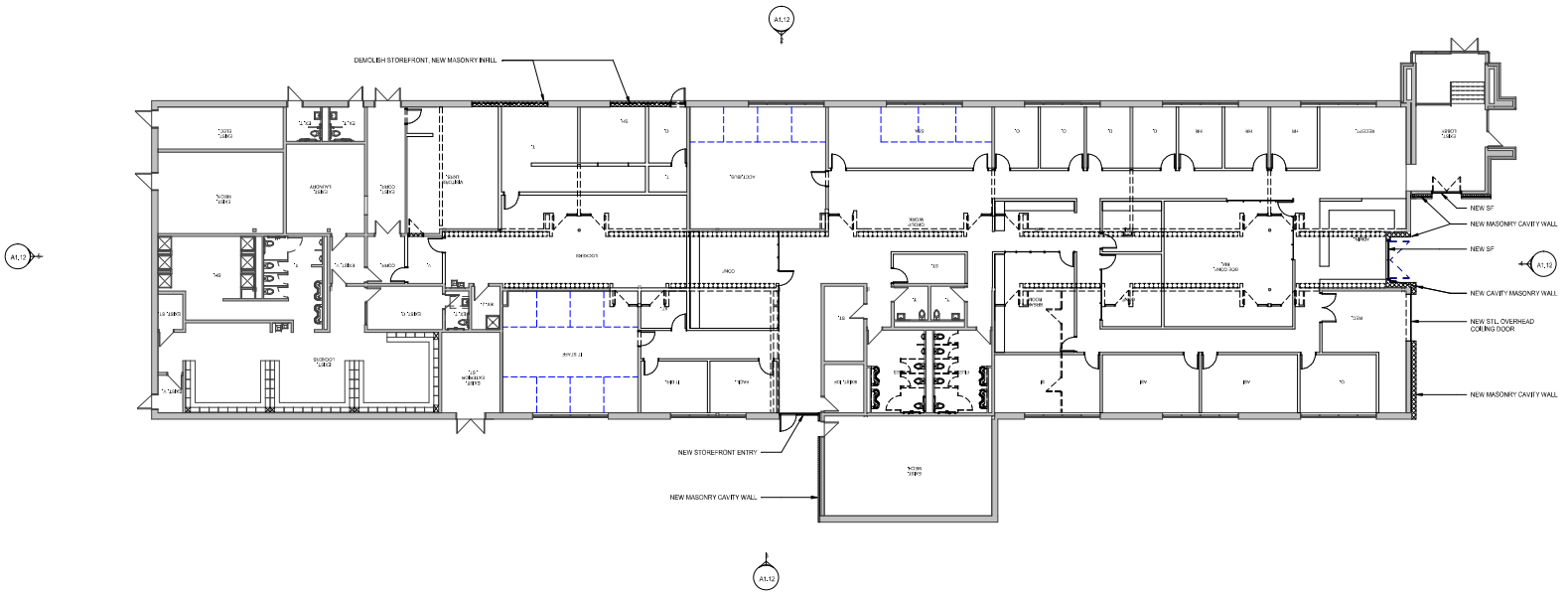
STATE PROJ. NO.	-
PROJ. NO.	TSKP #190701
SCALE	1" = 20'-0"
DATE	15 APRIL 2020
DRAWN BY	Author
APPROVED BY	Approver

ISSUE DATES

NO.	DATE	PURPOSE

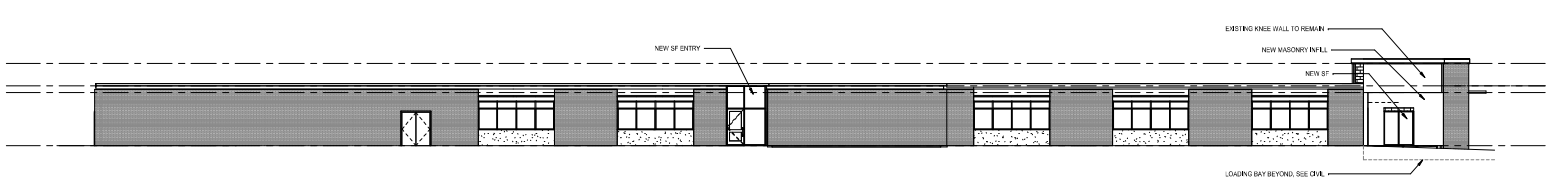
EX1.03

4/15/2020 8:31:21 PM F:\Farmington High School\190701_DRAWINGS\REVIT\190701-Farmington High-central-EXISTING.rvt

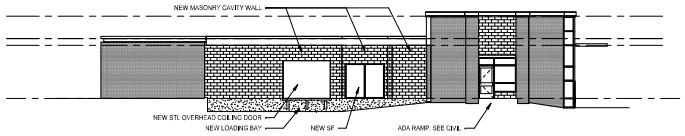


1 MAIN LEVEL - NEW
3/32" = 1'-0"

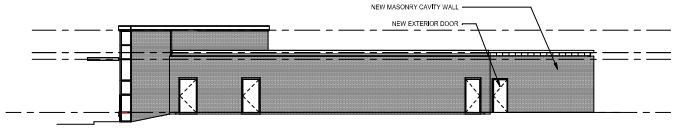
2 RENOVATED EAST ELEVATION
3/32" = 1'-0"



3 RENOVATED WEST ELEVATION
3/32" = 1'-0"



5 RENOVATED SOUTH ELEVATION
3/32" = 1'-0"



4 RENOVATED NORTH ELEVATION
3/32" = 1'-0"

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KEY PLAN

DRAWING TITLE
RENOVATED 900 WING

STATE PROJ. NO.	
PROJ. NO.	1907.01
SCALE	3/32" = 1'-0"
DATE	10 APRIL 2020
DRAWN BY	Author
APPROVED BY	Approver

ISSUE DATES

NO.	DATE	PURPOSE

EX1.10

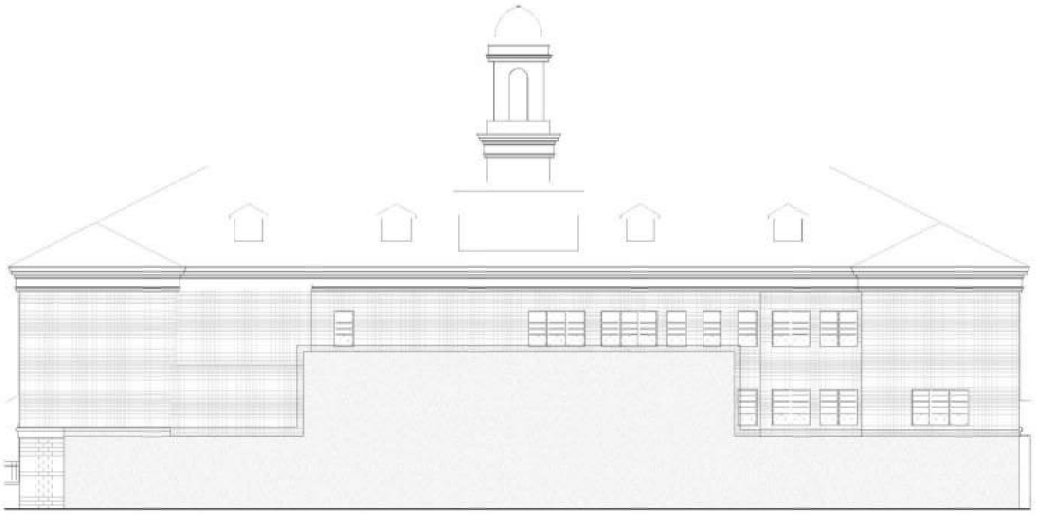
5/26/2020 12:08:03 PM C:\Users\mscott\Documents\ARCH_Farmington High School 900wing CP15_mscott.rvt

DEMOLITION KEY:

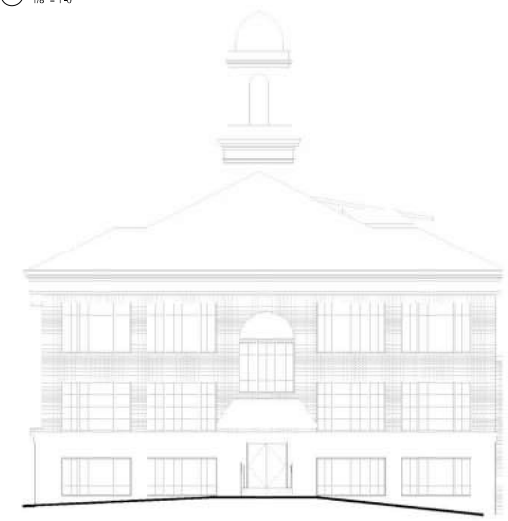
BASE SCOPE - DEMOLISH BUILDING IN ITS ENTIRETY. REMOVE ALL SLABS ON GRADE, FOUNDATIONS, PIPING AND SERVICES

FOR MOTHBALL OPTION SCOPE, PROVIDE NEW CLAY MASONRY CAVITY WALL AT AREAS OF ADJACENT DEMOLTION. RELIEVE MASONRY ABOVE AT LINEOF DEMOLITION

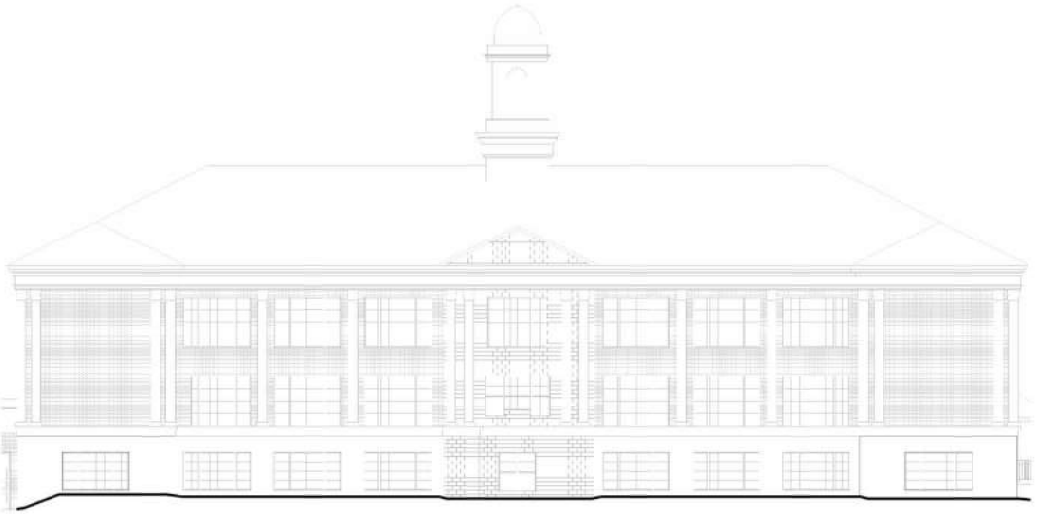
4 100-300 WINGS - WEST
1/8" = 1'-0"



3 100-300 WINGS - NORTH
1/8" = 1'-0"



2 100-300 WINGS - EAST
1/8" = 1'-0"



1 100-300 WINGS - SOUTH
1/8" = 1'-0"

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PROJECT

SCHEMATIC DESIGN PRICING

KEY PLAN

DRAWING TITLE

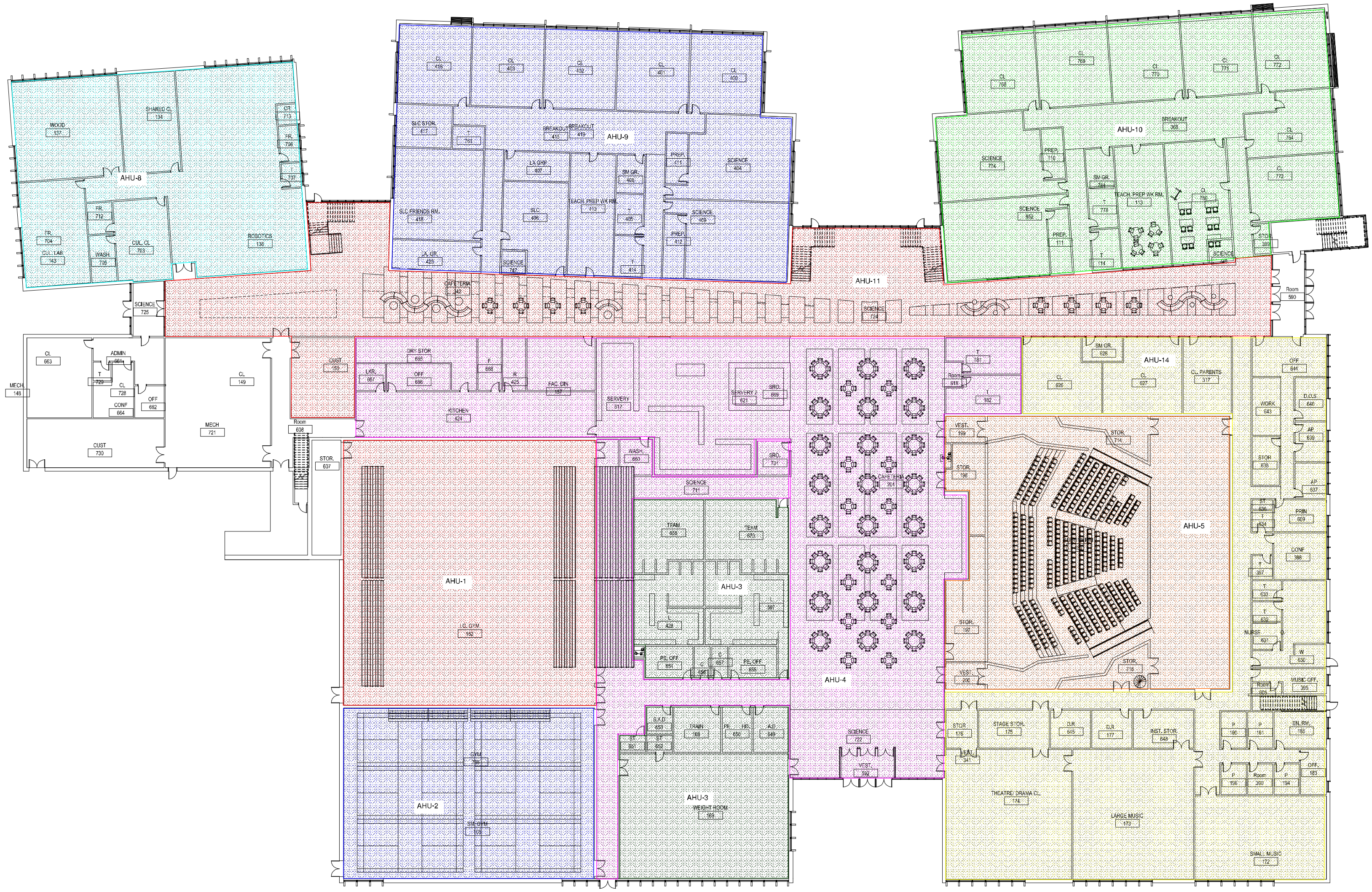
EXTERIOR ELEVATIONS

STATE PROJ. NO.	-
PROJ. NO.	TSKP #190701
SCALE	1/8" = 1'-0"
DATE	15 APRIL 2020
DRAWN BY	Author
APPROVED BY	Approver

ISSUE DATES

NO.	DATE	PURPOSE

EX3.01



1 MEP-0.11 FIRST FLOO PLAN
SCALE: 1/16" = 1'-0"

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PRICING DOCUMENTS

KEY PLAN

DRAWING TITLE

FIRST FLOOR ZONING PLAN - MEP

STATE PROJ. NO.	
PROJ. NO.	19120
SCALE	1/16" = 1'-0"
DATE	4/15/2020
DRAWN BY	KR
APPROVED BY	KR

ISSUE DATES

NO.	DATE	PURPOSE

MEP-0.11

1 SECOND FLOOR PLAN
MEP-0.21 SCALE: 1/16" = 1'-0"

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KEY PLAN

DRAWING TITLE

SECOND FLOOR ZONING PLAN - MEP

STATE PROJ. NO.	
PROJ. NO.	19120
SCALE	1/16" = 1'-0"
DATE	4/15/2020
DRAWN BY	KR
APPROVED BY	KR

ISSUE DATES

NO.	DATE	PURPOSE

MEP-0.21

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PRICING DOCUMENTS

KEY PLAN

DRAWING TITLE

THIRD FLOOR ZONING PLAN - MEP

STATE PROJ. NO.	
PROJ. NO.	19120
SCALE	1/16" = 1'-0"
DATE	4/15/2020
DRAWN BY	KR
APPROVED BY	KR

ISSUE DATES

NO.	DATE	PURPOSE

MEP-0.31

1 MEP-0.31 THIRD FLOOR PLAN
SCALE: 1/16" = 1'-0"

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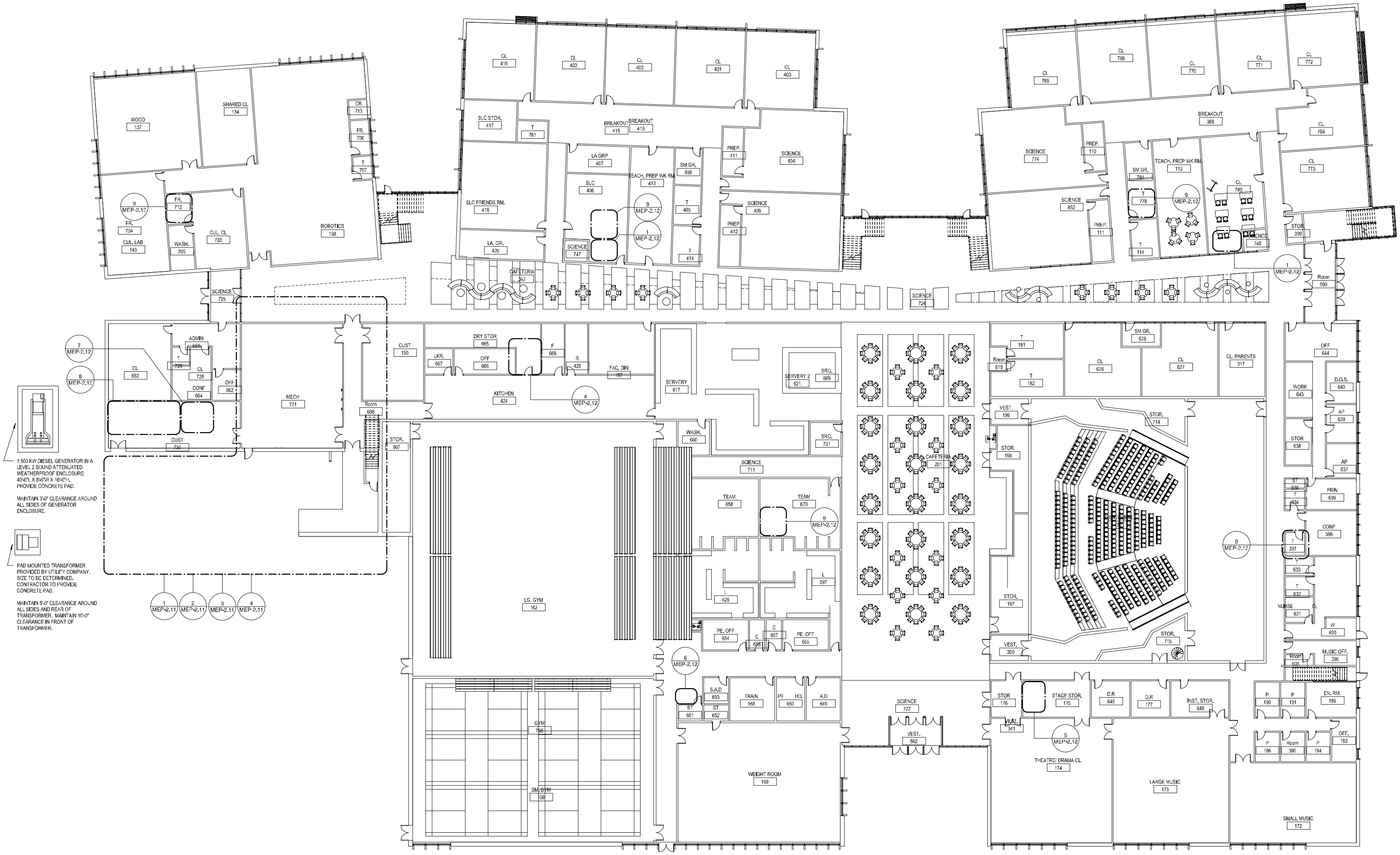
PRICING DOCUMENTS

KEY PLAN



1,500 KW DIESEL GENERATOR IN A LEVEL 2 SOUND ATTENUATED WEATHERPROOF ENCLOSURE: 40'-0"L X 8'-0"W X 16'-0"H. PROVIDE CONCRETE PAD.

MAINTAIN 3'-0" CLEARANCE AROUND ALL SIDES OF GENERATOR ENCLOSURE.

PAD MOUNTED TRANSFORMER PROVIDED BY UTILITY COMPANY. SIZE TO BE DETERMINED. CONTRACTOR TO PROVIDE CONCRETE PAD.

MAINTAIN 5'-0" CLEARANCE AROUND ALL SIDES AND REAR OF TRANSFORMER. MAINTAIN 10'-0" CLEARANCE IN FRONT OF TRANSFORMER.

1 MEP-1.11 FIRST FLOO PLAN
SCALE: 1/16" = 1'-0"

DRAWING TITLE

FIRST FLOOR PLAN - MEP

STATE PROJ. NO.	
PROJ. NO.	19120
SCALE	1/16" = 1'-0"
DATE	4/15/2020
DRAWN BY	KR
APPROVED BY	KR

ISSUE DATES

NO.	DATE	PURPOSE

MEP-1.11

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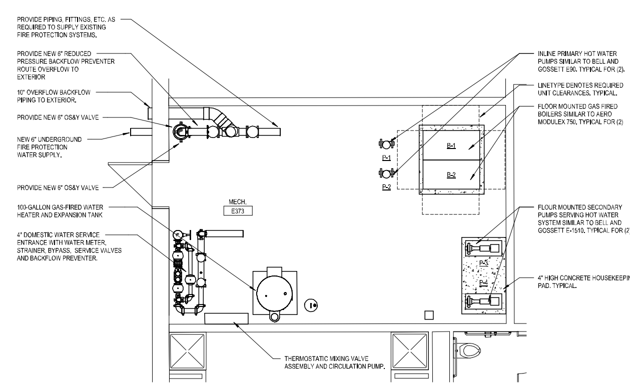
4/15/2020 4:02:08 PM

1 FIRST FLOOR PLAN - 900 WING
MEP-1.12 SCALE: 1/8" = 1'-0"



2 FIRST FLOOR MECHANICAL ROOM PART PLAN - 900 WING - MEP
MEP-1.12 SCALE: 1/4" = 1'-0"

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PROJECT

NEW CONSTRUCTION
PRICING DOCUMENTS

KEY PLAN

DRAWING TITLE

FIRST FLOOR PLAN - 900 WING - MEP

STATE PROJ. NO.	
PROJ. NO.	19120
SCALE	As indicated
DATE	4/15/2020
DRAWN BY	KR
APPROVED BY	KR

ISSUE DATES

NO.	DATE	PURPOSE

MEP-1.12

1
MEP-1.21
SECOND FLOOR PLAN
SCALE: 1/16" = 1'-0"

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NEW CONSTRUCTION
PRICING DOCUMENTS

KEY PLAN

DRAWING TITLE

SECOND FLOOR PLAN - MEP

STATE PROJ. NO.	
PROJ. NO.	19120
SCALE	1/16" = 1'-0"
DATE	4/15/2020
DRAWN BY	KR
APPROVED BY	KR

ISSUE DATES

NO.	DATE	PURPOSE

MEP-1.21

4/15/2020 4:02:16 PM C:\Users\kaldridge\Documents\19120_Farmington HS_KR19_kaldridgeUE892.rvt

1 MEP-1.31 THIRD FLOOR PLAN
SCALE: 1/16" = 1'-0"

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NEW CONSTRUCTION
PRICING DOCUMENTS

KEY PLAN

DRAWING TITLE

THIRD FLOOR PLAN - MEP

STATE PROJ. NO.	
PROJ. NO.	19120
SCALE	1/16" = 1'-0"
DATE	4/15/2020
DRAWN BY	KR
APPROVED BY	KR

ISSUE DATES

NO.	DATE	PURPOSE

MEP-1.31

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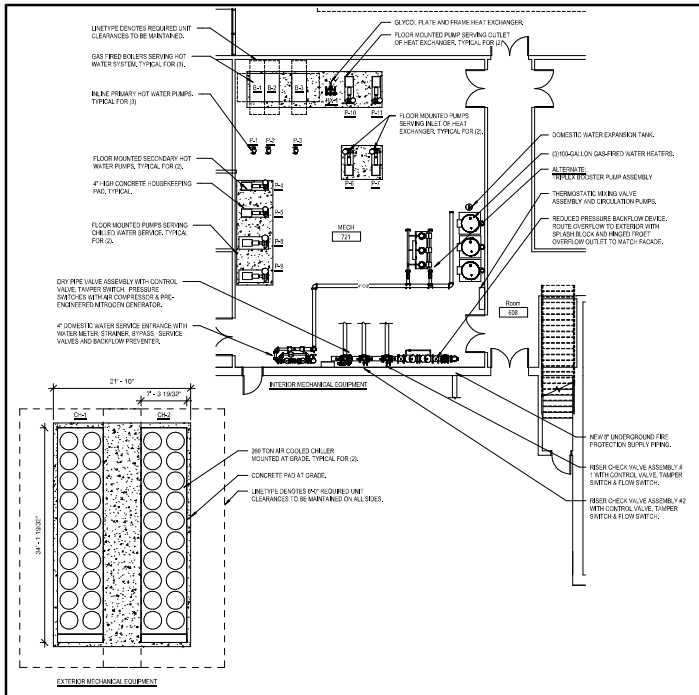
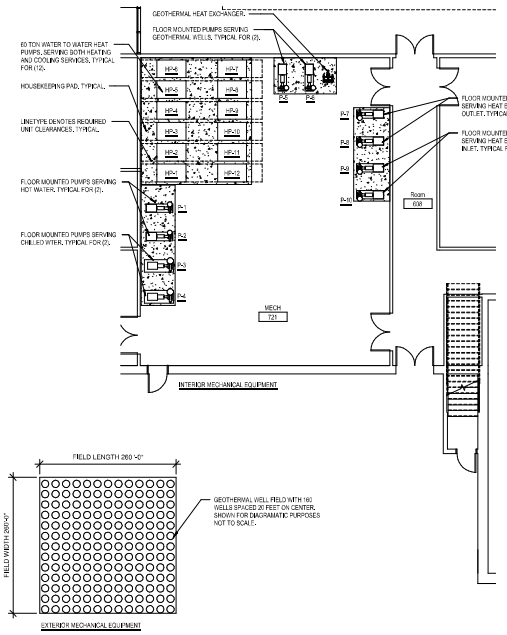
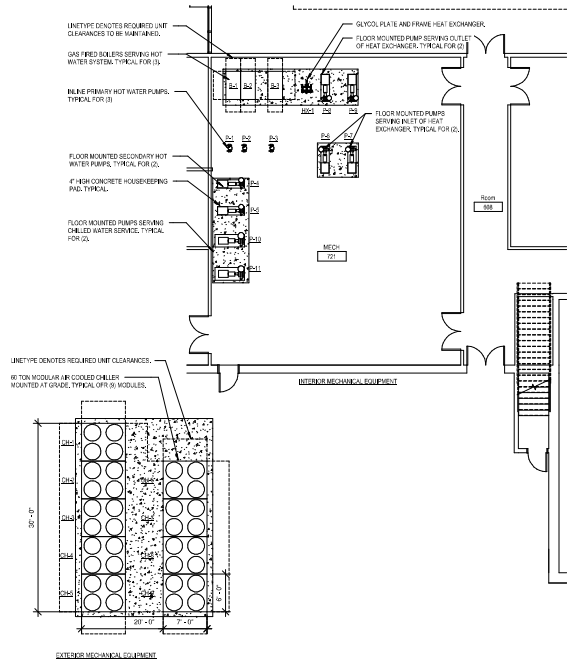


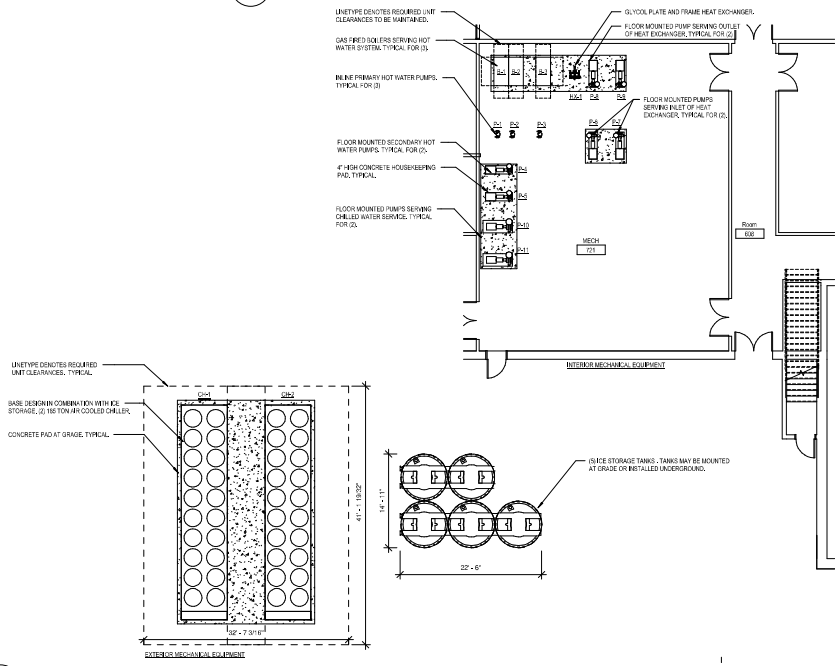
1 MEP-2.11 MECHANICAL ROOM PART PLAN - BASE MEP DESIGN
SCALE: 1/8" = 1'-0"



2 MEP-2.11 MECHANICAL ROOM PART PLAN - MECHANICAL ALTERNATE 1
SCALE: 1/8" = 1'-0"



3 MEP-2.11 MECHANICAL ROOM PART PLAN - MECHANICAL ALTERNATE 2
SCALE: 1/8" = 1'-0"



4 MEP-2.11 MECHANICAL ROOM PART PLAN - MECHANICAL ALTERNATE 3
SCALE: 1/8" = 1'-0"

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NEW CONSTRUCTION PRICING DOCUMENTS

KEY PLAN

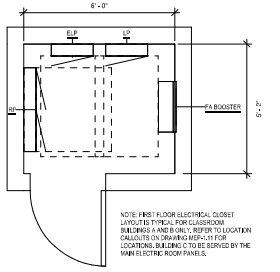
DRAWING TITLE
PARTIAL FLOOR PLANS - MEP

STATE PROJ. NO.	
PROJ. NO.	19120
SCALE	1/8" = 1'-0"
DATE	4/15/2020
DRAWN BY	KR
APPROVED BY	KR

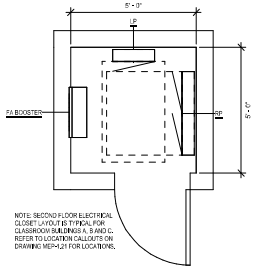
ISSUE DATES

NO.	DATE	PURPOSE

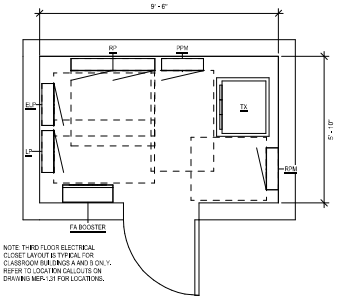
MEP-2.11



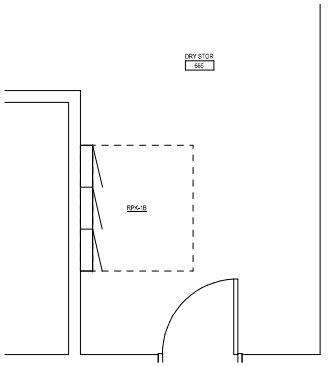
1 MEP-2.12 FIRST FLOOR ELECTRICAL CLOSET
SCALE: 1/2" = 1'-0"



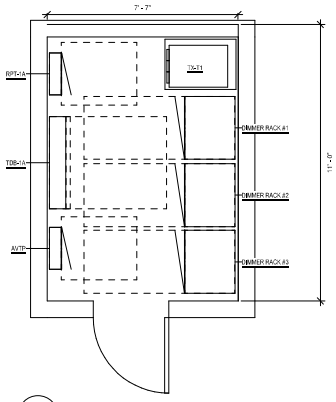
2 MEP-2.12 SECOND FLOOR ELECTRICAL CLOSET
SCALE: 1/2" = 1'-0"



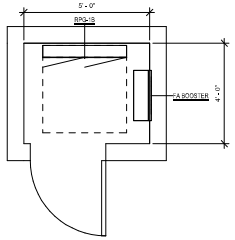
3 MEP-2.12 THIRD FLOOR ELECTRICAL CLOSET
SCALE: 1/2" = 1'-0"



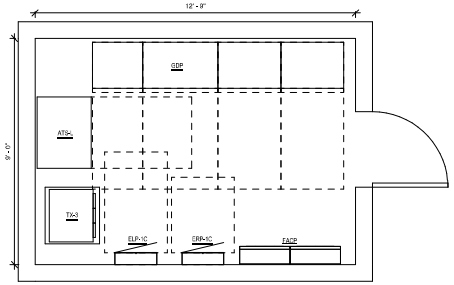
4 MEP-2.12 DRY STORAGE PARTIAL PLAN
SCALE: 1/2" = 1'-0"



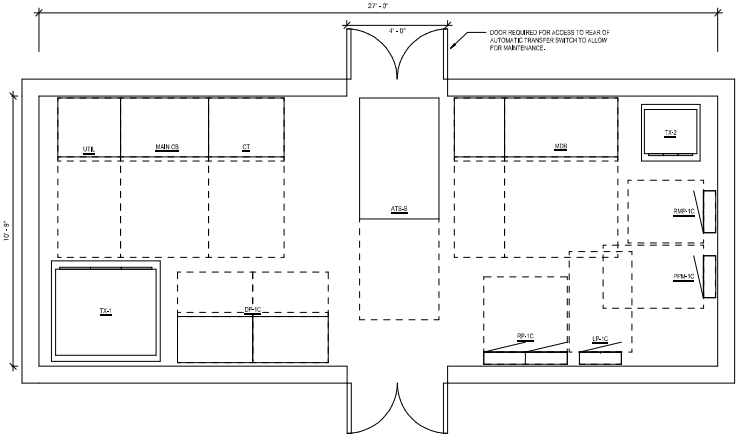
5 MEP-2.12 THEATER ELECTRICAL CLOSET LAYOUT
SCALE: 1/2" = 1'-0"



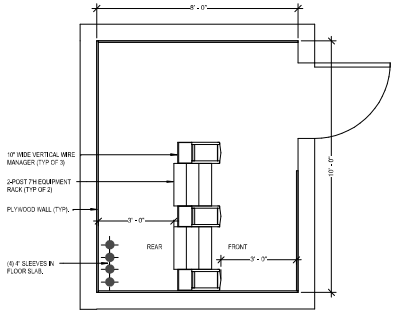
6 MEP-2.12 GYMNASIUM ELECTRICAL CLOSET LAYOUT
SCALE: 1/2" = 1'-0"



7 MEP-2.12 MAIN ATS ELECTRICAL ROOM
SCALE: 1/2" = 1'-0"



8 MEP-2.12 MAIN ELECTRICAL ROOM
SCALE: 1/2" = 1'-0"



9 MEP-2.12 TELECOM ROOM LAYOUT (TYPICAL)
SCALE: 1/2" = 1'-0"

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NEW CONSTRUCTION PRICING DOCUMENTS

KEY PLAN

DRAWING TITLE
PARTIAL PLANS - MEP

STATE PROJ. NO.	
PROJ. NO.	19120
SCALE	1/2" = 1'-0"
DATE	4/15/2020
DRAWN BY	KR
APPROVED BY	KR

ISSUE DATES

NO.	DATE	PURPOSE

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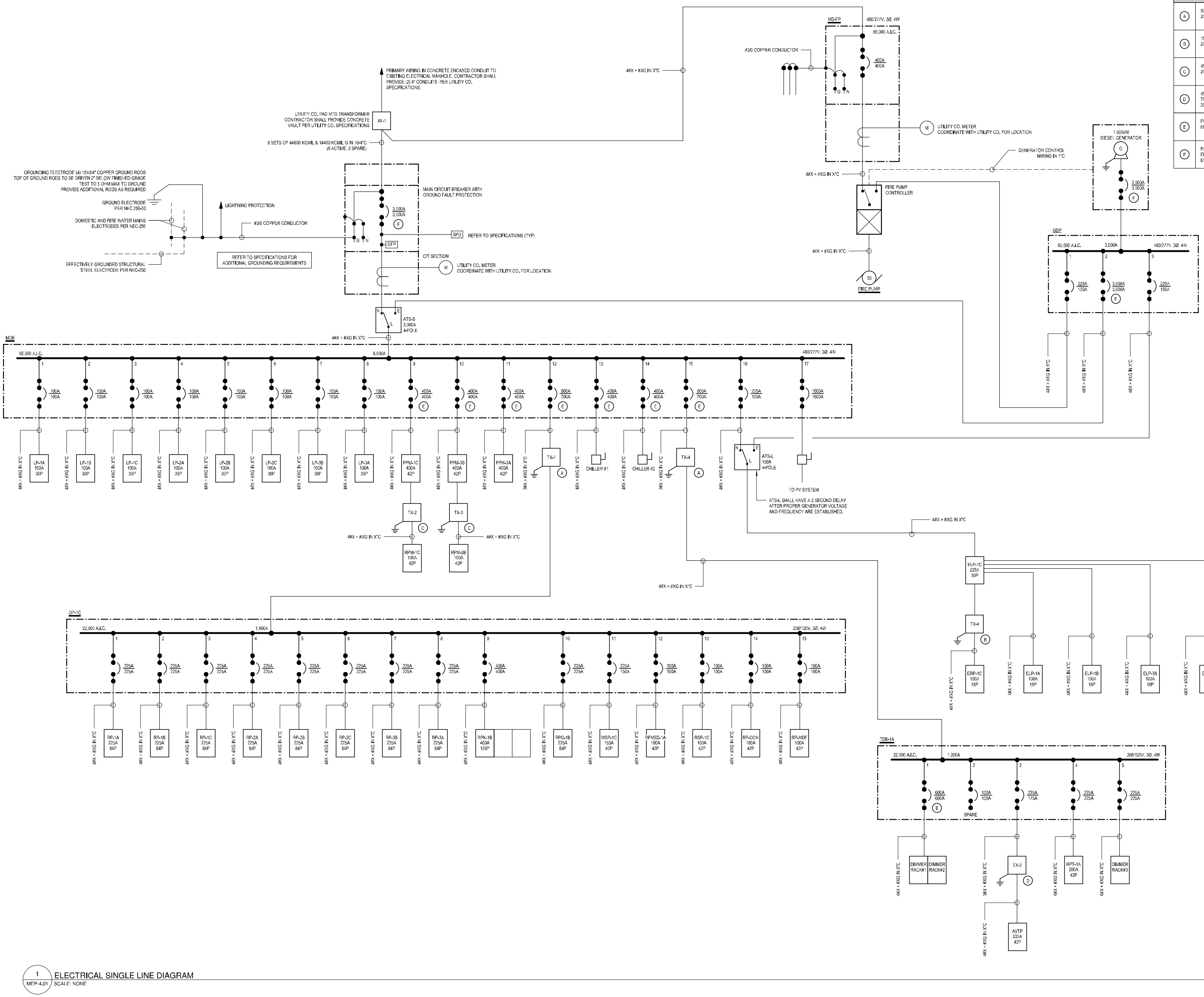

EQUIPMENT SCHEDULE

A	500kVA TRANSFORMER 480V PRIMARY 208Y/120V, SECONDARY 115°C TEMP. RISE
B	15kVA TRANSFORMER 480V PRIMARY 208Y/120V, SECONDARY 115°C TEMP. RISE
C	45kVA TRANSFORMER 480V PRIMARY 208Y/120V, SECONDARY 115°C TEMP. RISE
D	45kVA HIGH HARMONIC ISOLATION TRANSFORMER 480V PRIMARY 208Y/120V, SECONDARY 115°C TEMP. RISE
E	PROVIDE CIRCUIT BREAKER WITH ELECTRONIC TRIP UNIT
F	PROVIDE CIRCUIT BREAKER WITH ELECTRONIC TRIP UNIT AND INTEGRAL ENERGY REDUCTION MAINTENANCE SWITCH

1 MEP-4.01 ELECTRICAL SINGLE LINE DIAGRAM
SCALE: NONE

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ARCHITECTURE | PLANNING | INTERIORS

FARMINGTON HIGH SCHOOL
Farmington, CT

NEW CONSTRUCTION
PRICING DOCUMENTS

KEY PLAN

DRAWING TITLE
ELECTRICAL SINGLE LINE DIAGRAM - MEP

STATE PROJ. NO.	
PROJ. NO.	19120
SCALE	NONE
DATE	4/15/2020
DRAWN BY	KR
APPROVED BY	KR

ISSUE DATES

NO.	DATE	PURPOSE

MEP-4.01

VIII. Appendices

D. Pricing Narratives

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PART I: GENERAL NOTES

Basis of design products and finishes where required by outlined scopes

A. QT flooring – AMERICAN OLEAN 6x6
B. VCT flooring – JOHNSONITE “iQ Optima” 24x24
C. PT flooring – STONE SOURCE “Chrometech”
D. CT flooring – AMERICAN OLEAN 6x6
E. Carpet – Tile 2x2, Karastan “Groovin II” unless otherwise noted
F. Rubber Base – ROPPE 6”
G. Rubber Tile and Tread – ROPPE, circular, low profile
H. CT walls – AMERICAN OLEAN 2x2
I. Toilet Partitions – GLOBAL “9200”
J. ACT ceilings – ARMSTRONG “Ultra” 2x2
K. Roller shades – 99% sun shading fabric roller shades, motorized on all exterior windows. Mechoshade or equal

Include new room and wayfinding signage throughout. Include digital flat panels displays called out in later sections

PART II: NEW CONSTRUCTION

EXTERIOR ENVELOPE

A. Masonry exterior walls will be masonry veneer on metal stud backup. The assembly will consist of 6" metal studs with dens glass sheathing, fluid applied moisture barrier, polystyrene insulation and either clay masonry or cast stone trim on masonry anchors. New walls over 2 stories high will be relieved at the third-floor slab with continuous steel angles tied back to perimeter steel framing elements.

B. Metal panel exterior wall will be cladding on metal stud backup. The assembly will consist of 6" metal studs with dens glass sheathing, fluid applied moisture barrier, polystyrene insulation and 18" w. panels, tern-coated zinc, on phenolic substrate clipped to rain screen system.

C. Exterior windows and doors will be aluminum storefront and curtainwall, thermally broken. EFCO or equal. 2" w. mullions. 1" insulated, low-E glazing with integral impact resistant film.

D. Horizontal Sunshades to be an aluminum system compatible with glazing manufacturer. 20" deep from face of wall. EFCO Xtherm E-Shade or equal. Vertical Sunshades to be plate aluminum on welded aluminum C channel frame. 20" deep from face of wall. All aluminum mullions, shade, and plates to be Kynar finished – custom color.

E. Roofing will be light gray EPDM, .060" thick typically. Fully adhered and mechanically fastened as required. Hot fluid applied rubberized asphalt roofing will be used under terraces and green roofs.

F. Standing seam metal roofing at gable-roofed clerestory with rosin slip sheet. Tern-coated zinc.

G. Skylights as shown on plans and sections.
    1 Custom Sloped units - aluminum, thermally broken. Wasco or equal. 1" insulated, low-E glazing with 50% white frit.
    2 Domed unit – double glazed dome with curb by manufacturer. Wasco or equal

H. Glazed Entrance Canopy
    1 Architecturally exposed structural steel, custom Colorgalv coating
    2 Laminated glass panels 1 ¼" th. w/ integrated frit (75%)
    3 Internal gutters and downspouts

DOORS

Interior doors to be solid core maple veneer in hollow metal frames, typical.

FINISHES

A. Lobbies and Corridors
    1 Finishes in lobbies and corridors will be durable and low maintenance to withstand heavy institutional usage.
    2 Flooring: Thin set porcelain tile.
    3 Walls: Ground Faced CMU with anti-graffiti clear sealer.
    4 Porcelain tile base.
    5 Interior glazing to be laminated glass.
    6 Ceilings: Acoustical tile with gypsum board soffits (assume 15% gyp bd).
        i Wood acoustical ceiling tile, Rulon or equal, at main circulation spine at floors 1 and 2 (underside of second and third floor deck).
        ii Ceiling of circulation spine at third floor is 60% GWB and 40% ACT.

    7 Miscellaneous:
        i 100’ of display case in Student Dining.
        ii 40’ of display case outside of Tech/Art.
        iii 30’ of display case outside of Administration.
        iv Electronic display board in Main Lobby, Student Dining, and Auditorium Lobby.
        v Recessed entry mat in vestibules.

    8 Third Floor Interior Storefront
        i Third Floor circulation spine separated from lower levels with Interior storefront deluge wall.
        ii Interior aluminum storefront with ¼” laminated glazing in gasketed frames
        iii Sprinkler heads 6’ o.c., 12” of face of framing along each INTERIOR face. No exterior sprinkler heads required.

B. Typical Classrooms
    1 Flooring: Vinyl composition tile.
    2 Walls: Two layers 5/8” gypsum board both sides of 3-5/8” metal stud with acoustic batt insulation, painted. All walls extend to underside of deck above.
    3 Vinyl base.
    4 Ceilings: Suspended acoustical tile typical.
    5 Miscellaneous:
        i 30’ of whiteboard.
        ii 12’ of tackboard.
        iii Built-in, lockable, shelving along exterior wall below windows with solid surface top.
        iv 4’ of tackboard outside of each classroom door.
        v Allow for 6’ full height glazed sidelight at all classrooms
        vi Blinds on interior and exterior glazing.
    6 (6) full height movable partitions, one per House. See locations on drawings. Manually operated, fabric wrapped finish, STC = 55.

C. Science Rooms
    1 As above
    2 (6) four person lab stations.
    3 Full gas and RO distribution, eyewash and emergency shower
    4 Fume Hood and waste water neutralization
    5 PPE cabinet and specialized FEC

D. Administration and Guidance
    1 Flooring: Vinyl composition tile in Work Rooms and Storage Rooms.
    2 Carpet in General Offices.
    3 Walls: Two layers 5/8” gypsum board both sides of 3-5/8” metal stud with acoustic batt insulation, painted. All walls extend to underside of deck above.
    4 Vinyl base.
    5 Ceramic tile in Toilet Rooms.
    6 Ceilings: Suspended acoustical tile typical.
    7 Gypsum board soffits.

E. Library/Media Center
    1 Flooring: Vinyl composition tile in Work Rooms, Storage Rooms and Computer Lab.
    2 Carpet in remaining spaces.
    3 Walls: Painted gypsum board typical.
    4 Vinyl base.
    5 Ceilings: Suspended acoustical tile typical.

F. Locker Rooms/Toilet Rooms
    1 Flooring: Vinyl composition tile in Offices and Storage Rooms.
    2 Ceramic tile typical.
    3 Walls: Epoxy painted CMU.
    4 Ceilings: Gypsum board typical.
    5 Suspended acoustical tile in offices.
    6 Miscellaneous:
        i Welded steel lockers, 3-tier in PE locker rooms, 2-tier in team rooms.
        ii Oversize lockers (18” wide x 24” deep) are full height, open front.

G. Kitchen/Servery
    1 Quarry tile floor and base
    2 PT wall finish
    3 Food service grade ACT
    4 New food service equipment throughout
    5 Millwork for serving counters, tray slides and stations

H. Cafeteria
   1 Quarry tile floor and base
   2 Millwork allowance for recycling and service stations.

I. Auditorium Performing Arts
   1 Typical interior finishes in the performing arts areas are as follows:
      i Flooring: Carpet (In Theater aisles only. Stage to be masonite).
      ii Walls: Painted concrete block with vinyl base typical.
      iii Acoustic wall panels (assume 50% of walls).
      iv Vinyl base.
      v Ceilings: Suspended acoustic tile typical. Theater to have suspended veneer plywood acoustic reflectors. Assume 75% of ceiling.
   2 650 upholstered folding seats.: sloped main level for approximately 300 seats and tiered stadium seating for 350 seats
   3 Control Booth to support performance and recording functions
   4 Front projection system with motorized screen
   5 Multicam video recording
   6 Dedicated IDF for high speed 10GB data
   7 New Theater lighting and theater arts package
   8 New steel catwalks and rigging

J. Gymnasium
   1 Flooring: Wood athletic flooring w/ steel angle base.
   2 Walls: Painted CMU.
   3 Ceilings: Exposed painted structure, acoustic metal deck.
   4 One high school competition main basketball court (50'x84') Two cross courts (50'x84' as well)
   5 Misc:
      i 6 folding basketball backboards, electrically operated.
      ii 1400 person bleacher seating in Main Gym. 200 person seating in Aux Gym.
      iii Overhead storage of wrestling mats and batting cage.
      iv 6' tall wall pads on all walls of fitness room
      v AV system in Main Gym

K. Stairs
   1 Flooring: Rubber.
   2 Walls: Ground faced CMU.
   3 Ceilings: Acoustic tile.
   4 Painted metal guardrails with vertical pickets. All fully welded, all welds ground smooth. Brushed stainless handrail and top rail.

L. Railings
   1 Openings between floors and at vertical circulation to be 42” painted steel guard rails, AESS standard all welds ground smooth.
   2 Steel pickets 4” O.C.
   3 Hardwood top rail, Hard wood, brushed stainless hand rail where required.

ELEVATOR

Two new elevators Otis GEN 2 or equal, three stops at circulation spine.

ARCHITECTURAL ALTERNATE #1

Motorized demountable partition between Large Gym and Small Gym- 22’ high, PANELFOLD or equal

ARCHITECTURAL ALTERNATE #2

Stone veneer I.l.o. masonry along first floor where indicated on building elevations. 1 ½” thick granite panels, 24” x 48” wide, flame finished. Relocate masonry relieving angle to second floor slab where stone veneer is used.

PART III: RENOVATION

EXISTING BUILDING

Demolish existing building in its entirety as depicted in EX drawings. This includes capping and removal of all utilities and removal of all sub surface structure.

MOTHBALL ALTERNATE

Retain original 3 story 1928 building, its attic, and partial basement as depicted in EX drawings. At portion of basement that extend beyond exterior wall, retain structure concrete first floor deck. Install membrane water proofing and pedestal pavers at grade.

Install new clay masonry cavity wall at area of adjacent building demolition along two sides. See EX 3.01.

900 WING

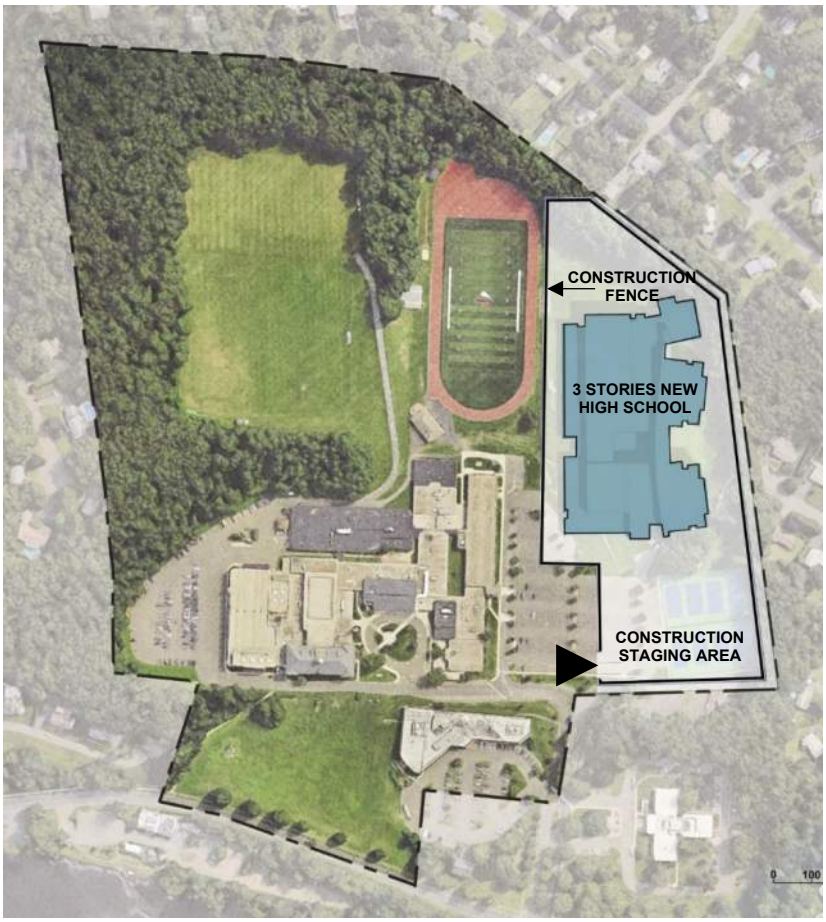
Originally constructed in 2003, this one story classroom wing includes many stand-alone systems. The structure contains one field house and numerous classrooms. In its new configuration, interior partitions and finishes will be demolish to accommodate another twin field house and administrative offices for the Board of Education.

A. Demolition
    1 Remove roofing down to deck
    2 Demolish partitions as shown
B. Concrete – no scope
C. Masonry
    1 Clean masonry
    2 New Masonry cavity wall cladding at where shown
D. Framing and Partitions – Brace south wall elevation for sheer
E. Thermal/Moisture – Roofing will be light gray EPDM, .060” thick typically. Fully adhered and mechanically fastened as required.
F. Doors and Windows – Ballistic film on all exterior glazing, #4 surface. 3M “Ultra” or equal
G. Finishes – New finishes throughout
    1 New LVT flooring in circulation spaces
    2 New CPT flooring in office and meeting spaces
    3 New PT flooring in toilet rooms
    4 New CT on toilet room walls
    5 New ACT ceilings
H. Elevator – no scope

PART IV: PHASING AND LOGISTICS

New Option will be constructed in 29 months.

Design & Approvals	12 mo.	Dec. 2020 – Nov. 2021
Bidding & Award	3 mo.	Dec. 2021 – Feb. 2022
Phase 1 New Construction	18 mo.	Mar. 2022 – Aug. 2023



Phase 2 Demo and Renovate 900 wing	11 mo.	Sept. 2023 – Jul. 2024
Phase 3 Site Work and Fields	6 mo.	Feb. 2024 – Jul. 2024

STRUCTURAL SCOPE OF WORK – OUTLINE SPECIFICATIONS

The following outlines the scope of work for the proposed construction:

GENERAL

All structures will be designed in accordance with the 2015 International Building Code/2018 Connecticut Supplement. The minimum design criteria as provided by the code, includes dead, live, and gravity loads, and wind and seismic loads. Dead loads consist of the weight of architectural, structural, mechanical and electrical systems. Live, wind and seismic loads are outlined in the "Design Criteria" following this narrative. The proposed structure shall be designed in accordance with the International Building Code (IBC) and Connecticut State Building Codes to withstand the applicable wind loads and roof loading from drifting of snow.

DESIGN BASIS

Soils Conditions: A geotechnical report providing recommendations for the proposed foundation system, excavation and backfilling requirements is required prior to commencing with the design of the building foundations. For the purposes of this narrative, suitable soils with a minimum bearing capacity of 3,000 psf has been assumed for this project.

New foundation walls (excluding retaining walls): New foundation walls are assumed to consist of 12" reinforced concrete walls on continuous 3'-0" wide x 1'-0" thick spread wall footings. Cast in place concrete walls and footings shall be constructed using 4,500 psi concrete. The wall reinforcing is assumed to consist of #5@16"o.c. vertical with matching footing dowels and #4@12"o.c. horizontal with (2)-#5 continuous horizontal bars top and bottom. The longitudinal footing reinforcing shall be (3)-#5 continuous. All wall reinforcing shall have Class "B" laps at splices and corner bars. New exterior columns will be supported on reinforced concrete piers supported on reinforced concrete spread footings. Interior columns will be supported on isolated reinforced concrete piers and isolated reinforced concrete spread footings.

New Floor Slabs on Grade: The typical floor slabs on grade are assumed to be 5" thick normal weight concrete slab (3,500 psi) reinforced with 6x6-W2.9xW2x.9 welded wire fabric supported on continuous steel wire chairs and (2)-#5 at re-entrant slab corners. The slabs shall be placed over a 15 mil vapor retarder on a compacted processed aggregate base material. All concrete for the slabs on grade shall include a moisture vapor reducing admixture to control the transmission of moisture vapors thru the slab. Floor depressions, as well as any areas of specialized floor finishes shall be located and specified by the Architect. Control joints shall be installed at a maximum grid of 12 feet on center.

Typical Supported Floor Construction: The typical supported floor construction is assumed to be 3 1/4 inches of light weight concrete (3,500 psi) on a 2 inch, 18 gage, galvanized composite metal floor deck (total slab depth = 5 1/4 inches) reinforced with 6x6-W2.9xW2x.9 welded wire fabric supported on continuous steel wire chairs and (2)-#5 at re-entrant slab corners and floor openings. The metal decking

shall be supported on steel framing consisting of composite steel beams and girders supported by steel columns. The concrete mix for the supported slabs shall include a moisture vapor reducing admixture. Floor depressions, as well as any areas of specialized floor finishes shall be located and specified by the Architect.

Shop Areas (Robotics/Auto/Wood): The supported floor construction located directly above these shop areas shall be exposed and consist of 3 1/4 inches of light weight concrete (3,500 psi) on a 2 inch, 18 gage, galvanized composite acoustic metal floor deck (total slab depth = 5 1/4 inches) reinforced with 6x6-W2.9xW2x.9 welded wire fabric supported on continuous steel wire chairs and (2)-#5 at re-entrant slab corners and floor openings. The metal decking shall be supported on steel framing consisting of composite steel beams and girders supported by steel columns. The concrete mix for the supported slabs shall include a moisture vapor reducing admixture.

It should be noted that the roof over the Special Education wing, located to the northeast of the Gymnasium, shall be designed as a future floor. For the purposes of this narrative, the construction should be assumed similar to the Typical Supported Floor Construction indicated herein. It will need to be determined if the concrete will be placed during the current construction project or at a future date.

Stairwells: Stairwell walls shall consist of reinforced 8” concrete masonry units. All masonry cores containing reinforcing shall be grouted solid. Continuous reinforced bond beams shall be installed at each floor and roof level with steel lintels installed for all wall openings.

Elevator Shaft: The elevator shaft is assumed to be constructed over a reinforced 4ft deep cast in place concrete pit foundation with sump. The shaft walls above shall consist of reinforced 8” concrete masonry units (full height). All masonry cores containing reinforcing shall be grouted solid. Continuous reinforced bond beams shall be installed at each floor and roof level with steel lintels installed for all wall openings. Provide a W8x21 hoist beam with bearing plates at each end bearing on reinforced and grouted masonry cores at beam bearing plates.

Typical Roof Construction: The typical roof construction, shall consist of 20 gage, 1.5 inch galvanized metal roof deck on steel beams and/or joists, supported by steel girders, supported by steel columns.

Gymnasium Roof Construction: The Large and Small Gymnasium roof construction shall consist of a 20 gage, 3” deep galvanized acoustic metal roof deck supported on steel joists supported on steel girders, supported by steel columns. The two gymnasiums shall be separated by an operable partition over which a deep steel girder shall be installed clear span the spaces to allow for a single large gymnasium. A deep steel girder shall also be installed over the bleachers on the south side of the large gymnasium to allow the bleachers to extend over the small academic offices in the Media space.

Cafeteria Roof Construction: The Cafeteria roof construction shall consist of 20 gage, 1.5 inch galvanized metal roof deck on steel beams and/or joists, supported by steel girders, supported by steel columns.

Auditorium Roof Construction: The roof construction shall consist of a 20 gage, 3” deep galvanized metal roof deck supported on steel joists supported on steel girders, supported by steel columns.

Structural steel roof frames shall be required for all roof mounted equipment and roof deck openings. All structural steel and miscellaneous metals exposed to weather shall be hot dip galvanized.

Structural Steel: Shall be fabricated and erected in accordance with the current AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings. During this early design phase, we would estimate the steel tonnage for the structure to be approximately 13 lbs. per square foot.

Lateral Load Resisting System: Based on the current architectural design, laterally stability shall be achieved utilizing either concentric steel braced frames or moment frames. The braced frames are assumed to consist of structural steel rectangular HSS sections spanning between steel columns at strategic locations to be coordinated during the design development and construction document phases.

DESIGN CRITERIA

1. 2015 International Building Code/2018 Connecticut Supplement.

2. Design Live Loads: Town of Farmington

   Minimum Live Loads:

Offices	50 psf
Cafeteria	100 psf
Classrooms	40 psf
Corridors (First floor)	100 psf
Corridors (above First Floor)	80 psf
Gymnasium	100 psf
Lobbies	100 psf
Stairs	100 psf
Partitions	15 psf

   Snow Loads:

   Roof, Flat Snow Load,

   Pf = 0.7 Ce Ct I Pg = 22.05 psf= 30 psf min.

   (Pg= 35 psf, Ce= 0.9, Ct = 1.0, I = 1.1

   Snow Drift Load:

   In accordance with Section 1608.7

3. Wind Load Criteria: Refer to ASCE 7-10, "Minimum Design Loads for Buildings and Other Structures"

   P = q GCp – qi (G Cpi)

Basic Wind Speed, V*ult*:	135 mph
V*asd*:	105 mph
Exposure Category:	B
Risk Category:	III
Mean Roof Height, h	TBD

4. Earthquake Load Criteria: Refer to Chapter 9 of ASCE 7-10, "Minimum Design Loads for Buildings and Other Structures"

   Seismic framing system – Ordinary Composite Braced Frames or Steel Moment Frames

   S_s = 0.183

   S_1 = 0.064

   S_{ds} = 0.192

   S_{d1} = 0.101

   Risk Category III

   Seismic Design Category B (Typical)

   Importance Factor, Is (Category III) = 1.25

   Soil Site Class = TBD

Response Modification Factor, R=3.0
Deflection Amplification Factor, C_d = 4.5

Division 03 30 00 – Cast-In-Place Concrete:

All cast-in-place concrete shall conform to ACI 301 "Specifications for Structural Concrete for Buildings", and ACI 318 "Building Code Requirements for Reinforced Concrete".

1. Reinforcing bars: ASTM A615, Grade 60
2. Welded wire fabric: ASTM A185
3. Portland cement: ASTM C150, Type I.
4. Aggregates: ASTM C33
5. Water: clean, free from deleterious amounts of acid, alkalis and organic materials.
6. Admixtures:
   - Air-entraining admixture: ASTM C260
   - Water reducing, accelerating, high range water reducing admixtures: ASTM C494
7. Concrete:
   - Slabs on grade: 3500 psi (no air entrainment) at 28 days. Water-cement ratio shall not exceed 0.50 by weight. Air content 6 percent by volume. Include moisture vapor reducing admixture in design mix.
   - Elevated slabs: Lightweight 3500 psi (no air entrainment) at 28 days. Include moisture vapor reducing admixture in design mix
   - Other interior concrete: 3000 psi at 28 days.
   - Exterior concrete: 3000 psi at 28 days, with air-entraining admixture. Concrete subject to de-icers shall have water-cement ratio not exceeding 0.40.

Division 05 12 00 – Structural Steel:

1. Structural steel: in accordance with the current AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings.
2. All welding: by welders holding active welding certificates only.
3. Structural steel: ASTM A36
4. Welding electrodes: E70XX
5. High strength bolts: ASTM A325
6. Shop welding, field welding, and high strength bolting: laboratory controlled.

Division 05 21 00 – Steel Joists:

1. Steel joists: designed, fabricated and erected in accordance with Steel Joist Institute Standard Specifications and Recommendations.
2. Joist manufacturer: Member of SJI, approved for joist types specified.
3. Field welding: laboratory controlled, performed by welders holding active welding certificates only.
4. Shop paint: fabricators standard lead-free shop paint. Touch up shop paint after installation.

Division 05 30 00 – Metal Deck:

1. Metal roof deck: 1 1/2" deep, 20 gage, galvanized steel roof deck with nesting side seams.

2. Acoustic Metal Roof Deck: 3” deep, 20 gage, galvanized acoustic metal roof deck
3. Composite floor deck: 2" deep, 20 gage galvanized steel deck with interlocking type side laps produced with integral locking lugs to provide mechanical lock between concrete and steel.
4. Manufacture and install in accordance with Steel Deck Institute Design Specifications and Code of Recommended Standard Practice. Manufacturer: Member of SDI.
5. Form metal from hot dipped galvanizing sheet conforming to ASTM A446-76, Grade A, with zinc coating conforming to ASTM A525-76, Coating Designation G-60.
6. Installation and fastening: Conform to SDI Tentative Recommendations for Design of Steel Deck Diaphragms.
7. Shear connectors: stud type conforming to ASTM A 108, Grade 1015 or 1020. Dimensions and tolerances in accordance with figure 4.22.1 of the AWS "Structural Welding Code - Steel".
    - An arc shield (ferrule) of heat resistant ceramic or other suitable material shall be furnished with each shear connector.
    - A suitable deoxidizing and arc stabilizing flux for welding shall be furnished with each shear connector.

Division 05 51 00 – Cold Formed Metal Framing:

1. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
    - Design Loads: Wind Loads: per ASCE-07-10
    - Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions.
2. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 25 percent.
    - Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows.
        a. Grade: As required by structural performance
        b. Coating: G60.
3. Exterior Non-Load-Bearing Wall Framing
    - Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
        a. Minimum Base-Metal Thickness: 0.0428 inch.
        b. Flange Width: 1-5/8 inches.

PART VI: MECHANICAL SYSTEMS NARRATIVE

A. GENERAL

Comply with all current Federal, State, and local codes, standards and ordinances including:

- 2018 Connecticut State Building Code
- 2015 International Building Code
- 2015 International Mechanical Code
- 2015 International Energy Conservation Code
- 2015 International Plumbing Code
- 2015 International Fire Code
- 2015 NFPA 101 Life Safety Code
- 2009 ANSI A117.1 Accessible and Useable Building and Facilities
- 2017 NFPA 70 National Electric Code (NEC)
- ASHRAE 90.1 - 2013

Comply with all requirements of the State of Connecticut High Performance Buildings and LEED Version 4.

The contractor will be responsible to give all necessary notices, obtain all permits and pay all taxes and fees necessary to obtain approvals and complete the work herein. Obtain all required certificates of inspection and deliver same to Owner.

The Mechanical systems will be designed to comply with all current State and Local Codes including associated supplements.

The work includes all labor, materials, equipment and services necessary to complete the work as shown on the drawings, specified herein, and that is required to provide complete and functional systems.

B. COORDINATION

Coordinate the work, with work of other trades and field conditions. Carefully check space requirements and utilities to ensure all equipment can be installed in the spaces allotted thereto and coordinate all necessary utility service requirements. Coordinate, protect and schedule work with work of other trades in accordance with the required construction sequence. Install all work in accordance with equipment manufacturer's installation instructions.

C. ENERGY CONSERVATION

Energy conservation requirements as set forth in the 2015 International Building Code with Local Amendments, 2015 International Energy Conservation Code with Local Amendments and ASHRAE 90.1 will be included. Additional energy conserving methods will be considered to further affect higher energy savings.

D. LEED

The project is pursuing LEED Silver. The following credits and requirements indicated within, involving the mechanical systems are to be incorporated as part of the design:

Energy & Atmosphere

- Prerequisite 1: Fundamental Commissioning of Building Energy Systems
- Prerequisite 2: Minimum Energy Performance
- Prerequisite 3: Building Level Energy Metering
- Prerequisite 4: Fundamental Refrigerant Management
- Optimize Energy Performance (Minimum of 21% above baseline.)
- Enhanced Refrigeration

Indoor Environmental Quality

- Prerequisite 1: Minimum Indoor Air Quality Performance
- Prerequisite 2: Environmental Tobacco Smoke (ETS) Control
- Enhanced Indoor Air Quality Strategies
- Low Emitting Materials
- Indoor Air Quality Assessment
- Thermal Comfort
- Interior Lighting

E. WARRANTY

The Contractor warrants that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. Contractor shall warranty all work for a period of one year from Owner acceptance unless specified otherwise in which case longer equipment warranties may apply.

Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace the following components of equipment that fail in materials or workmanship within specified warranty period:

Warranty Period, Commencing on Date of Substantial Completion:

- Refrigeration Compressors: 10 years.
- Evaporator and Condenser Coils: 5 years.
- Heat Exchangers: 5 years.
- Air Handling Units & Components: 5 years.
- All equipment minimum 18 months

F. SUBMITTALS

Contractor shall submit; shop drawings, product data, samples, record documents (as-builts) and operation and maintenance manuals in accordance with the Contract requirements and particular specification section requirements.

G. RECORD DRAWINGS

Provide a complete set of as-built drawings reflecting as installed conditions. As-built drawings shall indicate all installed conditions of systems within this discipline. Drawings shall be of similar scale as the construction documents and include details as necessary to clearly reflect the installed condition. Drawings shall be bound in a complete and consecutive set. Supplemental sketches and loose paperwork will not be acceptable and will be returned for revision. The contractor shall comply with the engineer's comments to produce a clear and concise set of drawings. Drawings shall be submitted in both hard copy and electronic (Auto-CAD or Revit version as required by the owner) version. Number of copies of each as requested by the owner.

Indicate the following installed conditions:

- All changes and an accurate record, on reproductions of the contract drawings or appropriate shop drawings, of all deviations, between the work shown and work installed.
- Mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.). Valve location diagrams, complete with valve tag chart.
- Equipment locations (exposed and concealed), dimensioned from prominent building lines.
- Approved substitutions, contract modifications, and actual equipment and materials installed.
- Contract modifications, actual equipment and materials installed.

Submit for review bound sets of the required drawings, manuals and operating instructions.

Submit a complete maintenance manual of all equipment installed under this contract.

H. COMMISSIONING

This project will include commissioning of mechanical systems by an approved Commissioning Authority (CA). All sub-contractors shall provide necessary support for demonstration of start-up and operation including all required system adjustments. Personnel shall be available as indicated in the CA schedule.

I. ACCEPTABLE MANUFACTURERS

Acceptable Manufacturers. Provide the specified product or submit the equal product from the list of acceptable manufacturers for approval.

Air Filters: Camfil Farr, AAF Flanders, Tri-Dim
Air Separators: Caleffi, Spirotherm, Honeywell
Air Handling Units: Carrier, York, Trane, Daikin/McQuay
Modular Chillers: Multistack, Aermec, Arctic Chillers
Conventional Chillers: Carrier, McQuay/Daikin, Trane, Johnson Controls/York
Water to Water Geothermal Heat Pumps: ClimateMaster, Bosch, Daikin
Chilled Beams: Price, Dadanco, Trox
Dedicated Outside Air Units: Munters, Semco
Gas Fired Boilers: Aerco, Patterson Kelly, Thermal Solutions
Diffusers and Grilles: Price, Nailor, Kreuger
Fans: Loren Cook, Greenheck, Twin City Fans
Flexible Ductwork: Flexmaster
Insulation: Owens-Corning, Certainteed, Knauf
Pumps: Taco, Grundfos, Bell&Gossett
Sound Attenuators: Vibro-Acoustics, VAW, Price
Vibration Isolation/Seismic Restraints: Mason Industries, Amber Booth, Vibration Mountings.
Cabinet Heaters, Unit Heaters, Radiation: Sterling, Vulcan, Runtal
Terminal Boxes: Price, Anemostat, Nailor
Building Controls: Automated Logic WebCTRL, Siemens Insight Software
Heat exchangers: Mueller, Bell & Gossett, Alfa Laval, APV
Thermal Ice Storage: Calmac, BAC, Evapco
Variable Frequency Drives: ABB, Yaskawa

J. DESIGN CONDITIONS

Outdoor Design Conditions (Based on Hartford, CT):

Winter design dry bulb	8.5°F (ASHRAE 99.6%)
Summer design dry bulb	88.2°F (ASHRAE 1%)
Coincident wet bulb	72.4°F (ASHRAE 1%)

Indoor Design Conditions:

Space Temperature Design Conditions				
Space Type	Summer		Winter	
	DB °F	RH %	DB °F	RH %
Administrative	75	50±5	68	NC
Classrooms	75	50±5	68	NC
Toilet rooms	75	50±5	68	NC
Storage Rooms	80	50±5	65	NC

Space Temperature Design Conditions				
Space Type	Summer		Winter	
	DB °F	RH %	DB °F	RH %
Auditorium	75	50±5	68	NC
Cafeteria	75	50±5	68	NC
Gymnasium	75	50±5	68	NC
Mechanical Rooms	NC	NC	60	NC
Electrical Rooms/Mechanical Rooms	85	NC	NC	NC
MDF	74	45	74	NC
Media Center	74	50±5	68	NC
Computer Lab	74	50±5	68	NC
Entrance Vestibules	NC	NC	55	NC
Lobby/Circulation	75	50±5	68	NC
Stairs	NC	NC	65	NC

NC – indicates no control over conditions will be provided.

K. HVAC SYSTEMS

1928 Building – Central Heating Plant

The existing 1928 Building will remain as a free-standing building as part of this project. Located in a sub-basement, outside the footprint of the 1928 Building, is a boiler room that contains dual fuel cast iron boilers that produces low pressure steam directly and heating hot water indirectly via a heat exchanger. The boiler plant also serves a portion of the 600 Building, portions of the 800 Building, and the 400 Building, all which are scheduled to be demolished as part of the project. As part of this project, the boiler plant will remain functional to serve the 1928 Building. All steam and hot water distribution serving buildings scheduled to be demolished shall be capped within the boiler room. Existing equipment within the boiler room that serves the to be demolished buildings shall remain abandoned in place.

900 Building – Central Heating Plant

The existing boiler currently serving the 900 Building shall be removed in its entirety, including all associated piping, pumps, controls, etc. As part of this project a new heating plant shall be provided consisting of two (2) fully modulating condensing boilers served by natural gas. The boilers shall be similar to Aerco Modulex BMK750 with a heating output of 720 MBH each. Each boiler shall be provided with a primary hot water pump. Pumps shall be similar to Bell & Gossett Series e90. Primary pumps shall be sized based on minimum flow rates required by the boiler manufacturer. Secondary heating hot water from the shall be circulated via end suction pumps similar to Bell & Gossett Series e1510 series in lead/standby configuration with variable frequency drives. Each secondary pump shall be sized for approximately 95 GPM @ 75 FTHD.

Heating hot water shall serve building perimeter finned tube radiation or radiant ceiling panels, hot water reheating coils, cabinet/unit heaters and other supplemental heating systems.

New High School - Central Heating Plant

Gas Fired Boiler (Base Heating Plant)

A mechanical room will be provided to accommodate the heating plant. The heating plant shall consist of three (3) fully modulating condensing boilers served by natural gas. The boilers shall be similar to Aerco Modulex BMK2500 with a heating output of 2360 MBH each. Each boiler shall be provided with a primary hot water pump. Pumps shall be similar to Bell & Gossett Series e90. Primary pumps shall be sized based on minimum flow rates required by the boiler manufacturer. Secondary heating hot water from the shall be circulated via end suction pumps similar to Bell & Gossett Series e1510 series in lead/standby configuration with variable frequency drives. Each secondary pump shall be sized for approximately 750 GPM @ 75 FTHD.

Heating hot water shall serve building perimeter finned tube radiation or radiant ceiling panels, hot water reheating coils, cabinet/unit heaters and other supplemental heating systems.

Glycol heating solution via a plate and frame heat exchanger shall be circulated via end suction pumps similar to Bell & Gossett Series 1510 in a lead/standby configuration with variable frequency drives. Glycol shall serve air handling unit pre-heating coils only.

Water to Water Heat Pumps (Heating Plant - Alternate 1)

Refer to Geothermal Heat Exchanger (Heating/Cooling Plant – Alternate 1) for additional information.

A mechanical room will be provided to accommodate the heating plant. The heating plant shall consist of twelve (12) water to water heat pumps capable of producing both heating hot water and chilled water. For the purpose of the heating plant, all twelve (12) heat pump modules will be required to operate. The heat pumps shall be similar to ClimateMaster Model TMW840 with a heating output of 630 MBH each. Heating hot water shall be circulated via end suction pumps similar to Bell & Gossett Series e1510 series in lead/standby configuration with variable frequency drives. Each pump shall be sized for approximately 750 GPM @ 75 FTHD.

Heating hot water shall serve building perimeter finned tube radiation, hot water reheating coils, cabinet/unit heaters and other supplemental heating systems.

Glycol heating solution via a plate and frame heat exchanger shall be circulated via end suction pumps similar to Bell & Gossett Series 1510 in a lead/standby configuration with variable frequency drives. Glycol shall serve air handling unit pre-heating coils only.

Geothermal Heat Exchanger (Heating/Cooling Plant - Alternate 1)

The geothermal system shall consist of approximately 160, 6” diameter boreholes at 495’ deep spaced 20 feet apart. Each vertical borehole shall consist of a 1 ¼” polyethylene piping with a u-bend assembly and shall be filled with a thermally enhanced bentonite-based grouting material with a minimum solids content of 20%

The geothermal piping shall have a geothermal vault located below grade outside the mechanical room. From the vault, geothermal piping shall enter the mechanical room and circulate via (2) base mounted end suction pumps. The pumps shall be similar to Bell & Gossett Series e1510 series in lead/standby configuration with variable frequency drives. Each pump shall be sized for approximately 1,600 GPM @ 100 FTHD.

A brazed plate heat exchanger will be provided to separate the geothermal loop (25% propylene glycol solution), from the condenser water loop serving the water to water heat pumps. Condenser water shall be circulated via end suction pumps similar to Bell & Gossett Series e1510 series in lead/standby configuration with variable frequency drives. Each pump shall be sized for approximately 1,600 GPM @ 40 FTHD.

1928 Building – Central Cooling Plant

The existing 1928 Building will remain as a free-standing building as part of this project. The building is currently not air conditioned and will remain without air conditioning as part of this project.

900 Building – Central Cooling Plant

Existing air-cooled DX rooftop condensing units serving the 900 Building shall be removed in their entirety, including all associated indoor air handling equipment, ductwork, controls, etc. As part of this project cooling shall be provided by packaged rooftop air handling equipment. Refer to the air handling section of this narrative for additional information.

New High School - Central Cooling Plant

Standard Air-Cooled Chiller Plant (Base Cooling Plant)

The cooling plant will consist of standard air-cooled chillers located at the roof or grade. A mechanical room will be provided to accommodate the chilled water pumps. The chillers shall be similar to Daikin Model AWV. A total of 2 chillers will be provided, each chiller will have a nominal cooling capacity 265 Tons, with a combined cooling capacity of 530 tons. Two base mounted pumps configured as primary/standby shall circulate chilled water (30% Glycol) to cooling coils at all air handling units. Pumps shall be similar to Bell & Gossett Series e1510, each sized for 1060 GPM each @ 125FT HD.

Water to Water Heat Pumps (Cooling Plant - Alternate 1)

Refer to Geothermal Heat Exchanger (Heating/Cooling Plant – Alternate 1) for additional information.

A mechanical room will be provided to accommodate the cooling plant. The cooling plant shall consist of twelve (12) water to water heat pumps capable of producing both heating hot water and chilled water. For the purpose of the cooling plant, nine (9) heat pump modules will be required to operate. The heat pumps shall be similar to ClimateMaster Model TMW840 with a cooling output of 60 Tons each, with a combined cooling capacity of 540 tons. Two base mounted pumps configured as primary/standby shall circulate chilled water to cooling coils at all air handling

units. Pumps shall be similar to Bell & Gossett Series e1510, each sized for 1060 GPM each @ 125FT HD.

Modular Air-Cooled Chiller Plant (Cooling Plant – Alternate 2)

The cooling plant will consist of modular air-cooled chillers located at grade or on the roof. A mechanical room will be provided to accommodate the chilled water pumps. The chillers shall be similar to Multistack Model ASP060X. A total of nine (9) modules will be provided, each module will have a nominal cooling capacity 60 Tons, with a combined cooling capacity of 540 tons. Two base mounted pumps configured as primary/standby shall circulate chilled water to cooling coils at all air handling units. Pumps shall be similar to Bell & Gossett Series e1510, each sized for 1060 GPM each @ 125FT HD.

Thermal Ice Storage (Cooling Plant – Alternate 3)

Thermal ice storage shall be considered as a possible alternate. This alternate can be utilized with the base cooling plant and alternate cooling plants. Thermal ice storage shall consist of a system capable of making ice during off-peak hours for partial storage. In partial storage, the system shall be capable of producing 2,500 Ton hours of ice. A partial storage system shall consist of five (5) Calmac Model 1500C tanks.

If this alternate is selected, the base (water cooled) and alternate (air cooled) cooling plant can be reduced. Under partial thermal storage, the chiller cooling capacity will be reduced to 370 Tons. This would reduce the equipment as follows:

Central Cooling Plant	Number of Chillers/Modules	Capacity (Each Chiller/Module)
Base Cooling System – Air Cooled Chiller	Two	185 Tons
Alternate 1 -Water to Water Heat Pumps	Six	60 Tons
Alternate 2 – Air Cooled Chiller Plant	Six	60 Tons

L. AIR HANDLING EQUIPMENT

1928 Building – Air Handling Equipment

The existing 1928 Building will remain as a free-standing building as part of this project. Existing equipment currently serving the building will remain operational, no additional improvements or air handling equipment shall be provided as part of this project.

900 Building – Air Handling Equipment

Air Handling Units to Overhead Distribution

Provide factory-assembled and tested air conditioning unit consisting of hot water heating, chilled water cooling, fans, temperature controls, filters and dampers.

All components shall be mounted in a weather resistant steel cabinet with corrosion resistant coating and exterior finish suitable for exterior installation. Provide minimum of 2-inch-thick thermal insulation, and exterior condensate drain connection, lifting lugs and removable panels or access doors for access to all internal equipment.

Provide two-inch MERV 8 prefilters and four-inch MERV 13 final filters.

Provide direct drive fan wall for supply and return sections. Provide unit completely factory wired with necessary controls and with connections for power wiring. Provide programmable thermostat

For roof mounted units, provide roof curb for ductwork connection directly to the curb. Coordinate curb size with structural framing modifications.

Unit casing shall be 2" double wall with 2" of insulation and a perforated interior panel.

SYSTEM	AREA SERVED	SYSTEM TYPE	COOLING CAPACITY (TONS)	AIRFLOW (CFM)	COMPONENTS
AHU-1	Board of Education	Variable Volume	25	10,000	1, 2, 3, 4, 5, 6, 7, 8, 9
AHU-2	Locker Rooms	Variable Volume	15	5,000	1, 2, 3, 4, 6, 7, 8, 9, 10

Air Handling Unit Components:

1. Pre and Final Filters.
2. Minimum Outside Air Dampers.
3. Hot Water Pre-heat Coil.
4. DX-Cooling Coil.
5. Hot Water Pre-heating Coil.
6. Supply Fan.
7. Variable Speed Drive Unit(s).
8. Return Fan.
9. Pressure independent electronically controlled VAV boxes with hot water reheat
10. Energy Recovery Wheel

New High School – Air Handling Equipment

Air Handling Units to Overhead Distribution (Base system)

Provide factory-assembled and tested air conditioning unit consisting of hot water heating, chilled water cooling, fans, temperature controls, filters and dampers.

All components shall be mounted in a weather resistant steel cabinet with corrosion resistant coating and exterior finish suitable for exterior installation. Provide minimum of 2-inch-thick thermal insulation, and exterior condensate drain connection, lifting lugs and removable panels or access doors for access to all internal equipment.

Provide two-inch MERV 8 prefilters and four-inch MERV 13 final filters.

Provide direct drive fan wall for supply and return sections. Provide unit completely factory wired with necessary controls and with connections for power wiring. Provide programmable thermostat

For roof mounted units, provide roof curb for ductwork connection directly to the curb. Coordinate curb size with structural framing modifications.

Unit casing shall be 2" double wall with 2" of insulation and a perforated interior panel.

REFER TO HVAC ZONING PLANS (BASE SYSTEM)

SYSTEM	AREA SERVED	SYSTEM TYPE	COOLING CAPACITY (TONS)	AIRFLOW (CFM)	COMPONENTS
AHU-1	Gymnasium	Variable Volume/ Variable Temperature	40	20,000	1, 2, 3, 4, 5, 6, 7, 8, 10
AHU-2	Auxiliary Gym	Variable Volume/ Variable Temperature	20	8,500	1, 2, 3, 4, 5, 6, 7, 8, 10
AHU-3	Weight Room/Locker Room	Variable Volume	17 1/2	7,500	1, 2, 3, 4, 6, 7, 8, 9, 10
AHU-4	Cafeteria	Variable Volume	27 1/2	12,500	1, 2, 3, 4, 6, 7, 8, 9, 10
AHU-5	Auditorium	Variable Volume/ Variable Temperature	40	20,000	1, 2, 3, 4, 5, 6, 7, 8, 10

SYSTEM	AREA SERVED	SYSTEM TYPE	COOLING CAPACITY (TONS)	AIRFLOW (CFM)	COMPONENTS
AHU-6	Band, Vocal, Administration	Variable Volume	30	15,000	1, 2, 3, 4, 6, 7, 8, 9, 10
AHU-7	Cafeteria, Main Corridor	Variable Volume	30	12,000	1, 2, 3, 4, 6, 7, 8, 9, 10
AHU-8	1st & 2nd Floor Classrooms	Variable Volume	60	24,000	1, 2, 3, 4, 6, 7, 8, 9, 10
AHU-9	1st, 2nd & 3rd Floor Classrooms	Variable Volume	70	30,000	1, 2, 3, 4, 6, 7, 8, 9, 10
AHU-10	1st, 2nd & 3rd Floor Classrooms	Variable Volume	70	30,000	1, 2, 3, 4, 6, 7, 8, 9, 10
AHU-11	SLC, Multimedia Prod. & 2nd Floor Corridor	Variable Volume	70	30,000	1, 2, 3, 4, 6, 7, 8, 9, 10
AHU-12	2nd Floor Media	Variable Volume	25	10,000	1, 2, 3, 4, 6, 7, 8, 9, 10
AHU-13	2nd Floor Offices and Classrooms	Variable Volume	25	10,000	1, 2, 3, 4, 6, 7, 8, 9, 10

Air Handling Unit Components:

1. Pre and Final Filters.
2. Minimum Outside Air Dampers.
3. Hot Water Pre-heat Coil.
4. Chilled Water-Cooling Coil.
5. Hot Water heating Coil.
6. Supply Fan.
7. Variable Speed Drive Unit(s).
8. Return Fan.
9. Pressure independent electronically controlled VAV boxes with hot water reheat
10. Energy Recovery Wheel

Dedicated Outside Air Systems to Chilled Beams (Alternate #1)

Regardless of the cooling plant provided, with Alternate #1 a primary chilled water loop shall be provided to serve air handling unit cooling coils. A secondary chilled water loop shall be provided to serve building chilled beam systems.

The primary chilled water loop shall be configured as a variable primary pump system. Chilled water shall be circulated via end suction pumps similar to Bell & Gossett Series 1510 in a lead/standby configuration with variable frequency drives.

The secondary chilled water loop shall be configured as a variable primary pump system with plate and frame heat exchanger. Chilled water shall be circulated via end suction pumps similar to Bell & Gossett Series 1510 in a lead/standby configuration with variable frequency drives. The secondary chilled water loop shall be limited to classrooms, and administration areas. Refer to room HVAC Zoning Plans – Alternate #1.

Spaces such as Classrooms and Administrative Office shall consist of four pipe active chilled beams and hot water panel radiators at the perimeter, as required. Chilled beams will be located at the ceiling level with outside air ducted to each beam. Each outside air branch serving a classroom and offices shall be provided with a variable air volume box which will modulate the outside air based on the carbon dioxide level within the classroom. Outside air will be provided from dedicated outside air units. The dedicated outside air units will be configured as follows: exhaust fan, exhaust filter section, active desiccant wheel with reaction air DX section, outside air filter section, hot water coil, chilled water coil and supply fan. Exhaust air will be ducted back to the units from each classroom and office via a ceiling mounted grille. Units shall be similar to Munters Model HCU.

The dedicated outside air handling units shall be scheduled as follows:

REFER TO HVAC ZONING PLANS (BASE SYSTEM)

SYSTEM	AREA SERVED	AIRFLOW (CFM)
DOAS-1	1st & 2nd Floor Classrooms	4,500
DOAS-2	1st, 2nd & 3rd Floor Classrooms	10,500
DOAS-3	1st, 2nd & 3rd Floor Classrooms	10,500
DOAS-4	1st & 2nd Floor Administration & Classrooms	3,000
DOAS-5	2nd Floor Classrooms & Media	4,750

All perimeter spaces shall be provided with hot water panel radiators located at the ceiling to take care of building skin losses. The panel radiators shall be 18 inches in width and run the entire length of the exterior envelope within the space it serves. Panel radiators shall be similar to Rittling Steel Panel Radiators.

Miscellaneous Systems:

Commercial kitchen: The commercial kitchen shall be served by an exhaust fan (UL 762 rated) for the commercial kitchen hood and a makeup air system capable of delivering conditioned air to the kitchen. Dishwasher exhaust shall be ducted to the outdoors via aluminum or stainless-steel ductwork with the ductwork pitched back toward the dishwasher. Dishwashing shall be exhausted via a Type II hood to a roof curb mounted exhaust fan.

Science & Prep Rooms: Science Classrooms and Prep Rooms with fume hoods will be designed such that no air is recirculated back to the central air handling unit. Fume hoods will be exhausted via a variable air volume laboratory exhaust system. Where possible multiple hoods will be connected to a central exhaust fan. Laboratory exhaust fans shall be similar to Greenheck Model Vektor-H.

Wood Shop: The wood shop will be furnished with a wood dust extraction and collection system. Dust collector shall be located outdoors and will be similar to Donaldson UMA 750. An ambient room dust filtration system similar will also be suspended in the space to continuously filter the air, ambient collection system shall be similar to Donaldson AT-3000.

Mechanical equipment & electric rooms: These spaces shall be provided with unit heaters for heating. Thermostatically controlled exhaust fans shall be provided for ventilation in mechanical and electrical rooms.

Copy Rooms/Janitors Closets: All janitor closet and copier exhaust shall be ducted to the outdoors via inline or roof mounted fans and continuously exhausted.

Toilet Rooms and Locker Rooms: All toilet and locker rooms shall be continuously exhausted and ducted to the outdoors via inline or roof mounted fans.

IT Server Rooms: These spaces shall be conditioned via dedicated split AC units. Condensing unit locations to be coordinated with the architect. Spaces shall be conditioned year-round and shall be on standby power.

Elevator Machine Rooms: The machine room shall be continuously exhausted via an independent system. Pending the environmental condition requirements for the room and heat dissipated off the equipment, space shall be air conditioned via a split AC unit. Condensing unit location to be coordinated with the architect. Space shall be conditioned 24/7 on standby power.

M. BUILDING CONTROL SYSTEM

The building control system will be a complete Direct Digital Control system including control panels, sensors, thermostats, CO2 sensors, humidity sensors, temperature and pressure transmitters, gauges, valves, dampers, operators, relays, and other equipment and appurtenances, including electrical wiring. Building control system shall control fan coil units, air handling units, pumps, VAV Boxes, lighting, etc., serving the building.

The building control system will be a complete MS Windows Server-based Energy Management System utilizing Automated Logic (ALC) WebCTRL or Siemens Insight system.

N. MISCELLANEOUS EQUIPMENT

Galvanized ASME Chilled Water and Hot Water Amtrol or Equal Diaphragm Type Expansion Tanks.

O. ELECTRIC COMPONENTS

Electric motors shall comply with NEMA standards premium efficiency type IEEE standard 112, test method B.

Enclosure type shall be open drip proof for indoor use, guarded drip proof where indoors and exposed to contact by personnel or weather protected type totally enclosed fan cooled for outdoor use.

Motors below ½ HP shall be ECM type and shall be 120-volt, single phase, 60 Hz, AC service factor 1.35. Motors 1/2 HP and larger shall be 208 or 480-volt, three phase 60 Hz, AC and service factor 1.15.

Motor Controllers: Comply with NEC, NFPA 70 and UL. FVNR for motors 1/3hp and less, 120 volt, 1-phase, 60hz, AC with pilot light, toggle switch, thermal overload and lockout type disconnect switch.

FVNR magnetic across-the-line combination type with fused disconnect switch for motors 1/2hp and greater, 208 or 480 volt, 3-phase, 60hz, AC with hand-off-auto switch, 120 volt control transformer and control circuit, pilot light, two sets of auxiliary contacts, 3-phase ambient temperature compensated thermal overload relays with manual reset push button.

Enclosures shall be NEMA type 1A for indoor applications, NEMA type 3x Stainless or 4x for outdoor applications and NEMA type 4x for locations subject to water spray or high humidity.

Motor Efficiency: All motors shall be premium efficiency and shall comply with local utility company requirements.

Variable Frequency Drives: All VFD's shall be provided with an input disconnect switch or circuit breaker with door mounted and interlocked switch (pad lockable in the OFF position), a bypass starter, electronic motor overload protection, a door mounted control panel with graphical display for local control, provisions for external control connections, and serial communications capability.

P. DUCTWORK

Submit sheet metal shop standards for review. Construct of galvanized steel, minimum 24 gage, ASTM A 527 with G90 coating, in accordance with SMACNA HVAC Duct Construction Standards Metal and Flexible, latest version. Seal all joints with approved low off-gassing sealer per Class A SMACNA.

Ductwork shall be sized not to exceed 800 FPM (Variable Air Volume/Variable Temperature systems) and 1200 FPM (Variable Air Volume Systems with Reheats) in mains and 500 FPM max velocity in branch runs to outlets. The use of flex duct shall be limited to 6'-0" and used for

alignment purposes only. Flex ductwork shall not be used to create a change of direction or elbows.

Install volume dampers upstream of all supply air outlets and inlets, volume dampers shall have locking quadrants and two end bearings. Provide cable operated dampers where damper is located above an inaccessible ceiling.

Acoustic duct liner shall be installed on interior of ducts a minimum of 15 feet on inlet and discharge side of air handling equipment, fans, and 10 feet downstream of all terminal boxes. Duct liner, shall have perforated internal liner with mold resistant acrylic coating on airstream side.

Air chambers and plenums shall be double wall 20-gauge galvanized steel with 4" thick 6 lb. density fiberglass insulation board.

Q. INSULATION

Insulation shall be provided on all ductwork and piping. Duct wrap insulation shall be provided with a vapor barrier and thickness in compliance with 2015 International Energy Conservation Code. All piping valves and fittings shall be insulated with pre-formed fibrous glass fittings and per the requirements set forth in 2015 International Energy Conservation Code including all state amendments and supplements, or ASHRAE 90.1-2013. All pipe insulation shall be provided with a vapor barrier. Provide continuous PVC or aluminum jacketing for piping installed less than 2 feet above the floor and subject to damage.

All ductwork exposed to weather shall be provided with Ventureclad insulation system. Exposed ductwork in mechanical spaces or areas of heavy traffic shall be provide with insulated fiberglass board with minimum 4.2 pcf density.

R. PIPING

Comply with ASME standard 31.9 "Building Services Piping" ANSI standard B31.1 Standard for "Power Piping" and B16.5 for welding.

Pipe and tubing materials, fittings and joints:

- Copper tubing: ASTM B-88, Type K with wrought copper fittings ANSI B16.22, solder joints ASTM B32 95-5 tin-antimony. Copper shall be used for pipe sizes 2” and below.
- Steel piping: ASTM A-120 or ASTM A-53 grade B, schedule 40, seamless, black steel pipe with cast iron threaded fittings ANSI B16.4 class 125 or 250, malleable iron threaded fittings ANSI B16.3 class 150 or 300, steel welding fittings ASTM A234, flanged fittings ANSI B16.5, or flanged fittings. Steel pipe shall be used for piping 2 ½” and above.
- Refrigerant piping: Copper type ACR with silver soldered or brazed joints.

Comply with MSS-90 requirements for support of piping and International Building Code for seismic requirements.

Pipe hanger spacing and support loading shall be in accordance with Table 305.4 of the 2015 International Mechanical Code. Where concentrated loads of valves, fittings and components occur space hangers closer as necessary based on the weight to be supported and the maximum recommended loads for the hanger support system.

Pipe hangers shall be of the clevis type, unless piping fluid is above 215°F where axial movement occurs use roller type hangers.

Hydro statically test piping in accordance with ANSI B31.9 requirements at 1-1/2 times system working pressure.

S. EXECUTION

Examination:

- Inspect site conditions before starting preparatory work and verify that actual conditions are known and acceptable before starting work. Inspect areas where equipment will be installed and verify adequate space is available for access, service, and removal of equipment. Coordinate with the Work of other Sections and Divisions.

Sheet Metal Work:

- All sheet metal work shall be done in a neat and workmanlike manner with ductwork following building lines and in straight lines with smooth transitions and offsets as required to suit actual installation. Sheet metal work, which does not conform to Drawings and/or Specifications or is poorly done shall be repaired and/or replaced as directed by the Architect at no cost to the project.
- All pre-fabricated duct sections shall be cleaned prior to storage on the site and be provided with protective covering on all openings to maintain the interior of the ductwork clean and free of dust and other materials prior to installation. Field-assembled duct sections shall be cleaned during assembly and similarly protected until installation.

Piping Systems Installation:

- Install piping straight, plumb and form right angles on parallel lines with building walls. Locate groups of pipes parallel to each other. Provide sufficient spacing for insulation and valve access.
- Hangers shall be sized to accommodate insulation.
- Pipe shall be free from scale and dirt. Protect open ended pipe ends to prevent debris from entering. All piping shall be reamed free of burrs.
- Joining and bending of copper tubings shall be in accordance with the Copper Development Association Copper Tube Handbook.
- Piping shall be worked into place without springing or forcing.
- Water systems piping shall be pitched in direction of flow. Drain valves shall be located at all system low points. Provide manual air vents at all system high points.
- Locate valves for easy access and operation. Valve stems shall be above horizontal.
- Provide complete dielectric isolation between ferrous and non-ferrous metals.

- Piping connections to coils and equipment shall be made with offsets provided with unions of flanges arranged so that equipment can be serviced or removed without dismantling.
- Provide for expansion and contraction in all piping systems to prevent undue strains on piping or equipment. Provide double off-sets at risers to take up expansion.
- Run piping concealed above ceilings and within furred spaces. Piping in mechanical rooms shall be exposed.
- Support vertical piping at every floor independently of connected horizontal piping. Pipe hangers shall be placed within 12 inches of each horizontal elbow.

Insulation Application Requirements:

- Install insulation, mastics, adhesives, coatings, covers, and weather-protection in accordance with manufacturer's recommendations.
- Remove dirt, scale, oil, rust, and other foreign matter from surfaces to be insulated. All surfaces shall be clean and dry prior to installation of insulation.
- Insulation shall not be applied to piping systems and related equipment until the completion of pressure testing.
- Insulation shall not be applied to duct systems and related equipment until ductwork has been sealed in accordance with specifications.
- Piping and ductwork insulation shall be continuous and full thickness through all penetrations of non-fire-rated construction and through all hangers.
- Equipment nameplates, labels, and access doors shall be exposed with insulation edges finished.
- Valves shall be insulated to top of bonnets.
- Anchors, hangers, and other projections shall be insulated and vapor-sealed to prevent condensation. All openings and punctures shall be sealed with vapor barrier compound.
- Flexible blanket insulation shall be installed with ends tightly butted. Install so that insulation is not excessively compressed at duct corners. Seams shall be stapled 6 inches on-center with outwardly clinching staples. Seal with pressure-sensitive vapor barrier tape. Where rectangular ducts are 24 inches in width or greater, duct wrap insulation shall be secured to bottom of duct with mechanical fasteners such as pins and speed clip washers, spaced on 12-inch centers and not over 3 inches from edges of insulation joints.
- Duct insulation liner shall be adhered to sheet metal with 90 percent coverage of adhesive and all exposed leading edges and transverse joints coated with adhesive and be provided with metal nosing. Duct liner shall be additionally secured with mechanical fasteners. Fasteners shall be impact driven or weld secured with mechanical fasteners. Fastener spacing shall be in accordance with manufacturer instructions. Refer to SMACNA HVAC DUCT CONSTRUCTION STANDARDS.

Protection and Clean-up:

- The Contractor shall be responsible for maintenance and protection of all materials and equipment furnished by him during the construction period from loss, damage or deterioration until final acceptance by the Owner. All materials and equipment on the job site shall be stored and protected from the weather. All piping and equipment openings shall be temporarily closed during construction to prevent obstruction and damage.
- All equipment with damaged finished surfaces shall be cleaned and repainted with the same paints as were factory applied.
- Keep the job site free from the accumulation of waste materials and rubbish daily. At the completion of the work, remove all rubbish, construction equipment and surplus materials from the site and leave the premises in a clean condition.

Test, Adjust and Balance:

- Test, adjust and balance all air and water systems/equipment in accordance with AABC or NEBB requirements.
- Tab agency to be certified by AABC or NEBB.
- Submit typed report of final measurements and equipment operational performance.
- Pressure test all ductwork systems with pressure class greater than or equal to 3” pressure class.

PART VII: ELECTRICAL SYSTEMS NARRATIVE

A. GENERAL

This narrative describes the schematic electrical scope of work and specifications; refer to architectural floor plans for additional information.

Comply with all current Federal, State, City and local codes, standards and ordinances, the International Building Code, the Connecticut Building Code including supplements, NFPA, utility company standards, insurance carrier requirements, and local authorities. The Electrical systems will be designed to comply with all state and local codes including the following codes adopted by the authority having jurisdiction:

- 2018 Connecticut State Building Code
- 2017 National Electric Code
- 2015 International Energy Conservation Code
- 2013 NFPA 72 National Fire Alarm and Signaling Code
- 2010 ADA Standards for Accessible Design

B. SUSTAINABILITY

Systems incorporating sustainable elements will be investigated for proper application throughout the design process. Refer to other Consultant sections.

C. COORDINATION

Coordinate the work, with work of other trades and field conditions. Carefully check space requirements and utilities to ensure all equipment can be installed in the spaces allotted thereto and coordinate all necessary NPS service requirements. Coordinate, protect and schedule work with work of other trades in accordance with the required construction sequence. Install all work in accordance with equipment manufacturer's installation

D. ELECTRICAL SERVICES

1928 Building

The existing 1928 building's utility transformer is existing to remain and shall remain connected to the existing medium voltage cables. The existing electrical distribution system, in the basement space adjacent to the 1928 shall be existing to remain. This is required because it provides the power to the 1928 building. Feeders to the portions of the building being demolished can be removed back to the main distribution system as required.

900 Building

The existing medium voltage pad mounted utility transformer, adjacent to building 900, is existing to remain and shall continue to accommodate the existing building 900 wing.

New High School

A new utility transformer shall be connected to existing medium voltage primary underground wiring in the general vicinity of the building 900 service transformer. The contractor shall provide a concrete pad for the transformer. Pad-mounted transformer shall be provided by Utility Company.

Provide underground concrete encased ductbank and manhole system and secondary wiring from the new pad mounted transformer to electric service equipment located in the new high school's main electric room. Include a red dye marker within ductbank backfill.

E. SECONDARY ELECTRICAL SERVICE AND DISTRIBUTION

New High School

The main switch and distribution switchboard shall be rated for 3,000A MCB-480/277 volt, 3-phase, 4-wire. Provide with SPD system rated for 240kA per phase. Provide a utility approved meter and separate customer electronic power monitoring multimeter.

Alternate: Contractor shall provide pricing for a main service switch dedicated to the fire pump. The fire pump switch shall be rated for 400A MCB-480/277 volt, 3-phase, 4-wire.

The distribution switchboard shall be 3,000A MLO-480/277 volt, 3-phase, 4-wire.

The 480-volt switchboard shall have the following 3Ø circuit breakers for the indicated loads:

Chiller (2) 400A

RTUs (10) 200A
Lighting Panelboards (8) 100A, one per pair of Science wing for a total of (3); one for auditorium wing; one for gymnasium wing.
Mechanical Rooms (3) 400A
Theater Lighting Panelboard (1) 800A

The 208-volt switchboard shall have the following 3Ø circuit breakers for the indicated loads:

Gymnasiums (2) 225A

Kitchen (1) 400A
Mechanical Rooms (1) 225A
Receptacle Panelboards (8) 225A
Wood Lab, (1) 225A. Provide a receptacle panelboard for this area.
Robotics wing (1) 225A. Provide a receptacle panelboard for this area.
Photo Lab, Ceramics, SLC Friends wing (1) 225A. Provide a receptacle panelboard for this area.
Media (1) 225A. Provide a receptacle panelboard for this area.
Concessions, (1) 100A. Provide a receptacle panelboard for this area.

Lighting panels shall generally be 480/277V rated 100A, 42 poles.

Receptacle panels shall generally be 208/120V rated 225A, 84 poles.

Kitchen panelboard shall be 400A, 208/120V 3Ø, 4W, 3 section, 126 pole, stainless steel.

Mechanical room panels shall generally be 480/277V rated 400A, 42 poles and 208/120V rated 225A, 42 poles as applicable.

Theater switchboard shall be 208/120V, rated 1,200A, 42 pole.

Gymnasium panelboard shall be 225A, 208/120V 3Ø, 4W, 42 pole.

MDF room receptacle panel shall be 208/120V rated 100A, 42 poles.

Switchboard and panelboards shall have copper bus and bolt on circuit breakers, surface or flush mounting.

Transformers shall have copper windings and shall be rated for 115°C rise.

F. EMERGENCY POWER SYSTEM

New High School

Provide 1,500kW diesel fired emergency generator to serve the entire school's electrical loads. Two automatic transfer switches (ATS) shall be provided, one for life safety loads and the other for the remaining standby building loads. The life safety ATS shall be 150A, 480/277V, 3Ø, 4W and the other ATS shall be 3,000A, 480/277V, 3Ø, 4W. The emergency loads including but not limited to emergency lighting, fire alarm, and controls, fire pump. Generator shall be located outdoors at the rear of the building in a sound attenuating, aluminum enclosure. A skid mounted fuel tank with double wall construction shall be located within the generator base. Provide tank with capacity for 72 hours of operation at full load. The generator shall have a 150A and a 3,000A circuit breakers to energize the ATSs.

G. HVAC WIRING

Provide all necessary disconnects, wiring/raceways for all exhaust fans, pumps, and air units including air conditioning. Motor controllers for HVAC equipment are by mechanical. Provide electrical service to all mechanical control transformers and control panels.

H. FIRE ALARM SYSTEM

1928 Building

The existing main fire alarm panel in the existing high school will need to be relocated to the 1928 building to maintain fire alarm service to the 1928 building.

900 Building

The 900 building, because most of the building is being renovated, will be provided with a new sub system, to the new high school system, containing a fire alarm annunciator at the 900 building main entrance and new devices throughout. The new high school will be connected to the 900 building and the third party monitor to reduce the connections to the third party monitor and thereby reduce monthly charges.

New High School

Provide an addressable type fire alarm system with voice evacuation. The system shall consist of a control panel, battery cabinet, annunciator panel, printer and all necessary peripheral devices, including but not limited to pull-stations, area smoke detection, flow switches, tamper switches, speaker/strobes, duct smoke detectors and magnetic door release devices. The system shall be connected to the campus fire alarm system. The fire alarm system shall be as manufactured by Notifier.

I. CALL FOR AID

Provide complete call for aid signaling system in all handicap bathrooms and stalls including pull cord and hall dome light.

J. RECEPTACLE DEVICES

Provide a minimum of four (4) duplex receptacles for each office and a minimum of four (8) duplex receptacles for each classroom.

Provide exterior weather resistant GFI receptacles with weatherproof covers on the building exterior and within 25’ of mechanical equipment.

K. WIRE AND INSULATION APPLICATIONS

Service Entrance: Type XHHW, in raceway.

Feeders: Type THHN/THWN, in raceway.

Branch Circuits: Type THHN/THWN, in raceway.

Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway or metal-clad cable, Type MC. Homeruns shall be THHN-THWN, single conductors in raceway. Homerun shall be considered from the panelboard to the area served. Contractor shall provide junction box in each area served for transition from conduit to MC cable.

Metal clad cables are permitted for lighting switching legs in dry walls and for whips not exceeding 6 feet in length from a junction box to light fixtures in ceiling.

Branch circuits and home runs shall not use MC cables.

Fire Alarm Circuits: Type THHN/THWN, in raceway.

Shielded Cables: Provide shielded cables where required by the manufacturers. Install in raceways or cable trays as specified.

Plenum Spaces: Use plenum rated cables in plenum spaces.

Class 1 Control Circuits: Type THHN/THWN, in raceway.

Class 2 Control Circuits: Type THHN/THWN, in raceway.

L. CONDUIT APPLICATION

Outdoors: Use the following wiring methods:

Exposed: Aluminum.

Concealed: Aluminum.

Underground: PVC, schedule 40.

Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

Boxes and Enclosures: NEMA 250, Type 3R or Type 4.

Conduit installed in floor slabs shall be PVC, schedule 40.

Indoors: Use the following wiring methods:

Exposed areas not subject to physical damage: EMT.

Exposed areas subject to physical damage: RMC.

Areas subject to physical damage include, but not limited to mechanical rooms, boiler and chiller rooms, sprinkler room and like utility rooms.

Concealed: EMT.

Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except in wet or damp locations, use LFMC.

Damp or Wet Locations: Aluminum.

Plenum Spaces: Wiring methods in plenum spaces shall conform to the requirements of NEC Section 300-22. All conduits shall be metal. Exposed cables, where used, shall be listed and approved for use in plenum.

Boxes and Enclosures: NEMA 250, Type 1, except as follows:

Damp or Wet Locations: NEMA 250, Type 4, stainless steel.

M. LIGHTING

Scope of lighting work shall include lighting fixtures and controls for all areas, refer to lighting designer's specifications for fixture description.

Lighting Control: Provide a system of room occupancy sensors to control all lighting fixtures in each classroom, office/work room, toilets, storage closet, etc.

Lighting in classrooms shall generally consist of LED lighting fixtures with interior photo sensors for automatic daylighting control. Additionally, each room shall have preset dimming system.

Provide under cabinet task lighting wherever overhead storage cabinets exist.

Provide two (2) wall switches and one (1) 2-pole ceiling occupancy sensor for lighting controls in each space.

Typical Classroom lighting shall consist of pendant-mounted direct/indirect, continuous row LED lighting fixtures, with 3500°K temperature, 90 or better CRI, and an efficacy of 90 lumens/watt or better, located approximately 8' - 0" on center, providing 50/55 foot candles. Circuiting shall be arranged for daylight harvesting on exterior rows.

Typical corridor lighting shall consist of recessed, parabolic LED lighting fixtures with 3500°K temperature, 90 or better CRI, and an efficacy of 90 lumens/watt or better. Providing 20 footcandles.

N. EMERGENCY LIGHTING

Emergency lighting shall be provided by selected LED lighting fixtures connected to emergency distribution system to provide a minimum of 1 F.C. in all paths of egress.

Exit lights shall be LED type.

An exterior emergency light shall be provided at each exit door. This fixture shall be a dual array, dual LED type lighting fixture with a corresponding bypass relay just inside the building.

Public way exterior lighting shall be energized from the emergency distribution system.

O. GROUNDING

Provide a system ground and all necessary bonding as required by the NEC.

Provide separate insulated ground wire with each branch circuit and feeder.

Provide a grounding electrode system using three ground rods and #2/0 conductor in addition to domestic water and fire protection service piping.

P. LIGHTNING PROTECTION SYSTEM

Provide a lightning protection system and connect to the ground loop as required by the NEC. Provide a lightning arrester on the electric service and all low voltage systems entering the building to obtain a Lightning Protection Inspection Certificate, UL96A for the project.

Q. PHOTOVOLTAIC (PV) SYSTEM

Provisions will be made to connect a 1,350kW PV array to the main electrical system. Weatherproof disconnect switches between the inverter and the electrical distribution system shall be provided on the exterior of the building as per Eversource requirements. The inverters shall be in the main electric room.

PART VIII: PLUMBING SYSTEMS NARRATIVE

A. GENERAL

Comply with all current Federal, State, and local codes, standards and ordinances including:

BUILDING CODES

- 2018 Connecticut State Building Code
- 2015 International Building Code
- 2015 International Residential Code
- 2015 International Existing Buildings Code
- 2015 International Mechanical Code
- 2015 International Plumbing Code
- 2017 National fire Protection Association 70 – National Electrical Code
- 2009 International Code Council / ANSI A117.1 – Accessible & Usable Buildings & Facilities
- 2012 International Energy Conservation Code

FIRE SAFETY CODES

- 2018 State of Connecticut Fire Safety Code
- 2015 International Fire Code
- 2015 National fire Protection Association Standard 101 – Life Safety Code

OTHER CODES or GUIDELINE

- OSHA, NPFA, utility company standards and all other codes and standards referenced by the above documents

The contractor will be responsible to give all necessary notices, obtain all permits and pay all taxes and fees necessary to obtain approvals and complete the work herein. Obtain all required certificates of inspection and deliver same to Owner.

The work includes all labor, materials, equipment and services necessary to complete the work as shown on the drawings and specified herein.

Provisions for the physically handicapped as required by the State of Connecticut Building Code will be included.

Potable water supply will be protected against backflow, back-siphonage, cross connection and other unsanitary conditions.

B. LEAD-FREE STATEMENT

Several plumbing fixtures described in this section fall under jurisdiction of the Federal Reduction of Lead in Drinking Water Act (42 USC 300G) which mandates that effective January 4, 2014 the wetted surfaces of any valve, fitting or fixture that comes in contact with potable water must have

a weighted-average lead content of no more than 0.25 percent. The contractor shall be responsible for providing products that are Lead-Free products and meet the requirements of Safe Drinking Water Act Section 1417 (e) (Section 9 of NSF/ANSI Standard 61) and authorities having jurisdiction.

C. COORDINATION

Coordinate the work, with work of other trades and field conditions. Carefully check space requirements and utilities to ensure all equipment can be installed in the spaces allotted thereto and coordinate all necessary utility service requirements. Coordinate, protect and schedule work with work of other trades in accordance with the required construction sequence. Install all work in accordance with equipment manufacturer's installation instructions.

D. ENERGY CONSERVATION

Energy conservation requirements as set forth in the State of Connecticut Building Code will be included. Additional energy conserving methods will be considered to further affect higher energy savings.

E. WARRANTY

The Contractor warrants that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted, that the Work will be free from defects not inherent in the quality required or permitted, and that the work will conform with the project requirements. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. Contractor shall warranty all work for a period of one year from Owner acceptance unless specified otherwise in which case longer equipment warranties may apply.

Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace the following components of furnaces that fail in materials or workmanship within specified warranty period:

Warranty Period, Commencing on Date of Substantial Completion: One (1) year.

F. WORKMANSHIP

Perform all work in a practical, neat and workmanlike manner with mechanics skilled in work, and using the best practices of the trade involved.

No work shall be concealed until it has been inspected and approved by the Architect.

Workmanship or materials not meeting with requirements of the specifications and drawings and satisfaction of the Architect shall be rejected and immediately replaced in an acceptable manner, without additional cost to the Owner.

G. SPECIAL WORKMANSHIP FOR ARCHITECTURALLY EXPOSED SYSTEMS

General: In addition to basic project workmanship requirements specified above, a higher degree of care in systems layout and routing shall be exerted in selected areas, as follows.

Architectural Exposures: Note that this project includes locations where systems will be partially or fully exposed to view in finished architectural spaces due either to the intentional omission of ceilings, and/or to the intentional holding back of ceiling edges from walls, for architectural effects. These areas shall receive extra effort and care above and beyond basic project workmanship principles.

Special Workmanship Requirements: In these special areas, comply with the following requirements:

- Run systems tight to overhead structure whenever possible.
- In spaces with gaps between ceiling edges and walls, do not run systems down near ceilings. Locate them as high above as feasible.
- Do not cross under framing members within view of such gaps. Seek alternative routes around or through obstacles.
- Fasten systems sufficiently often to prevent their visually sagging or drooping between support points.
- Route systems parallel to walls, framing members, and other elements defining spatial geometries.
- Change directions orthogonally.
- Do not run diagonally when traversing horizontal or vertical surfaces.

Rejection of Work: Workmanship and/or materials not complying with the above additional requirements in these special areas to the satisfaction of the Architect shall be rejected and shall be immediately replaced in an acceptable manner without additional cost.

H. SUBMITTALS

Contractor shall submit; shop drawings, product data, samples, record documents (as-builts) and operation and maintenance manuals in accordance with the Contract requirements and particular specification section requirements.

Shop Drawings: Submit shop drawings of all items proposed to be furnished and installed under this Section which shall include but not be limited to:

- Coordination drawings, coordinated with all other trades
- As Built drawings in electronic (Revit) format as specified by owner with hard copies.
- Piping materials, joints and fittings
- Valves, tags and name plates with schedule and location
- Pipe hangers and supports
- Insulation
- Valves

- Cross connection protection devices
- Pipe sleeves and seals
- Drains
- Cleanouts
- Plumbing fixtures
- Water heating equipment
- Pumps
- Water detection equipment
- Hose bibbs and wall hydrants
- Access panels
- Trap primers
- Miscellaneous plumbing specialties
- Welding certifications: submit reports as required for piping work
- Brazing certifications: submit reports as required for piping work

Manufacturers' recommended installation procedures which, when approved, will become the basis for inspecting and accepting or rejecting actual installation procedures used on the work.

I. RECORD DRAWINGS

Provide a complete set of as-built drawings reflecting as installed conditions. As-built drawings shall indicate all installed conditions of systems within this discipline. Drawings shall be of similar scale as the construction documents and include details as necessary to clearly reflect the installed condition. Drawings shall be bound in a complete and consecutive set. Supplemental sketches and loose paperwork will not be acceptable and will be returned for revision. The contractor shall comply with the engineer's comments to produce a clear and concise set of drawings. Drawings shall be submitted in both hard copy and electronic (AutoCAD or Revit version as required by the owner) version. Number of copies of each as requested by the owner.

Indicate the following installed conditions:

- Include all changes and an accurate record, on reproductions of the contract drawings or appropriate shop drawings, of all deviations, between the work shown and work installed.
- Mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.). Valve location diagrams, complete with valve tag chart.
- Equipment locations (exposed and concealed), dimensioned from prominent building lines.
- Approved substitutions, contract modifications, and actual equipment and materials installed.
- Contract modifications, actual equipment and materials installed.
- Submit for review bound sets of the required drawings, manuals and operating instructions.
- Submit a complete maintenance manual of all equipment installed under this contract.

J. SUSTAINABLE DESIGN FEATURES

The following indicates proposed sustainable design features:

- Water conserving fixtures.
- Electronic Controlled Fixtures for water use reduction.
- Rainwater harvesting
- Waterless Urinals

K. FLOW METERS

Flow meters: Provide for a quantity of (15) fifteen Flow Meters.

Basis of Design: ONICON Model F-4600 Series Inline Ultrasonic Flowmeter. Provide an inline flowmeter complete with direct beam wetted ultrasonic transducers, temperature sensor, mounting hardware and calibration certificate. Flowmeter shall be selected for the intended application in terms of pipe size, pipe material, installation requirements, expected flow rate, ambient conditions and fluid characteristics which include but are not limited to pressure, temperature, and viscosity. Ultrasonic flow sensing element shall utilize matched direct path, wetted ultrasonic transducers and 1000 OHM Platinum RTD. All wetted materials shall be NSF 372 compliant.

Transmitter with Integral Display and Operator Interface: Provide an operator interface consisting of three push-buttons. Display shall visually indicate total fluid volume, instantaneous flow rate and fluid temperature. Output signals shall be either serial network protocol, pulse output, analog output or combination. Pulse output for totalization of flow, Gallons typical. Optional serial communications output shall be native to the BTU meter, BACnet meters shall be BTL certified, secondary communication gateways shall not be permitted. Information provided via the serial communication network shall include: Flow rate, flow total, fluid temperature and a trend including peak values. Meters with serial communications shall be able to provide up to three additional auxiliary pulses configured as inputs or outputs.

L. SYSTEM DESCRIPTION

1928 building

The existing 1928 building will remain as a standalone structure with existing plumbing systems intact. The mechanical room in the sub-basement outside the building frame will remain as is. Existing sanitary, natural gas, domestic hot & cold-water piping serving the existing 1928 building and the related mechanical room will remain active. Existing plumbing equipment, pumps, water heaters, tanks control, etc. related to the 1928 building will remain intact and active.

Water supply, drainage piping and plumbing systems extending outside the building perimeter will be divorced from the outside structures and cut and capped inside the building. Equipment serving outside systems within the frame of the existing building to remain will be decommission and abandoned.

The existing storm leaders at the front of the building spilling to grade will remain. Existing storm leaders draining onto the existing structures scheduled for removal will be extended to grade level and drained away from the building. Drainage locations are to be filed coordinated during demolition.

The existing water service entering the basement level will remain to serve this building.

The existing building will be provided new gas service, meter and regulator to support the existing to remain domestic water heating and space heating systems serving the 1928 building. The existing mechanical room demand and pressure requirements to be field verified. The new meter location and service line shall be installed and coordinated with the local gas utility company.

900 Building

Demolition:
The existing 900 building will remain as a standalone structure. The existing domestic water service, meter and shut off valves will remain. The existing strainer, backflow preventer, domestic water distribution piping after the meter shutoff will be removed. All sanitary, waste and vent piping will be removed. The existing sanitary main will be capped at the service entrance. The existing vent through roof will be protected for reuse. Miscellaneous plumbing systems, compressed air, acidic waste and all equipment to be removed.

The existing storm system roof drains and piping will remain intact to be replaced during the building renovations.

The existing natural gas system service assembly at the north end of the 900 building will remain. All gas supply piping serving structures outside the 900 building will be severed cut and capped at the service assembly. The existing gas supply piping to this building will be disconnected inside the building at the entrance.

New Work:
Domestic hot and cold water: The existing water service will be supplied and new backflow preventer with flood control solenoid and strainer. Domestic water distribution piping will supply the new bathrooms and showers as required by the program. Pressure reducing vales will be provided where required. Freeze-proof exterior hydrants will replace existing locations.

The building will be provided a new, gas-fired, semi instantaneous tank type 100-gallon water heater equal to manufacturer PVI model Conquest #20 L 100A-CGL, 199 cfh with recovery of 233 gallons at 100°f rise. The hot water distribution system will be provided hot water circulation and thermostatic mixing valve assembly to supply 105-degree F serving lavatory and shower fixtures.

Sanitary: Install sanitary, waste and vent piping serving plumbing fixtures and floor drains. The existing sanitary waste connection within the building is proposed to be maintained and reused. The existing sanitary system will be scoped to verify condition. Refer to Civil sections for discharge location.

Storm: The existing roof will be provided new roof drains in existing locations. All interior piping will be replaced with new. The existing roof is constructed without parapet walls and does not require secondary roof drainage. The existing storm connection within the building is proposed to be reused. The existing storm system will be scoped to verify condition. Refer to Civil sections for discharge location.

The existing natural gas system service assembly at the north end of the 900 building will remain and be reconnected to the new equipment as required to serve the new program.

New building

Install a 4" domestic water service coordinated with the Local Water Utility Company.

Provide and install a full-size reduced pressure backflow preventer on each building's water service.

Alternate: Provide a packaged variable speed drive triplex pressure booster pump assembly.

Domestic hot and cold water: Install hot and cold-water distribution to plumbing fixtures and other points of connection or service throughout as required by the program. Provide freeze-proof exterior hydrants.

Domestic hot water shall be generated by (3) new, gas-fired, semi instantaneous tank type 100 gallon water heater equal to manufacturer PVI model Conquest #30 L 100A-CGL, 300 cfh with recovery of 349 gallons at 100°f rise each. The hot water distribution system will be provided circulation pumps for each system zone as required. The domestic hot water distribution will be divided in two temperature zones, 140-degree F serving the kitchen and 110-degree F serving toilet room fixtures. 110-degree F water distribution will be controlled with a thermostatic mixing valve assembly.

Sanitary: Install sanitary, waste and vent piping serving plumbing fixtures and floor drains. Install a gravity building drain with a connection to the site sanitary sewer. Refer to Civil sections for discharge location.

Roof, terrace and areaway drainage will be piped independent of the sanitary sewer and discharge to the site storm sewer. Refer to civil sections for discharge location. Areaway drains at lower levels shall incorporate back-water valves to prevent flooding.

Install a complete gas service and piping as required, serving Kitchen and Mechanical. Gas service shall be installed and coordinated with the local gas utility company.

M. COMMISSIONING

This project will include commissioning of plumbing systems by and approved Commissioning Authority (CA). All sub-contractors shall provide necessary support for demonstration of start-up and operation including all required system adjustments. Personnel shall be available as indicated in the CA schedule.

N. DOMESTIC WATER

Scope: Domestic hot and cold-water distribution to plumbing fixtures and other points of connection as required by the program.

Freeze-proof exterior hydrants will be located around the building.

Water piped to plumbing fixtures, drinking fountains, lawn hydrants, and sinks. Hot water piped to plumbing fixtures and sinks.

Design Criteria: Pipe sizing in accordance with the International Plumbing Code based upon friction loss charts with a maximum of 6 feet per second velocity.

Source: Local Water Utility Company.

Piping Materials

Domestic water service piping below ground (4" size): Class 52 (exterior coated), cement lined ductile iron push-on pipe, ANSI A2l.5l/AWWA Cl5l with 350 psi cement lined ductile iron mechanical joint fittings ANSI A2l.10/AWWA C110 and ANSI A21.11/AWWA C111. Cement lining on interior shall be in accordance with ANSI A21.4/AWWA C104. Provide and install tie-rods and clamps at each fitting. Coat rods and clamps, with an environmentally safe exterior corrosion protection coating. Provide thrust blocks at changes of direction.

Domestic hot, cold and hot water recirculation piping above ground (2” and smaller):

Hard drawn seamless Type L copper tubing ASTM B88

Wrought copper solder fittings A.N.S.I. B16.22 and "Bridgit" or other no lead content solder joints ASTM B32-83, alloy Grades SN96 or SB5. Solder flux lead content-zero percent.

******** [OR] ********

Copper Pressure-Seal-Joint Fittings:
Bronze or copper shall conform to the material requirements of ASME B16.18 or ASME B16.22, and the performance requirements of IAPMO PS117, and ICC LC1002. Press fittings ½-inch thru 2-inch for use with ASTM B88 copper tube type L. Press fittings shall have an EPDM sealing element and Smart Connect (SC), leak detention feature for un-pressed fittings. Press fittings with EPDM sealing element shall conform to NSF 61-G when installed in a potable water system. Installation shall conform to manufacturer’s instructions and specifications. Manufacturers: Viega

Domestic hot, cold and hot water recirculation piping above ground (2” and larger):

Hard drawn seamless Type L copper tubing ASTM B88

Copper Grooved-End Fittings: ASTM B 75 copper tube or ASTM B 152 wrought copper fittings with copper tubing sized grooved ends designed to accept Victaulic couplings (flaring of tube and fitting ends to IPS dimensions is not permitted).

Grooved-End-Tube Couplings: Copper-tube dimensions and design similar to AWWA C606. Include ferrous housing sections cast with offsetting, angle-pattern bolt pads to provide system rigidity upon visual metal-to-metal bolt pad contact with no torque requirement, coated with copper-colored enamel, Grade EHP EPDM-synthetic rubber gasket UL classified in accordance with ANSI/NSF61 for hot (180F) and cold (86F) water, and bolts and nuts. Designs that permit spaces or gaps at bolt pads or require a torque per written manufacturer's installation instructions not permitted. Victaulic Style 607.

Valves:

General: Approved manufacturers; Nibco, Apollo, Stockham, Milwaukee.

Domestic water systems up to 2-1/2"size: 2-piece, full port, bronze threaded, extended stem, 400 psi WOG.

Gate valve for domestic water systems 3" and over: Flanged, MSS SP-70, Type I. CWP Rating: 200 psig, ASTM A 126, gray iron with bolted bonnet.

Check valves for domestic water systems up to 2-1/2" size: class 125 all bronze, silent type, threaded.

Check valves for domestic water systems sizes 3" and over: class 125 IBBM flanged, silent check valve.

Balancing valve (domestic hot water circulation): all bronze, threaded end, calibrated stem, balancing ports, Armstrong CBVT series.

Reduced pressure backflow preventers (RPD) - sizes 3/4" through 2": UL listed, AWWA, USC, and SBCCI/IAPMO approved bronze body reduced pressure zone air gap equipped with stainless steel relief and check valves, oversized copper funnel for pressure relief discharge piped to drain, bronze test cocks, integral body unions, bronze strainer and inlet and outlet ball valves. Manufacturer: Watts 909 series.

Hose end drain valve NIBCO Fig. No. T-113-HC, all bronze gate (Watts #B-6000-cc, all bronze ball valve) with 3/4" hose thread outlet, threaded cap, rubber gasket and safety chain.

O. DOMESTIC WATER HEATING

Tank type Gas:

Each water heater shall be condensing gas fired tank type with individual combustion air inlet and stainless-steel exhaust to the exterior. Equipment shall conform to all applicable A.S.M.E. Standards and approved by the National Sanitation Foundation, and in compliance with ASHRAE

90 (latest edition). All components that contact condensate are constructed of corrosion resistant materials. Nonferrous, removable fittings at all tank connections. Aqua PLEX tank requires no anodic protection, whether sacrificial or induced current. All tank connections are non-ferrous and galvanically neutral to the Aqua PLEX tank. Aqua PLEX tank is entirely robotically welded. Programmable electronic operating control with digital LED temperature readouts and Modbus connectability to BAS. ASME-rated temperature and pressure relief valve.

Manufacturer: PVI Industries Conquest, Patterson Kelly HiDra or engineer approved equal.

Water Heating Specialties:

Thermometer (TH): adjustable angle type, mercury or liquid actuated, constructed with non-corrosive internal mechanism and recalibrator adjustment; assembled in minimum 3-1/2-inch diameter gasket sealed, glass faced stainless steel case; equipped with stainless steel bracket assembly, separable socket, 30 to 240 degrees F water temperature range. Manufacturer: Trerice L80030.

Pressure and temperature relief valve - P&T: ASME rated, bronze body, non-corrosive trim, automatic reseating, extension thermostat, test lever, threaded inlet and outlet; 75 to 150 psi adjustable pressure range, set at 125 psi, 210 degrees F. water

Expansion tanks: ASME certified 125 psi, diaphragm type tank for potable water usage.

P. DIGITAL WATER TEMPERATURE CONTROL VALVE

Lead free digital water temperature control and monitoring system shall feature 3.5" full-color touchscreen interface which is configurable on location and does not require factory pre-programming. System shall control water temperature to +/- 2°F in accordance with ASSE 1017 and resist "temperature creep" during periods of low/zero demand. Controller shall be password protected and feature a user-adjustable outlet temperature range of 60 - 180°F with high and low temperature alerts, and an approach temperature of 2°F. System shall digitally control and monitor mixed outlet temperature. Controller shall integrate with building automation systems (separate module not required) through BACnet and Modbus protocols and feature local and remote temperature alarms. System will feature a user-set, high-temperature sanitization mode for thermal disinfection of bacteria and a programmable temperature set back feature to improve energy efficiency. System will also feature high speed actuator with override feature. In the event of a power failure, system will open full cold supply. In case of a loss of cold water, the system will close hot water supply. Valve and controller shall be listed/approved to ASSE 1017, cUPC, NSF, CSA 24/UL873 and BTL (BACnet Testing Laboratories)

System shall be a pre-pipped Powers LFIS series.

Q. SANITARY DRAINAGE

Scope: Drainage of plumbing fixtures, sinks, drinking fountains, and floor drains piped to sanitary building drain. Venting of fixtures and drains to atmosphere.

Design Criteria: International Plumbing Code and State of Connecticut Plumbing Code.

Disposal: Connect to the municipal sanitary sewer independent of the storm sewer system by gravity.

Piping Materials:

Sanitary, waste and vent piping above ground within building: Hubless cast iron pipe with no hub fittings and "Husky" Series 4000 clamps. Sizes 1-1/2”-4” shall have minimum of (4) sealing bands, Sizes 5”-10” piping shall have minimum of (6) sealing bands.

Sanitary, waste and vent piping below ground within building: service weight cast iron pipe and fittings with hub and spigot ends, ASTM A74. Seal: one-piece neoprene rubber gaskets matching the internal configuration of the hub.

R. STORM DRAINAGE

Scope: Roof drains (primary and secondary) serving flat roof areas piped to interior rain leaders and underground storm drain piping. All downspouts and rain leaders will drain to the site storm sewer system. Secondary or emergency roof drainage serving flat roof areas will be piped independently to the building’s exterior discharging above grade.

Sloped roof areas will be drained utilizing architectural gutters and exterior or interior leaders. Leaders will be piped to an underground network discharging independently to the site system.

Design Criteria: International Plumbing Code and the State of Connecticut Building code.

Disposal: connect into site storm drainage system independent of the sanitary sewer by gravity.

Insulation: all above ground horizontal and vertical runs including drain body shall be covered with fibrous glass and fire-retardant vapor barrier jacket.

Piping materials:

Storm piping above ground within building: Hubless cast iron pipe with no hub fittings and "Husky" Series 4000 clamps. Sizes 1-1/2”-4” shall have minimum of (4) sealing bands, Sizes 5”-10” piping shall have minimum of (6) sealing bands.

Storm piping below ground within building: service weight cast iron pipe and fittings with hub and spigot ends, ASTM A74. Seal: one-piece neoprene rubber gaskets matching the internal configuration of the hub. Insulation: all above ground horizontal and vertical runs including drain body shall be covered with fibrous glass and fire-retardant vapor barrier jacket.

Interior Roof Drains: cast iron body, cast iron dome strainer, sump pan, flashing and under deck clamps.

S. PUMPS

Hot Water Recirculation Pumps:

Description: Factory-assembled and -tested, in-line, single-stage, close-coupled, overhung-impeller centrifugal pumps designed for installation with pump and motor shaft mounted vertical.

Casing: Radially split, cast iron, with wear rings and threaded companion-flange connections for pumps with NPS 2 pipe connections and flanged connections for pumps with NPS 2-1/2 pipe connections.

Impeller: Statically and dynamically balanced, closed, and keyed to shaft.

Shaft and Shaft Sleeve: Stainless-steel shaft, with copper-alloy shaft sleeve.

Seal: Mechanical, with carbon-steel rotating ring, stainless-steel spring, ceramic seat, and rubber bellows and gasket. Include water slinger on shaft between motor and seal.

Bearings: Oil-lubricated; bronze-journal or ball type.

Shaft Coupling: Flexible or rigid type if pump is provided with coupling.

Motor: Single speed, with grease-lubricated ball bearings; and rigidly mounted to pump casing.

Manufacturer: Grundfos, Taco, Armstrong, B&G

ALTERNATE - Domestic Water Booster Pumps:

Furnish and install a pre-fabricated and tested variable speed packaged pumping system to maintain constant water delivery pressure. The packaged pump system shall be a standard product of a single pump manufacturer. The entire pump system including pumps and pump logic controller, shall be designed and built by the same manufacturer.

Manufacturer: Grundfos or Armstrong

Duplex Sewage Ejector Pumps:

Provide a complete prepackaged duplex pumping system. The system shall be by the same manufacturer as supplying the pump and motor control panel to insure suitability and single source responsibility for all equipment. The pump shall be able to pass a 2 1/2" spherical solid.

All fasteners exposed to the pumped liquids shall be 300 series stainless steel. The pump Volute, Motor, Seal Housing and Impeller shall be manufactured from class 30 Cast Iron.

Fiberglass basis shall be provided with Steel Anti-Flotation Flange mounted on the bottom of the basin. The unit will be 2-piece field assembled. The basin shall come complete with steel gas tight cover.

Control panel shall be supplied by the pump manufacturer to ensure complete compatibility with the pumps and the balance of the equipment. The control panel shall be NEMA 3R and come complete.

Manufacturer: Hydromatic

T. KITCHEN WASTE

Scope: Drainage of kitchen plumbing fixtures, sinks, floor drains and floor sinks piped to an exterior grease interceptor independent of the building sanitary system. Install venting of fixtures and drains to atmosphere, independently of the building vent system. Provide indirect waste piping from kitchen fixtures and equipment to floor receptor.

Design Criteria: International and State of Connecticut Plumbing Code.

Disposal: Connect to the building sanitary drain by gravity.

Insulation: above ground horizontal and vertical runs covered with fibrous glass and fire-retardant vapor barrier jacket.

Exterior grease and solids interceptor

FRP Composite Grease Interceptor: Provide Xerxes Corporation FRP Composite Storage Tank IAPMO/ANSI Z1001; Tank Material: FRP composite - tank to be manufactured with a composite laminate consisting of resin and glass fiber reinforcement only. Sand/silica fillers or resin extenders shall not be used. Tank to be manufactured with structural ribs fabricated as an integral part of tank wall. Vent tank to atmospheric pressure. Tank capable of handling liquids with specific gravity up to 1.1. Tank to be compatible with liquids identified in manufacturer's standard limited warranty. Capacity: 2000 gallons. Baffles and Partitions: Capable of withstanding hydrostatic loads occurring when one compartment is empty and remaining compartment(s) is/are full. Type of Installation: Underground.

Piping Materials:

Kitchen waste and vent piping above ground within building: Hubless cast iron pipe with no hub fittings and "Clamp-All 125" or 4 band "Husky" clamps.

Kitchen waste and vent piping below ground within building: service weight cast iron pipe and fittings with hub and spigot ends, ASTM A74. Seal: one-piece neoprene rubber gaskets matching the internal configuration of the hub.

Indirect waste piping above ground: hard drawn seamless Type L copper tubing ASTM B88 with wrought copper solder fittings A.N.S.I. B16.22 and "Bridgit" or other no lead content solder joints ASTM B32-83, alloy Grades SN96 or SB5. Solder flux lead content-zero percent.

Grease Trap Maintenance System: Kitchen Waste piping shall be provided with a grease digesting system. System shall be similar to Bioflow grease trap maintenance system as manufactured by Zircon Industries, system to include:

- Bio-flow liquid bacterial solution (in 5-gallon containers)
- Dema Model 257C "Drain Chief" drain dosing pump with digital timer.
- 1/4" tubing, compression fittings and accessories as required for a complete system.
- Tapped 1/8" NPT fitting at point of injection to drain line.
- Contractor shall supply the customer with a minimum of six (6) 5-gallon containers of Bio-flow solution as part of this project.

******** [OR] ********

Underground Kitchen Waste piping shall be provided with process temperature maintenance heat tracing. Similar to Thermon.

U. ACID WASTE

Scope: Drainage of lab sinks, lab hood cup sinks and drains located within science laboratory classrooms and lab prep rooms independently piped to a central exterior 1000 gallon acid neutralization tank with sampling basin and pH monitoring panel. Venting of lab and science fixtures and drains to atmosphere, independently of the building vent system.

Pipe: Orion Blueline (fire retardant) Pipe shall be manufactured to Schedule 40 P.E. pipe dimensions, of pipe grade fire retardant polypropylene, to be supplied in 10-foot lengths. Pipe to be cylindrical and straight and meet tolerances in accordance with ASTM D2447-74. Pipe shall be factory grooved for mechanical joint systems and plain end for socket fusion systems. Material shall conform to ASTM D4101.

Fittings: Orion Blueline (fire retardant) Fittings shall be manufactured to Schedule 40 P.E. pipe dimensions of fire-retardant polypropylene as shown on Orion dimension sheets. Fitting shall conform to tolerances in ASTM D3311. Material to meet ASTM D4101.

Fusion Joints: All fittings to be socket ends. All joints to be made by Orion heat tool to produce hermetically sealed joint which encompasses heat joining of polyolefin pipe and fitting standards and practices to meet ASTM D2657.

Exterior Acid Neutralization Basin:

The neutralization basin shall be constructed of precast concrete having a 28-day compressive strength of 4500 PSI and be reinforced in accordance to ACI 318-89. All reinforcement steel shall comply with ASTM A615 grade 60 or ASTM A706 Grade 60. Bar bending shall comply with latest ACI standards. Lifting inserts to be installed for handling and be installed per manufacturer's requirements. Manufacturer shall certify that the vault design accounts for the prevention of buoyancy effect. The tank shall be provided with a cast iron frame and cover of minimum 20" diameter clear opening and be watertight. Cast iron frame/covers shall conform to ASTM A48-83 Class 30 and be traffic duty. The cover shall be gasketed and bolted with stainless bolts. The cover

shall be marked with 1" high letters indicating "ACID NEUTRALIZATION BASIN". Manhole covers shall be placed at grade elevation by using concrete extension rings or 24" RCP.

Interior Liner: The neutralization tank primary liner shall be constructed of Virgin High Density Polyethylene conforming to ASTM D1248 for polyolefin materials. Liner shall be minimum 5mm thick. Liner shall have integral anchors for embedment into precast concrete shell. The liner shall withstand temperatures of 160 degrees F, and intermittent operation at 200 degrees. Inlet/outlet/vent pipe fittings shall be made of polyethylene and fusion welded to tank.

Exterior Liner: The vault exterior shall be coated with 60 mils of waterproofing mastic. All coatings shall be applied per manufacturer's specifications.

Manufacturer: Park Lab Tank series ANTL-1000

Neutralization Fill: The chemical rock (neutralization fill) shall be furnished by the tank system manufacturer. The neutralization fill shall consist of laboratory quality dolomitic limestone (53% calcium carbonate, 45% magnesium carbonate). The fill shall be ashed and sorted 1-3" size.

pH Monitoring System: System shall be Park Equipment Company Model PHR series or equal. The monitoring system shall consist of pH probe with preamplifier and remote mounted control panel.

The control panel shall consist of a NEMA 4X enclosure with a full Lexan window in the door front. The enclosure shall have stainless steel hinges and locking hasp. The panel shall be prewired and contain the following components:

- PH analyzer microprocessor-based with LCD readout with (2) isolated 4-20 mA analog outputs.
- Direct Digital Recorder with reusable memory card and isolated 4-20 mA input. Memory card shall have capacity to accommodate 1 year of data.
- Audible / visual pH high/low alarm horn and indicator lights.
- Alarm silencing button and H-O-A switch.
- Panel power on-off switch.
- Dry contacts for remote alarm.
- Sump pump RUN light indicator light.

V. AUTOMOTIVE SHOP GARAGE WASTE

Scope: Drainage of garage floor drains piped to an exterior oil/sand interceptor independent of the building sanitary, kitchen waste and acid waste systems. Install venting of drains to atmosphere, independently of the building vent system.

Design Criteria: International and State of Connecticut Plumbing Code.

Disposal: Connect to the building sanitary drain by gravity.

Insulation: above ground horizontal and vertical runs covered with fibrous glass and fire-retardant vapor barrier jacket.

Exterior OIL/SAND interceptor:

Provide and install Highland Tank 1000-gallon capacity Model SB OSI - 1000 Single Basin Oil/Sand Interceptor (s).

Gravity-based oil/sand interceptor shall be constructed of high-strength, mild carbon steel to ASTM specifications and coated inside and outside with high-solids polyurethane.

Interceptor shall be 4' - 0" in diameter and 14' - 0" long; having a total volume of 1000 gallons and a sludge holding capacity of 60 cubic feet to comply with the requirements of the plumbing code. The sizing and construction of this interceptor is consistent with industry protocols for complying with the sewer pretreatment regulations, therefore an interceptor of smaller volume or multiple, interconnecting vessel construction is not permissible.

Interceptor shall have the capacity to minimize turbulence and promote separation.

Flow to the interceptor shall be by gravity. Interceptor shall retain wastewater long enough to allow sand, grit, and free oil and grease to separate from the water due to their differences in specific gravity. The wastewater will then flow to a sanitary sewer.

Interceptor shall be installed underground with top access at or above grade level (as specified on drawings).

DESIGN CRITERIA

The Interceptor shall be constructed of high-strength, mild carbon steel, meeting ASTM specifications, with capacities, dimensions, construction, and thickness in strict accordance with Underwriters Laboratories, Subject UL-58 Standard for Safety, Steel Underground Tanks for Flammable and Combustible Liquids, September 30, 1997, Single Wall construction.

The Interceptor's Corrosion Control System shall be in strict accordance with Underwriters Laboratories Inc. Subject UL-1746 Standard for External Corrosion Protection Systems for Steel Underground Storage Tanks and Highland Tank's HighGuard External Corrosion Protection Specifications.

The Interceptor shall be the standard product of a steel tank manufacturer regularly engaged in the production of such equipment. No subcontracting of Interceptor fabrication shall be permitted.

The Interceptor shall be fabricated, inspected and pressure tested for leakage before shipment from the factory by manufacturer as a completely assembled, single vessel ready for installation.

The Interceptor shall be cylindrical, horizontal, atmospheric-type steel vessel.

The Interceptor shall have the structural strength to withstand static and dynamic hydraulic loading while empty and during operating conditions.

The Interceptor's dimensions and thickness shall be in strict compliance with Roark's Formulas for Stress and Strain as presented in UL 58, September 30, 1997.

Calculations, signed and stamped by a Registered Professional Engineer shall be submitted to document structural strength under specified overbearing or external pressure. An interceptor with a reduced shell thickness is not permissible.

The Interceptor shall consist of inlet and outlet connections, internal influent nozzle, heavy duty sludge baffle, large sediment and oil pump-out access, effluent downcomer, fittings for vent, sampling, gauging, and lifting lugs.

OIL LEVEL SENSOR AND CONTROLS:

UL Listed Interface/Oil Level Sensor and Controls.

Oil/Water Separator shall be supplied with an audible and visual alarm system that indicates high level and high-high level of accumulated oil in the oil/water separator.

Level sensor to be intrinsically-safe, separator-mounted magnetic float probes, suitable for use in Class I, Division II, Group D locations.

Level sensor floats to be made of Buna-N.

The control panel shall be NEMA 4X (FRP).

A silence control shall be provided for the audible alarms.

Power to the control panel is to be 110-volt, 1 phase.

Control panel shall be connected to Building Management System.

W. INSULATION

Insulation:

Pipe Insulation: piping within building insulated with 1" minimum thickness fibrous glass insulation and pre-formed fibrous glass fittings with fire retardant vapor barrier jacket. Include sound attenuation insulation and wrap.

All insulating materials shall comply with the following ratings:

Flame spread	-25
Smoke Developed	-50
Fuel Contributed	-50

Fiberglass Piping Insulation (interior)

Molded fibrous glass with 3.5 pounds minimum density, Maximum K = .3 at 200°F, mean and rated to 450°F. The insulation should be sectional pipe jacketed with an embossed vapor barrier laminate.

Service: Refer to Drawing Schedule

Manufacturers:

1. Owens-Corning, Type 25 ASJ
2. Knauf - Pipe Insulation with ASJ
3. CertainTeed - Type 500 Snap-On with ASJ
4. Manville - Micro-Lok 650 with AP jacket

Foamglass Piping Insulation (exterior and below grade piping systems)

8.5 PCF average density, max. K = .38 at 75°F mean, and operating temperature -320°F to 300°F, rigid glass cells.

Service:	Thickness:
Outdoor Piping	2”
Water Make-up	2”

Manufacturers:

1. Pittsburgh-Corning, Type Foamglas
2. Trymer L Include Aluminum jacketing on all exterior insulation.

Service: Outdoor Piping on Type C and Type D Insulation

Manufacturer:

1. Childers Products Co. - Lock-on or slip-on type.

Fiberglass insulation for valves, fittings, flanges (vapor seal insulation).

Molded factory-formed fibrous glass with 3.5 PCF minimum density, max. K = .3 at 200°F, mean, rated to 450°. All joints to be sealed with vapor barrier adhesive and wrapped with glass mesh tape. Each fitting to be finished with two coats of Benjamin Foster 30-36 vapor seal.

Service:	Thickness:
Domestic Water:	Same as piping

Manufacturers:

1. Fibrous Glass Products, Inc.
2. Insulcoustic Corp.
3. Hamfab

Protective Shielding Pipe Covers: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements. Truebro LavGuard 2 or approved equal

X. DRAINS

General: Provide all poured in place drains with 24" x 24" flashing.

Floor drain mechanical rooms: heavy duty floor drains with, cast iron body, bottom outlet, 9" diameter cast iron top, trap primer connection, seepage pan and combination membrane flashing clamp.

Floor drain toilet rooms: cast iron body, bottom outlet, 6” square nickel bronze top, trap primer connection, seepage pan and combination membrane flashing clamp.

Bi-functional Roof Drains: Casted Drain Bodies: Drain Bodies (sump) shall be one complete unit and shall also include the outlet connections within the casting and must comply with LC 1021 regarding sump free area. Bi-Functional drains must have removable overflow pipe riser or provide access to primary system to facilitate full pipe rodding of primary system from roof. Separate strainers must be provided for the primary and overflow systems. Drains using one strainer for both systems are not allowed. Manufacturer: Froet.

Roof drains: heavy duty drain with, 15" diameter cast iron body, bottom outlet, 12" diameter cast iron dome, roof sump receiver, under-deck clamp, extension collar, and combination membrane flashing clamp/gravel guard.

Areaway drain: heavy duty drains with, cast iron body, bottom outlet, 15" diameter cast iron top, seepage pan and combination membrane flashing clamp.

Terrace drain: heavy duty drains with, cast iron body, bottom outlet, 14" square cast iron heel proof grate, seepage pan and combination membrane flashing clamp.

Y. FUEL GAS SERVICE

Scope: Provide a complete gas service including meters and piping installed in accordance with local gas utility requirements and NFPA 54.

Design Criteria: International and State of Connecticut Fuel Gas Code and NFPA 54.

Source: Connect to the utility company main with a metered service.

Materials:

Gas piping (up to and including 2" size): schedule 40 black steel ASTM A106, threaded end ANSI B1.20.1, with class 150 malleable iron threaded fittings ANSI B16.3.

Steel Mechanical Press Fittings (1/2” thru 2”):
Viega MegaPress G (Gas) or equivalent cold press mechanical Joint Fittings shall conform to material requirements of ASTM A420 or ASME B16.3 and performance criteria of ANSI/CSA LC4. Fittings shall have anti-corrosion protection with nickel zinc coating or equivalent. MegaPressG fittings shall have an HNBR sealing element, 420 stainless steel grip ring, separator ring, and an un-pressed fitting leak identification feature. All fittings used in Fuel Gas Applications shall be listed by a third-party agency as being acceptable for fuel gas piping systems.

Gas piping (over 2" size): schedule 40 black steel ASTM A106, with schedule 40 butt weld fittings.

Gas service valves: UL listed, for fuel gas service, including Exterior Emergency gas shut-off valve equipped with sign: “EMERGENCY GAS SHUT-OFF VALVE”.

Gas pressure regulating valves: Pilot controlled, and actuated.

Z. PIPING SUPPORT

Scope: support of piping from building structure including seismic restraint. Provide necessary structural members, hangers and supports of approved design to keep piping in proper alignment and prevent transmission of injurious thrusts and vibrations. In all cases where hangers, brackets, etc., are supported from concrete construction, do not weaken concrete or penetrate waterproofing. All hangers and supports shall be capable of screw adjustment after piping is erected. Hangers supporting piping expanding into loops, bends and offsets shall be secured to the building structure in such a manner that horizontal adjustment perpendicular to the run of piping supported may be made to accommodate displacement due to expansion. All such hangers shall be finally adjusted both in the vertical and horizontal direction, as required. Hangers in contact with copper or brass pipe shall be dielectric, compatible with copper and brass alloy or provided with felt sleeve.

Design Criteria: Manufacturers Standardization Society (MSS) Standard Practice SP-69, SMACNA, State of Connecticut Building Code.

AA. SLEEVES, ESCUTCHEONS, FIRESTOPPING

Scope: sleeves and fire stopping for piping passing through walls and partitions. Escutcheons for piping exposed to view.

Design Criteria: size sleeves for continuous pipe insulation.

BB. PIPE MARKERS, LABELS, VALVE TAGS AND WARNING SIGNS

Scope: vinyl plastic pipe markers and flow arrows, brass valve tags, valve charts and diagrams.

Metal Labels for Equipment - Brass, 0.032-inch minimum thickness, but not less than 2-1/2 by 3/4-inch, Minimum letter size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

Warning Signs and Labels - Multilayer, multicolor, plastic labels for mechanical engraving, 1/16-inch-thick, and having predrilled holes for attachment hardware. Size not less than 2-1/2 by 3/4 inch. Minimum letter size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include caution and warning information, plus emergency notification instructions.

Pipe Labels - Preprinted, color-coded, with lettering indicating service, and showing flow direction. Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

Stencils: Prepared with letter sizes according to ASME A13.1 for piping; and minimum letter height of 3/4 inch for access panel and door labels, equipment labels, and similar operational instructions.

Valve Tags - Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers. Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.

Warning Tags - Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing; 3 by 5-1/4 inches minimum. Large-size primary caption such as "DANGER", "CAUTION" or "DO NOT OPERATE."; Yellow background with black lettering.

Design Criteria: ANSI A13.1.

CC. CLEANOUTS

Scope:

Accessible cleanouts to permit "snaking" of drainage piping, and other buried non-pressure piping. Cleanout plates for buried piping.

Design Criteria:

Cleanouts at base of vertical stacks and leaders, at ends of horizontal runs, at each change in direction greater than 45°F., approximately 50 feet apart on piping runs.

Provide and install all cleanouts with 24" x 24" flashing material.

Cleanouts shall be installed at the base of all stacks, at all changes of directions greater than 45 degrees and in runs to provide means of cleaning lines at maximum 50' intervals.

Cleanouts shall be at least the same size as the pipe served up to 6” size. Cleanouts for piping over 6” in size shall be 6” minimum size.

Floor plates: cast iron body, appropriate brass cover plate.

Wall plates: stainless steel.

DD. PLUMBING FIXTURES

Fixtures: As indicated by the Architect, new, complete with trimmings and fittings, including faucets, carriers, supplies, stops, traps, tailpieces, waste plugs, casings, hangers, plates, brackets, anchors, supports, hardware and fastening devices.

Water Closet: Vitreous china, wall hung, elongated siphon jet, flush valve, open front seat, angle supply and stop, floor mounted support. American Standard, Kohler, Toto, Sloan or approved equal.

Water Closet Flush valve: 1.28 Gallons per Flush. American Standard Selectronic PWRX, Kohler Wave, Toto Ecopower, Sloan Optima, AMTC series or approved equal.

Urinal (waterless): Vitreous china. Cartridge-free integral trapway. Touch-free design is vandal resistant and added hygiene. 2" outlet spud, 3 oz Sealing Liquid Sample, Cleaner Sample, Hanger(s), Removable Strainer. Kohler Seward or approved equal.

Lavatory: Vitreous china, wall or counter mounted, floor mounted support, supply and waste fittings. American Standard, Kohler, Toto, Sloan or approved equal.

Lavatory Faucet: Single hole, deck mounted, electronic sensor. American Standard Nextgen Selectronic, Kohler Sculpted, Toto Ecopower, Sloan Basys, AMTC or approved equal.

Mop Sinks: Molded stone floor receptor, supply and waste fittings, mop rack, and faucet hose. Similar to Fiat or approved equal.

Electric Water Cooler: Shall deliver 8.0 gph of 50° F degree water at 90°F ambient and 80°F inlet water per ASHRAE 18 testing. Shall include two vandal-resistant antimicrobial copper push buttons to activate the flow of water and a low flow one-piece bubbler with flexible guard. The fountains shall be designed to eliminate splashing and standing water. Water saver bubbler to reduce waste water by 50% and shall have flexible guard and operate between 20 and 100 PSI. Bottle filler components contain Freshield®, which utilizes a silver-based antimicrobial compound to protect the surfaces from discoloration, odors and degradation caused by the growth of micro-organisms and mildew. Cabinet finish shall be brushed stainless steel. Shall use R-134a refrigerant. Shall comply with ANSI 117.1 and ADA. Shall be listed by Underwriters Laboratories to US and Canadian standards. Shall comply with NSF/ANSI 61 and NSF/ANSI 372.Bi-level; 2-bowl with bottle filler. Wall hung, self-contained, electric, air-cooled. Similar to Oasis Model M8CREBF.Sinks: Counter mounted stainless steel, self-rimming type, with supply and waste fittings and P trap. Similar to Just or approved equal.

Color Selection shall be by Architect.

Handicap fixtures will be provided and set in accordance with the applicable codes.

Stainless steel: type 302, 304, 316, or 317, as noted, sound deadened.

Trimmings and fittings: construct of forged, cast, rolled or extruded brass or bronze with monel and other suitable non-corrosive parts: designed with easily renewable parts that are subject to wear or deterioration. No die castings and stampings other than brass or stainless steel. Plumbing trim shall consist of:

Exposed surfaces: chrome plated.

Pipe: copper type L.

Pipe fittings: threaded bronze.

Supply stops: chrome plated bronze, stuffing box, renewable seat washer.

Waste tailpiece: minimum #17 gage brass.

Escutcheons: one-piece chrome plated cast brass or stainless steel.

EE. ASSE 1070 THERMOSTATIC MIXING VALVE (SINKS AND LAVATORIES)

Provided each sink and lavatory with an ASSE 1070 Compliant thermostatic mixing valve. The sink tempering valve shall be IAPMO lab certified per ASSE 1070 at 0.25 GPM and CSA standards and shall have a solid brass body with corrosion resistant internal components. It shall include integral checks with screens to prevent backflow and to filter debris from entering the valve. Temperature adjustment shall be made using an allen wrench and a locknut on the bonnet to prevent unauthorized or accidental temperature adjustment. Valve shall provide 4.0 GPM with 3/8" compression connection and 4.5 GPM capacity with the 1/2" NPT connection at 45 psi differential. Temperature range shall be 85°F-115° F.

FF. DISINFECTION OF POTABLE WATER SYSTEM

Potable water systems shall be disinfected in accordance with State and Local codes but by not less than one of the following methods before it is placed in operation.

The system, or part thereof, shall be filled with a solution containing 50 parts per million of available chlorine and allowed to stand 24 hours before flushing and returning to service.

The system, or part thereof, shall be filled with a solution containing 200 parts per million of available chlorine and allowed to stand 3 hours before flushing and returning to service.

Repeat procedure where bacteriological testing and examination shows presence of contamination. Perform and submit bacteriological testing and examination reports.

GG. TESTING

General: Perform tests in accordance with building code requirements in the presence of the authorities having jurisdiction. Do not close in, conceal, or cover up any plumbing work until it has been tested, inspected, and approved.

Flush piping, prior to testing, to remove foreign materials which may have entered during course of installation. Clean filters and strainers after flushing.

PART IX: FIRE PROTECTION SYSTEMS NARRATIVE

A. GENERAL

Comply with all current Federal, State, City and local codes, standards and ordinances, including:

BUILDING CODES

- 2018 Connecticut State Building Code
- 2015 International Building Code
- 2015 International Residential Code
- 2015 International Existing Buildings Code
- 2015 International Mechanical Code
- 2015 International Plumbing Code
- 2017 National fire Protection Association 70 – National Electrical Code
- 2009 International Code Council / ANSI A117.1 – Accessible & Usable Buildings & Facilities
- 2015 International Energy Conservation Code

FIRE SAFETY CODES

- 2018 State of Connecticut Fire Safety Code
- 2015 International Fire Code
- 2015 National fire Protection Association Standard 101 – Life Safety Code

OTHER CODES or GUIDELINE

- OSHA, NFPA, utility company standards and all other codes and standards referenced by the above documents.

All equipment shall be in accordance with NFPA 13, 14, 20, 24, UL listed, FM approved. FM approved equipment is mandatory for all FM Global projects

B. COORDINATION

Coordinate the work, with work of other trades and field conditions. Carefully check space requirements and utilities to ensure all equipment can be installed in the spaces allotted thereto and coordinate all necessary utility service requirements. Coordinate, protect and schedule work with work of other trades in accordance with the required construction sequence. Install all work in accordance with equipment manufacturer's installation instructions.

C. WARRANTY

The Contractor warrants that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be

considered defective. Contractor shall warranty all work for a period of one year from Owner acceptance unless specified otherwise in which case longer equipment warranties may apply.

Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace the following components that fail in materials or workmanship within specified warranty period:

Warranty Period, Commencing on Date of Substantial Completion: One (1) year.

D. WORKMANSHIP

Perform all work in a practical, neat and workmanlike manner with mechanics skilled in work, and using the best practices of the trade involved.

No work shall be concealed until it has been inspected and approved by the Architect.

Workmanship or materials not meeting with requirements of the specifications and drawings and satisfaction of the Architect shall be rejected and immediately replaced in an acceptable manner, without additional cost to the Owner.

E. SPECIAL WORKMANSHIP FOR ARCHITECTURALLY EXPOSED SYSTEMS

General: In addition to basic project workmanship requirements specified above, a higher degree of care in systems layout and routing shall be exerted in selected areas, as follows.

Architectural Exposures: Note that this project includes locations where systems will be partially or fully exposed to view in finished architectural spaces due either to the intentional omission of ceilings, and/or to the intentional holding back of ceiling edges from walls, for architectural effects. These areas shall receive extra effort and care above and beyond basic project workmanship principles.

Special Workmanship Requirements: In these special areas, comply with the following requirements:

- Run systems tight to overhead structure whenever possible.
- In spaces with gaps between ceiling edges and walls, do not run systems down near ceilings. Locate them as high above as feasible.
- Do not cross under framing members within view of such gaps. Seek alternative routes around or through obstacles.
- Fasten systems sufficiently often to prevent their visually sagging or drooping between support points.
- Route systems parallel to walls, framing members, and other elements defining spatial geometries.
- Change directions orthogonally.
- Do not run diagonally when traversing horizontal or vertical surfaces.

Rejection of Work: Workmanship and/or materials not complying with the above additional requirements in these special areas to the satisfaction of the Architect shall be rejected and shall be immediately replaced in an acceptable manner without additional cost.

F. SUBMITTALS

Contractor shall submit; shop drawings, product data, samples, record documents (as-builts) and operation and maintenance manuals in accordance with the Contract requirements and particular specification section requirements.

Shop Drawings: Submit shop drawings of all items proposed to be furnished and installed under this Section which shall include but not be limited to:

- Coordination drawings, coordinated with all other trades
- As Built drawings in electronic Revit format as specified by owner with hard copies.
- Piping materials, joints and fittings
- Valves, tags and name plates with schedule and location
- Pipe hangers and supports
- Valves
- Cross connection protection devices
- Pipe sleeves and seals
- Pumps
- Sprinkler heads and accessories
- Access panels
- Miscellaneous fire protection specialties
- Welding certifications: submit reports as required for piping work
- Brazing certifications: submit reports as required for piping work

Manufacturers' recommended installation procedures which, when approved, will become the basis for inspecting and accepting or rejecting actual installation procedures used on the work.

G. RECORD DRAWINGS

Provide a complete set of as-built drawings reflecting as installed conditions. As-built drawings shall indicate all installed conditions of systems within this discipline. Drawings shall be of similar scale as the construction documents and include details as necessary to clearly reflect the installed condition. Drawings shall be bound in a complete and consecutive set. Supplemental sketches and loose paperwork will not be acceptable and will be returned for revision. The contractor shall comply with the engineer’s comments to produce a clear and concise set of drawings. Drawings shall be submitted in both hard copy and electronic (Auto-cad or Revit version as required by the owner) version. Number of copies of each as requested by the owner.

Indicate the following installed conditions:

- Include all changes and an accurate record, on reproductions of the contract drawings or appropriate shop drawings, of all deviations, between the work shown and work installed.
- Mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.). Valve location diagrams, complete with valve tag chart.
- Equipment locations (exposed and concealed), dimensioned from prominent building lines.
- Approved substitutions, contract modifications, and actual equipment and materials installed.
- Contract modifications, actual equipment and materials installed.
- Submit for review bound sets of the required drawings, manuals and operating instructions.
- Submit a complete maintenance manual of all equipment installed under this contract.

H. SYSTEM DESCRIPTION

Water Supply:

Document and verify new underground fire protection water supply is sufficient to supply the new sprinkler system in accordance with NFPA 13 and local codes (provide hydraulic calculations and water flow test, less than 1 year old).

Contractor shall document (in schematic way) in which renovated buildings to remain are supplied including pipe sizes, overall length of piping, etc. as necessary to perform hydraulic calculations.

1928 Building:

Existing sprinklers, piping, heads, etc. to remain. Provide new 6" fire protection water supply as required to support existing 1928 Building fire sprinklers. Install new double check detector backflow assembly, with metered by-pass.

Cut and cap any/all fire protection piping supplying other buildings / areas to be demolished.

Provide fire department connection (type, size and location determined by local AHJ).

900 Building:

Provide new 6" fire protection water supply as required to support existing 900 Building fire sprinklers. Install a new reduced pressure backflow assembly, with metered by-pass.

Cut and cap any/all fire protection piping supplying other buildings / areas to be demolished.

Provide fire department connection (type, size and location determined by local AHJ).

Existing sprinkler system to remain completely active (as long as possible) during demolition phase. Existing sprinklers, piping etc. to then be completely removed and properly disposed of throughout the entire building. Contractor to limit time sprinkler system is down and notify proper authorities each and every time. Fire watch shall be provided as required by AHJ, owner, owner's insurance company, etc.

Provide and install a full size reduced pressure detector assembly backflow preventer on each water service. Overflow shall be routed to exterior.

The new fire protection water supply will feed; riser check valve assemblies, (supplying fire sprinklers throughout the building. Sprinkler control assemblies (control valves, check valves tamper switches and flow switches) shall be utilized on each floor to create more manageable zones.

Install concealed pendent sprinklers within areas with finished ceilings and install exposed uprights, pendents, etc. within unfinished areas.

Exposed areas shall have custom piping and color, coordinate routing with architect (and receive approval) prior to installation. Provide additional sprinklers (more than code) in order to ensure symmetry, etc. Piping shall be routed in order to minimize exposed piping and shall be approved and coordinated with architect prior to installation.

Contractor shall provide multiple layers of sprinklers within areas with "cloud" type ceilings. Utilize concealed pendent sprinklers with clouds (custom color cover plates) and exposed uprights and exposed piping (with custom color) at upper ceiling areas.

<u>New High School:</u>

Water Supply:

Document and verify new underground fire protection water supply is sufficient to supply the new sprinkler system in accordance with NFPA 13 and local codes (provide hydraulic calculations and water flow test, less than 1 year old).

Install a new 8" underground fire protection water service coordinated with the local water authority requirements, including tapping sleeve and curb valve.

Provide and install a full size reduced pressure detector assembly backflow preventer on each water service.

Provide and install fire department connection(s) in order for local fire department to supplement sprinkler/standpipe water supply. Exact location, type and quantity of fire department connections shall be determined by local AHJ.

All piping exceeding 175 psi shall be rated at class 250 for both piping and fittings throughout.

The contractor shall provide a water analysis in order to test for onsite microbes and chemical species (iron, Ph, oxygen/ Microbiologically influenced Corrosion (MIC) in accordance with NFPA

13, 25, etc. with a MICKit ™ or similar. Provide report indicating mitigation techniques in order to eliminate / reduce corrosion such as the treatment of the sprinkler water with a biocide which is compatible with piping, fittings, gaskets, sprinklers, etc. Install an FM Approved vent on wet pipe systems (with nitrogen) similar to ECS PAV-WNS

Fire Sprinkler Systems:

Fire Protection water supply will feed; riser check valve assemblies, (supplying fire sprinklers throughout the building. Sprinkler control assemblies (control valves, check valves tamper switches and flow switches) shall be utilized on each floor to create more manageable zones.

Install concealed pendent sprinklers within areas with finished ceilings and install exposed uprights, pendents, etc. within unfinished areas.

Exposed areas shall have custom piping and color, coordinate routing with architect (and receive approval) prior to installation. Provide additional sprinklers (more than code) in order to ensure symmetry, etc.

Contractor shall provide multiple layers of sprinklers within areas with “cloud” type ceilings. Utilize concealed pendent sprinklers with clouds (custom color cover plates) and exposed uprights and exposed piping (with custom color) at upper ceiling areas.

Fire Standpipe Systems:

The water supply will feed; riser check valve assembly, (supplying Class III fire standpipes (2 ½” valve, 2 ½” x 1 ½” cap and chain and a 1 ½” valve with cap and chain) on either side of the stage.

Other

Pre-engineered kitchen hood extinguishing system(s): Provide and install within the kitchen areas. The system(s) shall include; piping nozzles, cylinder, remote pull stations, mechanical gas shut off, etc. and be in accordance with 2012 IMC, NFPA 17A, 70, 72 & 96 and UL.

Provide closely spaced listed window sprinklers (6’-0” o.c.) at glazing, etc. as required to provide rating

All sprinkler pipe passing through or crossing building seismic and/or expansion joints, shall contain a flexible expansion loop, designed for seismic movement.

Dry pipe valve assembly shall supply sprinklers throughout any/all unheated areas.

The dry pipe valve assembly shall incorporate galvanized piping, air compressor, pressure and tamper switches, etc. Dry pipe valve assemblies shall supply concealed dry pendent sprinklers in areas with finished ceilings and exposed uprights in unfinished areas. Provide an Inspector’s Test Connection, piped to the exterior.

The dry pipe systems shall incorporate a pre-engineered nitrogen generation system including; a cabinet, dry smart vent(s) for each zone, interface controller, etc. Similar to ECS pgen-5.

Contractor shall provide additional drum drips (routed to exterior with galvanized piping and splash block) along with valved, threaded capped outlets to ensure entire system can be drained.

Provide exposed upright sprinklers in any/all combustible concealed spaces (attics, etc.)

Alternate:

Contractor shall provide pricing for: electric driven fire pump assembly (1000 gpm 50 HP) as necessary to increase existing water pressure to satisfy NFPA 13 & 14 requirements. Fire pump assembly shall include: fire pump, jockey pump, controllers, transfer switch, associated piping, test header, etc.

I. COMMISSIONING

This project will include commissioning of fire protection systems by an approved Commissioning Authority (CA) and in accordance with NFPA 3. All sub-contractors shall provide necessary support for demonstration of start-up and operation including all required system adjustments. Personnel shall be available as indicated in the CA schedule.

J. DESIGN CRITERIA

State and Local Code, Owner's Insurance Company and NFPA Standards. Systems to be hydraulically calculated based upon the following information with area adjustments for dry and attic systems as required by NFPA 13 & 14. Minimum Density for Automatic-Sprinkler Piping Design shall be coordinated with and meet CT DPW requirements.

Light Hazard
Lobbies, Offices, Corridors
Density - 0.10 gpm/s.f. over the most remote 1,500 s.f. area with 100 gpm added for hose streams. Sprinkler heads rated at 165° spaced at 196 s.f. per head (maximum) with protection of all combustible concealed spaces.

Ordinary Hazard Group 1
Mechanical and Electrical Equipment Rooms -
Density - 0.15 gpm/s.f. over the most remote 1,500 s.f. area with 250 gpm added for hose streams. Sprinkler heads rated at 165° spaced at 130 s.f. per head (maximum).

Ordinary Hazard Group 2
Storage Rooms
Density - 0.20 gpm/s.f. over the most remote 1,500 s.f. area with 250 gpm added for hose streams. Sprinkler heads rated at 165° spaced at 130 s.f. per head (maximum).

K. FIRE STANDPIPE

Hydraulically designed in accordance with NFPA 14.

L. PIPING MATERIALS

Fire Protection piping below ground: Piping shall be equal to U.S. Pipe and Foundry ductile iron class 52 (ANSI) A21.51 (AWWA C151) with push on rubber gasketed joints and rodding as required. Fittings shall be ductile iron class 250 (ANSI) A21.10 and A21.11 mechanical joint type. Contractor shall use a combination of mechanical joint retainer glands, thrust blocks, tie-rods and pipe clamps, at each fitting. The type of pipe, soil conditions and available space shall determine the proper anchoring method. All ductile iron pipe and fittings shall be cement lined on interior in accordance with ANSI A 21.4 and AWWA C104 and coated on exterior, along with rods and clamps, with coal tar enamel.

Wet Sprinkler Piping:

- 2-1/2" and larger: Schedule 10, Black-Steel Pipe: ASTM A 135 or ASTM A 795/A 795M and grooved fittings. Pipe ends may be factory or field formed to match joining method.
- 2" and smaller: Schedule 40 black steel pipe ASTM A 53/A 53M, Type E, Grade B and ASTM A 865, threaded fittings.

Dry Sprinkler piping:

- 2-1/2" and larger: Schedule 40 ASTM A 53/A 53M, Type E, Grade B steel pipe and grooved fittings.
- 2" and smaller: Schedule 40 ASTM A 53/A 53M, Type E, Grade B steel pipe and threaded fittings.

Drain Sprinkler piping:

- Schedule 40 ASTM A 53/A 53M, ASTM A795, Type E, Grade B galvanized pipe and galvanized fittings.

Mechanical Couplings for Joining Carbon Steel Pipe:

Mechanical Couplings: Manufactured in two segments of cast ductile iron, conforming to ASTM A-536, Grade 65-45-12. Gaskets shall be pressure-responsive synthetic rubber, grade to suit the intended service, conforming to ASTM D-2000. Mechanical Coupling bolts shall be zinc plated (ASTM B-633) heat treated carbon steel track head conforming to ASTM A-449 and A-183, minimum tensile strength 110,000 psi (758450 kPa) as provided standard Victaulic.

All grooved components shall conform to local code approval and/or as listed by UL/ULC, FM, or NFPA.

Grooved end product manufacturer to be ISO-9001 certified.

Rigid Type:

- "Installation Ready" rigid joints shall be Victaulic FireLock® EZ Style 009H and Style 107H which are designed for direct "stab" installation onto grooved pipe without prior disassembly of the coupling. Housings shall be cast with offsetting, angle-pattern bolt pads.
- Standard rigid joints shall be Victaulic Style 005 (FireLock® 005) or 07 (Zero-Flex®). Housings shall be cast with offsetting, angle-pattern bolt pads to provide system rigidity and support and hanging in accordance with NFPA 13.
- Rigid couplings shall require visual pad-to-pad verification of complete installation. Tongue and recess type couplings which require the use of a torque wrench to achieve the exact required gap between housings are not permitted.

Flexible Type: Use in seismic areas where required by NFPA 13.

- "Installation Ready" flexible joints shall be Victaulic Style 177 QuickVic™, in sizes 2" through 6", which shall be designed for direct "stab" installation onto grooved pipe without prior disassembly of the coupling. .
- Standard flexible couplings shall be Victaulic Style 004, 75, or 77.

Mechanical Coupling Gaskets: Pressure-responsive, synthetic rubber listed for use with the housings.

Fire Protection Service	Temperature Range	Gasket Recommendation
Dry Systems	Ambient	Grade EPDM, Type A
Freezer Applications	-30°F to 0°F (-34°C to -17°C)	FlushSeal®, Grade L, Silicone
Water/Wet Systems	Ambient	Grade EPDM, Type A

Flange Adapters: For use with grooved end pipe and fittings, for mating to ANSI Class 125 / 150 flanges. Victaulic Style 741 or 744. For mating to ANSI Class 300 flanges use Victaulic Style 743.

Victaulic Grooved End Fittings: Fittings shall be cast of ductile iron conforming to ASTM A-536, Grade 65-45-12 (FireLock), forged steel conforming to ASTM A-234, Grade WPB 0.375" wall (9,53 mm wall), or fabricated from Std. Wt. Carbon Steel pipe conforming to ASTM A-53, Type F, E or S, Grade B. Fittings provided with an alkyd enamel finish or hot dip galvanized to ASTM A-153. Zinc electroplated fittings and couplings conform to ASTM B633.

M. SPRINKLER HEADS

Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.

Sprinkler Heads:

UL listed/FM approved automatic type; upright, concealed pendent, pendent, or sidewall to meet conditions, and of proper temperature rating. Deflector to be marked to indicate position

Die-cast brass frame, teflon encapsulated Belleville spring seal and frangible glass bulb. Body cast with hex shaped wrench boss. (Sprinklers shall not contain O-rings.) Quick response type.

Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.

Sprinkler head finishes to be confirmed with architect. Provide custom colors as required.

Pressure Ratings:

Pressure Rating for Automatic Sprinklers: 175 psig minimum.

Guards and Escutcheons: UL 199, Guards and escutcheons shall be listed, supplied, and approved for use with the sprinkler by the sprinkler manufacturer. Provide as required for heads subject to mechanical injury.

Multiple-Use Flexible Drop System: In lieu of rigid pipe offsets or return bends for sprinkler drops, the Victaulic Aquaflex stainless steel sprinkler fitting system may be used to locate sprinklers as required by final finished ceiling tiles and walls. The drop system shall consist of a braided (corrugated) type 304 stainless steel flexible tube, a zinc-plated steel flexible tube 1" NPT Male threaded nipple for connection to branchline piping, and a zinc-plated steel reducer with 1/2" or 3/4" NPT Female thread for connection to the sprinkler head. Union joints shall be provided for ease of installation. The flexible drop shall attach to the ceiling grid using a one-piece open gate bracket (The bracket shall allow for sprinkler installation before or after the bracket is secured to the sprinkler grid). The braided drop system is FM Approved for sprinkler services to 200 psi (1380 kPa) and can be installed without the use of tools.

Spare Sprinkler Equipment:

Spare heads: not less than 12, total number based on one spare head of each type and rating per each 100 similar heads, or part thereof, installed.

Spare head cabinet: baked enameled steel cabinet, hinged cover, of adequate size to contain heads and wrench.

Head wrench: provide at least one, with suitable openings.

N. VALVES

Division (Zone) Valves: spaced to isolate specific areas within buildings and hose supplies.

Ball Valves:

UL/FM Global approved, 350 psi, grooved or threaded ends, bronze body (ASTM B-584 Alloy 844), standard port, chrome-plated brass ball, stainless steel stem, TFE seats, brass gearbox, with pre-wired supervisory switches. Victaulic Series 728 FireLock.

Butterfly Valves:

UL/FM Global approved, 300 psi, grooved ends, polyphenylene sulfide (PPS) coated ductile iron body (ASTM A-536, Grade 65-45-12). Ductile iron disc, synthetic rubber encapsulated suited for the intended service, with integrally cast stem. Complete with weatherproof actuator and pre-wired supervisory switches. Victaulic Series 705 FireLock

Gate Valves: UL/FM Global approved.

2-1/2" through 12" Sizes OS&Y Gate Valves: 250 psi, grooved ends. Ductile iron body conforming to ASTM A-536, cast iron yoke and handwheel conforming to ASTM A-126-B; EPDM coated ASTM A-126-B cast iron disc; ASTM B16 brass rising stem; flanged and epoxy coated cast iron bonnet; EPDM o-ring stem seals and body gasket. Victaulic Series 771.

Wall Type Indicator Post: ASTM A-126-B cast iron wall type indicator post, with ASTM B-62 bronze operating stem and carbon steel operating rod. Victaulic Series 773.

Adjustable Indicator Post Vertical Type: ASTM A-126-B cast iron adjustable indicator post vertical type with ASTM A-126-B cast iron extension sleeve, ASTM B-62 bronze operating stem and carbon steel extension rod. Victaulic Series 774.

Check Valves: UL/FM Global approved.

2" through 3"Sizes Spring Assisted: Black enamel coated ductile iron body, ASTM A-536, Grade 65-45-12, non-slam tilting disc, stainless steel disc and spring, brass shaft, 365 psi. Victaulic Series 717H.

4" through 12" Sizes Spring Assisted: Black enamel coated ductile iron body, ASTM A-536, Grade 65-45-12, elastomer encapsulated ductile iron disc suitable for intended service, stainless steel spring and shaft, welded-in nickel seat, 250 psi. Victaulic Series 717. Designed to accept a riser check kit. Victaulic Series 717R.

O. ALARM VALVES

Alarm Check Valve: Black enamel coated ductile iron body conforming to ASTM A-536, grade 65-45-12, aluminum bronze clapper, stainless steel spring and shaft, EPDM seal, and Nitrile seat O-rings. Valve internal parts shall be replaceable without removing the valve from the installed

position. Water working pressure is 300 psi. Suitable for constant and variable pressure systems with optional Series 752 retard chamber. Victaulic FireLock® Series 751.

Dry System Check Valve: Low differential, latched clapper design, black enamel coated ductile iron body conforming to ASTM A-536, grade 65-45-12, aluminum bronze clapper, stainless steel spring and shaft, peroxide cured EPDM diaphragm, EPDM seal, brass seat, and Nitrile seat O-rings. Valve internal parts shall be replaceable without removing the valve from the installed position. Valve shall be externally resettable. Required air pressure is 13 psi. Water working pressure is 300 psi. Victaulic FireLock® NXT Series 768. Equipment shall also include; nitrogen generating system.

P. EQUIPMENT

Air compressor: UL/FM, single stage, oil-less, permanently lubricated, direct drive, one air filter per cylinder, safety relief valve, thermal protection, base plate mounted with NFPA approved automatic air maintenance device. Size dictated by system volume. Coordinate electrical requirements with electrical contractor. Air compressor/ air maintenance device: General model no. OL-335 1/2 H.P. 115V AC, 1 phase.

Dry valve assemblies shall include a pre-engineered wall mounted nitrogen generator including: cabinet with air compressor and power supply, single point nitrogen/air discharge – ½" FNPT, Oil less air compressor, Cabinet enclosed membrane type nitrogen generator (no nitrogen gas storage) with manual bypass, Air maintenance device with on board adjustable regulator (Victaulic Series 757, Tyco Model AMD– 1 and Reliable Model A-2), Riser-mounted ECS Protector Dry SMART Vent (PSV-D), ECS Protector SMART Gas Analyzer (SGA-1). Similar to EC's PGEN-5. Provide integration with BMS.

Backflow Preventer (New Building and 900 Building): Reduced pressure type, FDA approved epoxy coated cast iron body, bronze seat and disc holder, stainless steel trim, tight seating check valve discs, bronze body ball valve test cocks, UL/FM OS&Y inlet and outlet valves, equipped with detector trim, water meter and backflow preventer. Watts Model Number Watts 909 RPDA. Provide 10" overflow piping routed to exterior.

Backflow Preventer (1928 Building): Double check detector type, FDA approved epoxy coated cast iron body, bronze seat and disc holder, stainless steel trim, tight seating check valve discs, bronze body ball valve test cocks, UL/FM OS&Y inlet and outlet valves, equipped with detector trim, water meter and backflow preventer. Watts Model Number Watts 709 DCDA or approved equal.

Class III, 2 ½" Fire Department Valve: 2 ½" Cast Brass angle Valve, Rough brass angle body, polished trim and red cast iron wheel handle, 300 PSI, WWP. POTTER-ROEMER 4065 or approved equal and a 1 ½" fire department valve with cap and chain.

Recessed mounted custom cabinet sized for (1) 2 ½" valve and (1) 1 ½" fire department valve.

Alarm Test Module: Grooved or threaded ends, bronze body and bonnet, bronze and copper alloy internals with stainless steel spring, dual polycarbonate sight glasses, and malleable iron handwheel. UL listed and FM Approved for services to 300 psi. Victaulic Series 720 TestMaster II.

Riser Manifold Assembly: Grooved end riser manifold assembly consisting of an orange enamel coated steel body, System Sensor model WFD flow switch, Victaulic Series 720 TestMaster™ II alarm test module, and pressure gauge. UL listed and FM approved for wet sprinkler system services to 250 psi.

Air vents on wet pipe systems shall be similar to Potters automatic air vent, PAV. Provide all piping, fittings etc. as required to route to an approved drain location. Include Ball valve supervisory switch model RBVS. UL listed, FM Approved.

Q. FIRE DEPARTMENT CONNECTION

Size, type, configuration, thread specifics and exact location to be coordinated with local fire department and fire marshal prior to installation.

Flush Type Storz:
Aluminum adapter with storz inlet, female NPT outlet. Cast brass escutcheon plate. Hardcoated aluminum storz cap with attachment cable. 30 Degree elbow, Aluminum with Brass Plate; Branding: "Standpipe-Sprinkler". Similar to listed Kochek series. Exact type, size and location shall be coordinated with local Fire Marshal.

R. PRE-ENGINEERED KITCHEN HOOD FIRE SUPPRESSION SYSTEM

Shall be provided and installed for the kitchen exhaust hood(s), and plenum(s), ductwork and cooking appliances requiring protection by the local and state codes, local fire marshal or owner's insurance company. The system shall be in accordance with 2012 IMC, NFPA 17A AND NFPA 96 and UL. The system shall be a pre-engineered, wet chemical, fixed nozzle agent distribution network. It shall include: automatic detection and actuation and remote manual actuation as well as automatic gas / electrical shut-off. Similar to ANSUL Model R-102 Restaurant Fire Suppression System.

S. FIRE PUMP-ALTERNATE

Electric driven 1000 GPM, 50 hp fire pump assembly including; controller, transfer switch, test header, etc. Install in accordance with NFPA 20. Fire pump shall be sized in order to meet NFPA 13 & 14 hydraulic sprinkler requirements. Similar to PEERLESS model 6AEF14.

Fire Pump Test Meters: Grooved end calibrated venturi meter manufactured of carbon steel (ASTM A-53) zinc electroplated body, brass needle valve conforming to ASTM B-124, with attached GPM meter. Minimum straight pipe installation of five diameters upstream and two diameters downstream. Victaulic Style 735.

T. ELECTRONIC DEVICES

Valve supervisory devices: UL/FM approved tamperproof signaling initiating switch arranged to detect closed valve position. Electrical rating: 120VAC.

Waterflow switch, 24 volt with 2 sets of contacts and pneumatic retard to prevent false alarms. Similar to potter model VSR-F.

Pressure switch: Electrically supervised water-flow switch with retard feature.

Components: Single-pole, double-throw switch with normally closed contacts.

Design Operation: Rising pressure signals water flow. Similar to Potter model PS Series.

Electric alarm bell; 6", 24vdc, with weatherproof backbox similar to potter model PBD246.

PART X: TECHNOLOGY SYSTEMS NARRATIVE

A. GENERAL

This narrative describes the Technology scope of work and specifications; refer to floor plans for additional information.

Comply with all current Federal, State, City and local codes, standards and ordinances, the International Building Code, the Connecticut Building Code including supplements, NFPA, utility company standards, insurance carrier requirements, and local authorities.

The Technology systems will be designed to comply with all state and local codes including the following codes adopted by the authority having jurisdiction:

- 2018 Connecticut State Building Code
- 2017 National Electric Code
- 2013 NFPA 72 National Fire Alarm and Signaling Code
- 2010 ADA Standards for Accessible Design
- OSHA, NFPA, utility company standards and all other codes and standards referenced by the above documents

Additionally, the following standards and documents will be referenced:

1. ANSI/TIA-568.1-D - Commercial Building Telecommunications Cabling Standard
2. ANSI/TIA-569-E - Telecommunications Pathways and Spaces
3. ANSI/TIA-606-C - Administration Standard for Telecommunications Infrastructure
4. ANSI/TIA-607-C - Generic Telecommunications Bonding and Grounding (Earthing) For Customer Premises
5. BICSI Telecommunications Distribution Methods Manual - 14th Edition
6. State of CT, Report of the School Safety Infrastructure Council, Nov. 19, 2015 Edition

B. COORDINATION

Coordinate the work, with work of other trades and field conditions. Carefully check space requirements and utilities to ensure all equipment can be installed in the spaces allotted thereto and coordinate all necessary utility service requirements. Coordinate, protect and schedule work with work of other trades in accordance with the required construction sequence. Install all work in accordance with equipment manufacturer's installation instructions.

C. WARRANTY

The Contractor warrants that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted, that the Work will be free from defects not inherent in the quality required or permitted, and that the work will conform with the project requirements. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. Contractor

shall warranty all work for a period of one (1) year from Owner acceptance unless specified otherwise in which case longer equipment warranties may apply. A 20-year manufacturer's warranty for copper and fiber optic cabling will be specified.

D. SUBMITTALS

Contractor shall submit: shop drawings, product data, samples, record documents (as-builts) and operation and maintenance manuals in accordance with the Contract requirements and particular specification section requirements.

E. RECORD DRAWINGS

Provide a complete set of as-built drawings reflecting "as-installed" conditions. As-built drawings shall indicate all installed conditions of systems within this discipline. Drawings shall be of similar scale as the construction documents and include details as necessary to clearly reflect the installed condition. Drawings shall be bound in a complete and consecutive set. Supplemental sketches and loose paperwork will not be acceptable and will be returned for revision. The contractor shall comply with the Engineer's comments to produce a clear and concise set of drawings. Drawings shall be submitted in both hard copy and electronic format (AutoCad or Revit version as required by the Owner). Number of copies of each as requested by the Owner.

F. TECHNOLOGY SYSTEMS

1928 Building

The existing incoming Telecommunications service to the current High School enters the 1928 building basement and must be maintained and preserved during demolition of other sections of this building, and also during construction of the new High School building. All backbone cabling between the 1928 building and other sections of the existing High School (such as the existing 700 Wing Server Room and all Telecom Rooms) are to be demolished only after the new High School building is operational, and the core IT network equipment is fully-migrated.

900 Building

The 900 Building will be renovated to support the Farmington School district's offices.

Two (2) 4-inch conduits with singlemode optical fiber cable will be installed between the new High School's Server Room and a new 900 building Server Room. The Farmington School district's IT network equipment will be installed within this building's Server Room.

One (1) Telecom Room will be constructed in addition to the new Server Room; see "Typical Telecom Room" requirements indicated within the "New High School" section below.

New High School

New incoming service cabling (optical fiber and copper) will be routed from the nearby Town Hall building to the new High School's Server Room in two (2) 4-inch concrete encased, schedule 80 PVC conduits. Cabling will consist of OSP-rated singlemode optical fiber, and OSP-rated 200-pair copper cable. Building Entrance Protectors shall be installed on all inter-building backbone copper cabling. Optical fiber cables will be terminated on LC connectors.

Twelve (12) Telecommunications Rooms (TRs) serving the new High School building will be located to provide connectivity to all areas within cable distance limitations. TRs will be located in these areas:

1st Floor - Building A
1st Floor - Building B
1st Floor - Building C
1st Floor - Auditorium Wing
1st Floor - Gym Wing
2nd Floor - Building A
2nd Floor - Building B
2nd Floor - Building C
2nd Floor - Auditorium Wing
2nd Floor - Gym Wing - (Server Room/Main Distribution Frame)
3rd Floor - Building A
3rd Floor - Building B

A Server Room (containing the IT Main Distribution Frame and acting as a TR for this area) will be located on the 2nd Floor above the Gym. Core network switches, servers, telephone system headend, and paging system equipment will be located in this room. Some equipment is existing in the current High School and shall be migrated to this new Server Room by the FHS IT staff.

One (1) additional NEMA-rated enclosure will be installed outside the new High School building in the parking lot area, acting as a TR for any nearby outdoor connections that may be required (light pole security cameras, wireless access points, etc.).

Typical Telecom Rooms will be sized to allow adequate clearances around front, back, and sides of IT Equipment rack(s) and will be provided with plywood backboards, two (2) 19" 2-post racks with vertical wire managers, rack-mount optical fiber enclosures, modular patch panels, horizontal wire managers, and other equipment as required. Ladder Rack will be installed in the ceiling above the equipment racks. UPS and Vertical Power Strips will be included. Active equipment (network switches, servers, etc.) will be furnished and installed by the Owner.

Server Rooms will be sized larger than Typical TRs in order to accommodate Server Cabinets, HVAC, and UPS equipment that require additional floor space and service clearances.

Backbone cabling between the Server Room and all TRs will consist of 24-strand OM4 multimode fiber, and 25-pair Category 5e rated copper cables. Optical fiber shall be terminated in rack-mounted optical shelves using LC connectors, and copper cables shall be terminated on rack-mount patch panels. Coaxial backbone cabling will consist of RG-11 quad-shield coaxial cable and will include all amplifiers, taps, and splitters.

Firestopped sleeves will be provided between the Server Room and TR walls, and the adjacent corridor where approved cable supports (cable tray and j-hooks) will be used to route Category-6A cables to each work area. Additional firestopped sleeves will be installed vertically between TRs.

All IT equipment racks and ladder rack will be grounded to the Telecommunications Grounding Busbar (TGB) in each TR. The Telecommunications Main Grounding Busbar (TMGB) will be installed in the Server Room. A Telecommunications Bonding Backbone (TBB) will be installed as required between TRs with a minimum 3/0 copper grounding electrode conductor from the nearest electrical service ground connection to the TMGB, and from the TMGB to the TGB in each TR.

A standards-compliant structured cabling system, designed by a Registered Communications Distribution Designer (RCDD), will be provided. The structured cabling system will consist of Category-6A STP cable, wall mounted outlet boxes, cover plates, and 8-pin RJ45 jacks. All cables will be properly labeled and terminated in the equipment racks on modular RJ45 patch panels.

Pathways for horizontal cabling will primarily utilize cable tray and j-hooks. Conduit will be installed over all inaccessible ceilings. The horizontal cabling will be installed in conduit from the outlet backbox, “stub-up” to the accessible ceiling space and then by approved cable supports back to the nearest Telecommunications Room. The outlet backbox at each work area will consist of a double-gang box with 1” conduit to accessible ceiling space.

Each workstation outlet in the office areas and at teacher’s stations will receive a minimum duplex drop (2 data cables). Additional voice and/or data drops will be provided in other locations as required, including all classrooms and other spaces as needed. Drops for wall-mount telephones will be provided in designated areas as required.

Wireless Access Points (WAPs) will be located throughout the facility to provide adequate coverage to all occupied areas of the building. Two (2) Category-6A cables installed at each WAP location will be terminated on a surface-mounted outlet faceplate. Each classroom will have two (2) Cat-6A cables for a WAP located in the ceiling, as well as other areas throughout the building. Wireless Access Point hardware, antennas and enclosures will be furnished by the Owner and installed by the IT Contractor.

Networking and telephone system equipment requirements will be coordinated with the Owner’s IT Department. Specification of these systems will be by the Owner, but adequate rack mounting space, cooling, power, and grounding will be provided.

Dedicated analog telephone lines (POTS) will be installed at required locations including elevator control rooms, fire alarm panels, security dialers, and gas meters. All wiring for these devices will be homerun to the nearest Telecom Room.

Coaxial cabling for TV services will consist of RG-6 quad-shield cabling to each device and will include all amplifiers, taps, and splitters.

Cabling to support Audio Visual equipment including LCD screens, projectors, AV Control Panels, and AV Equipment cabinets will be provided in conference rooms, and other locations as required.

Additional speakers for an overhead paging system will be located throughout the building. A new digital bell/clock system will be installed in the new High School

In compliance with State of CT School Safety Infrastructure Council Guidelines, a Distributed Antenna System will be installed to ensure adequate coverage for First Responder radio frequencies. This system will be specified with the required radio frequencies and performance specifications, but designed, installed, tested and commissioned by a qualified DAS Integrator.

G. SECURITY SYSTEMS

Video surveillance cameras will be installed in locations designated by the Owner, including around the building perimeter, main entrances, corridors, and other locations as required. All cameras will be IP-based, with Category-6A cable installed from the camera to the nearest TR. Exterior cameras not attached to the building façade will be supported by the “parking area” TR (see “Technology Systems” section) or hybrid optical fiber/copper cable and fiber extenders installed within the new High School, to deliver both video signal and power to each camera. PoE Switches to power the cameras will be Owner-provided.

Intrusion Detection devices will be provided including door contacts on all exterior doors and roof hatches, motion sensors, glass break sensors, and keypads located at designated entry locations. Security Panels will be located in the TRs mounted to the plywood backboards.

Card readers will be provided at designated locations including exterior entrances, Telecommunications Rooms, Mechanical Rooms, and other locations as requested.

Panic buttons will be located at designated locations, including but not limited to the Main Administration Office Area entrance, Main Public Entrance, and other locations as required. Depressing a panic will initiate a sequence of operations including 911 notification, securing of all main entrance doors, triggering an audible announcement via the Fire Alarm Voice Evac system, and other procedures as required by the Owner.

Video Intercom units will be located at the exterior of all entrance doors. These will be controlled from indoor stations located as required by the Owner.

H. AUDIO VISUAL SYSTEMS

Each classroom will have AV wiring from the Teacher desk to the Interactive Whiteboard location. The specific type of AV cabling will be dependent upon the projector model selected by the Owner. Audio from the Teacher's device (laptop or PC) will be rebroadcast to ceiling mounted speakers, that will also broadcast general paging announcements.

Category-6A STP data cables and power will be provided at all Digital Signage display locations. Additionally, in-wall multimedia enclosures will be installed behind Digital Signage locations for housing of equipment and cables.

Conference Rooms within the Administration Office will be equipped with infrastructure to support an LED display with AV signal inputs (i.e. HDMI, RCA audio, XLR, etc.) located either in the wall, or inside a recessed table box, depending on furniture selection.

In both the Auditorium and Gym, an Audio-Visual system consisting of AV signal inputs, projection screen, projector, speakers, touchscreen control panel, assistive listening system, and AV Switching system will be provided. Assistive listening systems will be provided for all areas containing sound reinforcement.

SITE NARRATIVE

The following outlines the scope of site work for the proposed new school:

Proposed Conditions – Site Improvements, Circulation, and Parking

Vehicular access to the school will remain from Farmington Avenue, Route 4, with modifications to both the ingress and egress lanes to better accommodate school and event traffic. Local officials including emergency services have requested two full travel lanes in both directions each with a fortified shoulder for emergency bypass if necessary. Further modifications within the Route 4 right-of-way include a dedicated left turn lane from the west and a right turn lane from the east. Each of these modifications will necessitate expansion of the north side curbline. All proposed modifications will require state coordination and approval due to Farmington Avenue being a state road. These improvements will likely also trigger improvements to the existing signal located at the driveway intersection with Route 4.

The redesigned school site will provide expanded on-site parking for visitors and staff with 590 dedicated school spaces provided throughout the campus. There are a minimum of 15 accessible spaces included in the parking count to meet the required code. The majority of parking and bus access will be consolidated to the south side of the new school building in dedicated areas for each. Buses will be routed to the east and circulated through a loop with 45 degree parking spaces limiting bus traffic into the site and any comingling of student drivers, visitors, and parent drop off. The dedicated bus area will accommodate bus loading spaces for 22 full size buses. The spaces will allow for arrival and departure of buses without backing up. A dedicated parent pickup and drop-off lane will parallel the school's main entry walks and will accommodate queuing of 24 cars. Site parking is redesigned entirely, with the majority of student parking in two east side lots. Staff parking will be to the north of the new building as will service access. Parking islands will accommodate shade trees and sidewalks in specific locations to aid in wayfinding and safe travel through the lots.

Interior site access drives and corner radii have been designed for easy maneuvering and safe vehicle passage including buses and emergency vehicles. Sidewalks are designed to provide pedestrian-friendly connectivity to and from areas of bus and parent drop off and pickup, and accessible ramps and crosswalks are located where appropriate. Signing and pavement markings to guide vehicle access and circulation will also be included. The proposed building and site access will comply with Office of School Construction Grants standards of vehicular circulation. Pedestrian access will be improved throughout all parking areas with multiple options for pedestrians to cross through parking to the building entrances. Access to the sports facilities will also be improved including regrading and paving the bituminous concrete walk to the upper soccer fields with respite pull-offs and an accessible route to the stadium grandstands and pressbox.

Emergency access has been upgraded above existing conditions to include an access route from the cul-de-sac at Crestwood Circle into the site paralleling the east property line and connecting through the north and south parking lots. This route can be a 12 foot wide heavy duty bituminous drive with 4 foot

wide reinforced turf shoulders or a grass paver system that utilizes plastic rings to allow for the weight of emergency vehicles.

The access drives and parking will have relatively gentle grades. Pavements are to be bituminous concrete, with heavy duty bituminous concrete at all bus access and parking areas, service areas, and emergency access vehicle routes. Sidewalks within and adjacent to parking are to be cast-in-place concrete. Sidewalks to sports fields and site amenities shall be bituminous concrete. Site curbing will be granite with minor areas utilizing bituminous concrete or extruded concrete curb. Site lights are to be LED fixtures on cast aluminum poles. Retaining walls are generally not anticipated for the site work with the exception of approximately 200 linear feet of wall at a maximum height of 10' to retain the hillside adjacent to the relocated Baseball Field.

Site landscaping will include a palette of shade and ornamental trees to complement the walks, drives, parking areas, and student terrace as well as architectural finishes. Low impact design features such as bioretention basins will have native plantings of trees, shrubs and herbaceous ground covers to create site features beyond simple infrastructure improvements. Buffer screening including an earthen berm and vegetation will be constructed along the entire north and east side of the property adjacent to parking and the school building to screen the residential neighbors. Plantings and berm construction will meet all town zoning regulations following the "C" bufferyard designation for a 6' high and 40' wide berm. A variety of trees, both evergreen and deciduous, as well as shrubs will be installed to vegetate the berm and create a diverse habitat along the property edge.

School athletic facilities including baseball and tennis will be relocated to the southwest portion of the site. An additional softball field is proposed as an add-alternate in the lower level field adjacent to Route 4. The upper terrace soccer fields and football stadium and track will remain in their current location with upgrades to accessibility and facilities.

Materials

Bituminous concrete – access drives and parking – heavy duty and light
Concrete walks
Integral concrete curb
Extruded concrete curb
Stamped Concrete
Concrete Unit Pavers
Permeable Pavers
Stone or Brick Veneer walls
Detectable warning strip pavers
Site lights – LED on aluminum poles
Lawn sod/seed

Trees
Shrubs
Perennials
Herbaceous ground covers
Signage – traffic and wayfinding
Pavement markings
Chain link fence – as needed for perimeter security
Emergency access gates
Timber guide rail
Concrete utility and dumpster pads
Flagpole
Catch basins and drainage pipe
Yard drains
Site furnishings – benches, trash receptacles, bollards
Utility services
Sedimentation and erosion controls

Storm Drainage

Proposed stormwater management components are to be designed per the Town of Farmington requirements and the applicable sections of the Connecticut Department of Energy & Environmental Protection *2004 Water Quality Manual*. We anticipate that most of the existing stormwater collection system on site will be removed and replaced to accommodate the new parking configurations and reconstruction of the site. The new stormwater infrastructure will connect to the existing drainage outlet piping near the limits of construction. There are currently two stormwater discharges from the site that cross Route 4 to the Farmington River. One is located near the northwest corner of the property, which provides a discharge point for the existing drainage system that wraps around the gymnasium to the north side of the school where it begins near the cafeteria. A second drainage system discharges across Route 4 to the Farmington River in front of the Town Hall. This drainage system collects stormwater runoff from the southeastern part of the school building, the stadium, eastern parking lot, Monteith Drive, the Town Library and the Town Hall.

Based on the planned site improvements, the drainage collection system to northwestern discharge point will likely see a decrease in impervious watershed and therefore a reduction in flows is anticipated without onsite stormwater detention needed. With the redevelopement of the new school and parking areas on the east side of the site and considering the site constraints we anticipate that some stormwater detention will be needed. A portion of this storage can be provided in small scale surface water quality basins in landscape islands, but an underground detention/water quality basin is anticipated to be needed beneath the east parking area. This basin will receive runoff from the new school building and associated parking areas. The basin will overflow to a new outlet pipe system that will connect to the existing drainage system that runs through the Town Hall parking lot. Low impact

design features will be pursued throughout the site to reduce the need for traditional drainage systems. These will include bio retention swales and basins, detention basins, subsurface sediment traps, and potentially permeable pavements.

Sanitary

There is a sanitary trunk line that runs along the northern bank of the Farmington River, which servs the High School, Library, and Town Hall. The High School and the Library are served by a common sewer collection lateral that crosses Route 4 in front of the library. The the Library appears to be served by a single lateral, while the High School is served by multiple laterals that extend to the front and east side of the building. The Town Hall has a separate lateral crossing of Route 4 to the trunk line.

We anticipate that the new school can be connected to the on-site sanitary system at one of the manholes that exist on the east side of the current school building. This section of the sanitary system also serves the 900 wing of the existing building, which is proposed to remain. We recommend that efforts be made to maintain this portion of the system as part of the redevelopment. It may be wise to have this system TV inspected to confirm the integrity of the system and estimate remaining longevity.

Water Supply, Gas, Electrical

Other utilities that currently serve the site such as water, gas, electrical, and communications have not been fully evaluated at this time. We expect that the existing utility services will continue to have the ability to serve the improved school facility, but further investigation is needed to confirm that ability. Once more information is available on utility loading requirements for the new facility, the information can be provided to the respective utilities to request a “will serve” letters and further refine the location of new infrastructure. If alternate service locations would better serve the new building, those will investigated with the facilities staff and respective utility providers.

END PART XI

VIII. Appendices

E. Cost Estimate

Schematic Design Estimate

Farmington High School

Farmington, CT

PM&C LLC
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Prepared for:

TSKP Studio

May 20, 2020

PM&C

Farmington High School
Farmington, CT

20-May-20

Schematic Design Estimate

MAIN CONSTRUCTION COST SUMMARY

	Construction Start	Gross Floor Area	$/sf	Estimated Construction Cost
NEW CONSTRUCTION	Mar-22			
NEW SCHOOL		239,250	$319.08	$76,340,835
RENOVATED 900 WING		19,700	$201.92	$3,977,765
DEMOLISH PORTION OF EXISTING BUILDING		197,720	$8.00	$1,581,760
REMOVE HAZARDOUS MATERIALS		197,720	$2.50	$494,300
SITEWORK				$8,942,810
SUB-TOTAL		258,950	$352.72	$91,337,470
ESCALATION TO BID DATE OF SPRING 2022	6.4%			$5,845,598
DESIGN AND PRICING CONTINGENCY	7.0%			$6,393,623
SUB-TOTAL		258,950	$399.99	$103,576,691
GENERAL CONDITIONS	35 months			$4,200,000
GENERAL REQUIREMENTS				$2,071,534
SUB-TOTAL		258,950	$424.21	$109,848,225
STATE EDUCATION FUND	0.03%			$31,073
PERFORMANCE AND PAYMENT BOND	0.68%			$704,321
INSURANCE GL	0.85%			$880,402
PERMIT				Waived
CM FEE	2.00%			$2,196,965
CM/GMP CONTINGENCY	3.0%			$3,295,447
TOTAL OF ALL CONSTRUCTION		258,950	$451.66	**$116,956,433**

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Farmington High School
Farmington, CT

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Schematic Design Estimate

ALTERNATES - including mark ups		
ALT #1- Motorized demountable partition between gyms	ADD	**$95,304**
ALT #2- Stone veneer I.L.O. masonry along first floor exterior	ADD	**$567,613**
ALT #3- Mothball renovation option including pavers	ADD	**$873,977**
ALT #4- Additional softball field	ADD	**$288,957**
ALT # 5 - Fire Pump	ADD	**$156,800**
ALT # 6 - Water Booster Pump	ADD	**$65,280**
ALT # 7 - Cooling Plant Water-Water Heat Pumps + Geothermal Wells	ADD	**$4,746,720**
ALT # 8 - Cooling Plant Modular Air-Cooled Plant	ADD	**$478,560**
ALT # 9 - Cooling Plant Alternate Thermal Ice Storage	ADD	**$230,400**
ALT # 10 - DOAS with Chilled Beams	ADD	**$306,240**
ALT # 11 - 1350kW PV system	ADD	**$4,838,400**
ALT # 12 - Route 4 improvements	ADD	**$640,000**
ALT # 13 - Universal Design (hands free plumbing fixtures; auto door openers	ADD	**$100,000**

This Schematic Design cost estimate was produced from drawings, outline specifications and other documentation prepared by TSKP Studio and their design team dated April 10, 2020. Design and engineering changes occurring subsequent to the issue of these documents have not been incorporated in this estimate.

This estimate includes all direct construction costs, construction manager's overhead, fee and design contingency. Cost escalation assumes start dates indicated.

Bidding conditions are expected to be public bidding to pre-qualified construction managers, and pre-qualified sub-contractors, open specifications for materials and manufacturers.

The estimate is based on prevailing wage rates for construction in this market and represents a reasonable opinion of cost. It is not a prediction of the successful bid from a contractor as bids will vary due to fluctuating market conditions, errors and omissions, proprietary specifications, lack or surplus of bidders, perception of risk, etc. Consequently the estimate is expected to fall within the range of bids from a number of competitive contractors or subcontractors, however we do not warrant that bids or negotiated prices will not vary from the final construction cost estimate.

ITEMS NOT CONSIDERED IN THIS ESTIMATE

Items not included in this estimate are:

- Land acquisition, feasibility, and financing costs
- All professional fees and insurance
- Site or existing conditions surveys investigations costs, including to determine subsoil conditions
- All Furnishings, Fixtures and Equipment
- Items identified in the design as Not In Contract (NIC)
- Items identified in the design as by others
- Owner supplied and/or installed items as indicated in the estimate
- Utility company back charges, including work required off-site
- Work to City streets and sidewalks, (except as noted in this estimate)
- Construction contingency (GMP Contingency is included)
- Contaminated soils removal

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Farmington High School
Farmington, CT

Schematic Design Estimate

CONSTRUCTION COST SUMMARY IN CSI FORMAT

	New Building		*Renovated 900 Wing*		*SITE WORK*		*TOTAL PROJECT* *Subtotal*	*Total*
TOTAL PROJECT								
DIV. 2 DEMOLITION				**$200,911**				**$200,911**
024000 Demolition			$200,911				$200,911	
DIV. 3 CONCRETE		**$3,947,188**		**$34,178**		**$158,400**		**$4,139,766**
033000 Cast-in-Place Concrete	$3,947,188		$34,178		$158,400		$4,139,766	
DIV. 4 MASONRY		**$6,000,070**		**$150,238**				**$6,150,308**
040001 Unit Masonry	$6,000,070		$150,238				$6,150,308	
DIV. 5 METALS		**$9,204,786**		**$38,075**				**$9,242,861**
051000 Metal Fabrications	$1,618,278		$21,090				$1,639,368	
051200 Structural Steel Framing	$6,345,136		$1,000				$6,346,136	
053100 Steel Decking	$858,920						$858,920	
054000 Light Gauge Framing	$382,452		$15,985				$398,437	
DIV. 6 WOODS & PLASTICS		**$803,732**		**$34,434**				**$838,166**
061000 Rough Carpentry	$541,092		$34,194				$575,286	
062000 Finish Carpentry	$262,640		$240				$262,880	
DIV. 7 THERMAL & MOISTURE PROTECTION		**$6,383,347**		**$519,689**				**$6,903,036**
070001 Waterproofing, Dampproofing and Caulking	$999,297		$55,494				$1,054,791	
070002 Roofing and Flashing	$3,186,251		$455,025				$3,641,276	
072100 Thermal Insulation	$234,354		$4,170				$238,524	
074200 Metal Panel	$1,286,660						$1,286,660	
077600 Roof Pavers								
078410 Fireproofing	$646,785		$5,000				$651,785	
079500 Expansion Control	$30,000						$30,000	
DIV. 8 DOORS & WINDOWS		**$6,043,360**		**$105,925**				**$6,149,285**
080001 Aluminum Entrances	$4,479,920		$64,900				$4,544,820	
080002 Glass and Glazing	$682,470						$682,470	
081110 Doors, Frames and Hardware	$246,690		$9,000				$255,690	
081400 Wood Doors	$216,680		$9,800				$226,480	
083110 Access Doors and Frames	$20,000		$500				$20,500	
083300 Overhead Coiling Doors	$45,000		$6,400				$51,400	
087100 Door Hardware	$299,400		$15,000				$314,400	
089000 Louvers	$53,200		$325				$53,525	

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20-May-20

Farmington High School
Farmington, CT

Schematic Design Estimate

CONSTRUCTION COST SUMMARY IN CSI FORMAT

	New Building		*Renovated 900 Wing*		*SITE WORK*	*TOTAL PROJECT* *Subtotal*	*Total*
TOTAL PROJECT							
DIV. 9 FINISHES		**$8,221,803**		**$581,515**			**$8,803,318**
090002 Tiling	$1,663,815		$148,515			$1,812,330	
090003 Acoustical Ceilings	$1,808,950		$124,110			$1,933,060	
090005 Resilient Flooring	$675,466		$33,583			$709,049	
090007 Painting	$573,810		$40,005			$613,815	
092110 Gypsum Board Assemblies	$2,682,125		$182,885			$2,865,010	
096000 Carpet	$79,784		$52,417			$132,201	
096400 Wood Athletic Flooring	$328,275					$328,275	
096700 Fluid Applied Flooring	$78,450					$78,450	
098400 Acoustic Room Components	$331,128					$331,128	
DIV 10 SPECIALTIES		**$1,377,550**		**$91,200**			**$1,468,750**
101100 Visual Display Surfaces	$221,760		$5,000			$226,760	
101200 Display Cases	$81,600					$81,600	
101400 Signage	$89,080		$2,200			$91,280	
102110 Toilet Compartments	$176,150		$17,750			$193,900	
102200 Operable Partitions	$153,360					$153,360	
102800 Toilet Accessories	$55,550		$3,450			$59,000	
103000 Lockers	$571,000		$60,000			$631,000	
104400 Fire Protection Specialties	$29,050		$2,800			$31,850	
DIV. 11 EQUIPMENT		**$2,168,288**		**$6,000**			**$2,174,288**
110620 Theatrical Equipment	$721,000					$721,000	
113100 Residential Appliances	$75,000		$5,000			$80,000	
114000 Food Service Equipment	$875,000					$875,000	
115213 Projection Screens	$24,000					$24,000	
115300 Science Room Equipment	$119,600					$119,600	
116600 Equipment	$353,688		$1,000			$354,688	
DIV. 12 FURNISHINGS		**$2,537,750**		**$24,750**			**$2,562,500**
122400 Window Shades	$325,000					$325,000	
123553 Wood Classroom and Laboratory Casework	$2,158,500		$15,000			$2,173,500	
124810 Entrance Mats and Frames	$54,250		$9,750			$64,000	
DIV. 13 SPECIAL CONSTRUCTION							
DIV. 14 CONVEYING SYSTEMS		**$330,000**					**$330,000**
142400 Passenger Elevators	$330,000					$330,000	

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20-May-20

Farmington High School
Farmington, CT

Schematic Design Estimate

CONSTRUCTION COST SUMMARY IN CSI FORMAT

	New Building		*Renovated 900 Wing*		*SITE WORK*		*TOTAL PROJECT* *Subtotal*	*Total*
TOTAL PROJECT								
DIV. 21 FIRE SUPPRESSION		**$1,394,513**		**$180,925**				**$1,575,438**
210000 Fire Protection	$1,394,513		$180,925				$1,575,438	
DIV. 22 PLUMBING		**$3,989,376**		**$284,200**				**$4,273,576**
220000 Plumbing	$3,989,376		$284,200				$4,273,576	
DIV. 23 HVAC		**$13,605,351**		**$1,097,225**				**$14,702,576**
230000 HVAC	$13,605,351		$1,097,225				$14,702,576	
DIV. 26 ELECTRICAL		**$9,554,452**		**$628,500**		**$626,000**		**$10,808,952**
260000 Electrical	$9,554,452		$628,500		$626,000		$10,808,952	
DIV. 31 EARTHWORK		**$779,269**				**$3,661,795**		**$4,441,064**
311000 Site Preparation					$846,420		$846,420	
311100 Erosion Control					$127,000		$127,000	
312000 Earthwork	$779,269				$2,688,375		$3,467,644	
316600 Ground Improvement								
DIV. 32 EXTERIOR IMPROVEMENTS						**$2,813,056**		**$2,813,056**
320000 Paving					$920,522		$920,522	
323000 Site Improvements					$1,031,218		$1,031,218	
329200 Landscaping					$861,316		$861,316	
DIV. 33 UTILITIES						**$1,683,559**		**$1,683,559**
331000 Water Utilities					$406,000		$406,000	
333000 Sanitary Sewerage Utilities					$58,500		$58,500	
334000 Storm Drainage Utilities					$1,219,059		$1,219,059	
SUBTOTAL DIRECT (TRADE) COST		**$76,340,835**		**$3,977,765**		**$8,942,810**		**$89,261,410**

PM&C

Farmington High School
Farmington, CT

20-May-20

Schematic Design Estimate

GFA 239,250

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST

NEW SCHOOL

GROSS FLOOR AREA CALCULATION

First Floor	130,320
Second Floor	77,010
Third floor	31,920

TOTAL GROSS FLOOR AREA (GFA) **239,250** ***sf***

03 CONCRETE

033000 Cast-In-Place Concrete

Foundation concrete

Strip Footings	*286*	*CY*			
Foundation Walls	*327*	*CY*			
Retaining Walls	*43*	*CY*			
Spread Footings	*768*	*CY*			
Piers	*109*	*CY*			
Total Foundation Concrete	*1,533*	*CY*			
Strip footings; 3'-0" x 1'-0"					
Formwork	**4,200**	sf	12.00	50,400	
Re-bar	**21,000**	lbs	1.35	28,350	
Concrete material; 4,500 psi	**245**	cy	140.00	34,300	
Placing concrete	**245**	cy	120.00	29,400	
Foundation wall; 12" thick					
Formwork	**16,800**	sf	16.50	277,200	
Re-bar	**33,600**	lbs	1.35	45,360	
Concrete material; 4,500 psi	**327**	cy	140.00	45,780	
Placing concrete	**327**	cy	120.00	39,240	
Dampproofing foundation wall and footing	**12,600**	sf	1.85	23,310	
Insulation to foundation walls; 2" thick	**8,400**	sf	2.50	21,000	
Form shelf	**2,100**	lf	6.00	12,600	
Strip footings; 5ft x 2'-0" at retaining wall at auditorium					
Formwork	**420**	sf	14.00	5,880	
Re-bar	**4,920**	lbs	1.35	6,642	
Concrete material; 3,000 psi	**41**	cy	135.00	5,535	
Placing concrete	**41**	cy	120.00	4,920	
Retaining wall; 16" thick					
Formwork	**1,680**	sf	18.00	30,240	
Re-bar	**3,360**	lbs	1.35	4,536	
Concrete material; 3,000 psi	**43**	cy	135.00	5,805	
Placing concrete	**43**	cy	120.00	5,160	
Waterproofing foundation wall and footing	**840**	sf	9.00	7,560	
Insulation to foundation walls; 2" thick	**1,680**	sf	2.50	4,200	
Column footings - 8' x 8' x 2'-0" interior footing at two story spaces					
Formwork	**1,344**	sf	16.00	21,504	
Re-bar	**15,750**	lbs	1.35	21,263	
Concrete material; 3,000 psi	**105**	cy	140.00	14,700	
Placing concrete	**105**	cy	150.00	15,750	
Column footings - 7' x 7' x 2'-0" perimeter footing at two story spaces					
Formwork	**2,128**	sf	16.00	34,048	
Re-bar	**21,750**	lbs	1.35	29,363	
Concrete material; 3,000 psi	**145**	cy	140.00	20,300	
Placing concrete	**145**	cy	150.00	21,750	
Column footings - 9'-0" x 9'-0" x 2'-0" exterior footing Three Story Areas					
Formwork	**1,344**	sf	16.00	21,504	
Re-bar	**11,700**	lbs	1.35	15,795	
Concrete material; 3,000 psi	**78**	cy	140.00	10,920	
Placing concrete	**78**	cy	150.00	11,700	
Column footings - 10' x 10' x 2'-0" Interior footing at Three story spaces					
Formwork	**2,072**	sf	16.00	33,152	

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW SCHOOL							
	Re-bar	**21,150**	lbs	1.35	28,553		
	Concrete material; 3,000 psi	**141**	cy	140.00	19,740		
	Placing concrete	**141**	cy	150.00	21,150		
	Column footings - 8' x 8' x 2'-0"footing at Gym + Aud						
	Formwork	**3,840**	sf	16.00	61,440		
	Re-bar	**44,850**	lbs	1.35	60,548		
	Concrete material; 3,000 psi	**299**	cy	140.00	41,860		
	Placing concrete	**299**	cy	150.00	44,850		
	Miscellaneous						
	Piers/pilasters	**109**	cy	750.00	81,750		
	Set anchor bolts grout plates	**49**	ea	165.00	8,085		
	Miscellaneous						
	Loading dock	**1**	ls	25,000.00	25,000		
	Equipment pads	**1**	ls	15,000.00	15,000		
	New Slab on grade, 5" thick						
	Mesh Re-bar 15% lap	**149,868**	sf	1.15	172,348		
	Concrete -5" thick; 4,000 psi	**2,078**	cy	145.00	301,310		
	Moisture mitigation	**2,078**	cy	60.00	124,680		
	Place & finish including control joints	**130,320**	sf	2.50	325,800		
	Vapor barrier under slab on grade	**130,320**	sf	1.00	130,320		
	Rigid insulation beneath slab on grade; 2" thick	**130,320**	sf	2.50	325,800		
	Miscellaneous						
	Premium for sloped auditorium floor/ramps	**1**	ls	75,000.00	75,000		
	Equipment pads	**1**	ls	5,000.00	5,000		
	New elevator pit	**1**	loc	35,000.00	35,000		
	Upper floor construction						
	Concrete on Metal Deck	*108,930*	*sf*				
	WWF reinforcement	**125,270**	sf	1.15	144,061		
	Concrete Fill to metal deck; Light Weight, 5-1/4"	**1,864**	cy	175.00	326,200		
	Place and finish concrete	**108,930**	sf	2.75	299,558		
	Rebar to decks	**32,679**	lbs	1.20	39,215		
	Moisture mitigation	**1,864**	cy	60.00	111,840		
	Premium for steps to maker space wing second floor	**46**	lf	150.00	6,900		
	Roof construction						
	Concrete on Metal Deck	*15,000*	*sf*				
	WWF reinforcement	**17,250**	sf	1.15	19,838		
	Concrete Fill to metal deck; Light Weight, 5-1/4"	**316**	cy	175.00	55,300		
	Place and finish concrete	**15,000**	sf	2.75	41,250		
	Rebar to decks	**4,500**	lbs	1.20	5,400		
	Stair construction						
	Concrete to stairs	**10**	flt	1,500.00	15,000		
	Floor Finishes						
	Sealed concrete at mechanical, electrical, custodial and laundry, allow	**11,393**	sf	1.50	17,090		
	Sealed concrete below auditorium seats	**2,090**	sf	1.50	3,135		
	SUBTOTAL					3,947,188	
	TOTAL, DIVISION 3 - CONCRETE						**$3,947,188**
04	***MASONRY***						
042000	**Unit Masonry**						
	Exterior wall						
	Clay masonry veneer	**45,275**	sf	37.00	1,675,175		
	CMU backup, 8" at mechanical and custodial	**2,680**	sf	24.00	64,320		
	CMU backup, 8" GFCMU backup at stairs	**363**	sf	29.00	10,527		
	CMU backup, 12" @ gymnasium and auditorium pop up roof	**11,784**	sf	32.00	377,088		
	Cast stone accent band 8"	**2,350**	lf	45.00	105,750		
	Flashings at exterior masonry	**45,275**	sf	0.50	22,638		
	Install lintels above exterior glazing, supplied by others	**1,840**	lf	25.00	46,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW SCHOOL							
	Staging to exterior wall	**91,438**	sf	3.00	274,314		
	Interior partitions						
	6" CMU at mechanical, custodial and kitchen	**9,408**	sf	20.00	188,160		
	8" CMU at stairs, reinforced	**6,832**	sf	28.00	191,296		
	8" CMU at lockers and corridors	**76,175**	sf	26.00	1,980,550		
	Elevator CMU - 8" reinforced 2 hr. rated	**3,052**	sf	35.00	106,820		
	12" CMU at gym , stage and auditorium	**13,356**	sf	32.00	427,392		
	Premium for anti-graffiti clear sealer at lobbies and corridors	**45,780**	sf	6.00	274,680		
	Premium for GFCMU	**51,072**	sf	5.00	255,360		
	SUBTOTAL					6,000,070	
	TOTAL, DIVISION 4 - MASONRY						**$6,000,070**
05	***METALS***						
050001	**Miscellaneous Metals**						
	Exterior Wall						
	Miscellaneous metals to exterior masonry; lintels, angles etc.	**45,275**	sf	2.00	90,550		
	Exterior sign, allow	**1**	ls	10,000.00	10,000		
	Interior Partitions						
	Seismic clips	**1,871**	ea	140.00	261,940		
	Misc. metals to CMU	**108,823**	sf	1.00	108,823		
	Support at operable partitions	**213**	lf	150.00	31,950		
	Specialties						
	Guardrail at auditorium ramps	**100**	lf	250.00	25,000		
	Guardrail at second floor corridor ramp	**45**	lf	250.00	11,250		
	Guardrail at second floor corridor steps	**6**	lf	250.00	1,500		
	Guardrail at exterior roof patio		lf	350.00	NR		
	Handrail at second floor corridor ramp	**40**	lf	75.00	3,000		
	Handrail at second floor corridor steps	**5**	lf	75.00	375		
	Open to below - 42" ptd steel picket guardrails, AESS w/ hdwd top rail	**830**	lf	320.00	265,600		
	OT/PT swing	**1**	ea	3,000.00	3,000		
	Catwalk allowance	**1**	ls	125,000.00	125,000		
	Decorative metal column covers at interior, allow	**1**	ls	30,000.00	30,000		
	Aluminum column covers at exterior entrance overhang, allow	**1**	loc	3,640.00	3,640		
	Steel angle base at gym wood flooring	**520**	lf	15.00	7,800		
	Corner guards, allow	**1**	ls	10,000.00	10,000		
	Miscellaneous metals throughout building	**239,250**	gsf	1.00	239,250		
	Stairs						
	Open Feature stairs at main circulation spine, including railing (90 degree turns)	**6**	flt	45,000.00	270,000		
	Egress stairs - standard	**2**	flt	25,000.00	50,000		
	Egress stairs - straight run	**2**	flt	22,000.00	44,000		
	Spiral stairs at auditorium storage, assumed metal threads	**1**	flt	20,000.00	20,000		
	Elevator						
	Pit ladder and sump cover	**2**	ea	2,500.00	5,000		
	Sill angle	**24**	lf	25.00	600		
	SUBTOTAL					1,618,278	
051200	**Structural Metals**	*13.0*	*lbs/sf*				
	Floor construction;	*1,556*	*tns*				
	Floor Structure - Steel:						
	Structure at Typical floors; 13 PSF	**806**	tns	3,800.00	3,062,800		
	Premium for HSS steel	**202**	tns	400.00	Included		
	Shear studs	**15,491**	ea	6.00	92,946		
	Miscellaneous						
	Firestopping at floor penetrations	**123,930**	gsf	0.15	18,590		
	Spray-applied fireproofing to beams and columns only	**123,930**	sf	2.50	taken below		
	Relieving angles				incl above		
	Roof construction						
	Roof Structure - Steel:						

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW SCHOOL							
	Structure at typical roof; 13 PSF	**568**	tns	3,800.00	2,158,400		
	Structure at Gym + Aud roof (trusses); 13 PSF	**182**	tns	4,200.00	764,400		
	Premium for HSS steel	**142**	tns	400.00	Included		
	Spray-applied fireproofing to beams and deck	**87,320**	sf	3.00	taken below		
	Miscellaneous						
	Premium for seating area at auditorium	**4,600**	sf	30.00	138,000		
	Support framing to roof screen	**1**	ls	50,000.00	50,000		
	AESS Canopy frame, assume 13#/SF	**6**	tns	5,000.00	30,000		
	Premium for AESS steel, allow	**1**	ls	30,000.00	30,000		
	SUBTOTAL					6,345,136	
053100	**Steel Decking**						
	2" Metal galvanized floor deck; 18 Ga.	**123,930**	sf	3.00	371,790		
	Premium for acoustic deck at shops and gymnasium	**26,000**	sf	6.00	156,000		
	3" 20 Ga. galvanized Metal Roof Deck	**28,000**	sf	3.25	91,000		
	1-1/2" 20 Ga. galvanized Metal Roof Deck	**87,320**	sf	2.75	240,130		
	SUBTOTAL					858,920	
054000	**Light Gauge Framing**						
	4" CFMF at exterior soffit	**3,230**	sf	10.00	32,300		
	6" MS at exterior wall	**30,448**	sf	11.50	350,152		
	SUBTOTAL					382,452	
	TOTAL, DIVISION 5 - METALS						**$9,204,786**
06	***WOOD & PLASTICS***						
061000	**Rough Carpentry**						
	Floor construction						
	Amphitheater stepped seating framing	**490**	sf	35.00	17,150		
	Windows						
	Wood blocking at openings	**7,590**	lf	12.00	91,080		
	Exterior doors						
	Wood blocking at openings	**396**	lf	10.00	3,960		
	Roof						
	Wood blocking at roof edge	**10,335**	lf	16.00	165,360		
	Wood blocking at misc. penetrations	**1**	ls	10,000.00	10,000		
	Partitions						
	Wood blocking at interiors	**239,250**	gsf	0.75	179,438		
	Rough blocking at partitions	**14,680**	lf	3.00	44,040		
	Interior Doors						
	Wood blocking at openings	**5,016**	lf	4.00	20,064		
	Specialties						
	Backer panels in electrical closets	**1**	ls	10,000.00	10,000		
	SUBTOTAL					541,092	
062000	**Finish Carpentry**						
	Administration desk	**1**	ls	15,000.00	15,000		
	Media center desk	**1**	ls	30,000.00	30,000		
	Wall hung counter at second floor cafe	**25**	lf	250.00	6,250		
	Window sill; solid surface	**1,898**	lf	55.00	104,390		
	Millwork for serving counters, tray slides and stations at Kitchen/Servery	**1**	ls	60,000.00	w/ kitchen equipment		
	Millwork allowance for recycling and service stations	**42**	lf	500.00	21,000		
	Mailboxes	**1**	ls	8,000.00	8,000		
	Closet rods and shelves	**1**	ls	2,000.00	2,000		
	Bench at locker rooms allowance	**1**	ls	20,000.00	20,000		
	Vanities at locker room toilets	**12**	lf	500.00	6,000		
	Miscellaneous millwork, wood paneling etc.	**1**	ls	50,000.00	50,000		
	SUBTOTAL					262,640	
	TOTAL, DIVISION 6 - WOOD & PLASTICS						**$803,732**

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW SCHOOL						
	07 THERMAL & MOISTURE PROTECTION						
070001	**Waterproofing, Dampproofing and Caulking**						
	Foundations						
	Dampproofing foundation wall and footing				taken above		
	Waterproofing at foundation wall and footing				taken above		
	Slab on Grade						
	Waterproofing at lowest level	**130,320**	sf	6.00	NIC		
	Vapor barrier	**130,320**	sf	1.00	taken above		
	Elevator pit walls						
	Waterproofing walls and slab	**2**	loc	8,000.00	16,000		
	Exterior walls						
	Fluid applied moisture barrier	**60,283**	sf	7.00	421,981		
	Air barrier at soffits	**3,230**	sf	7.00	22,610		
	Air barrier/flashing at windows	**7,590**	lf	6.25	47,438		
	Miscellaneous sealants to closure	**60,283**	sf	1.00	60,283		
	Windows						
	Backer rod & double sealant	**7,590**	lf	10.00	75,900		
	Exterior Doors						
	Backer rod & double sealant	**396**	lf	10.00	3,960		
	Roof						
	AVB at roof perimeter	**3,445**	lf	8.00	27,560		
	Partitions						
	Miscellaneous sealants at partitions	**239,250**	gsf	0.30	71,775		
	Interior Doors						
	Backer rod & double sealant	**5,016**	lf	2.50	12,540		
	Specialties						
	Miscellaneous sealants throughout building	**239,250**	gsf	1.00	239,250		
	SUBTOTAL					999,297	
070002	**Roofing and Flashing**						
	EPDM roofing membrane .060" thick typically	**123,260**	sf	7.00	862,820		
	Protection board, 1/2" gypsum sheathing	**123,260**	sf	1.75	215,705		
	Insulation; including tapered at select areas	**123,260**	sf	5.00	616,300		
	Reinforced vapor barrier	**123,260**	sf	1.00	123,260		
	Substrate board, 5/8" gypsum sheathing	**123,260**	sf	1.25	154,075		
	Standing seam metal roofing at gable-roofed clerestory with rosin slip sheet, Tern-coated zinc. 5" roof insulation	**7,033**	sf	65.00	457,145		
	Green roof, allowance	**1**	ls		NR		
	Roof membrane system at backside of parapets, allowance	**2,723**	sf	12.00	32,676		
	Sidewalls at sloped skylight systems, roof membrane on metal stud framing	**1,313**	sf	25.00	32,825		
	Miscellaneous Roofing						
	Skylights - aluminum, thermally broken 1" insulated, low-E glazing with 50% white frit	**2,090**	sf	150.00	313,500		
	Roof edge	**1,255**	lf	30.00	37,650		
	Parapet cap	**2,190**	lf	80.00	175,200		
	Roof hatch & ladder	**3**	loc	4,000.00	12,000		
	Miscellaneous flashings	**123,260**	sf	0.75	92,445		
	Roof to wall flashing	**1,410**	lf	30.00	42,300		
	Walkway pads	**1**	ls	7,500.00	7,500		
	Elevator ventilation unit	**2**	ea	3,500.00	7,000		
	Internal downspouts at glazed entrance canopy	**30**	lf	35.00	1,050		
	Internal gutters at glazed entrance canopy	**80**	lf	35.00	2,800		
	SUBTOTAL					3,186,251	
072100	**Thermal Insulation**						
	Foundations						
	Insulation				taken above		
	Slab on grade						
	Rigid insulation				taken above		
	Exterior walls						

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW SCHOOL							
303		Polystyrene insulation at brick veneer and metal panel	**60,283**	sf	3.50	210,991		
304		Insulation at soffits	**3,230**	sf	3.50	11,305		
305		Rigid insulation at roof edges	**3,445**	sf	3.50	12,058		
306		SUBTOTAL					234,354	
307								
308	**074200**	**Metal Panel**						
309		Exterior Wall						
310		Standing seam wall panels rain screen system	**15,008**	sf	65.00	975,520		
311		Standing seam wall panels rain screen system at mechanical wells (backside of masonry veneer wall)	**1,036**	sf	65.00	67,340		
312		Metal panel exterior soffit, allow	**3,230**	sf	60.00	193,800		
313		Metal panel mock-up	**1**	ls	50,000.00	50,000		
314		SUBTOTAL					1,286,660	
315								
316	**077600**	**Roof Pavers**						
317		Roof pavers at green roof, allow	**1**	ls		NR		
318		SUBTOTAL						
319								
320	**078410**	**Fire stopping/Fire proofing**						
321		Spray-applied fireproofing to beams and columns only (floor construction)	**123,930**	sf	2.50	309,825		
322		Spray-applied fireproofing to beams and deck (roof construction)	**87,320**	sf	3.00	261,960		
323		Intumescent paint - allow	**1**	ls	50,000.00	50,000		
324		Fire stopping floors	**1**	ls	25,000.00	25,000		
325		SUBTOTAL					646,785	
326								
327	**079500**	**Expansion Joints**						
328		Roof expansion joint	**1**	ls	5,000.00	5,000		
329		Expansion joints	**1**	al	25,000.00	25,000		
330		SUBTOTAL					30,000	
331								
332		***TOTAL, DIVISION 7 - THERMAL AND MOISTURE PROTECTION***						**$6,383,347**
333								
334	***08***	***DOORS & WINDOWS***						
335								
336	**080001**	**METAL WINDOWS**						
337		Exterior glazing						
338		Exterior clerestory at gym	**1,640**	sf	85.00	139,400		
339		Sloped clerestory system glazing at roof monitors	**1,401**	sf	90.00	126,090		
340		Curtainwall - thermally broken 2" w. mullions, 1" insulated, low-E glazing with integral impact resistant film	**9,493**	sf	110.00	1,044,230		
341		Exterior Storefront - thermally broken 2" w. mullions, 1" insulated, low-E glazing with integral impact resistant film	**18,605**	sf	80.00	1,488,400		
342		Premium for spandrel glazing, allow	**1**	ls	30,000.00	30,000		
343		Punched windows	**16**	sf	80.00	1,280		
344		Horizontal aluminum sunshades with Kynar finish 20" deep	**2,815**	lf	150.00	422,250		
345		Horizontal aluminum sunshades with Kynar finish 36" deep at curtainwall	**260**	lf	250.00	65,000		
346		Vertical aluminum sunshades with Kynar finish - plate aluminum on welded aluminum C channel frame 20" deep from	**1,755**	lf	200.00	351,000		
347		Exterior Doors						
348		Exterior storefront doors w/ impact film including frames and hardware, single	**3**	ea	4,500.00	13,500		
349		Exterior storefront doors w/ impact film including frames and hardware, double	**8**	pr	9,000.00	72,000		
350		Interior storefront						
351		Interior storefront at entrance vestibules, classrooms adjacent to central spine, second floor overlooking café and teacher work rm	**6,471**	sf	60.00	388,260		
352		Interior storefront at third floor stairs, 1/4" laminated glazing in gasketed frames	**3,546**	sf	60.00	212,760		
353		Transaction window at admin	**25**	sf	150.00	3,750		
354		Control booth window	**1**	ls	2,000.00	2,000		
355		Interior Doors						
356		Interior storefront doors at entrance vestibules including frames and hardware, double	**7**	pr	8,000.00	56,000		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW SCHOOL							
357		Interior storefront doors at media including frames and hardware, double	**1**	pr	8,000.00	8,000		
358		Interior storefront doors at select classroom interior storefront, single	**9**	ea	4,000.00	36,000		
359		Interior fire rated storefront doors at third floor center stairs, double	**2**	pr	10,000.00	20,000		
360		SUBTOTAL					4,479,920	
361								
362	**080002**	**Glass and Glazing**						
362		Premium for impact resistant film to exterior glazing	**28,098**	sf	12.55	352,630		
363		Sidelight glazing (6' full height glazed sidelight at all classrooms)	**3,024**	sf	35.00	105,840		
364		Glazed entrance canopy - laminated glass panels 1-1/4" thick w/ integrated 75% frit	**995**	sf	200.00	199,000		
365		Wall mirror at fitness rooms; allowance	**1,000**	sf	25.00	25,000		
366		SUBTOTAL					682,470	
367								
368	**081110**	**HM Doors and Frames**						
369		Exterior Doors						
370		Flush HM door, frame & HW, single	**5**	ea	600.00	3,000		
371		Flush HM door and frame, double	**5**	pr	450.00	2,250		
372		Interior Doors						
373		Frames, single	**248**	ea	450.00	111,600		
374		Frames, double	**40**	ea	600.00	24,000		
375		Sidelight frames	**3,024**	sf	35.00	105,840		
376		SUBTOTAL					246,690	
377								
378	**081400**	**Wood Doors**						
379		Interior Doors						
380		Pocket doors at reading classroom including frame and hardware	**1**	ea	6,000.00	6,000		
381		Solid core maple veneer doors, single	**248**	ea	410.00	101,680		
382		Solid core maple veneer doors, double	**40**	ea	820.00	32,800		
383		Premium for doors with vision panels and glazed panels	**1**	ls	25,000.00	25,000		
384		Premium for fire rated doors at stairs, per leaf	**6**	ea	200.00	1,200		
385		Premium for sound gasketing & STC rated doors	**1**	ea	50,000.00	50,000		
386		SUBTOTAL					216,680	
387								
388	**083110**	**Access Doors and Frames**						
389		Access Doors	**1**	ls	20,000.00	20,000		
390		SUBTOTAL					20,000	
391								
392	**083300**	**Overheard doors**						
393		Coiling grill at cafeteria/servery, allow	**1**	ls	30,000.00	30,000		
394		Exterior OHD at loading, allow	**1**	ls	15,000.00	15,000		
395		SUBTOTAL					45,000	
396								
397	**087100**	**Door Hardware**						
398		Door Hardware at interior door leaf	**328**	ea	800.00	262,400		
399		Door Hardware at exterior door leaf	**15**	ea	1,400.00	21,000		
400		Auto openers - allow	**4**	ea	4,000.00	16,000		
401		SUBTOTAL					299,400	
402								
403	**089000**	**Louvers and Vents**						
404		Terne-coated zinc vertical louver at mech wells	**560**	sf	95.00	53,200		
405		SUBTOTAL					53,200	
406								
407		***TOTAL, DIVISION 8 - DOORS AND WINDOWS***						**$6,043,360**
408								
409	***09***	***FINISHES***						
410								
411	**090002**	**Tile**						
412		Wall finishes						
413		Porcelain tile at kitchen/servery full height	**3,630**	sf	19.00	68,970		
414		Tile to toilet and locker room walls full height	**10,920**	sf	19.00	207,480		
415		Floor finishes						
416		Cafeteria - Quarry tile	**12,640**	sf	24.00	303,360		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW SCHOOL							
	Kitchen/Servery - Quarry tile	**4,465**	sf	24.00	107,160		
	Lobbies & Corridors - Thin set porcelain tile	**33,915**	sf	21.00	712,215		
	Locker & Toilet rooms - Ceramic tile 6x6	**7,720**	sf	18.00	138,960		
	Marble thresholds at bathrooms, allow	**23**	ea	150.00	3,450		
	Quarry tile base	**1,315**	lf	12.00	15,780		
	Porcelain tile base	**6,985**	lf	12.00	83,820		
	Ceramic tile base	**1,885**	lf	12.00	22,620		
	SUBTOTAL					1,663,815	
090003	**ACT**						
	Typical ACT, 2x2	**155,139**	sf	7.00	1,085,973		
	Acoustical tile at lobbies and corridors (85% of area)	**10,826**	sf	9.00	97,434		
	Ceiling of circulation spine at third floor (40% of area)	**1,296**	sf	9.00	11,664		
	Food service grade ACT at kitchen/servery	**4,465**	sf	7.25	32,371		
	Suspended acoustical tile at auditorium	**5,674**	sf	10.00	56,740		
	Wood acoustical ceiling tile at main circulation spine at floor 1 & 2	**16,399**	sf	32.00	524,768		
	SUBTOTAL					1,808,950	
090005	**Resilient Floor Tile**						
	VCT 24x24, typical	**100,691**	sf	4.75	478,282		
	RAF at weight room, allow	**3,025**	sf	12.00	36,300		
	Rubber flooring at ramp	**175**	sf	16.00	2,800		
	Rubber flooring at amphitheater stepped seating	**490**	sf	16.00	7,840		
	Vinyl base	**39,019**	lf	2.50	97,548		
	Stairs						
	Rubber flooring at first floor stair landings	**677**	sf	18.00	12,186		
	Rubber tile at stairs -intermediate landings	**570**	sf	18.00	10,260		
	Rubber tile at stairs - treads & risers	**1,375**	lft	22.00	30,250		
	SUBTOTAL					675,466	
090007	**Painting and Coating**						
	Paint doors and frames	**343**	ea	200.00	68,600		
	Paint to staircases	**9**	flt	1,700.00	15,300		
	Paint exposed ceiling structure	**5,930**	sf	1.50	8,895		
	Paint exposed ceiling structure at gym and stage	**5,930**	sf	2.00	11,860		
	Paint to GWB walls and ceilings	**260,922**	sf	0.85	221,784		
	Paint to CMU walls	**132,206**	sf	1.00	132,206		
	Premium for epoxy paint at locker and toilet rooms	**20,220**	sf	0.75	15,165		
	Misc. wall coverings, allow	**1**	ls	50,000.00	50,000		
	Staging allowance	**1**	ls	50,000	50,000		
	SUBTOTAL					573,810	
092110	**GWB**						
	Exterior wall						
	Densglass sheathing at exterior wall backup	**45,456**	sf	2.75	125,004		
	5/8" Gypsum sheathing at soffit	**3,230**	sf	2.75	8,883		
	GWB lining to interior face of exterior wall	**45,456**	sf	3.10	140,914		
	Interior Partitions						
	Typical partition - 3-5/8" MS w/ 2 lyrs 5/8" GWB b/s w/ acoustic batt insulation	**102,900**	sf	15.00	1,543,500		
	Miscellaneous GWB assemblies	**239,250**	gsf	2.00	478,500		
	Ceilings						
	GWB ceilings at circulation spine, locker and toilet rooms	**9,666**	sf	14.00	135,324		
	Soffits throughout	**1**	ls	250,000.00	250,000		
	SUBTOTAL					2,682,125	
096000	**Carpet**						
	Carpet tile in offices, meeting spaces, library and conference 2x2	**10,259**	sf	6.22	63,811		
	Broadloom carpet in Auditorium	**3,785**	sf	4.22	15,973		
	SUBTOTAL					79,784	

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW SCHOOL							
096400	**Wood Athletic Floor**						
	Wood flooring at gyms	**15,575**	sf	18.00	280,350		
	Steel angle base at gym wood flooring	**520**	lf		taken above		
	Masonite wood flooring at stage	**3,195**	sf	15.00	47,925		
	SUBTOTAL					328,275	
096700	**Fluid Applied Flooring**						
	Epoxy flooring at auto, wood and robotics, allow	**5,230**	sf	15.00	78,450		
	SUBTOTAL					78,450	
098400	**Acoustic Room Components**						
	Suspended veneer plywood acoustic reflector ceiling panels at auditorium; 75% of area	**4,256**	sf	48.00	204,288		
	Acoustic wall panels at auditorium; 50% of area	**4,228**	sf	30.00	126,840		
	SUBTOTAL					331,128	
	TOTAL, DIVISION 9 - FINISHES						**$8,221,803**
10	***SPECIALTIES***						
101100	**Visual Display Surfaces**						
	Marker boards	**7,200**	sf	20.00	144,000		
	Tackboards	**4,320**	sf	18.00	77,760		
	SUBTOTAL					221,760	
101200	**Display cases**						
	Display cases in Student Dining	**100**	lf	480.00	48,000		
	Display cases outside of Tech/Art	**40**	lf	480.00	19,200		
	Display case outside of Administration	**30**	lf	480.00	14,400		
	Electronic display board in Main Lobby, Student Dining, and Auditorium Lobby	**1**	ls		F,F+E		
	SUBTOTAL					81,600	
101400	**Signage**						
	Room Signs	**328**	loc	110.00	36,080		
	Building directory	**1**	loc	3,000.00	3,000		
	Other signage/graphics	**1**	ls	50,000.00	50,000		
	SUBTOTAL					89,080	
102110	**Toilet Compartments**						
	ADA	**17**	ea	1,800.00	30,600		
	Standard	**68**	ea	1,600.00	108,800		
	Urinal screen	**17**	ea	650.00	11,050		
	Shower curtain and rod	**14**	ea	400.00	5,600		
	Shower seat	**2**	ea	350.00	700		
	Shower surround allowance	**14**	ea	1,300.00	18,200		
	Curtain and track at nurse, allow	**3**	ea	400.00	1,200		
	SUBTOTAL					176,150	
102200	**Operable Partitions**						
	Moveable partitions , fabric wrapped finish STC 55	**2,130**	sf	72.00	153,360		
	SUBTOTAL					153,360	
102800	**Toilet Accessories**						
	Gang bathroom	**17**	rms	2,950.00	50,150		
	Single bathroom	**6**	rms	500.00	3,000		
	Janitors Closet Accessories	**3**	rms	300.00	900		
	Janitors workroom accessories	**1**	rms	1,500.00	1,500		
	SUBTOTAL					55,550	
103000	**Lockers**						
	Welded steel lockers						
	Double tier corridor lockers 12" x 15" double tier	**1,400**	ope	260.00	364,000		
	Locker room lockers 12" wide, 3 tier 18" x 24"	**1,080**	ope	190.00	205,200		
	Kitchen and custodial lockers, allow	**6**	ea	300.00	1,800		
	SUBTOTAL					571,000	

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW SCHOOL							
104400	**Fire Protection Specialties**						
	Fire extinguisher cabinets	**80**	ea	350.00	28,000		
	AED cabinets	**3**	ea	350.00	1,050		
	SUBTOTAL					29,050	
TOTAL, DIVISION 10 - SPECIALTIES							**$1,377,550**
11	***EQUIPMENT***						
110620	**Theatrical Equipment**						
	Theatrical Lighting	**1**	ls	125,000.00	w/ Electrical		
	Theatrical Rigging and curtains	**1**	ls	500,000.00	500,000		
	Auditorium seating (650 seats)	**1**	ls	221,000.00	221,000		
	SUBTOTAL					721,000	
113100	**Appliances**						
	Appliances, allow	**1**	ls	75,000.00	75,000		
	SUBTOTAL					75,000	
114000	**Food Service Equipment**						
	Commercial food service equipment - Kitchen and Servery	**1**	ls	650,000.00	650,000		
	Commercial food service equipment - Culinary Arts	**1**	ls	225,000.00	225,000		
	SUBTOTAL					875,000	
115213	**Projection Screens**						
	Classrooms, Smartboards	**54**	ea		F,F+E		
	Media Center, allow	**1**	ea	8,000.00	8,000		
	Cafeteria, allow	**1**	ea	8,000.00	8,000		
	Auditorium projection screen	**1**	ea	8,000.00	8,000		
	SUBTOTAL					24,000	
115300	**Science Equipment**						
	Fume hood in science classrooms, single sided	**12**	ea	8,500.00	102,000		
	Kiln	**1**	ea	5,000.00	5,000		
	Peg board	**30**	ea	300.00	9,000		
	Goggle cabinet	**12**	ea	300.00	3,600		
	SUBTOTAL					119,600	
116600	**OTHER EQUIPMENT**						
	Basketball backstops; swing up; electric operated	**6**	ea	8,000.00	48,000		
	Gym wall pads (not behind bleachers)	**1,692**	sf	18.00	30,456		
	Weight room wall pads	**774**	sf	18.00	13,932		
	Gymnasium dividing net; electrically operated	**1**	loc	41,800.00	Alternate		
	Volley ball standard floor inserts	**2**	ea	500.00	1,000		
	Bleachers in main gym; 1,400 seat capacity	**1**	ls	189,000.00	189,000		
	Bleachers in aux gym; 200 seat capacity	**1**	ls	27,000.00	27,000		
	Wrestling mat overhead storage	**1**	loc	19,300.00	19,300		
	Batting cage including overhead storage	**1**	loc	10,000.00	10,000		
	Scoreboard	**3**	loc	15,000.00	w/ Electrical		
	Loading dock equipment	**1**	ls	15,000.00	15,000		
	SUBTOTAL					353,688	
TOTAL, DIVISION 11 - EQUIPMENT							**$2,168,288**
12	***FURNISHINGS***						
122400	**Window Shades**						
	Roller shades at exterior windows, with motorized where necessary	**1**	ls	325,000.00	325,000		
	SUBTOTAL					325,000	
123553	**Casework**						

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW SCHOOL							
	Instrument storage casework	**1**	ls	60,000.00	60,000		
	Classrooms including makerspace						
	Built-in, lockable, shelving along exterior wall below windows with solid surface top	**1,620**	lf	400.00	648,000		
	Upper cabinets, allow	**1,620**	lf	220.00	356,400		
	Science						
	Science student table (6 per room)	**72**	ea	3,000.00	216,000		
	Science base cabinet with epoxy resin countertop, allow 30' per room	**360**	lf	500.00	180,000		
	Upper cabinets, allow 30' per room	**360**	lf	300.00	108,000		
	PPE cabinets	**12**	ea	1,800.00	21,600		
	Prep room casework, allow	**6**	rms	15,000.00	90,000		
	Miscellaneous casework	**239,250**	gsf	2.00	478,500		
	SUBTOTAL					2,158,500	
124810	**Entrance Mats and Frames**						
	Recessed entry mats at vestibules	**850**	sf	55.00	46,750		
	Walk off mats, allow	**500**	sf	15.00	7,500		
	SUBTOTAL					54,250	
TOTAL, DIVISION 12							**2,537,750**
14	***CONVEYING SYSTEMS***						
142000	**ELEVATOR**						
	Electric traction elevator, 3 stop	**2**	ea	165,000.00	330,000		
	SUBTOTAL					330,000	
TOTAL, DIVISION 14							**$330,000**
21	***FIRE PROTECTION***						
210000	**FIRE PROTECTION, GENERALLY**						
	8" Double check valve assembly	**1**	ea	18,000.00	18,000		
	8" Main alarm check valve	**1**	ea	7,000.00	7,000		
	Storz fire department connection	**1**	ea	1,700.00	1,700		
	Riser check valve assembly	**2**	ea	3,750.00	7,500		
	Zone control valve station	**5**	ea	2,200.00	11,000		
	2-1/2" Fire department valve	**2**	ea	800.00	1,600		
	Dry pipe system incl compressor, switches, nitrogen system, etc.	**1**	ls	20,000.00	20,000		
	Sprinkler heads	**239,250**	sf	0.95	227,288		
	Distribution piping with fittings & hangers	**239,250**	sf	2.00	478,500		
	Main sprinkler piping with fittings & hangers	**239,250**	sf	2.00	478,500		
	Add for sprinklers above clouds	**239,250**	sf	0.10	23,925		
	Miscellaneous						
	Kitchen hood extinguishing system				by others		
	System testing and flushing	**1**	ls	10,000.00	10,000		
	Coring, sleeves & firestopping	**1**	ls	12,500.00	12,500		
	Seismic Restraints and Structural Steel Comp.	**1**	ls	15,000.00	15,000		
	Hydraulic lifts/rigging	**1**	ls	35,000.00	35,000		
	Shop drawings / BIM / ENG Support / As-Builts	**1**	ls	30,000.00	30,000		
	Commissioning Support	**1**	ls	3,000.00	3,000		
	Fees & permits	**1**	ls	14,000.00	14,000		
	SUBTOTAL					1,394,513	
TOTAL, DIVISION 21							**$1,394,513**
22	***PLUMBING***						
220000	**PLUMBING, GENERALLY**						
	Gas fired semi-inst HW heater with storage	**3**	ea	27,000.00	81,000		
	Plumbing equipment	**239,250**	sf	1.50	358,875		
	Plumbing Fixtures & Specialties						

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW SCHOOL							
	Plumbing fixtures	**239,250**	sf	2.50	598,125		
	Domestic Water Type L Copper Pipe						
	Domestic water pipe with fittings & hangers	**239,250**	sf	4.00	957,000		
	Domestic water pipe insulation	**239,250**	sf	1.00	239,250		
	Sanitary Waste And Vent Pipe w/ Hangers						
	Sanitary waste pipe with fittings & hangers	**239,250**	sf	2.00	478,500		
	Kitchen waste pipe with fittings & hangers	**239,250**	sf	0.30	71,775		
	Garage waste pipe with fittings & hangers	**239,250**	sf	0.10	23,925		
	Storm Drainage, Hubless Cast Iron Pipe						
	Storm water pipe with fittings & hangers	**239,250**	sf	1.50	358,875		
	Pipe insulation on horizontal runs	**239,250**	sf	0.25	59,813		
	Gas And Fuel Distribution Pipe						
	Gas pipe with fittings & hangers	**239,250**	sf	1.10	263,175		
	Acid Waste And Vent Pipe w/ Hangers						
	Acid waste polypropylene pipe	**239,250**	sf	1.25	299,063		
	Miscellaneous						
	Coordination & BIM	**1**	ls	100,000.00	100,000		
	Coring, sleeves & firestopping	**1**	ls	25,000.00	25,000		
	Commissioning support	**1**	ls	15,000.00	15,000		
	Testing and sterilization	**1**	ls	25,000.00	25,000		
	Fees & permits	**1**	ls	35,000.00	35,000		
	SUBTOTAL					3,989,376	
	TOTAL, DIVISION 22						**$3,989,376**
23	***HVAC***						
230000	**HVAC, GENERALLY**						
	Gas fired HW boiler 2500 MBH	**3**	ea	50,000.00	150,000		
	Air cooled chiller 265 ton with sound enclosure	**2**	ea	240,000.00	480,000		
	HVAC equipment	**239,250**	sf	1.50	358,875		
	Pumps						
	Pumps	**239,250**	sf	0.55	131,588		
	Air distribution						
	AHU's with CHW, HW & ERW	**229,500**	cfm	14.00	3,213,000		
	Air distribution equipment	**239,250**	sf	3.50	837,375		
	Exhaust fans	**239,250**	sf	0.50	119,625		
	Sheet metal & Accessories						
	Sheet metal	**229,500**	sf	15.25	3,499,875		
	Duct insulation	**239,250**	sf	2.00	478,500		
	Sheet metal accessories	**239,250**	sf	2.75	657,938		
	Piping						
	Hot Water Piping						
	Hot water piping with fittings & hangers	**239,250**	sf	2.60	622,050		
	Chilled Water Piping						
	Chilled water piping with fittings & hangers	**239,250**	sf	2.30	550,275		
	Refrigerant Piping						
	Refrigerant piping with fittings & hangers for miscellaneous ductless split systems for IT rooms	**239,250**	sf	0.10	23,925		
	Condensate Drain Piping						
	Condensate drain piping with fittings & hangers	**239,250**	sf	0.10	23,925		
	Piping Insulation						
	Piping insulation	**239,250**	sf	2.00	478,500		
	Automatic Temperature Controls						
	Automatic temperature controls DDC	**239,250**	sf	6.00	1,435,500		
	Balancing						
	System testing & balancing	**239,250**	sf	0.80	191,400		
	Miscellaneous						
	Coordination & BIM	**1**	ls	140,000.00	140,000		
	Commissioning support	**1**	ls	60,000.00	60,000		
	Coring, sleeves & fire stopping	**1**	ls	25,000.00	25,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW SCHOOL							
	Equipment start-up and inspection	**1**	ls	3,000.00	3,000		
	Rigging & equipment rental	**1**	ls	70,000.00	70,000		
	Vibration & seismic restraints	**1**	ls	55,000.00	55,000		
	SUBTOTAL					13,605,351	
	TOTAL, DIVISION 23						**$13,605,351**
	26 ELECTRICAL						
	Normal and Emergency Power						
	3000A main circuit breaker & CT cabinet	**1**	ea	30,000.00	30,000		
	1500kW diesel generator in WP sound attenuated enclosure	**1**	ea	525,000.00	525,000		
	3000A ATS	**1**	ea	50,000.00	50,000		
	150A ATS	**1**	ea	4,000.00	4,000		
	6000AF MDP (per riser)	**1**	ea	150,000.00	150,000		
	3000A generator distribution panelboard	**1**	ea	80,000.00	80,000		
	1600A distribution panelboard	**1**	ea	25,000.00	25,000		
	1200A distribution panelboard	**1**	ea	20,000.00	20,000		
	400A triple tub panelboard	**1**	ea	18,000.00	18,000		
	400A panelboard	**3**	ea	6,500.00	19,500		
	225A double tub panelboard	**9**	ea	5,000.00	45,000		
	225A panelboard	**2**	ea	2,500.00	5,000		
	200A panelboard	**1**	ea	2,200.00	2,200		
	150A panelboard	**1**	ea	1,800.00	1,800		
	100A panelboard	**19**	ea	1,400.00	26,600		
	500kVA dry-type transformer	**2**	ea	23,500.00	47,000		
	45KVA high harmonic dry type transformer	**1**	ea	10,000.00	10,000		
	45KVA dry type transformer	**2**	ea	4,000.00	8,000		
	15KVA dry type transformer	**1**	ea	3,275.00	3,275		
	Normal and emergency power gear and distribution not yet defined inc feeders	**239,250**	sf	3.50	837,375		
	Photovoltaic						
	1350kW PV system	**1,350,000**	w	2.80	By Others		
	Equipment Wiring						
	Fire pump feed and connection				Alternate		
	400A FP main circuit breaker and meter				Alternate		
	400A chiller feed and connection	**2**	ea	15,000.00	30,000		
	200A RTU feed and connection	**10**	ea	6,500.00	65,000		
	Equipment wiring not yet detailed	**239,250**	sf	2.00	478,500		
	LIGHTING & POWER						
	Lighting & Branch Power						
	Lighting	**239,250**	sf	6.00	1,435,500		
	Lighting control system						
	Lighting controls including daylight harvesting system, allow	**239,250**	sf	1.15	275,138		
	Branch devices						
	Branch devices	**239,250**	sf	0.50	119,625		
	Lighting and branch circuitry						
	Lighting & branch circuitry	**239,250**	sf	5.00	1,196,250		
	COMMUNICATION & SECURITY SYSTEMS						
	Fire Alarm						
	Fire alarm system (notifier)	**239,250**	sf	2.25	538,313		
		1	ls	5,000.00	5,000		
	Connect fire alarm system to campus loop, per narrative	**1**	ls	5,000.00	5,000		
	BDA system	**239,250**	sf	0.50	119,625		
	DAS system	**239,250**	sf	0.50	119,625		
	Security System						
	Security System	**239,250**	sf	2.00	478,500		
	Telephone/Data/CATV						

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW SCHOOL							
790		Network switches, servers etc. (By owner)				By Owner		
791		MDF fit out	**1**	ls	12,000.00	12,000		
792		IDF fit out	**12**	ea	5,500.00	66,000		
793		Telecommunications rough in	**239,250**	sf	0.50	119,625		
794		Telecommunications devices and cabling (WAP OFCI)	**239,250**	sf	2.00	478,500		
795		Digital Signage System						
796		Digital Signage System, allow per narrative	**239,250**	sf	0.50	119,625		
797		Call for Aid System						
798		Call for aid system at handicapped bathrooms, allow	**239,250**	sf	0.15	35,888		
799		Public Address/Clock System						
800		PA/Master Clock system	**239,250**	sf	0.85	203,363		
801		Audio Visual (rough-in and power only)						
802		AV equipment				By Owner		
803		Rough-In power, conduit and backboxes only	**239,250**	sf	0.30	71,775		
804		Speech reinforcement system at areas containing sound reinforcement (allowance includes Auditorium and Gymnasium per narrative only)	**2**	loc	5,000.00	10,000		
805		Auditorium						
806		Performance lighting and dimming system, allow	**1**	ls	650,000.00	650,000		
807		Theater AV system	**1**	ls	450,000.00	450,000		
808		Sound Systems, allow						
809		Theatre	**1**	ls	60,000.00	60,000		
810		Gymnasium	**1**	ls	30,000.00	30,000		
811		Cafeteria	**1**	ls	20,000.00	20,000		
812		Large music room	**1**	ls	7,500.00	7,500		
813		Small music room	**1**	ls	5,000.00	5,000		
814		Gymnasium						
815		Large gym equipment feeds and connections inc 2 scoreboards, allow	**1**	ls	20,000.00	20,000		
816		Small gym equipment feeds and connections inc 1 scoreboards, allow	**1**	ls	15,000.00	15,000		
817		Grounding Protection						
818		Grounding	**1**	ls	25,000.00	25,000		
819		Lightning protection	**1**	ls	100,000.00	100,000		
820								
821		OTHER ELECTRICAL SYSTEMS						
822		Miscellaneous						
823		Temp power and lights	**239,250**	sf	0.60	143,550		
824		Testing and studies	**1**	ls	20,000.00	20,000		
825		Seismic restraints	**1**	ls	7,800.00	7,800		
826		Fees & Permits	**1**	ls	110,000.00	110,000		
827		SUBTOTAL					9,554,452	
828								
829		***TOTAL, DIVISION 26***						**$9,554,452**
830								
831								
832	***31***	**EARTHWORK**						
833								
834	**312000**	**Earthwork**						
835		Foundations						
836		Strip footings; 3'-0" x 1'-0"						
837		Excavation	**2,722**	cy	12.00	32,664		
838		Store on site for reuse	**2,722**	cy	8.00	21,776		
839		Backfill with selected material	**2,477**	cy	9.00	22,293		
840		Strip footings; 5ft x 2'-0" at retaining wall at auditorium						
841		Excavation	**175**	cy	12.00	2,100		
842		Store on site for reuse	**175**	cy	8.00	1,400		
843		Backfill with selected material	**134**	cy	9.00	1,206		
844		Column footings - 8' x 8' x 2'-0" interior footing at two story spaces						
845		Excavation	**448**	cy	14.00	6,272		
846		Store on site for reuse	**448**	cy	8.00	3,584		
847		Backfill with selected material	**343**	cy	12.00	4,116		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW SCHOOL							
848		Column footings - 7' x 7' x 2'-0" perimeter footing at two story spaces						
849		Excavation	**681**	cy	14.00	9,534		
850		Store on site for reuse	**681**	cy	8.00	5,448		
851		Backfill with selected material	**536**	cy	12.00	6,432		
852		Column footings - 9'-0" x 9'-0" x 2'-0" exterior footing Three Story Areas						
853		Excavation	**207**	cy	14.00	2,898		
854		Store on site for reuse	**207**	cy	8.00	1,656		
855		Backfill with selected material	**129**	cy	12.00	1,548		
856		Column footings - 10' x 10' x 2'-0" Interior footing at Three story spaces						
857		Excavation	**663**	cy	14.00	9,282		
858		Store on site for reuse	**663**	cy	8.00	5,304		
859		Backfill with selected material	**522**	cy	12.00	6,264		
860		Column footings - 8' x 8' x 2'-0"footing at Gym + Aud						
861		Excavation	**1,280**	cy	14.00	17,920		
862		Store on site for reuse	**1,280**	cy	8.00	10,240		
863		Backfill with selected material	**981**	cy	12.00	11,772		
864		Miscellaneous						
865		Rock removal allowance				Excluded		
866		Foundation drain	**2,100**	lf	22.00	46,200		
867		Dewatering allowance	**1**	ls	30,000.00	30,000		
868		New Slab on grade, 5" thick						
869		Rough and fine grade	**130,320**	sf	0.50	65,160		
870		Base course; 8" thick; compacted	**3,234**	cy	40.00	129,360		
871		Add structure fill at unsuitable material; 8"	**3,234**	cy	40.00	129,360		
872		Miscellaneous						
873		Underslab drainage; assumed not required						
874		E+B for plumbing	**130,320**	sf	1.50	195,480		
875		SUBTOTAL					779,269	
876								
		TOTAL, DIVISION 31 - Earthwork						**$779,269**

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Farmington High School
Farmington, CT

20-May-20

Schematic Design Estimate

GFA 19,700

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
RENOVATED 900 WING							
	GROSS FLOOR AREA CALCULATION						
	First Floor			19,700			
	TOTAL GROSS FLOOR AREA (GFA)				**19,700** ***sf***		
2	***DEMOLITION***						
024000	**Demolition**						
	Demolish ceiling finishes	**17,730**	sf	1.00	17,730		
	Demolish floor finishes	**17,730**	sf	2.50	44,325		
	Demolish exterior storefront	**285**	sf	10.00	2,850		
	Demolish exterior doors, frames and hardware, single	**2**	ea	175.00	350		
	Demolish interior doors, frames and hardware, single	**18**	ea	150.00	2,700		
	Demolish interior partition	**7,504**	sf	4.00	30,016		
	Demolish lockers	**251**	ea	10.00	2,510		
	Demolish gang toilet accessories	**2**	ea	300.00	600		
	Demolish ADA toilet partition	**2**	ea	150.00	300		
	Demolish regular toilet partition	**7**	ea	40.00	280		
	Demolish urinal screen	**1**	ea	150.00	150		
	Miscellaneous demolition, allowance	**19,700**	gsf	2.00	39,400		
	Cleaning/dust control/temp protection of existing finishes etc. - allowance	**1**	ls	10,000.00	10,000		
	Remove cut & capped MEP equipment and fixtures	**19,700**	gsf	1.00	19,700		
	Sawcut/Remove/Excavate for underslab water service piping	**1**	ls	30,000.00	30,000		
	SUBTOTAL					200,911	
	TOTAL, DIVISION 2 - DEMOLITION						**$200,911**
03	***CONCRETE***						
033000	**Cast-In-Place Concrete**						
	Slab on grade						
	New concrete housekeeping pads at mechanical room	**1**	ls	2,000.00	2,000		
	Patch existing slab at mechanical room for new water services	**1**	ls	1,500.00	1,500		
	New loading bay, complete	**1**	ls	25,000.00	25,000		
	Floor Finishes						
	Sealed concrete at mechanical, electrical and laundry, allow	**3,785**	sf	1.50	5,678		
	SUBTOTAL					34,178	
	TOTAL, DIVISION 3 - CONCRETE						**$34,178**
04	***MASONRY***						
042000	**Unit Masonry**						
	Exterior wall						
	Clay masonry veneer	**1,390**	sf	40.00	55,600		
	Brace south wall elevation for sheer, per narrative	**105**	lf	250.00	26,250		
	Install lintels	**40**	lf	25.00	1,000		
	Flashings & sealants	**1,390**	sf	1.00	1,390		
	Staging to exterior wall	**1**	ls	15,000.00	15,000		
	Clean existing exterior masonry	**5,981**	sf	8.00	47,848		
	Interior partitions						
	Masonry door infill at previous single door	**1**	loc	3,150.00	3,150		
	SUBTOTAL					150,238	
	TOTAL, DIVISION 4 - MASONRY						**$150,238**
05	***METALS***						
050001	**Miscellaneous Metals**						
	Exterior Wall						

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
RENOVATED 900 WING							
	Miscellaneous metals to exterior masonry; lintels, angles etc.	**1,390**	sf	1.00	1,390		
	Specialties						
	Miscellaneous metals throughout building	**19,700**	sf	1.00	19,700		
	SUBTOTAL					21,090	
051200	**Structural Metals**						
	Furnish exterior lintels, install by masonry	**25**	lf	40.00	1,000		
	SUBTOTAL					1,000	
054000	**Light Gauge Framing**						
	6" CFMF stud backup at exterior wall	**1,390**	sf	11.50	15,985		
	SUBTOTAL					15,985	
TOTAL, DIVISION 5 - METALS							**$38,075**
06	***WOOD & PLASTICS***						
061000	**Rough Carpentry**						
	Exterior Glazing						
	Wood blocking at openings	**130**	lf	10.00	1,300		
	Exterior doors						
	Wood blocking at openings	**60**	lf	10.00	600		
	Roof						
	Wood blocking at roof edge	**810**	lf	20.00	16,200		
	Partitions						
	Wood blocking at interiors	**19,700**	gsf	0.50	9,850		
	Rough blocking at partitions	**1,628**	lf	3.00	4,884		
	Interior Doors						
	Wood blocking at openings	**340**	lf	4.00	1,360		
	SUBTOTAL					34,194	
062000	**Finish Carpentry**						
	Window sill; Solid surface	**5**	lf	48.00	240		
	SUBTOTAL					240	
TOTAL, DIVISION 6 - WOOD & PLASTICS							**$34,434**
07	***THERMAL & MOISTURE PROTECTION***						
070001	**Waterproofing, Dampproofing and Caulking**						
	Exterior walls						
	Fluid applied moisture barrier	**1,390**	sf	7.00	9,730		
	Air barrier/flashing at exterior glazing	**130**	lf	6.25	813		
	Miscellaneous sealants to closure	**1,390**	sf	1.00	1,390		
	Exterior storefront						
	Backer rod & double sealant	**130**	lf	7.00	910		
	Exterior Doors						
	Backer rod & double sealant	**60**	lf	8.00	480		
	Roof						
	AVB at roof perimeter	**810**	lf	8.00	6,480		
	Partitions						
	Miscellaneous sealants at partitions	**10,582**	sf	0.50	5,291		
	Interior Doors						
	Backer rod & double sealant	**340**	lf	2.50	850		
	Specialties						
	Miscellaneous sealants throughout building	**19,700**	sf	1.50	29,550		
	SUBTOTAL					55,494	
070002	**Roofing and Flashing**						
	Remove existing roofing down to deck including insulation, blocking and fascia	**19,700**	sf	3.00	59,100		
	EPDM roofing membrane .060" thick typically	**19,700**	sf	7.00	137,900		
	Protection board, 1/2" gypsum sheathing	**19,700**	sf	1.50	29,550		
	Insulation; including tapered at select areas	**19,700**	sf	4.75	93,575		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
RENOVATED 900 WING							
	Reinforced vapor barrier	**19,700**	sf	1.00	19,700		
	Substrate board, 5/8" gypsum sheathing	**19,700**	sf	1.25	24,625		
	Miscellaneous Roofing						
	Roof edge	**810**	lf	80.00	64,800		
	Roof hatch & ladder, allow	**1**	loc	4,000.00	4,000		
	Miscellaneous flashings	**19,700**	sf	0.75	14,775		
	Walkway pads	**1**	ls	2,000.00	2,000		
	Miscellaneous roof accessories, allow	**1**	ls	5,000.00	5,000		
	SUBTOTAL					455,025	
072100	**Thermal Insulation**						
	Exterior walls						
	Polystyrene insulation at exterior wall	**1,390**	sf	3.00	4,170		
	SUBTOTAL					4,170	
078410	**Fire stopping/Fire proofing**						
	Fire stopping at new partitions	**1**	ls	5,000	5,000		
	SUBTOTAL					5,000	
TOTAL, DIVISION 7 - THERMAL AND MOISTURE PROTECTION							**$519,689**
08	***DOORS & WINDOWS***						
080001	**METAL WINDOWS**						
	Exterior glazing						
	Exterior Storefront - thermally broken 2" w. mullions, 1" insulated, low-E glazing with integral impact resistant film	**218**	sf	80.00	17,440		
	Impact resistant film on existing windows; 3M ultra	**1,341**	sf	12.55	16,830		
	Exterior Doors						
	Glazed aluminum entrance door, frame and hardware; single	**2**	ea	4,000.00	8,000		
	Interior storefront						
	Interior storefront at BOE conference room	**207**	sf	90.00	18,630		
	Interior Doors						
	Interior storefront doors at BOE conference room interior storefront, single	**1**	ea	4,000.00	4,000		
	SUBTOTAL					64,900	
081110	**HM Doors and Frames**						
	Interior Doors						
	Frames, single	**20**	ea	450.00	9,000		
	SUBTOTAL					9,000	
081400	**Wood Doors**						
	Interior Doors						
	Solid core maple veneer doors, single	**20**	ea	410.00	8,200		
	Glazed vision panel at office doors, allowance	**16**	ea	100.00	1,600		
	SUBTOTAL					9,800	
083110	**Access Doors and Frames**						
	Access Doors	**1**	ls	500.00	500		
	SUBTOTAL					500	
083300	**Overheard doors**						
	New steel overhead coiling door at loading dock 10' x 8'	**1**	loc	6,400.00	6,400		
	SUBTOTAL					6,400	
087100	**Door Hardware**						
	Door Hardware at interior door leaf	**20**	ea	750.00	15,000		
	SUBTOTAL					15,000	
089000	**Louvers and Vents**						
	Aluminum louvers at mech room , allowance	**5**	sf	65.00	325		
	SUBTOTAL					325	
TOTAL, DIVISION 8 - DOORS AND WINDOWS							**$105,925**
09	***FINISHES***						

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
RENOVATED 900 WING							
090002	**Tile**						
	Wall finishes						
	Ceramic tile at shower room walls, full height	**1,480**	sf	19.00	28,120		
	Ceramic tile at toilet room walls, full height	**2,630**	sf	19.00	49,970		
	Floor finishes						
	Porcelain floor tile in toilet and shower rooms	**1,315**	sf	21.00	27,615		
	Porcelain floor tile in locker rooms	**1,590**	sf	21.00	33,390		
	Tile base	**785**	lf	12.00	9,420		
	SUBTOTAL					148,515	
090003	**ACT**						
	New ACT ceilings throughout	**17,730**	sf	7.00	124,110		
	SUBTOTAL					124,110	
090005	**Resilient Floor Tile**						
	LVT flooring in circulation spaces including prep	**3,310**	sf	7.50	24,825		
	Vinyl base	**3,503**	lf	2.50	8,758		
	SUBTOTAL					33,583	
090007	**Painting and Coating**						
	Paint new doors and frames	**20**	ea	200.00	4,000		
	Prep and paint existing doors and frames, allow	**17**	ea	250.00	4,250		
	Prep and paint existing walls, allow	**21,170**	sf	1.50	31,755		
	SUBTOTAL					40,005	
092110	**GWB**						
	5/8" Gypsum sheathing at exterior wall backup	**1,390**	sf	2.75	3,823		
	GWB lining to interior face of exterior wall	**1,390**	sf	3.10	4,309		
	Interior Partitions						
	Typical partition - 3-5/8" MS w/ 2 lyrs 5/8" GWB b/s w/ acoustic batt insulation	**10,582**	sf	14.00	148,148		
	Door infill at previous single door location	**1**	loc	441.00	441		
	Miscellaneous GWB assemblies	**10,582**	gsf	2.00	21,164		
	Ceilings						
	Soffits, allow	**1**	ls	5,000.00	5,000		
	SUBTOTAL					182,885	
096000	**Carpet**						
	Carpet tile in office, meeting spaces and library including prep	**7,260**	sf	7.22	52,417		
	SUBTOTAL					52,417	
TOTAL, DIVISION 9 - FINISHES							**$581,515**
10	***SPECIALTIES***						
101100	**Visual Display Surfaces**						
	Marker boards /Tackboards allowance	**1**	ls	5,000.00	5,000		
	SUBTOTAL					5,000	
101400	**Signage**						
	Room Signs	**20**	loc	110.00	2,200		
	SUBTOTAL					2,200	
102110	**Toilet Compartments**						
	ADA	**1**	ea	1,800.00	1,800		
	Standard	**3**	ea	1,600.00	4,800		
	Urinal screen	**1**	ea	600.00	600		
	Shower curtain and rod	**6**	ea	400.00	2,400		
	Shower seat	**1**	ea	350.00	350		
	Shower surround allowance	**6**	ea	1,300.00	7,800		
	SUBTOTAL					17,750	
102800	**Toilet Accessories**						
	Gang bathroom	**1**	rms	2,950.00	2,950		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
RENOVATED 900 WING							
	Single bathroom	**1**	rms	500.00	500		
	SUBTOTAL					3,450	
103000	**Lockers**						
	Locker room lockers 18" x 24", single tier	**200**	ope	300.00	60,000		
	SUBTOTAL					60,000	
104400	**Fire Protection Specialties**						
	Fire extinguisher cabinets	**7**	ea	350.00	2,450		
	AED cabinets	**1**	ea	350.00	350		
	SUBTOTAL					2,800	
TOTAL, DIVISION 10 - SPECIALTIES							**$91,200**
11	***EQUIPMENT***						
113100	**Appliances**						
	Appliances, allow	**1**	ls	5,000.00	5,000		
	SUBTOTAL					5,000	
116600	**OTHER EQUIPMENT**						
	Loading dock equipment	**1**	ls	1,000.00	1,000		
	SUBTOTAL					1,000	
TOTAL, DIVISION 11 - EQUIPMENT							**$6,000**
12	***FURNISHINGS***						
122400	**Window Shades**						
	Roller shades at exterior storefront, motorized	**218**	sf	18.00	not anticipated		
	SUBTOTAL					-	
123553	**Casework**						
	Casework allowance (none shown)	**1**	ls	15,000.00	15,000		
	SUBTOTAL					15,000	
124810	**Entrance Mats and Frames**						
	Recessed entry mats at vestibules, allow	**150**	sf	55.00	8,250		
	Walk off mats, allow	**100**	sf	15.00	1,500		
	SUBTOTAL					9,750	
TOTAL, DIVISION 12							**24,750**
21	***FIRE PROTECTION***						
210000	**FIRE PROTECTION, GENERALLY**						
	6" Double check valve assembly	**1**	ea	13,000.00	13,000		
	6" Main alarm check valve	**1**	ea	5,000.00	5,000		
	Storz fire department connection	**1**	ea	1,700.00	1,700		
	Zone control valve stations	**2**	ea	2,200.00	4,400		
	Riser check valve assembly	**1**	ea	2,500.00	2,500		
	Sprinkler heads	**19,700**	sf	1.00	19,700		
	Branch sprinkler piping w fittings & hangers	**19,700**	sf	2.00	39,400		
	Main sprinkler piping with fittings & hangers	**19,700**	sf	2.00	39,400		
	Add for sprinklers above clouds	**19,700**	sf	0.25	4,925		
	1928 Building						
	6" Double check valve assembly	**1**	ea	13,000.00	13,000		
	6" Main alarm check valve	**1**	ea	5,000.00	5,000		
	Storz FD connection & branch piping	**1**	ea	6,000.00	6,000		
	Cut & cap piping supplying other demo bldgs	**1**	ls	5,000.00	5,000		
	Existing sprinklers, piping, heads to remain				NR		
	Miscellaneous						
	Demolition	**19,700**	sf	0.50	9,850		
	System testing and flushing	**1**	ls	1,000.00	1,000		
	Coring, sleeves & firestopping	**1**	ls	1,250.00	1,250		
	Seismic Restraints and Structural Steel Comp.	**1**	ls	1,500.00	1,500		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
RENOVATED 900 WING							
	Hydraulic lifts/rigging	**1**	ls	3,500.00	3,500		
	Shop drawings / BIM / ENG Support / As-Builts	**1**	ls	3,000.00	3,000		
	Commissioning Support	**1**	ls	300.00	300		
	Fees & permits	**1**	ls	1,500.00	1,500		
	SUBTOTAL					180,925	
	TOTAL, DIVISION 21						**$180,925**
22	***PLUMBING***						
220000	**PLUMBING, GENERALLY**						
	Gas fired semi-inst HW heater with storage	**1**	ea	7,500.00	7,500		
	Plumbing equipment	**19,700**	sf	1.50	29,550		
	Plumbing Fixtures & Specialties						
	Plumbing fixtures	**19,700**	sf	2.50	49,250		
	Domestic Water Type L Copper Pipe						
	Domestic water pipe with fittings & hangers	**19,700**	sf	3.50	68,950		
	Domestic water pipe insulation	**19,700**	sf	1.25	24,625		
	Sanitary Waste And Vent Pipe w/ Hangers						
	Sanitary waste pipe with fittings & hangers	**19,700**	sf	2.00	39,400		
	Storm Drainage, Hubless Cast Iron Pipe						
	Storm water pipe with fittings & hangers	**19,700**	sf	1.50	29,550		
	Pipe insulation on horizontal runs	**19,700**	sf	0.25	4,925		
	Gas And Fuel Distribution Pipe						
	Gas pipe with fittings & hangers	**19,700**	sf	1.00	19,700		
	Miscellaneous						
	1928 Building: cap, cap, make safe	**1**	ls	2,500.00	2,500		
	Demolition	**19,700**	sf	1.00	19,700		
	Coordination & BIM	**1**	ls	4,000.00	4,000		
	Coring, sleeves & firestopping	**1**	ls	1,250.00	1,250		
	Commissioning support	**1**	ls	2,500.00	2,500		
	Testing and sterilization	**1**	ls	1,000.00	1,000		
	Fees & permits	**1**	ls	2,000.00	2,000		
	SUBTOTAL					306,400	
	TOTAL, DIVISION 22						**$306,400**
23	***HVAC***						
230000	**HVAC, GENERALLY**						
	Gas fired condensing HW boiler 720 MBH out	**2**	ea	19,500.00	39,000		
	HVAC equipment	**19,700**	sf	2.00	39,400		
	Pumps						
	Pumps	**19,700**	sf	0.50	9,850		
	Air distribution						
	RTU's DX, HW & ERW	**15,000**	cfm	15.00	225,000		
	Air distribution equipment	**19,700**	sf	3.50	68,950		
	Exhaust fans	**19,700**	sf	0.50	9,850		
	Sheet metal & Accessories						
	Sheet metal	**19,700**	sf	13.00	256,100		
	Duct insulation	**19,700**	sf	1.75	34,475		
	Sheet metal accessories	**19,700**	sf	2.75	54,175		
	Piping						
	Hot Water Piping						
	Hot water piping with fittings & hangers	**19,700**	sf	3.50	68,950		
	Refrigerant Piping						
	Refrigerant piping with fittings & hangers for miscellaneous ductless split systems for IT rooms	**19,700**	sf	0.15	2,955		
	Condensate Drain Piping						
	Condensate drain piping with fittings & hangers	**19,700**	sf	0.30	5,910		
	Piping Insulation						
	Piping insulation	**19,700**	sf	2.00	39,400		
	Automatic Temperature Controls						

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
RENOVATED 900 WING							
	Automatic temperature controls DDC	**19,700**	sf	6.00	118,200		
	Balancing						
	System testing & balancing	**19,700**	sf	0.80	15,760		
	Miscellaneous						
	1928 Boiler Plant: cap steam/hw piping	**1**	ls	15,000.00	15,000		
	Demolition	**19,700**	sf	1.50	29,550		
	Coordination & BIM	**1**	ls	12,500.00	12,500		
	Commissioning support	**1**	ls	6,000.00	6,000		
	Coring, sleeves & fire stopping	**1**	ls	2,500.00	2,500		
	Equipment start-up and inspection	**1**	ls	1,000.00	1,000		
	Rigging & equipment rental	**1**	ls	15,000.00	15,000		
	Vibration & seismic restraints	**1**	ls	5,500.00	5,500		
	SUBTOTAL					1,075,025	
	TOTAL, DIVISION 23						**$1,075,025**
26	***ELECTRICAL***						
	Normal and Emergency Power						
	Normal and emergency power gear and distribution not yet defined inc feeders	**19,700**	sf	5.00	98,500		
	Equipment Wiring						
	Equipment wiring not yet detailed	**19,700**	sf	2.00	39,400		
	LIGHTING & POWER						
	Lighting & Branch Power						
	Lighting	**19,700**	sf	6.00	118,200		
	Lighting control system						
	Lighting controls including daylight harvesting system, allow	**19,700**	sf	1.15	22,655		
	Branch devices						
	Branch devices	**19,700**	sf	0.50	9,850		
	Lighting and branch circuitry						
	Lighting & branch circuitry	**19,700**	sf	5.00	98,500		
	COMMUNICATION & SECURITY SYSTEMS						
	Fire Alarm						
	Fire alarm system	**19,700**	sf	2.00	39,400		
	BDA system	**19,700**	sf	0.50	9,850		
	DAS system	**19,700**	sf	0.50	9,850		
	Security System						
	Security System	**19,700**	sf	2.00	39,400		
	Telephone/Data/CATV						
	Network switches, servers etc. (By owner)				By Owner		
	MDF fit out	**1**	ls	12,000.00	12,000		
	IDF fit out	**1**	ea	5,500.00	5,500		
	Telecommunications rough in	**19,700**	sf	0.65	12,805		
	Telecommunications devices and cabling	**19,700**	sf	2.00	39,400		
	Public Address/Clock System						
	PA/Master Clock system	**19,700**	sf	0.85	16,745		
	Audio Visual (rough-in and power only)						
	AV equipment				By Owner		
	Rough-In power, conduit and backboxes only	**19,700**	sf	0.25	4,925		
	Speech reinforcement				Assumes NIC		
	Grounding Protection						
	Grounding	**1**	ls	2,000.00	2,000		
	Lightning protection	**1**	ls	10,000.00	10,000		

PM&C

Farmington High School
Farmington, CT

20-May-20

Schematic Design Estimate

GFA 19,700

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	RENOVATED 900 WING							
443		OTHER ELECTRICAL SYSTEMS						
444		Miscellaneous						
445		Temp power and lights	**19,700**	sf	0.60	11,820		
446		Demo and make safe	**19,700**	sf	1.00	19,700		
447		Fees & Permits	**1**	ls	8,000.00	8,000		
448		SUBTOTAL					628,500	
449								
450		***TOTAL, DIVISION 26***						**$628,500**

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
SITEWORK							
	Overall Site Area	*2,078,000*	*sf*				
G	***SITEWORK***						
G10	**SITE PREPARATION & DEMOLITION**						
311000	*SITE PREPARATION & DEMOLITION*						
	Site construction fence/barricades - 8' high CL fence with dust screen	**7,000**	lf	16.00	112,000		
	Construction gates	**2**	loc	3,000.00	6,000		
	Construction entrance	**5,000**	sf	5.00	25,000		
	Allowance to demolish existing paving; pulverize and reuse as base	**320,000**	sf	1.00	320,000		
	Phasing and logistics	**1**	ls	150,000.00	150,000		
	Hazardous Waste Remediation						
	Dispose/treat contaminated soils				Assumed not required		
	SITE CLEARING						
	Clear and grub existing site	**1,178,000**	sf	0.05	58,900		
	Strip topsoil, store onsite	**21,815**	cy	8.00	174,520		
311100	*EROSION AND EDIMENT CONTROL*						
	Silt fence	**7,000**	lf	11.00	77,000		
	Tree protection	**1**	ls	10,000.00	10,000		
	Silt fence maintenance and monitoring	**1**	ls	40,000.00	40,000		
312000	*EARTH MOVING*						
	Site Earthwork						
	Cut/Fill; assumed balanced; level site	**65,444**	cy	6.00	392,664		
	Landscaped berm; 6ft high	**12,258**	cy	20.00	245,160		
	Rock removal allowance				NIC		
	Fine grading	**130,889**	sy	1.25	163,611		
	Hazardous Waste Remediation						
	Dispose/treat contaminated soils/water				NIC		
	SUBTOTAL					1,774,855	
G20	**SITE IMPROVEMENTS**						
	BITUMINOUS PAVING						
	Bituminous Paving; parking lot and roadway	*317,704*	*sf*				
	gravel base; 12" thick; reuse existing asphalt	**11,767**	cy	40.00	470,680		
	asphalt; 3.5" thick	**35,300**	sy	26.00	917,800		
	Precast curbs	**14,380**	lf	25.00	359,500		
	Granite curbs at entrance drive	**2,020**	lf	42.00	84,840		
	Tennis Courts	*8*	*courts*				
	Bituminous concrete paving	*49,500*	*sf*				
	gravel base; 6" thick	**917**	cy	40.00	36,680		
	bituminous concrete; 3 1/2" thick	**5,500**	sy	40.00	220,000		
	Tennis court surfacing	**49,500**	sf	2.50	123,750		
	Tennis nets	**8**	set	1,200.00	9,600		
	Chain-link fence with wind break	**993**	lf	70.00	69,510		
	Allowance for tennis lighting	**1**	ls	140,000.00	140,000		
	PEDESTRIAN PAVING						
	Concrete Paving/Sidewalks	*17,849*	*sf*				
	gravel base; 8" thick	**443**	cy	40.00	17,720		
	concrete; 4" thick	**17,849**	sf	8.50	151,717		
	premium for integral curb	**1,800**	lf	6.50	11,700		
	Bituminous Paving/Sidewalks	*21,300*	*sf*				
	gravel base; 8" thick	**529**	cy	40.00	21,160		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	SITEWORK							
63		Bituminous concrete; 3" thick	**21,300**	sf	4.00	85,200		
64		Dumpster Pad Area						
65		gravel base; 8" thick	**74**	cy	40.00	2,960		
66		concrete; 8" thick	**3,000**	sf	12.00	36,000		
67								
68		*UNIT PAVERS*						
69		gravel base; 8" thick	**362**	cy	40.00	14,480		
70		concrete base; 4" thick	**14,600**	sf	4.00	58,400		
71		sand bedding; 1" thick	**40**	cy	40.00	1,600		
72		Precast pavers	**13,600**	sf	18.00	244,800		
73								
74		Raised crosswalk; allowance	**1,000**	sf	24.00	24,000		
75								
76		*PAVEMENT MARKINGS*						
77		Road markings; other	**1**	ls	25,000.00	25,000		
78		Single solid lines, 4" thick	**590**	space	25.00	14,750		
79		HC parking	**15**	space	125.00	1,875		
80								
81		*WAYFINDING SIGNS*						
82		Monumental signage (entrance), allow	**1**	ls	40,000.00	40,000		
83		Way finding signage	**1**	ls	25,000.00	25,000		
84								
85		*SITE WALLS*						
86		*Retaining wall at Field*						
87		Precast modular block wall; 10 ft high; includes E+B and geo-textile fabric	**2,000**	sf	50.00	100,000		
88								
89		*RAILINGS/FENCES*						
90		4' CL fence at retaining wall at field	**200**	lf	55.00	11,000		
91		Guardrail at entrance - steel backed timber	**1,100**	lf	45.00	49,500		
92								
93		*FLAGPOLES*						
94		Flagpole, allow	**1**	loc	10,000.00	10,000		
95								
96		*ATHLETIC FIELDS*						
97		*Main Field at Stadium*						
98		Synthetic turf; complete including gravel and drainage and shock pad	**100,000**	sf	12.00	ETR		
99		Perimeter drain	**1,300**	lf	120.00	ETR		
100		Football goals	**4**	ea	3,500.00	ETR		
101		Scoreboard	**1**	ls	50,000.00	ETR		
102		Line markings - allowance	**1**	ls	2,000.00	ETR		
103		Soccer goals (movable)	**2**	loc	10,000.00	ETR		
104		Bleachers, allow; includes pressbox	**1**	ls	700,000.00	ETR		
105		4' CL fence	**1,300**	lf	45.00	ETR		
106		CL fence gate - single	**2**	ea	1,200.00	ETR		
107		CL fence gate - double	**1**	ea	2,400.00	ETR		
108								
109		Allowance for field AV system	**1**	ls	50,000.00	ETR		
110		Allowance for sports lighting	**1**	ls	800,000.00	ETR		
111								
112		Allowance for running track	**1**	ls	450,000.00	ETR		
113								
114		*Soccer Fields; three fields*						
115		Gravel base - assumed 8" thick	**5,075**	cy	40.00	ETR		
116		Soil mix; reuse amended soil from on-site spoils	**7,574**	cy	12.00	ETR		
117		Sports turf mix	**204,500**	sf	0.50	ETR		
118		Line markings - Allowance	**1**	ls	6,000.00	ETR		
119		4' CL fence	**3,291**	lf	38.00	ETR		
120		Allowance for sports lighting				Assumed Not Required		
121								
122		*Baseball Field*	**95,000**	sf		-		
123		Gravel base - assumed 8" thick	**2,357**	cy	40.00	94,280		

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SITEWORK							
	Soil mix; reuse amended soil from on-site spoils	**3,519**	cy	12.00	42,228		
	Sports turf mix	**95,000**	sf	0.50	47,500		
	Infield mix	**1**	ls	60,000.00	60,000		
	Pitching mound; home plate	**1**	loc	2,750.00	2,750		
	3 bases	**1**	loc	700.00	700		
	Line markings w/ marking pins below grade	**1**	ls	3,000.00	3,000		
	Foul poles	**2**	ea	1,500.00	3,000		
	Backstops	**1**	ea	45,000.00	45,000		
	Dugouts	**2**	ea	10,000.00	20,000		
	4' CL fence	**1,300**	lf	38.00	49,400		
	Softball Field - ALTERNATE	**56,000**	sf				
	Gravel base - assumed 8" thick	**1,390**	cy	40.00	**Alternate 2**		
	Soil mix; reuse amended soil from on-site spoils	**2,074**	cy	12.00	**Alternate 2**		
	Sports turf mix	**56,000**	sf	0.50	**Alternate 2**		
	Infield mix	**1**	ls	40,000.00	**Alternate 2**		
	Pitching mound; home plate	**1**	loc	2,750.00	**Alternate 2**		
	3 bases	**1**	loc	700.00	**Alternate 2**		
	Line markings w/ marking pins below grade	**1**	ls	3,000.00	**Alternate 2**		
	Foul poles	**2**	ea	1,500.00	**Alternate 2**		
	Backstops	**1**	ea	30,000.00	**Alternate 2**		
	4' CL fence	**995**	lf	38.00	**Alternate 2**		
	SITE IMPROVEMENTS						
	Miscellaneous site improvements; benches, bike racks, seat walls, trash receptacles etc.	**1**	ls	250,000.00	250,000		
	Allowance to upgrade signal and intersection at Route 4	**1**	ls	500,000.00	Alternate 12		
328400	*PLANTING IRRIGATION*						
	Irrigation at natural turf fields	**299,500**	sf	1.00	299,500		
329200	*TURF AND GRASSES*						
	Lawn						
	Topsoil - reuse existing topsoil	**10,722**	cy	18.00	192,996		
	Loam and seed	**300,000**	sf	0.25	75,000		
329300	*PLANTS*						
	Evergreen tree	**170**	ea	700.00	119,000		
	Ornamental tree	**56**	ea	900.00	50,400		
	Planting at landscape berm; ground cover	**54,800**	sf	2.00	109,600		
	Shrubs	**247**	ea	60.00	14,820		
	SUBTOTAL					4,858,396	
G30	**CIVIL MECHANICAL UTILITIES**						
	All unit pricing below includes E+B, pipe bedding and piping						
	WATER UTILITIES						
	Water supply; Pricing includes E&B and bedding						
	Domestic	**900**	lf	90.00	81,000		
	Fire line	**900**	lf	90.00	81,000		
	Fire loop	**2,000**	lf	90.00	180,000		
	Connect to existing	**2**	loc	6,000.00	12,000		
	FD connection	**1**	ea	2,000.00	2,000		
	Fire hydrant, allow	**4**	ea	5,000.00	20,000		
	SANITARY SEWERAGE UTILITIES						
	Sanitary sewer						
	Gravity sewer	**900**	lf	45.00	40,500		
	Connect to existing sewer	**1**	ea	3,000.00	3,000		
	Grease trap, 5,000 gal	**1**	ls	15,000.00	15,000		
	STORM DRAINAGE UTILITIES						

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SITEWORK							
	Storm water						
	Allowance for complete system; Piping, Manholes, catch basins, WQS, Infiltration, detention and rain gardens	**406,353**	sf	3.00	1,219,059		
	GAS UTILITIES						
	Excavate and backfill for gas service, piping by utility service	**1**	ls	30,000.00	30,000		
	SUBTOTAL					1,683,559	
G40	**ELECTRICAL UTILITIES**						
	Power						
	Utility co. back charges, allow	**1**	ls	20,000.00	Assumes by owner		
	Connections at existing manhole				Utility co.		
	Tap existing electrical manhole	**1**	ls	2,500.00	2,500		
	Primary ductbank 2-5" ductbank, empty, allow	**900**	lf	120.00	108,000		
	Transformer by utility company				By Utility Co.		
	Transformer pad	**1**	ea	2,500.00	2,500		
	Secondary service 2500A feed	**200**	lf	350.00	70,000		
	Communications						
	Tap existing communications manhole	**1**	ls	2,000.00	2,000		
	Telecom ductbank 4-4", allow	**900**	lf	90.00	81,000		
	Telecom duct bank - concrete encased- 2-4" to the Town Hall Building, allow per narrative	**1500**	lf	90.00	135,000		
	Site Lighting						
	Site lighting fixture; LED includes pedestrian lighting	**1**	ls	225,000.00	225,000		
	SUBTOTAL					626,000	
	TOTAL - SITE DEVELOPMENT						***$8,942,810***