Weston & Sampson

westonandsampson.com

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Foxborough, MA 02035
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Schematic Design

DRAFT

November 2024

New Public Works Facility

14 Forest Road
Acton, Massachusetts 01720

TOWN OF
Acton
MASSACHUSETTS



Town of Acton
New Public Works Facility
Schematic Design Package

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Town of Acton
New Public Works Facility
Schematic Design Package

1. Review & Confirmation

November 2024

Town of Acton
New Public Works Facility
Schematic Design Package

Review & Confirmation

Space Needs Summary

November 2024

Town of Acton, MA
Department of Public Works & Transfer Station
Space Needs Summary
07/23/2024

Area	Description	Original Size (SF)	2/18/2021 Revision	7/16/2024 Size (SF)	Ref #	Room / Area Dimensions length	width	size
Office & Office Support Areas	Vestibule/Public Lobby	224	195	195	A1	13	15	195
	Admin Open Office (5 Workstations)	100	624	624	A2	24	26	624
	DPW Director Office	192	192	192	A3	12	16	192
	DPW Operations Superintendent	144	144	144	A4	12	12	144
	Assistant DPW Superintendent	144	144	144	A4	12	12	144
	Tree Warden Office	144	144	144	A4	12	12	144
	~~**Municipal Facilities Superintendent Office**~~	-	144	-	~~A4~~	12	12	144
	Town Engineer Office	144	144	144	A4	12	12	144
	~~Assistant Town Engineer Office~~	144	-	-	~~A4~~	~~12~~	~~12~~	~~144~~
	Highway Crew Leader Alcove (in Shop)	168	60	60	~~A5~~	6	10	60
	~~Engineer Workstation~~	64	-	-	~~A6~~	~~8~~	~~8~~	~~64~~
	~~Auxiliary / Swing Space~~	120	-	-	~~A7~~	~~10~~	~~12~~	~~120~~
	Copy/Mail Area	80	80	80	A8	8	10	80
	Layout Area	216	216	216	A9	12	18	216
	DPW Archive File Storage	**225**	**225**	**180**	**A10**	**12**	**15**	**180**
	Engineer File Storage	225	225	**180**	A10	**12**	**15**	**180**
	Large Conference Room	320	320	320	A11	20	16	320
	Small Conference Room	192	192	192	A12	12	16	192
	Office Supply Closet	24	24	24	A13	4	6	24
	Engineer Equip. Closet	24	24	24	A13	4	6	24
	Large Supply Closet	168	168	168	A14	12	14	168
	Kitchenette	50	50	50	A15	5	10	50
	Toilet Facility	**152**	**152**	**120**	**A16**	**8**	**15**	**120**
	Subtotal:	3,264	3,467	3,201				
	Area Grossing Factor (10%):	326	347	320				
	Circulation (30%):	1,077	1,144	1,056				
	TOTAL:	**4,668**	**4,958**	**4,577**				
Employee Facilities	Staff Entrance & Kiosk	56	56	56	B1	8	7	56
	Muster / Multipurpose Room	840	676	676	B2	26	26	676
	Men's Locker Room	780	780	**644**	B3	**23**	**28**	**644**
	Women's Locker Room	306	266	266	B4	14	19	266
	~~**Wet Gear Area**~~	72	72	-	~~B5~~	~~6~~	~~12~~	~~72~~
	Uniform Area	120	96	96	B6	6	16	96
	Secure Inventory Closet	48	48	48	B7	6	8	48
	Crew Supply Storage	20	20	20	B8	4	5	20
	Janitor Closet	36	36	36	B9	6	6	36
	Electric Room	168	168	168	B10	12	14	168
	Tel / Data Room	120	120	120	B11	10	12	120
	Mechanical Room	192	192	**256**	B12	**16**	**16**	**256**
	Plumbing/Fire Protection Room	168	168	168	B10	12	14	168
	Subtotal:	2,926	2,698	2,554				
	Area Grossing Factor (10%):	293	270	255				
	Circulation (30%):	966	890	843				
	TOTAL:	**4,184**	**3,858**	**3,652**				

Town of Acton, MA
Department of Public Works & Transfer Station
Space Needs Summary
07/23/2024

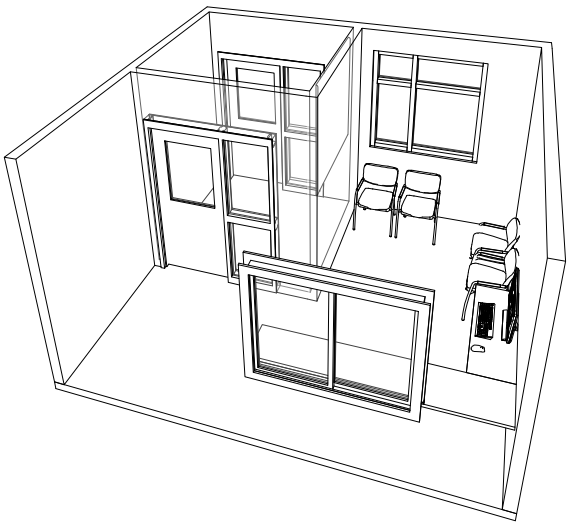
Area	Description	Original Size (SF)	2/18/2021 Revision	7/16/2024 Size (SF)	Ref #	Room / Area Dimensions length	width	size
Work Shops & Material Storage	~~Sign Shop (Inventory Storage)~~	500	-	-	~~C1~~	~~20~~	~~25~~	~~500~~
	Carpentry Shop	1,386	1,386	1,386	C2	33	42	1,386
	Trees & Grounds Workshop / Small Engine Repair	1,386	840	840	C4	28	30	840
	Trees & Grounds Storage	168	(on Mezz)	(on Mezz)	C3	12	14	168
	Highway Workshop	840	840	840	C4	28	30	840
	Highway Storage	168	(on Mezz)	(on Mezz)	C3	12	14	168
	Subtotal:	4,448	3,066	3,066				
	Area Grossing Factor (5%):	222	153	153				
	Circulation (10%):	467	322	322				
	TOTAL:	5,137	3,541	3,541				
Vehicle Maintenance	Welding Bay	750	720	720	D1	24	30	720
	Large Maintenance Bay	1,200	1,440	1,440	D1	24	60	1,440
	Maintenance Bay	600	720	720	D1	24	30	720
	Maintenance Bay	600	720	720	D1	24	30	720
	Maintenance Bay	600	720	720	D1	24	30	720
	Maintenance Bay	600	720	720	D1	24	30	720
	Fluid Storage Room	224	224	224	D2	14	16	224
	Maintenance Workshop	180	180	180	D3	10	18	180
	Maintenance Office	192	192	192	D4	12	16	192
	Parts & Materials Storage	432	432	432	D5	18	24	432
	Tire Storage Area	240	224	224	D6	8	28	224
	Hydraulic Hose Area	100	100	100	D7	10	10	100
	Compressor Room	120	(on Mezz)	(on Mezz)	D8	10	12	120
	Subtotal:	5,838	6,392	6,392				
	Area Grossing Factor (5%):	292	320	320				
	Circulation (10%):	613	671	671				
	TOTAL:	**6,743**	**7,383**	**7,383**				
Wash Area	Wash Bay	1,650	1,650	1,680	E1	28	60	1,680
	Wash Equipment Room	100	100	100	E1	10	10	100
	Subtotal:	1,750	1,750	1,780				
	Circulation:	n/a	n/a	n/a				
	TOTAL:	**1,750**	**1,750**	**1,780**				
Vehicle & Equipment Storage	**Vehicle / Equipment Storage**	28,800	25,000	**25,000**	F1	**100**	**250**	**25,000**
	Subtotal:	28,800	25,000	25,000				
	Area Grossing Factor (5%):	1,440	1,250	1,250				
	Circulation:	n/a	n/a	n/a				
	TOTAL:	**30,240**	**26,250**	**26,250**				
	DPW BUILDING TOTAL:	**52,723**	**47,741**	**47,185**				

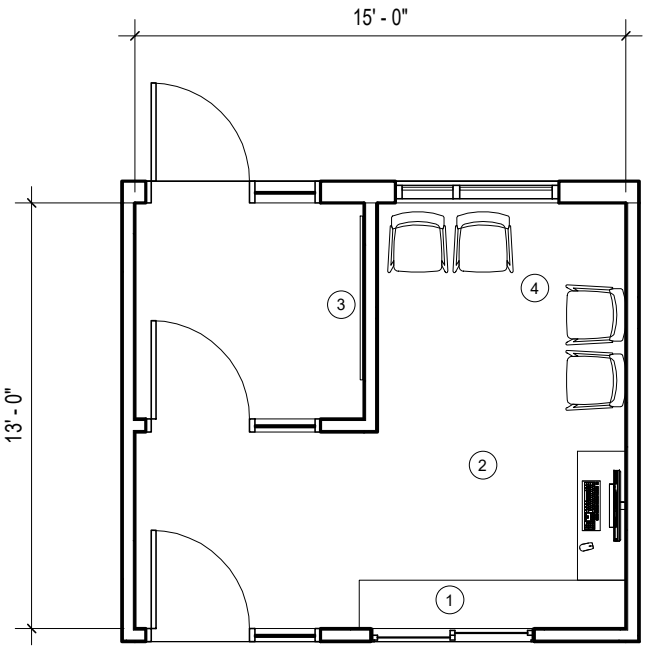
Town of Acton
New Public Works Facility
Schematic Design Package

Review & Confirmation

Room Data Sheets

November 2024





1 VESTIBULE/PUBLIC LOBBY -195 SF
3/16" = 1'-0"

ROOM FINISHES:

FLOORS: CERAMIC TILE

WALLS: GWB, PAINTED

CEILING: ACT

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

HEATING / COOLING

OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

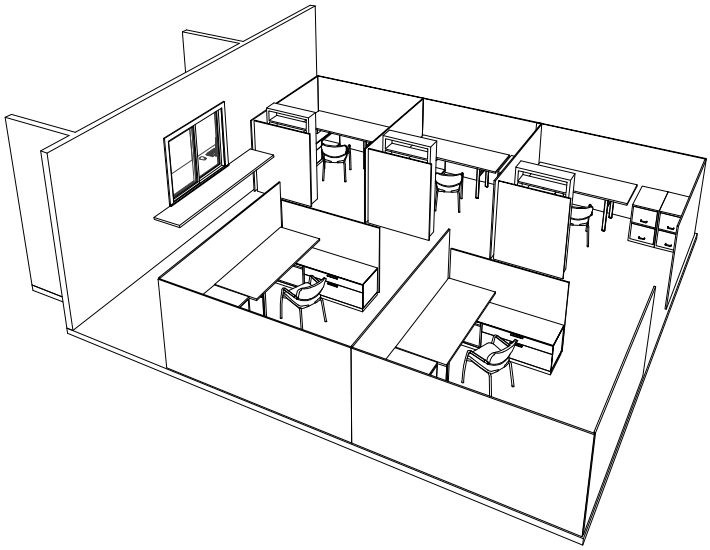
NATURAL LIGHTING

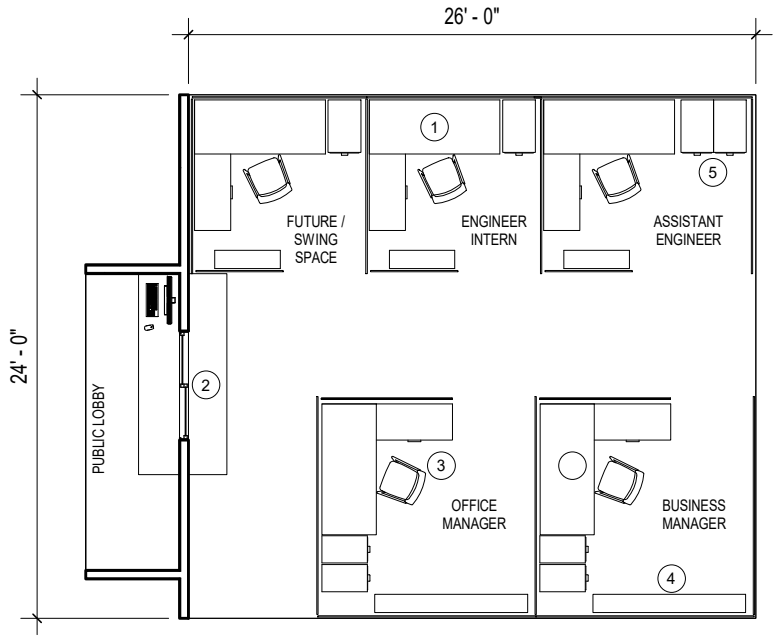
COMPONENTS:

1. COUNTER & RECEPTION WINDOW
2. PUBLIC KIOSK - ADA COMPLIANT
3. BULLETIN BOARD
4. WAITING CHAIRS
5. WALK-OFF MAT

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**VESTIBULE/PUBLIC LOBBY - 195 SF**	A1





1 ADMIN OPEN OFFICES - 624 SF
1/8" = 1'-0"

ROOM FINISHES:

FLOORS: CARPET

WALLS: GWB PAINTED

CEILING: ACT TILE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL/DATA OUTLET JACKS

NATURAL LIGHTING W/ WINDOWS

OCCUPANCY SENSORS FOR LIGHTING CONTROLS

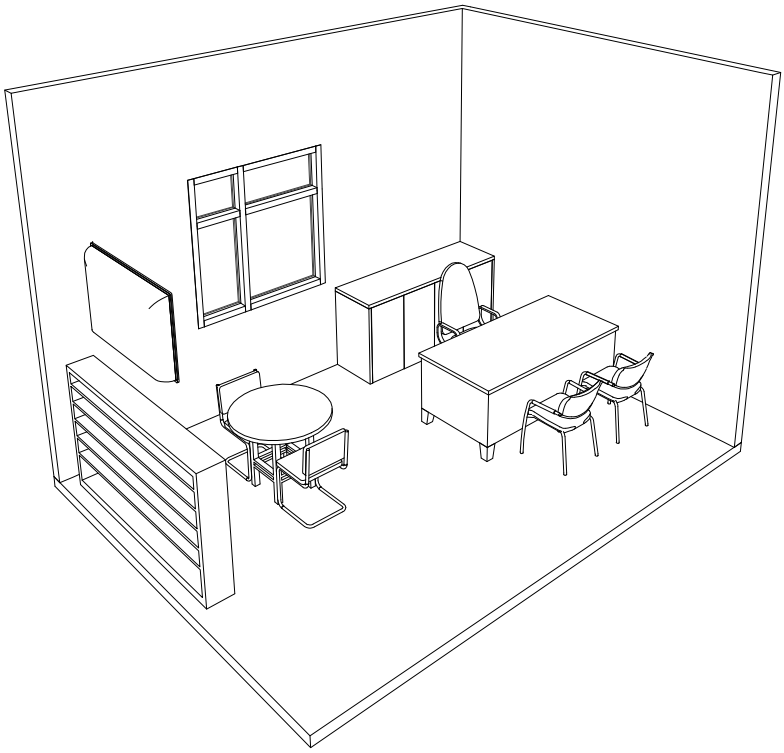
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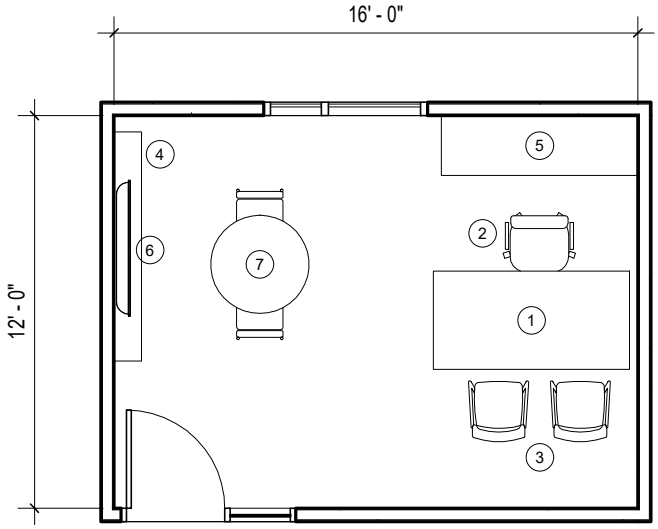
COMPONENTS:

1. (5) WORK STATIONS
   - BUSINESS MANAGER (10' X 10')
   - OFFICE MANAGER (10' x 10')
   - ASSISTANT ENGINEER (8' x 10')
   - ENGINEER INTERN (8' x 8')
   - FUTRE/SWING SPACE (8' X 8')
2. RECEPTION COUNTER
3. (5) EXECUTIVE CHAIRS
4. BOOKCASE
5. FILE CABINET

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**ADMIN OPEN OFFICES - 624 SF**	A2





1 DPW DIRECTOR OFFICE - 192 SF
3/16" = 1'-0"

ROOM FINISHES:

FLOORS: CARPET

WALLS: GWB, PAINTED

CEILING: ACT TILE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

HEATING / COOLING

OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

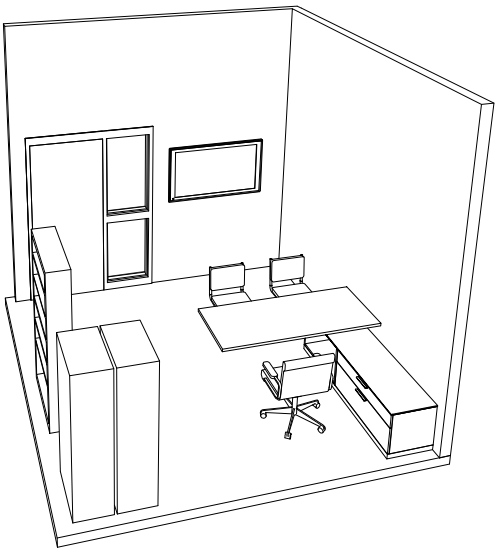
NATURAL LIGHTING

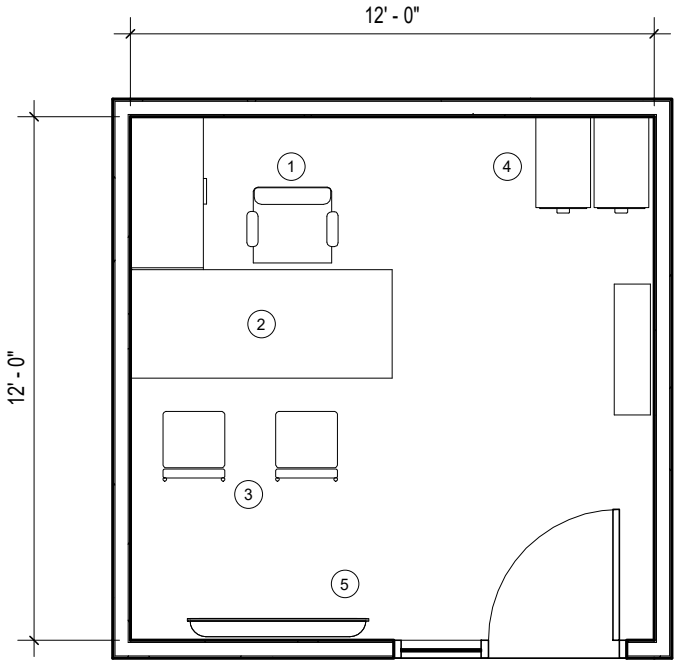
COMPONENTS:

1. DESK
2. EXECUTIVE CHAIR
3. (4) CHAIRS
4. BOOKCASE
5. CRADENZA
6. TV MONITOR
7. SMALL TABLE

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**DPW DIRECTOR OFFICE - 192 SF**	A3





1 OFFICE - 144 SF
1/4" = 1'-0"

ROOM FINISHES:

FLOORS: CARPET

WALLS: GWB, PAINTED

CEILING: ACT TILE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

HEATING / COOLING

OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

NATURAL LIGHTING

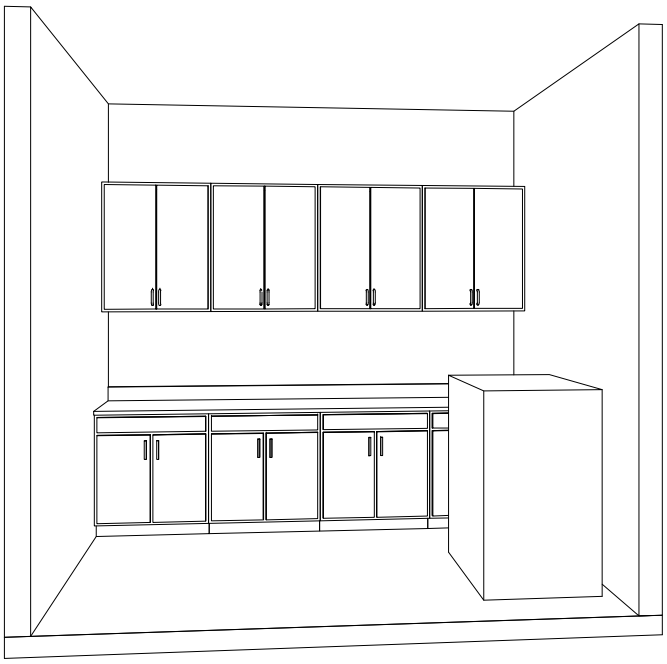
COMPONENTS:

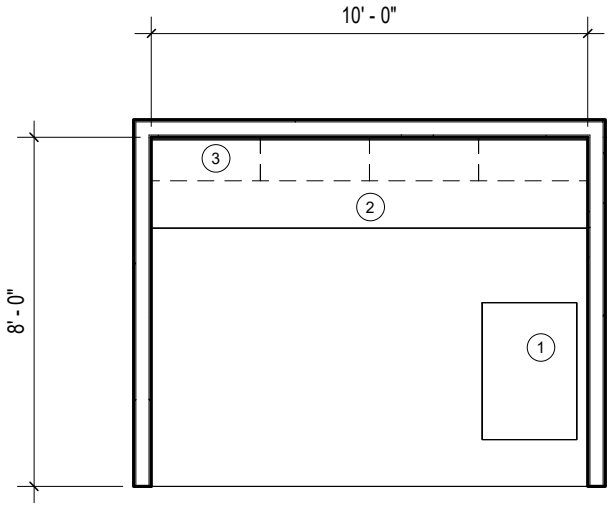
1. EXCETUTIVE CHAIR
2. DESK WITH SIDE RETURN
3. GUEST CHAIRS
4. BOOKCASE /
   FILE CABINETS
5. BOOKCASE
6. TV MONITOR

APPLIES TO (4) STAFF MEMBERS:
- DPW OPERATIONS SUPERINTENDENT
- ASSISTANT DPW SUPERINTENDENT
- TREE WARDEN OFFICE
- TOWN ENGINEER OFFICE

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**OFFICE - 144 SF**	A4





1 COPY/MAIL AREA - 80 SF
1/4" = 1'-0"

ROOM FINISHES:

FLOORS: CARPET

WALLS: GWB, PAINTED

CEILING: ACT TILE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

HEATING / COOLING

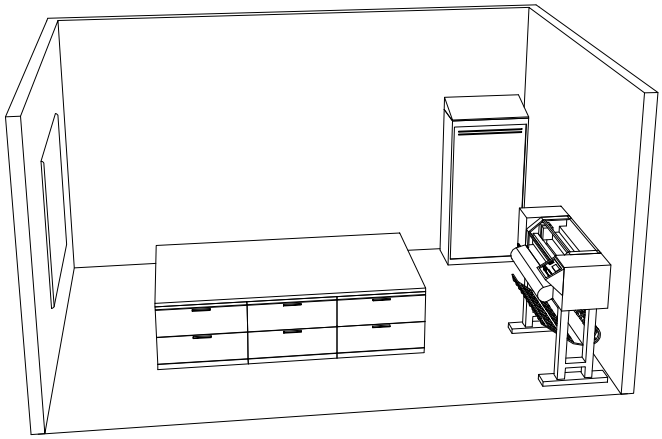
OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

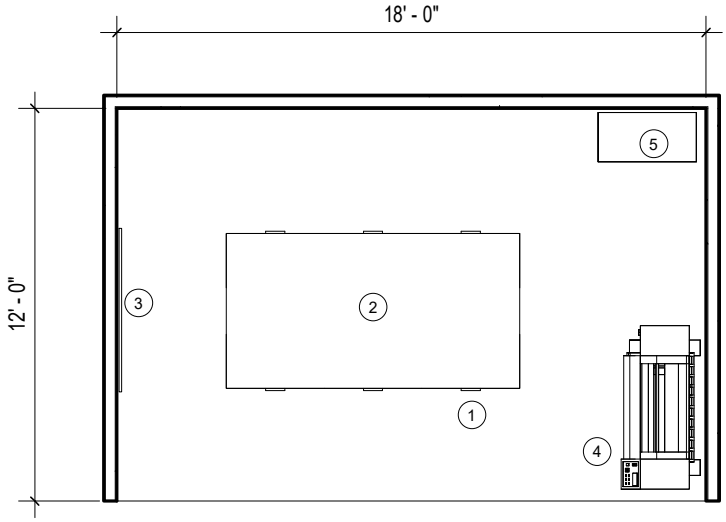
COMPONENTS:

1. PRINTER
2. WORK COUNTER / LOWER CABINETS
3. UPPER CABINETS W/U.C. LIGHTING

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**COPY/MAIL AREA - 80 SF**	A8





1 LAYOUT AREA - 216 SF
3/16" = 1'-0"

ROOM FINISHES:

FLOORS: LINOLEUM SHEET

WALLS: GWB

CEILING: ACT TILE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

HEATING / COOLING

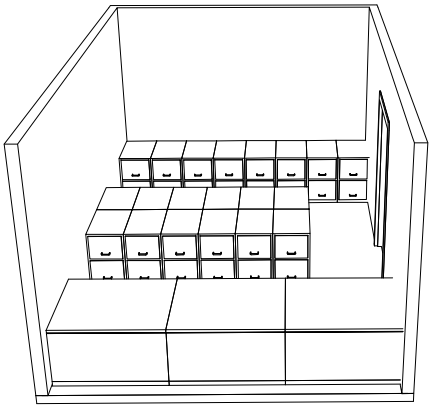
OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

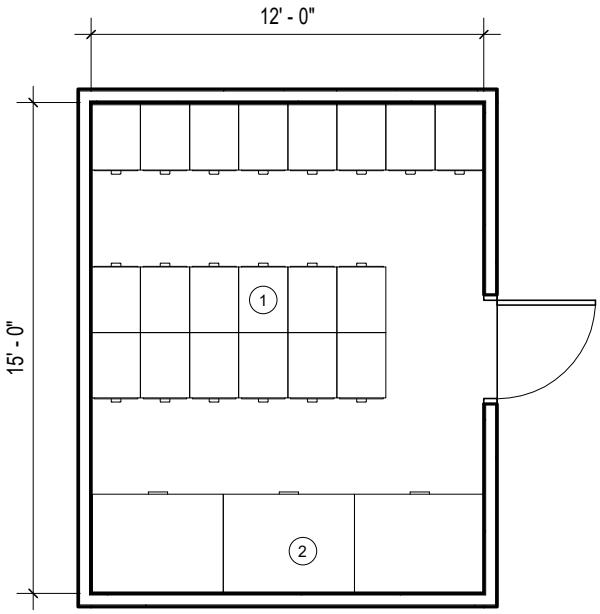
COMPONENTS:

1. (6) FLAT FILES
2. 8' x 4'-2" LAYOUT COUNTER TOP (ABOVE FLAT FILES)
3. DISPLAY BOARD
4. PLOTTER/SCANNER
5. SUPPLY CABINET

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**LAYOUT AREA - 216 SF**	A9





1 FILE STORAGE - 180 SF
3/16" = 1'-0"

ROOM FINISHES:

FLOORS: CARPET TILES

WALLS: GWB PAINTED

CEILING: ACT TILES

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

HEATING / COOLING

OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

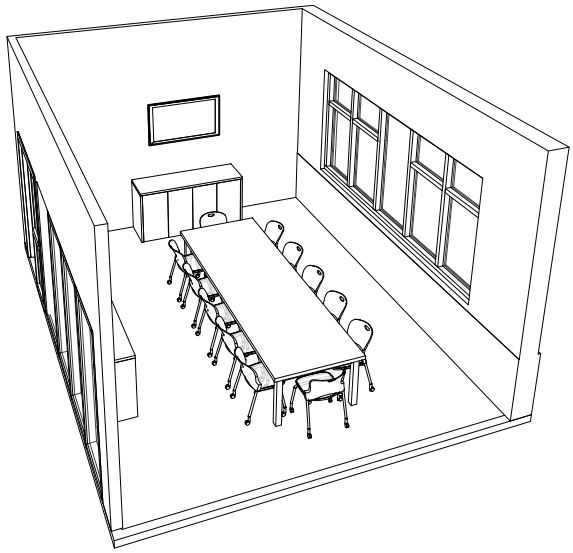
COMPONENTS:

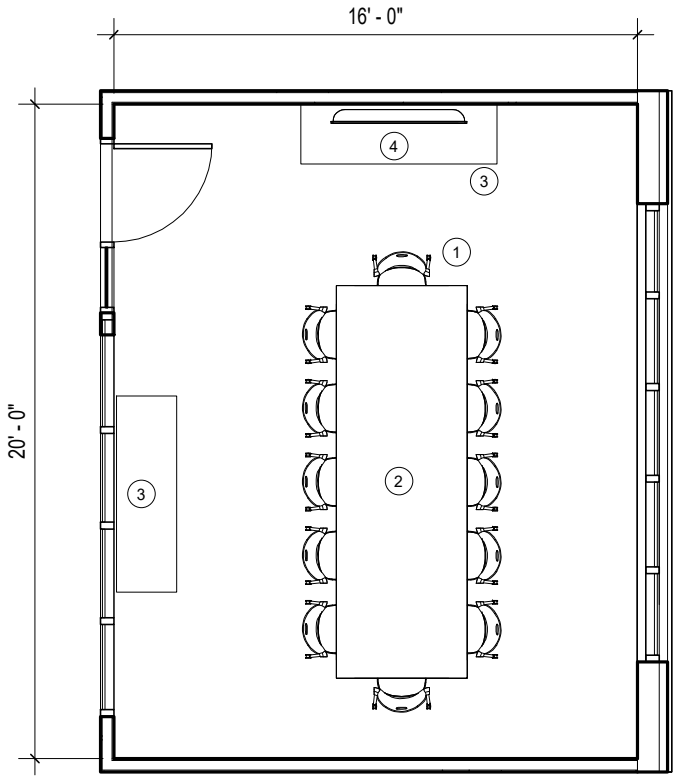
1. (24) 18" X 24" FILE CABINETS
2. (3) FLAT FILES / ROLLED DRAWING STORAGE

ROOM SIZE APPLIES TO (2) SPACES:
- DPW ARCHIVE FILE STORAGE
- ENGINEER FILE STORAGE

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**FILE STORAGE - 180 SF**	A10





1 LARGE CONFERENCE ROOM - 320 SF
3/16" = 1'-0"

ROOM FINISHES:

FLOORS: CARPET TILE

WALLS: GWB PAINTED

CEILING: ACT TILE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

(2) TEL / DATA OUTLET JACKS

HEATING / COOLING

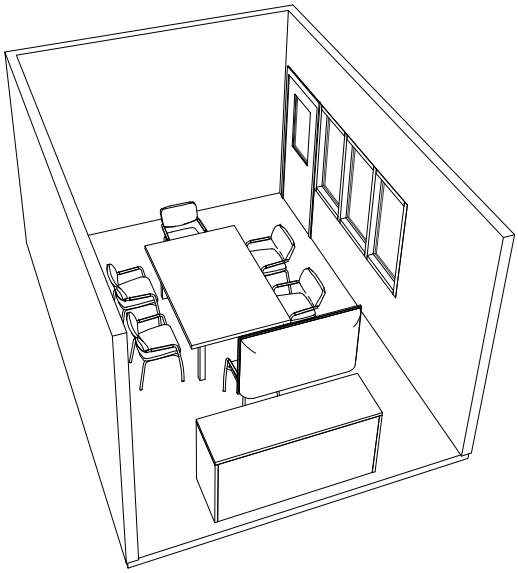
OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

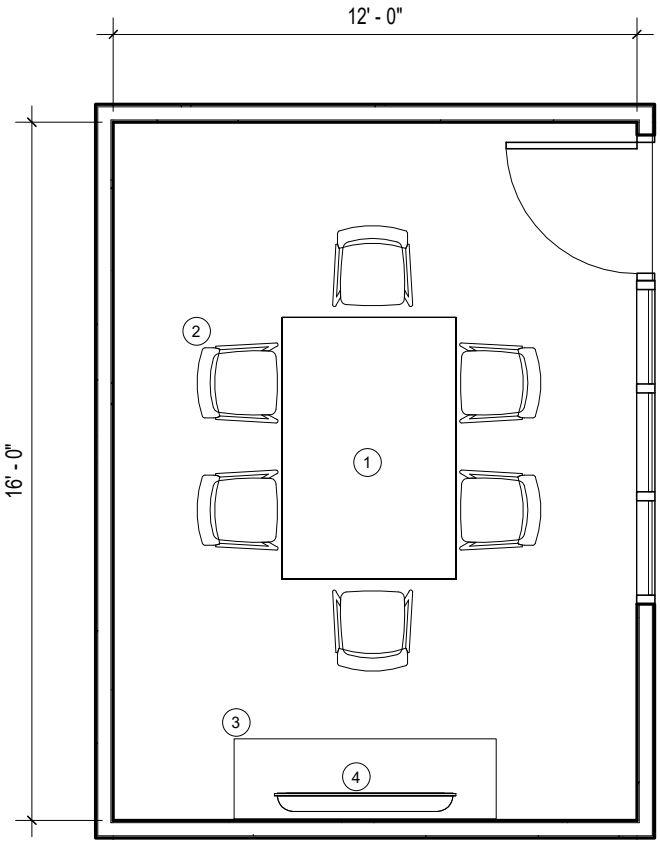
COMPONENTS:

1. (12) CHAIRS
2. CONFERENCE TABLE
3. CREDENZA
4. TV MONITOR

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**LARGE CONFERENCE ROOM - 320 SF**	A11





1 SMALL CONFERENCE ROOM - 192 SF
1/4" = 1'-0"

ROOM FINISHES:

FLOORS: CARPET TILE

WALLS: GWB PAINTED

CEILING: ACT TILE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

HEATING / COOLING

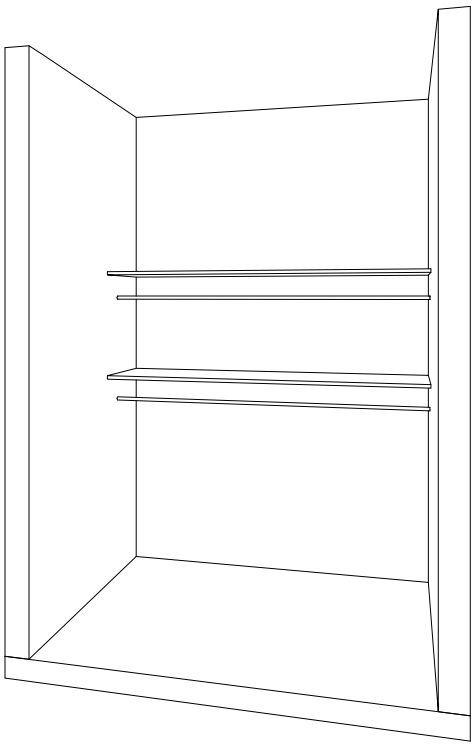
OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

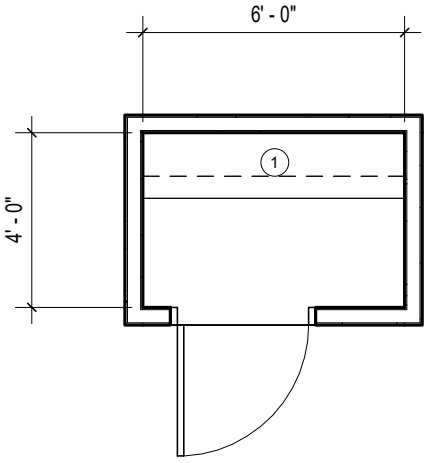
COMPONENTS:

1. CONFERENCE TABLE
2. (6) CHAIRS
3. CREDENZA
4. WIDE SCREEN TV

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**SMALL CONFERENCE ROOM - 192 SF**	A12





1 OFFICE SUPPLY CLOSET - 24 SF
1/4" = 1'-0"

ROOM FINISHES:

FLOORS: CARPET

WALLS: GWB PAINTED

CEILING: ACT TILE

MEP/DATA REQUIREMENTS:

HEATING / COOLING

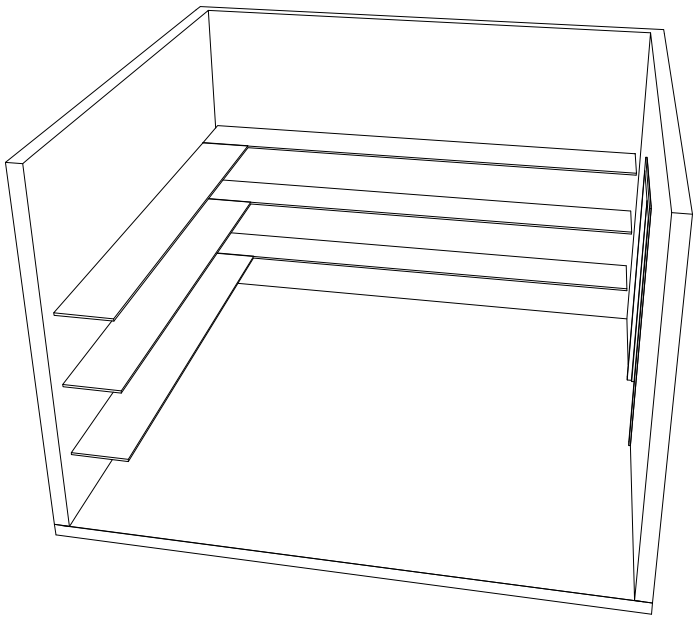
OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

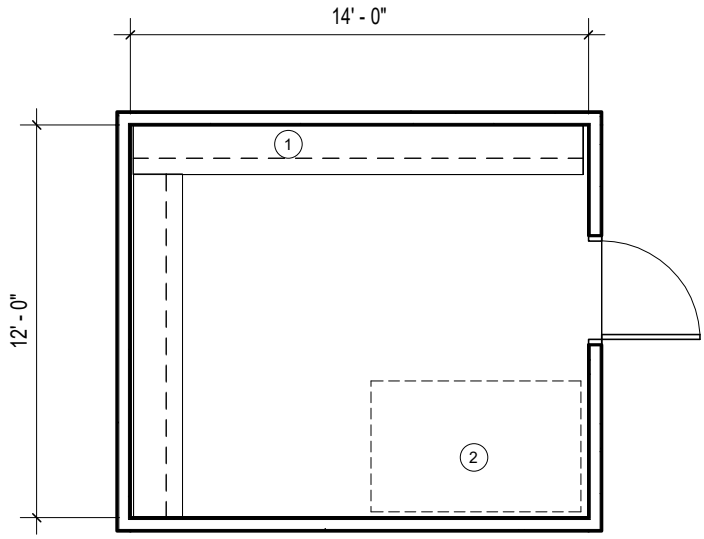
COMPONENTS:

1. SHELF WITH POLE

ROOM SIZE APPLIES TO (2) SPACES:
- OFFICE SUPPLY CLOSET
- ENGINEER EQUIPMENT CLOSET

DRAFT





1 LARGE SUPPLY CLOSET - 168 SF
3/16" = 1'-0"

ROOM FINISHES:

FLOORS: LINOLEUM

WALLS: GWB PAINTED

CEILING: ACT TILES

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

HEATING / COOLING

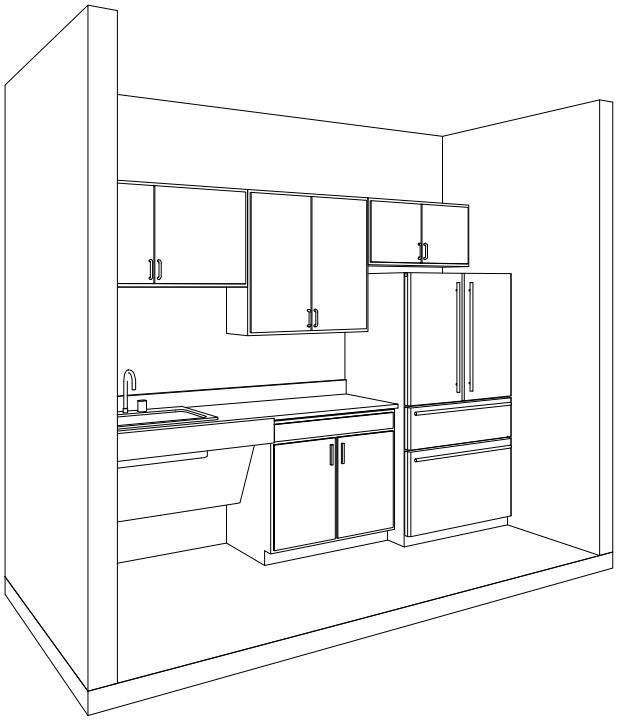
OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

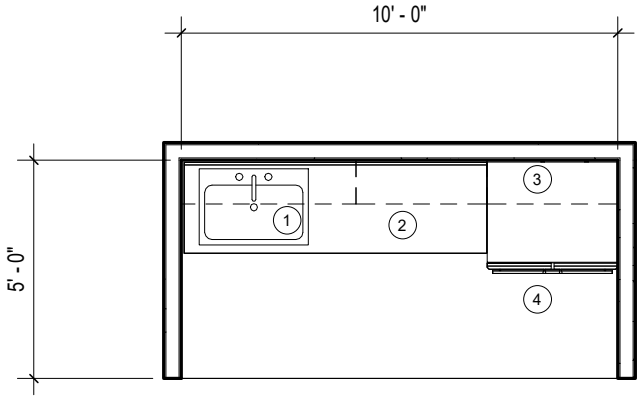
COMPONENTS:

1. WALL MOUNTED SHELVES
2. DESIGNATED FLOOR STORAGE

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**LARGE SUPPLY CLOSET - 168 SF**	A14





1 KITCHENETTE - 50 SF
1/4" = 1'-0"

ROOM FINISHES:

FLOORS: LINOLEUM

WALLS: GWB, PAINTED

CEILING: ACT TILE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

HEATING / COOLING

OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

COMPONENTS:

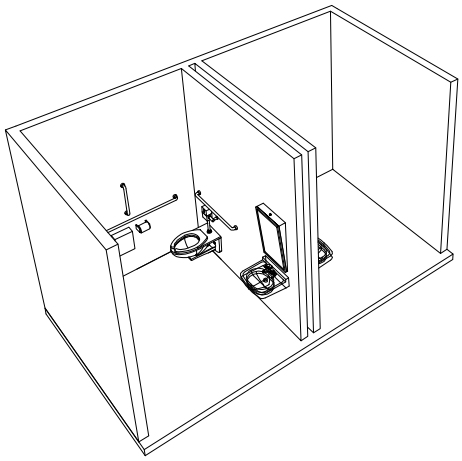
1. STAINLESS STEEL SINK
   ADA BASE
2. COUNTER & BASE CABINET
3. UPPER CABINETS
4. STAINLESS STEEL REFRIDGERATOR

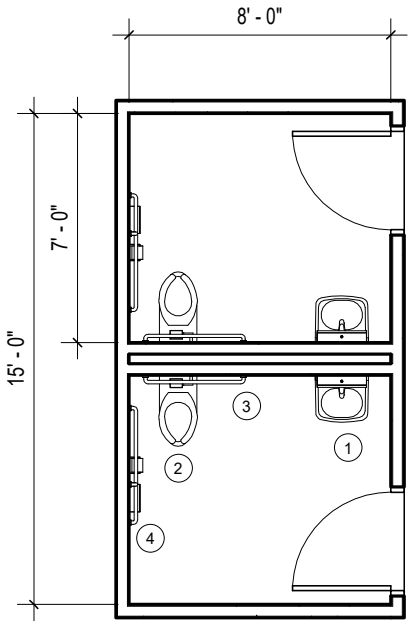
(BELOW ARE NOT REPRESENTED
ON THIS SHEET)

5. ICE MAKER
6. MICROWAVE
7. COFFEE STATION

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**KITCHENETTE - 50 SF**	A15





1 TOILET FACILITY - 120 SF
3/16" = 1'-0"

ROOM FINISHES:

FLOORS: CERAMIC TILE

WALLS: CERAMIC TILE / GWB PAINTED

CEILING: GYP, PAINTED

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

HEATING / COOLING

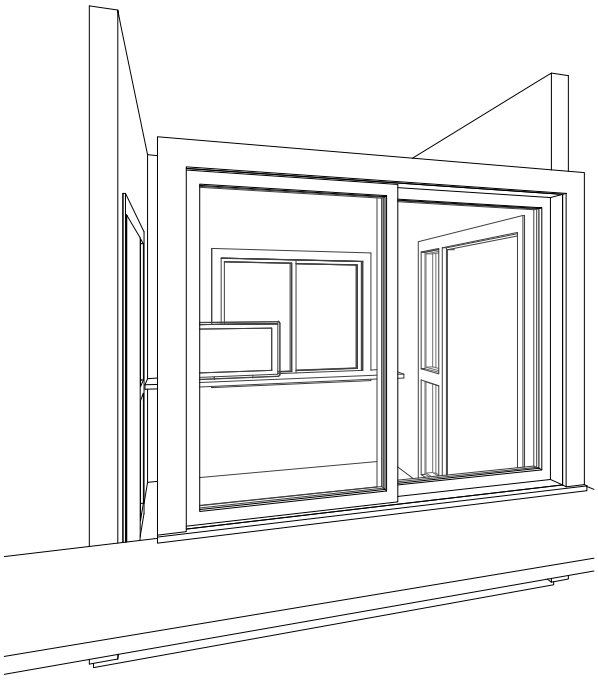
OCCUPANCY SENSORS FOR LIGHTING CONTROLS

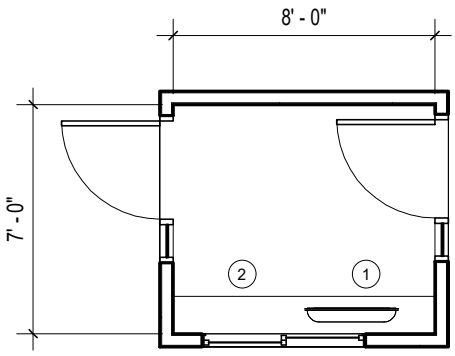
COMPONENTS:

1. (2) WALL HUNG SINK
2. (2) WALL HUNG TOILET
3. (2) 36" GRAB BAR
4. (2) 48" GRAB BAR

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**TOILET FACILITY - 120 SF**	A16





1 STAFF ENTRANCE & KIOSK - 56 SF
3/16" = 1'-0"

ROOM FINISHES:

FLOORS: LINOLEUM

WALLS: GWB

CEILING: GYP, PAINTED

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

HEATING / COOLING

OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

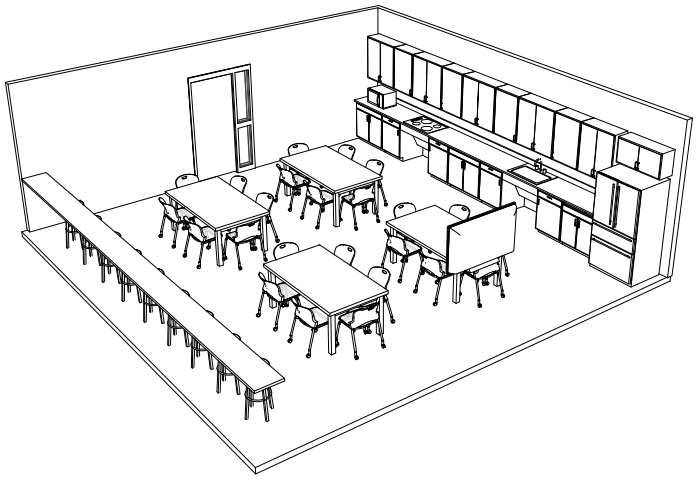
NATURAL LIGHTING

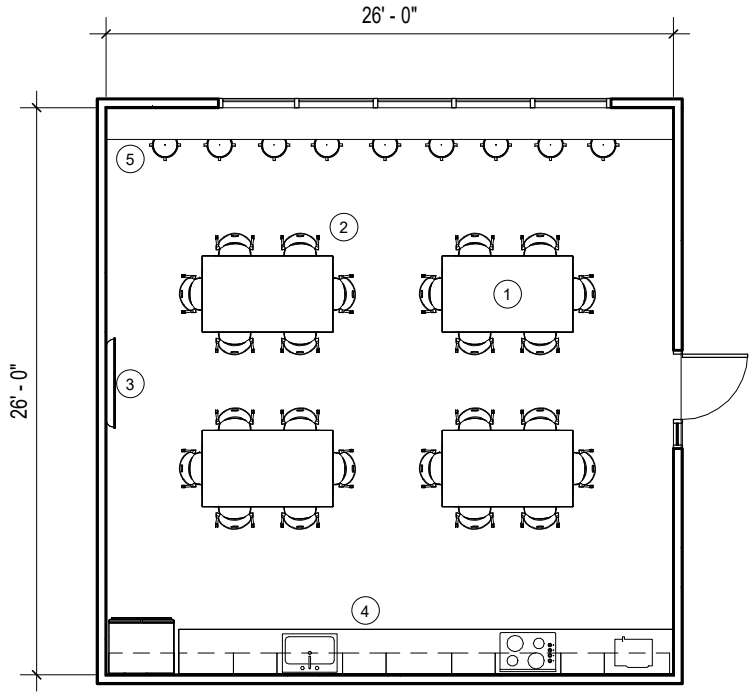
COMPONENTS:

1. KIOSK
2. CUSTOMER SERVICE COUNTER/WINDOW

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**STAFF ENTRANCE & KIOSK - 56 SF**	B1





MUSTER / MULTIPURPOSE ROOM - 676 SF

1 1/8" = 1'-0"

ROOM FINISHES:

FLOORS: LINOLEUM

WALLS: GWB, PAINTED

CEILING: ACT

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

HEATING / COOLING

OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

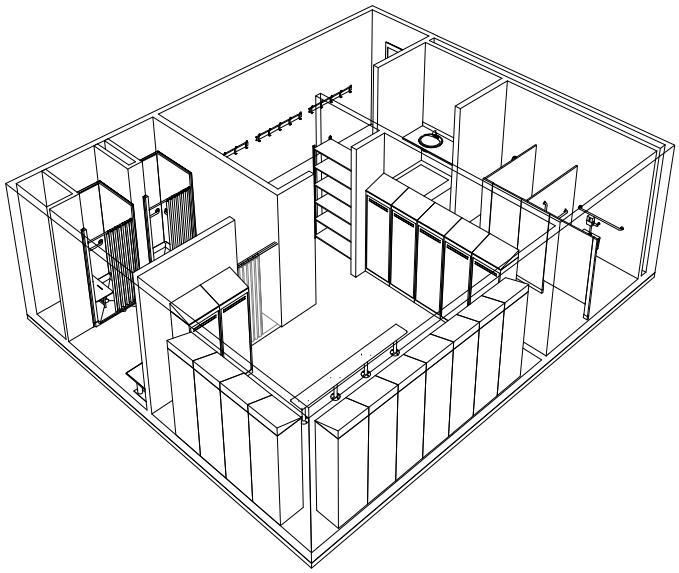
NATURAL LIGHTING

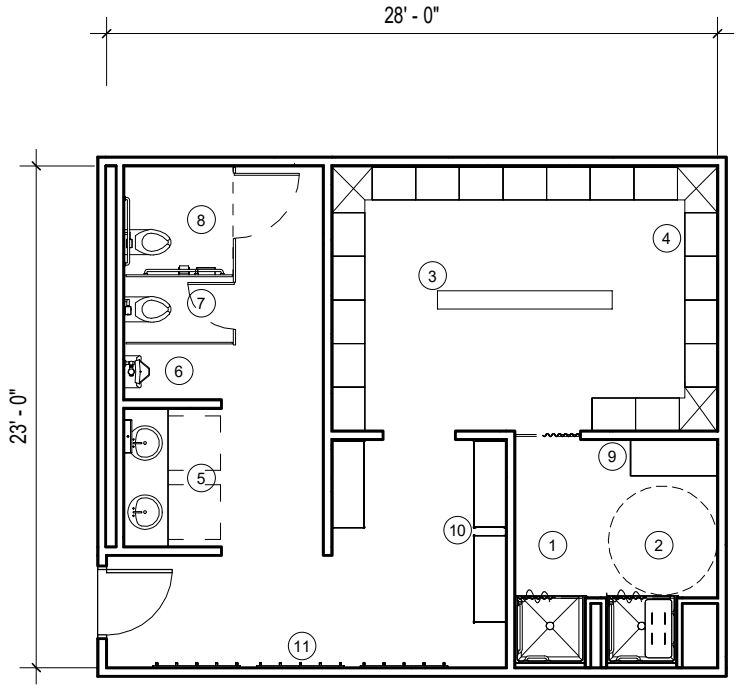
COMPONENTS:

1. (4) TABLES
2. (24) CHAIRS
3. WALL MOUNTED TELEVISION
4. KITCHEN, INCLUDES:
   - SOLID SURFACE COUNTERS
   - BASE & WALL CABINETS
   - STAINLESS STEEL SINK
   - REFRIGERATOR
   - COOKTOP
   - MICROWAVES
   - TOASTER OVENS
   - COFFEE STATION
   - ICE MACHINE
5. COUNTER & STOOLS

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**MUSTER / MULTIPURPOSE ROOM - 676 SF**	B2





1 MALE LOCKER ROOM - 644 SF
1/8" = 1'-0"

ROOM FINISHES:

FLOORS: RESINOUS EPOXY

WALLS: CERAMIC TILE & GWB PAINTED

CEILING: MOISTURE RESISTANT ACT TILE & GWD, PNTD

MEP/DATA REQUIREMENTS:

GFI ELECTRICAL OUTLETS

OCCUPANCY SENSORS FOR LIGHTING CONTROLS

HEATING

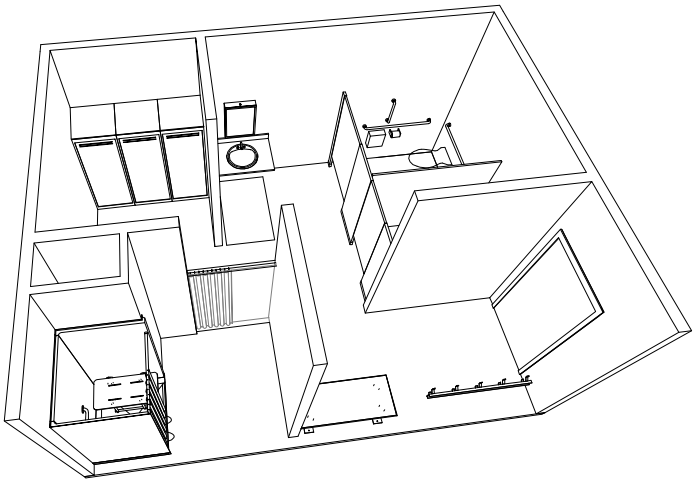
COOLING

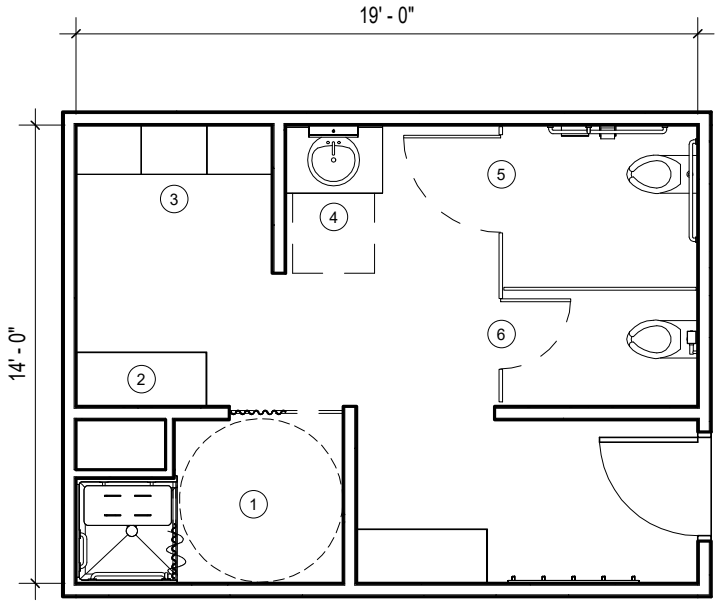
COMPONENTS:

1. STANDARD SHOWER STALL
2. ADA SHOW STALL
3. STANDARD BENCH
4. (21) 18" x 24" LOCKERS
5. COUNTER, SINKS & MIRRORS
6. WALL HUNG URINALS
7. STANDARD TOILET STALL
8. ADA TOILET STALL
9. ADA BENCH
10. UTILITY SHELVING
11. WET GEAR HOOKS

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**MEN'S LOCKER ROOM - 644 SF**	B3





1 WOMEN'S LOCKER ROOM - 266 SF
3/16" = 1'-0"

ROOM FINISHES:

FLOORS: RESINOUS

WALLS: CERAMIC TILES & GWB PAINTED

CEILING: MOISTURE RESISTANT ACT TILES

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

HEATING / COOLING

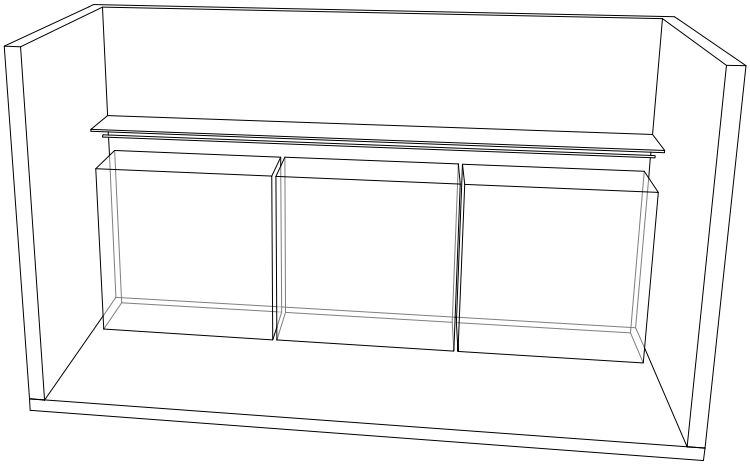
OCCUPANCY SENSORS FOR LIGHTING CONTROLS

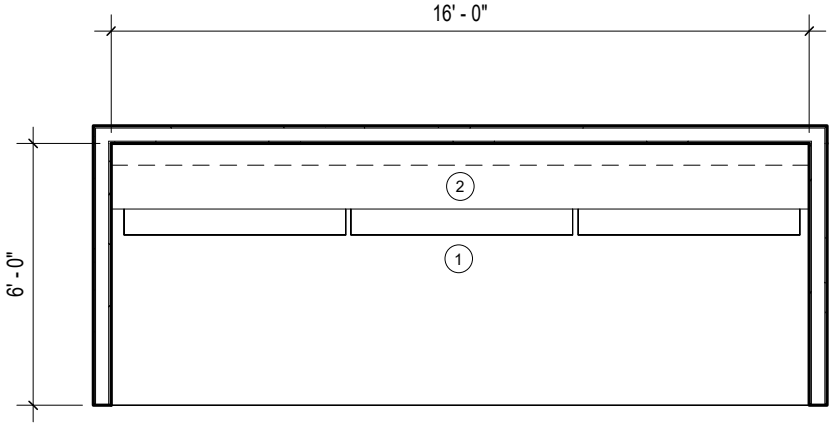
COMPONENTS:

1. ADA SHOWER STALL
2. ADA BENCH
3. (3) 18" X 24" LOCKERS
4. COUNTER, SINK, & MIRROR
5. ADA TOILET STALL
6. STANDARD STALL

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**WOMEN'S LOCKER ROOM - 266 SF**	B4





1 UNIFORM AREA - 96 SF
1/4" = 1'-0"

ROOM FINISHES:

FLOORS: RESINOUS EPOXY OR SEALED CONCRETE

WALLS: GWB, PAINTED

CEILING: ACT TILES

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

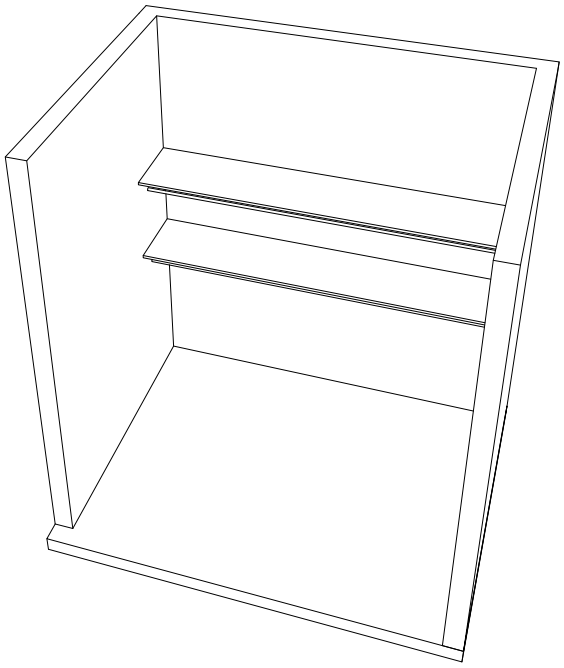
HEATING / COOLING

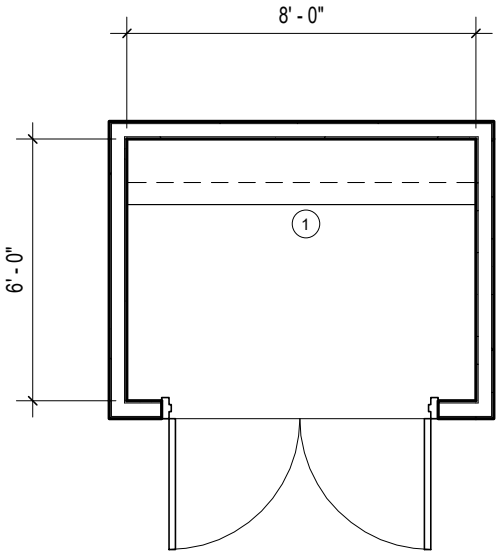
OCCUPANCY SENSORS FOR LIGHTING CONTROLS

COMPONENTS:

1. (3) UNIFORM RACKS
2. SHELVING

DRAFT





1 SECURE INVENTORY CLOSET - 48 SF
1/4" = 1'-0"

ROOM FINISHES:

FLOORS: CARPET TILE

WALLS: GWB PAINTED

CEILING: 2' X 2' ACT TILE

MEP/DATA REQUIREMENTS:

HEATING

COOLING

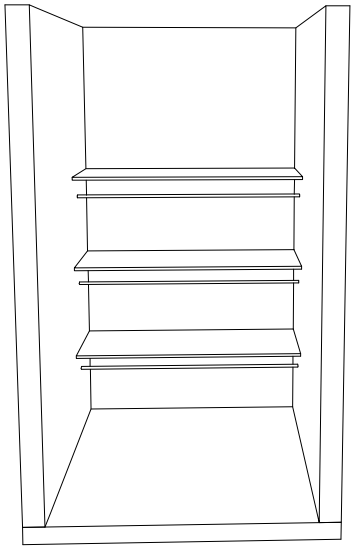
DUPLEX ELECTRICAL OUTLETS

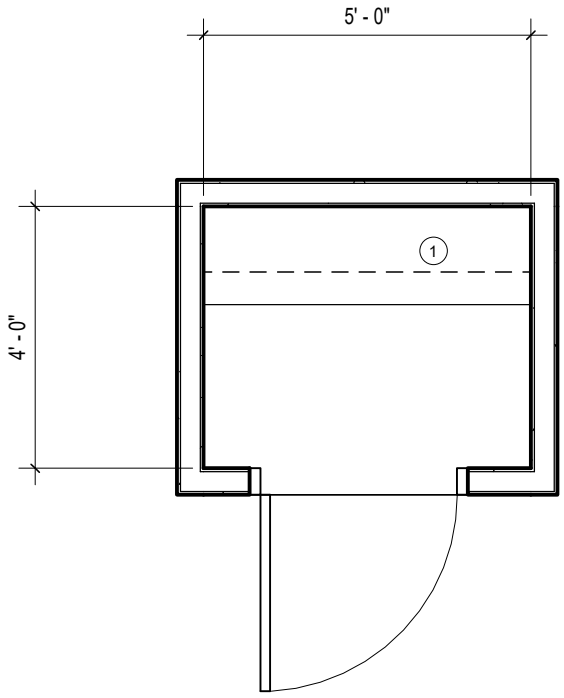
COMPONENTS:

1. WALL MOUNTED SHELVING

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**SECURE INVENTORY CLOSET - 48 SF**	B7





1 CREW SUPPLY STORAGE - 20 SF
3/8" = 1'-0"

ROOM FINISHES:

FLOORS: CARPET TILE

WALLS: GWB PAINTED

CEILING: 2' X 2' ACT TILE

MEP/DATA REQUIREMENTS:

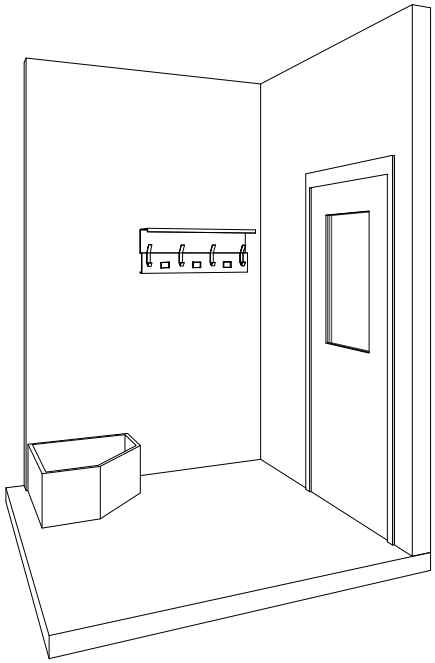
DUPLEX ELECTRICAL OUTLETS

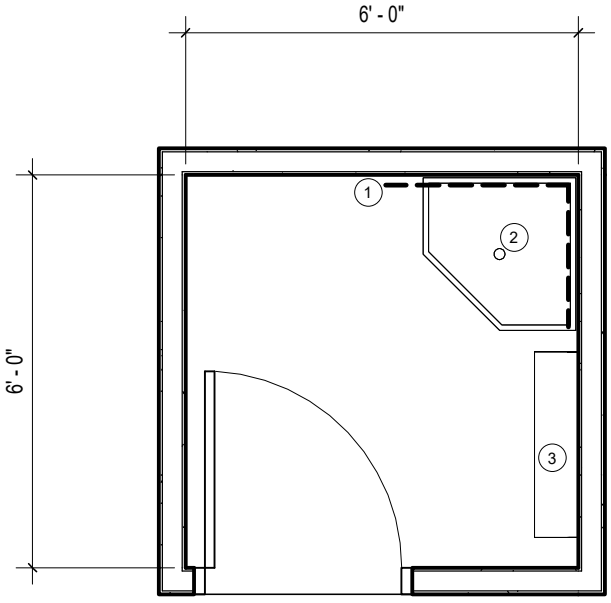
COMPONENTS:

1. WALL MOUNTED SHELVING

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**CREW SUPPLY STORAGE - 20 SF**	B8





1 JANITOR CLOSET - 36 SF
3/8" = 1'-0"

ROOM FINISHES:

FLOORS: 12X12 VCT TILE

WALLS: GWB PAINTED

CEILING: 2X2 ACT TILE

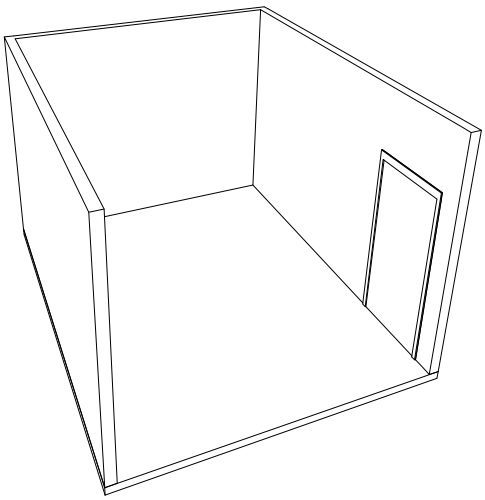
MEP/DATA REQUIREMENTS:

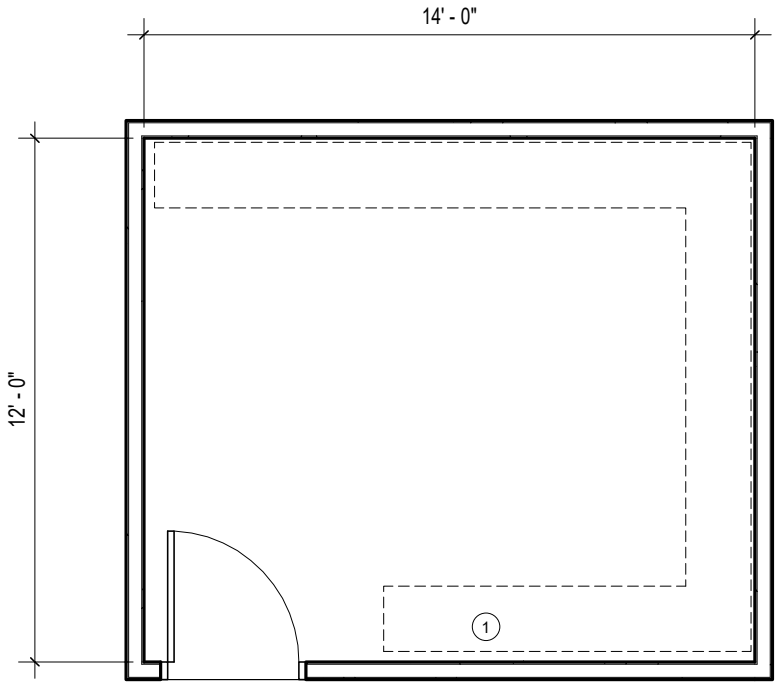
DUPLEX ELECTRICAL OUTLETS

COMPONENTS:

1. FRP PANELING AT SINK
2. UTILITY SINK
3. UTILITY SHELF W/ MOP & BROOM HOLDERS

DRAFT





1 UTILITY ROOM - 168 SF
1/4" = 1'-0"

ROOM FINISHES:

FLOORS: SEALED CONCRETE

WALLS: GWB, PAINTED

CEILING: OPEN TO STRUCTURE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

DATA OUTLET JACKS

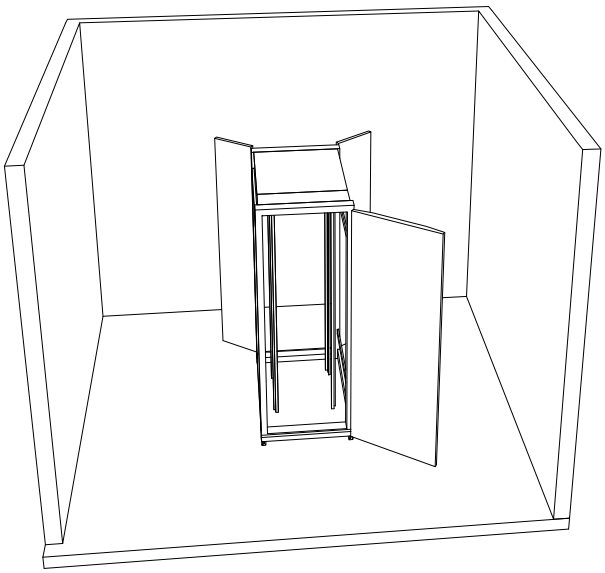
HEATING / COOLING

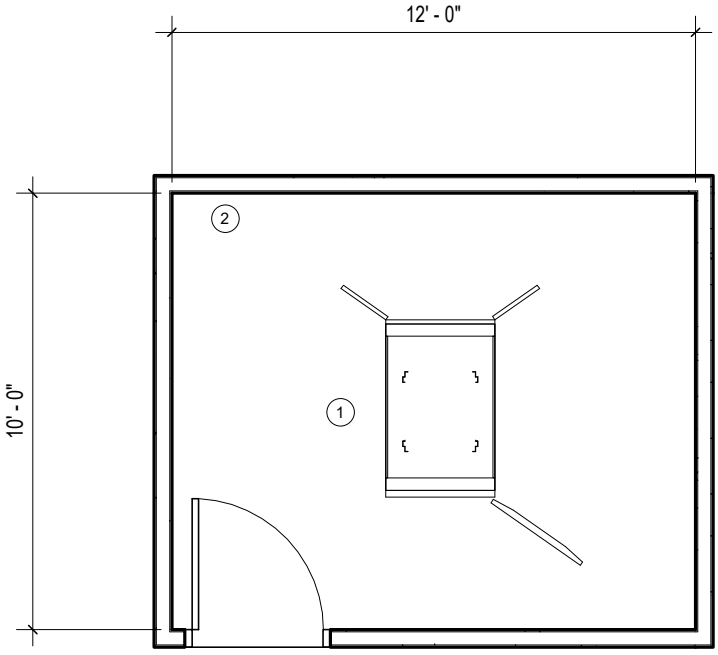
COMPONENTS:

1. WALL MOUNTED UNITS

ROOM SIZE APPLIES TO (2) SPACES:
- ELECTRICAL ROOM
- PLUMBING/FIRE PROTECTION ROOM

DRAFT





1 TEL/DATA ROOM - 120 SF
1/4" = 1'-0"

ROOM FINISHES:

FLOORS: SEALED CONCRETE

WALLS: CMU PAINTED

CEILING: OPEN TO STRUCTURE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

DATA OUTLET JACKS

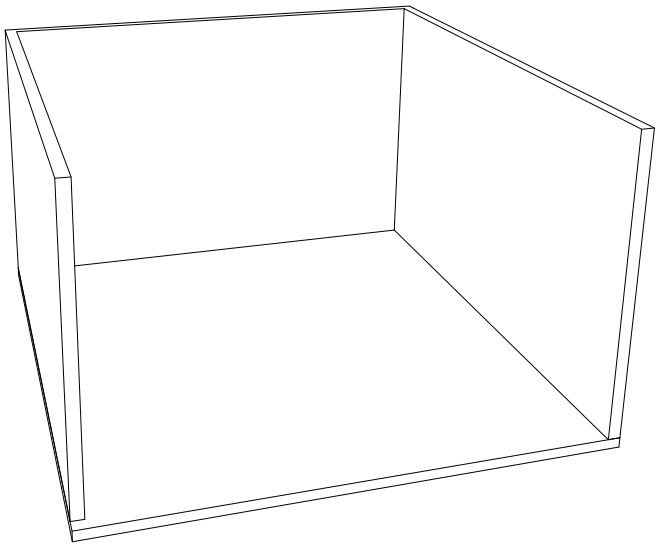
FLOOR DRAIN

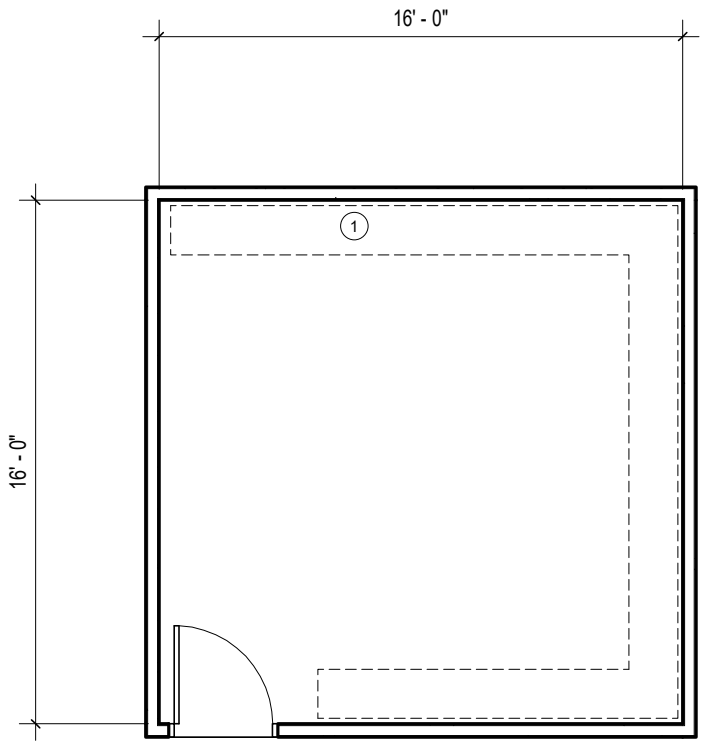
COMPONENTS:

1. DATA RACK
2. PLYWOOD BACK RACK BOARD FOR BUILDING SYSTEM COMPONENTS (SECURITY, CABLE, ETC.)

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**TEL / DATA ROOM - 120 SF**	B11





1 MECHANICAL ROOM - 252 SF
3/16" = 1'-0"

ROOM FINISHES:

FLOORS: SEALED CONCRETE

WALLS: CMU PAINTED

CEILING: OPEN TO STRUCTURE

MEP/DATA REQUIREMENTS:

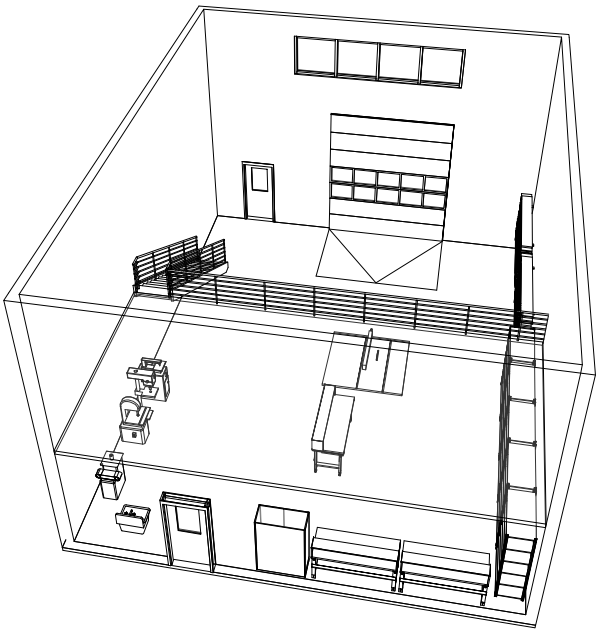
DUPLEX ELECTRICAL OUTLETS

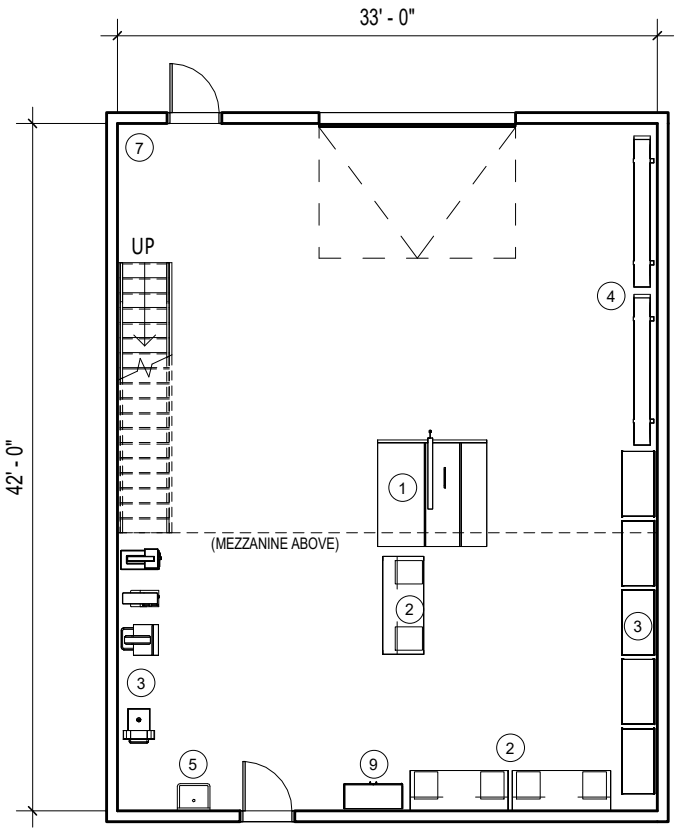
DATA OUTLET JACKS

COMPONENTS:

1. WALL MOUNTED PANELS

DRAFT





1 CARPENTRY WORKSHOP - 1,386 SF
3/32" = 1'-0"

ROOM FINISHES:

FLOORS: SEALED CONCRETE

WALLS: CMU PAINTED

CEILING: OPEN TO STRUCTURE

MEP/DATA REQUIREMENTS:

HEATING

COOLING

DUPLEX ELECTRICAL OUTLETS

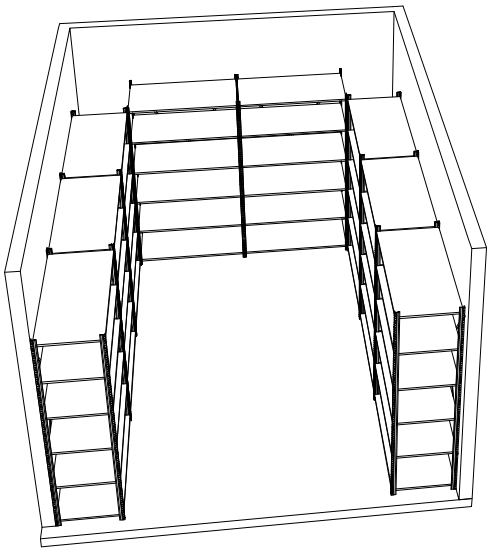
DATA OUTLET JACKS

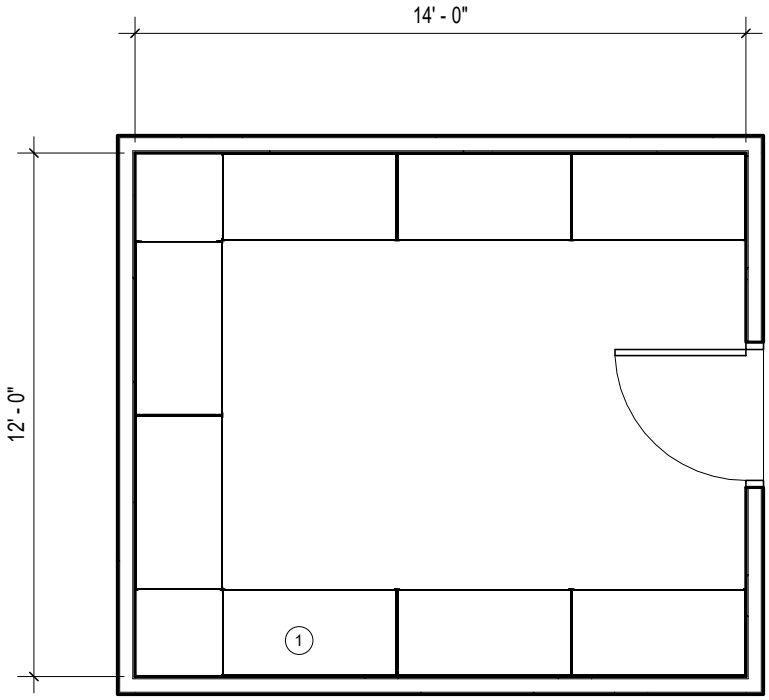
COMPONENTS:

1. TABLE SAW
2. WORKBENCH
3. UTILITY SHELVING
4. LUMBER STORAGE RACK
5. UTILITY SINK
6. FIRE CABINET
7. DUST COLLECTION
8. VARIOUS SMALL EQUIP. (TBD)

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**CARPENTRY WORKSHOP - 1,386 SF**	C2





1 SECURE STORAGE - 168 SF
1/4" = 1'-0"

ROOM FINISHES:

FLOORS: SEALED CONCRETE

WALLS: CMU (Painted)

CEILING: OPEN TO STRUCTURE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

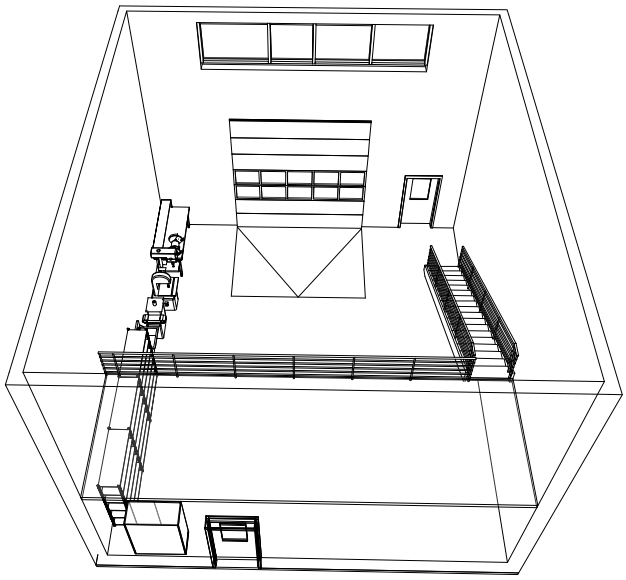
NATURAL LIGHTING

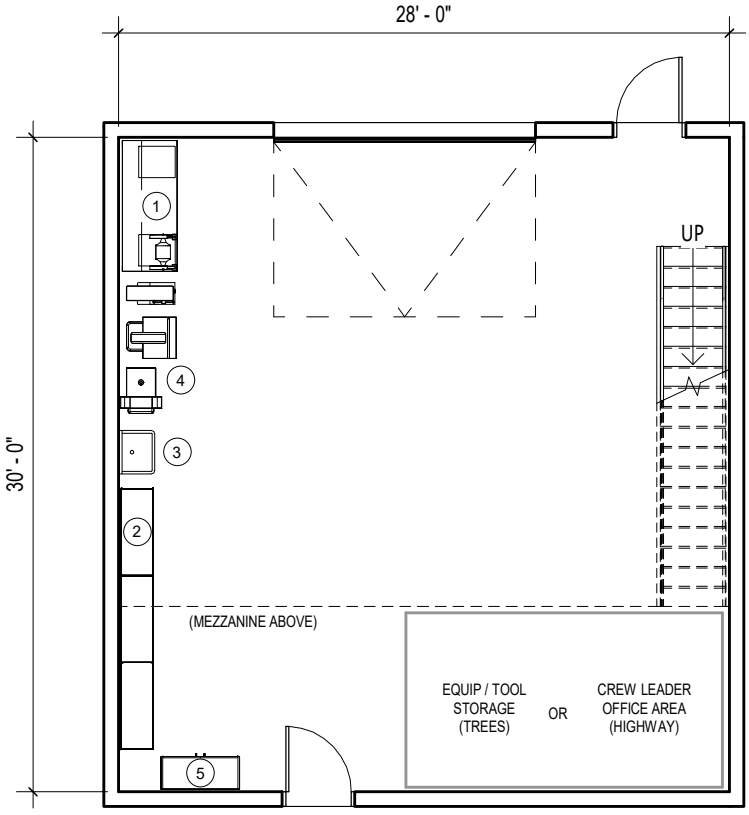
COMPONENTS:

1. 48" X 24" UTILITY SHELVING

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**SECURE STORAGE - 168 SF**	C3





1 WORKSHOP - 840 SF
1/8" = 1'-0"

ROOM FINISHES:

FLOORS: SEALED CONCRETE

WALLS: CMU PAINTED

CEILING: OPEN TO STRUCTURE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

DATA OUTLET JACKS

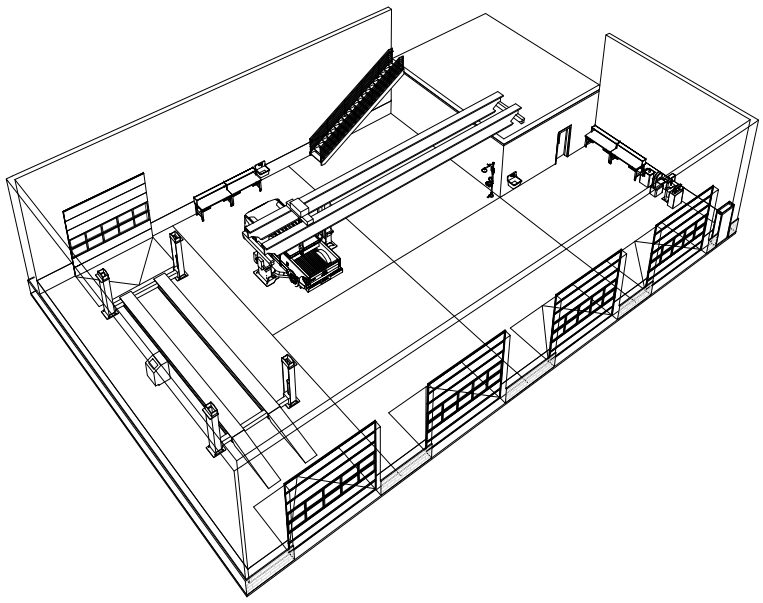
NATURAL LIGHTING

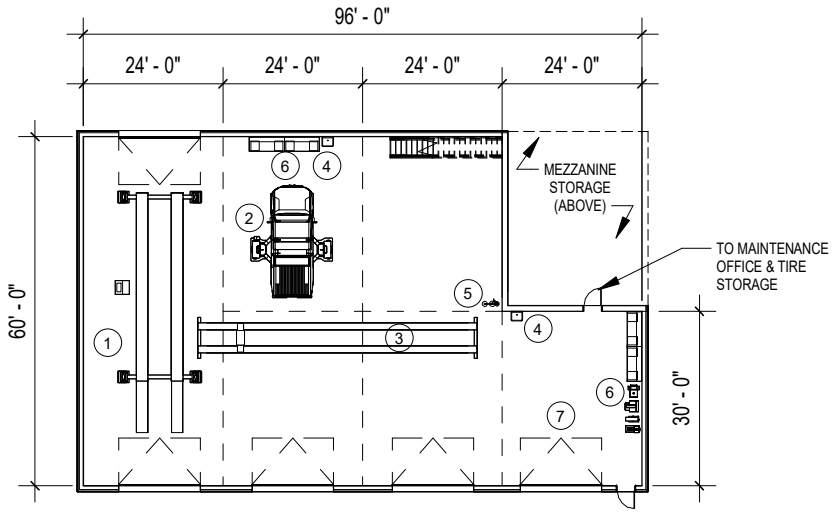
COMPONENTS:

1. WORKBENCH
2. UTILITY SHELVING
3. UTILITY SINK
4. EQUIPMENT (TBD)
5. FIRE CABINET

ROOM SIZE APPLIES TO (2) SPACES:
- TREES & GROUNDS WORKSHOP
- HIGHWAY WORKSHOP

DRAFT





1 VEHICLE MAINTENANCE BAYS - 5,040 SF
1" = 30'-0"

ROOM FINISHES:

FLOORS: SEALED CONCRETE

WALLS: CMU TO 5'-4",
MTL PANEL ABOVE

CEILING: OPEN TO STRUCTURE

MEP/DATA REQUIREMENTS:

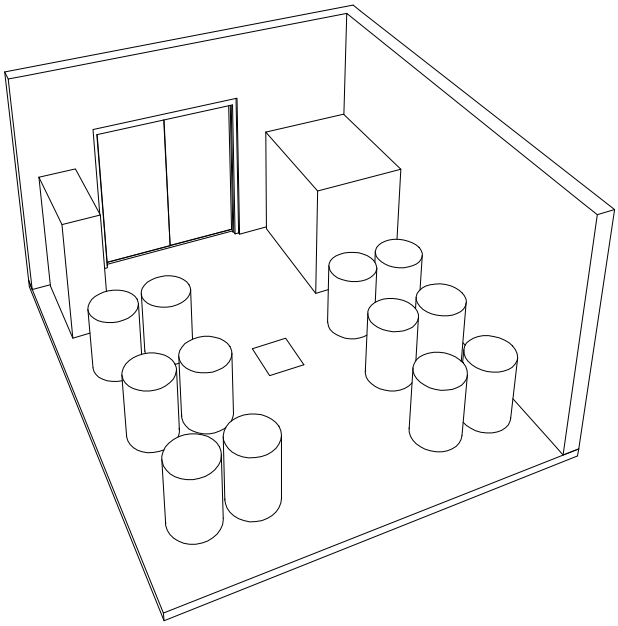
- DUPLEX ELECTRICAL OUTLETS
- TEL / DATA OUTLET JACKS
- OCCUPANCY SENSORS FOR LIGHTING CONTROLS
- SPECIALTY EQUIP. ELEC. OUTLETS
- HEATING (RADIANT FLOOR)
- NATURAL LIGHTING
- TOXIC ALERT SENSORS
- FLUID DISTRIBUTION SYSTEM
- COMPRESSED AIR

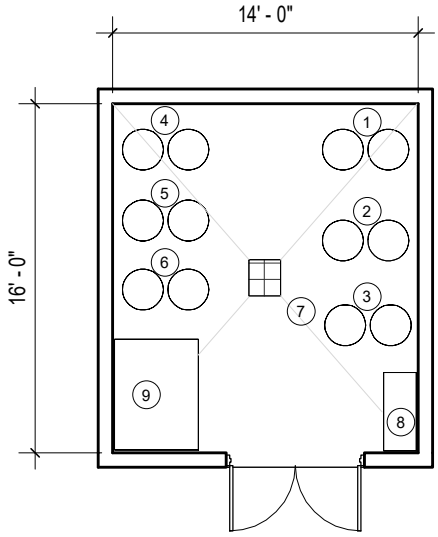
COMPONENTS:

1. HEAVY DUTY LIFT
2. LIGHT DUTY LIFT
3. OVERHEAD CRANE
4. SHOP SHINK
5. EMERGENCY EYE WASH STATION
6. SMALL EQUIP WORK SHOP (EQUIPMENT TBD)
7. WELDING BAY

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**VEHICLE MAINTENANCE BAYS - 5,040 SF**	D1





1 FLUID STORAGE ROOM - 224 SF
1/8" = 1'-0"

ROOM FINISHES:

FLOORS: SEALED CONCRETE

WALLS: CMU PAINTED

CEILING: GWB PAINTED

MEP/DATA REQUIREMENTS:

HEATING

DEDICATED EXHAUST SYSTEM

GFI ELECTRICAL OUTLETS

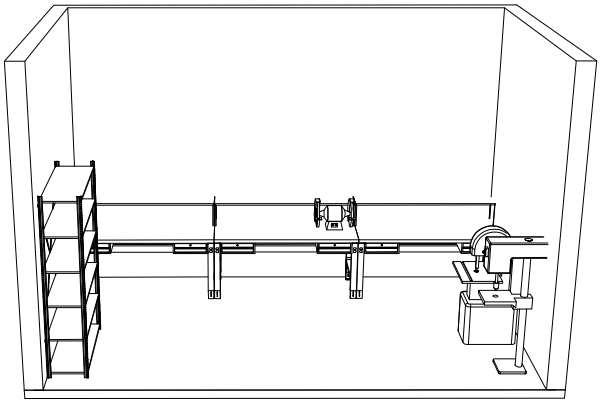
COMPRESSES AIR FOR PHNUMATIC PUMPS

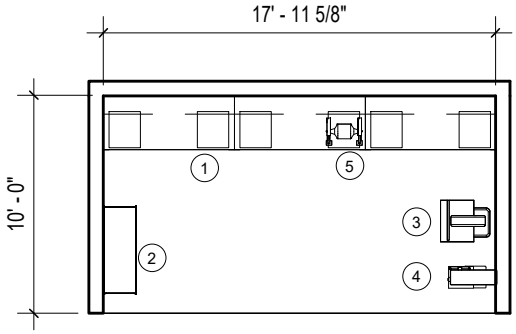
CONTAINMENT SUMP

COMPONENTS:

1. 15W-40
2. 10-30
3. 5W-20
4. HYDROLIC FLUID
5. ANTIFREEZE
6. AUTOMATIC TRANSMISSION FLUID (ATF)
7. FLUID SPILL CONTAINMENT SUMP
8. WASTE ANTI-FREEZE
9. WASTE OIL

DRAFT





1 MAINTENANCE WORKSHOP - 180 SF
1/8" = 1'-0"

ROOM FINISHES:

FLOORS: SEALED CONCRETE

WALLS: CMU / GWB

CEILING: OPEN TO ABOVE

MEP/DATA REQUIREMENTS:

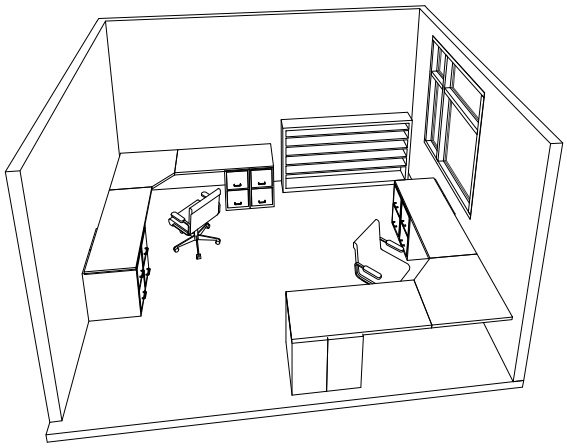
- INDUSTRIAL MEP SYSTEMS
- DUPLEX ELECTRICAL OUTLETS
- TEL / DATA OUTLET JACKS
- OCCUPANCY SENSORS FOR LIGHTING CONTROLS
- SPECIALTY EQUIP. ELEC. OUTLETS
- NATURAL LIGHTING

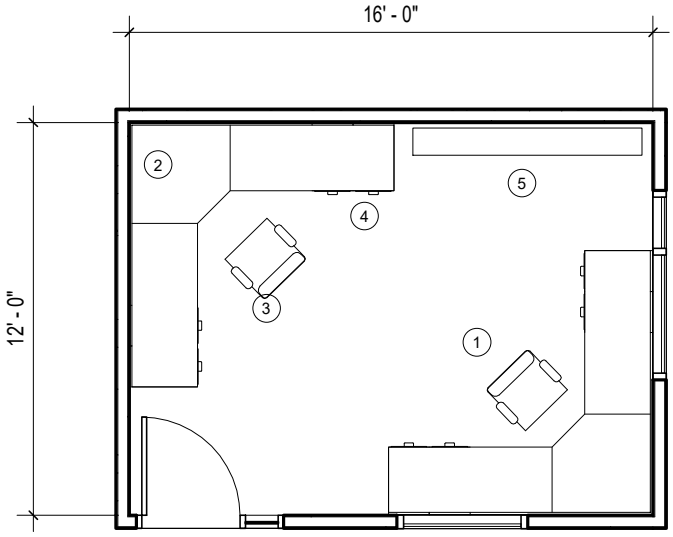
COMPONENTS:

1. WORKBENCH
2. UTILITY SHELVING
3. BAND SAW
4. DRILL PRESS
5. BENCH GRINDER

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**MAINTENANCE WORKSHOP - 180 SF**	D3





2 MAINTENANCE OFFICE - 192 SF
3/16" = 1'-0"

ROOM FINISHES:

FLOORS: LINOLEUM

WALLS: GWB OR CMU, PAINTED

CEILING: ACT TILE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

HEATING / COOLING

OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

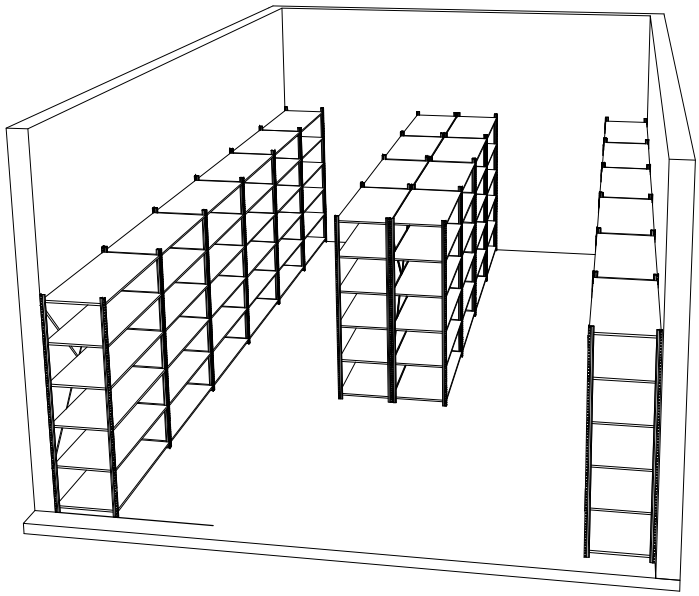
NATURAL LIGHTING

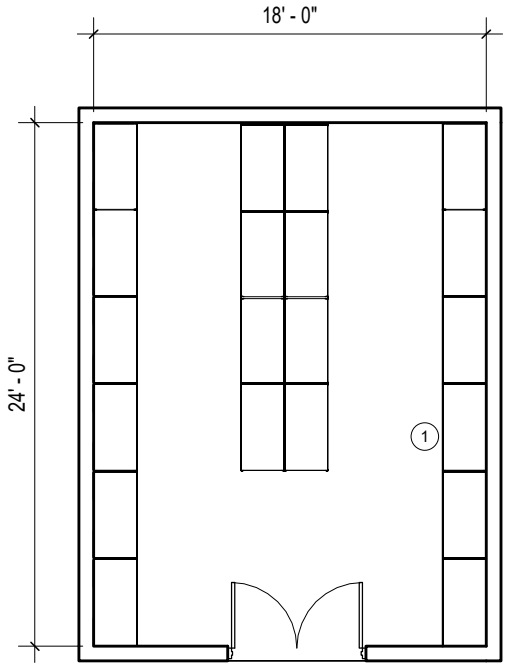
COMPONENTS:

1. (2) WORKSTATION
2. DESK
3. EXECUTIVE CHAIR
4. FILE STORAGE
5. BOOKCASE

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**MAINTENANCE OFFICE - 192 SF**	D4





PARTS & MATERIAL STORAGE ROOM - 432 SF

1 1/8" = 1'-0"

ROOM FINISHES:

FLOORS: SEALED CONCRETE

WALLS: CMU PAINTED

CEILING: OPEN TO STRUCTURE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

DATA OUTLET JACKS

SPECIALTY EQUIP. ELEC. OUTLETS

HEATING

VENTILATION

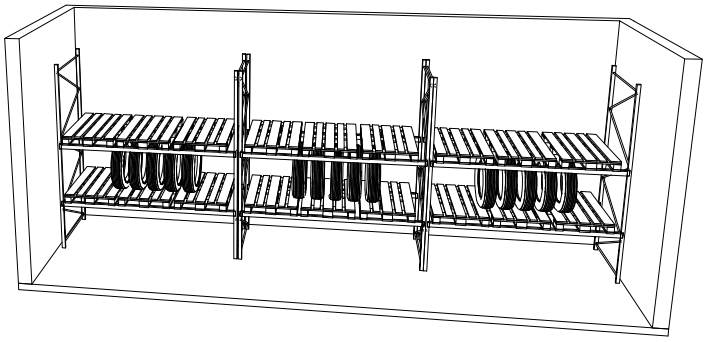
COMPONENTS:

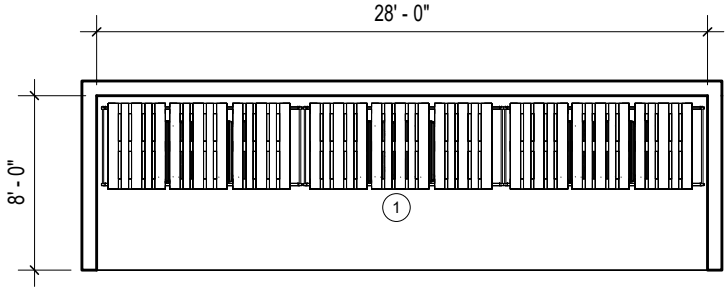
1. 48" W x 24" D UTILITY SHELVING

MAY BE LOCATED ON THE MEZZANINE

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**PARTS & MATERIALS STORAGE ROOM - 432 SF**	D5





1 TIRE STORAGE AREA - 224 SF
1/8" = 1'-0"

ROOM FINISHES:

FLOORS: SEALED CONCRETE

WALLS: CMU PAINTED

CEILING: OPEN TO STRUCTURE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

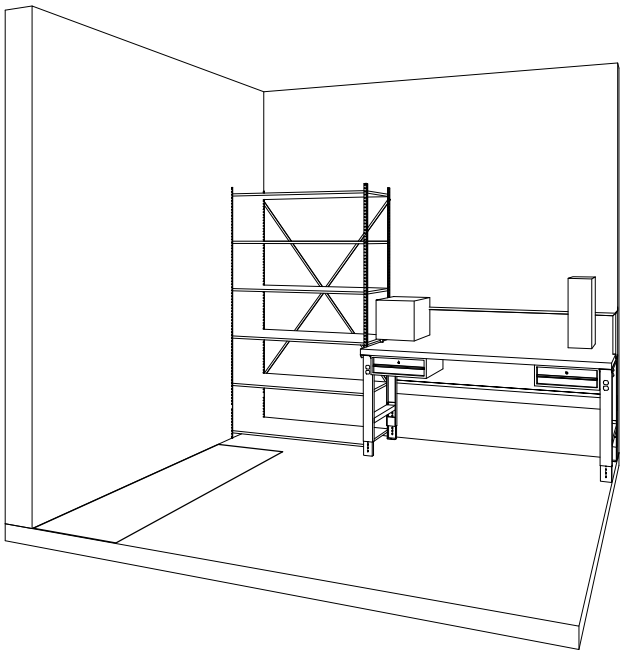
DATA OUTLET JACKS

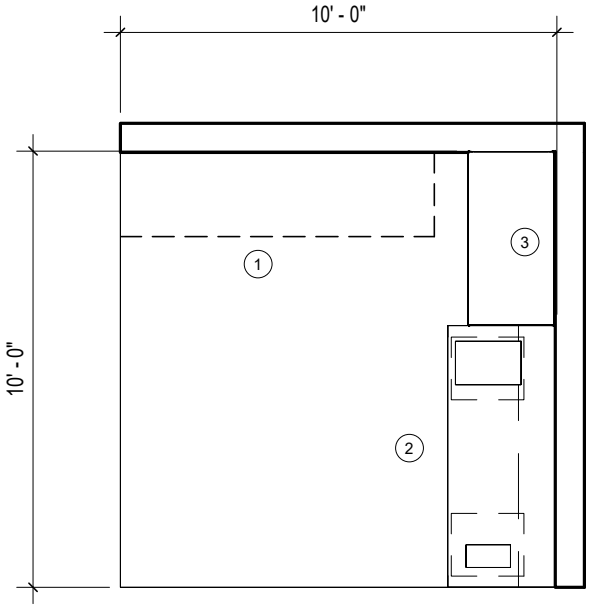
HEATING

COMPONENTS:

1. TIRE STORAGE RACKS

DRAFT





2 HYDRAULIC HOSE SHOP - 100 SF
1/4" = 1'-0"

ROOM FINISHES:

FLOORS: SEALED CONCRETE

WALLS: CMU OR WIRE CAGE

CEILING: OPEN TO STRUCTURE

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

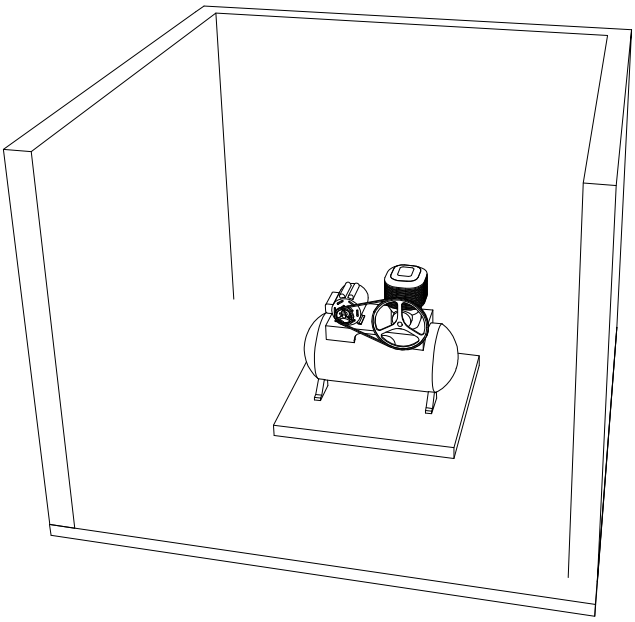
DATA OULET JACKS

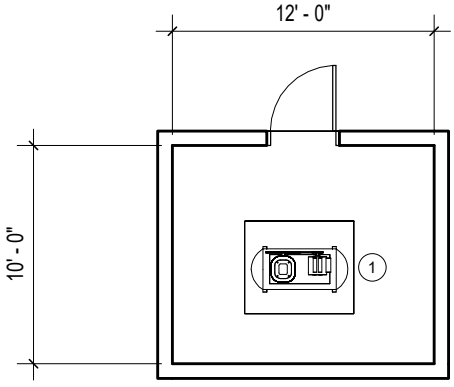
HEATING

COMPONENTS:

1. HANGING REELS FOR HOSES (3)
2. CHOP SAW WORKBENCH
3. UTILITY SHELVING FOR PARTS STORAGE

DRAFT





1 COMPRESSOR ROOM - 120 SF
1/8" = 1'-0"

ROOM FINISHES:

FLOORS: LINOLEUM

WALLS: CMU OR GWB, PAINTED

CEILING: ACT TILES

MEP/DATA REQUIREMENTS:

DUPLEX ELECTRICAL OUTLETS

TEL / DATA OUTLET JACKS

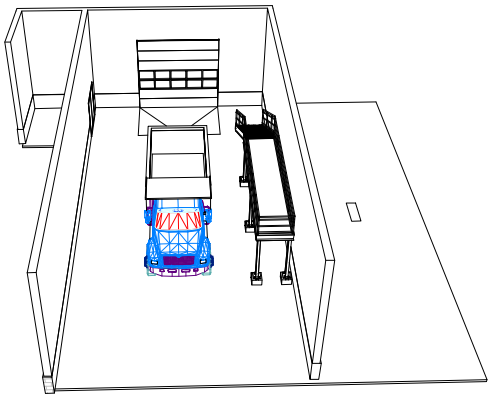
HEATING / COOLING

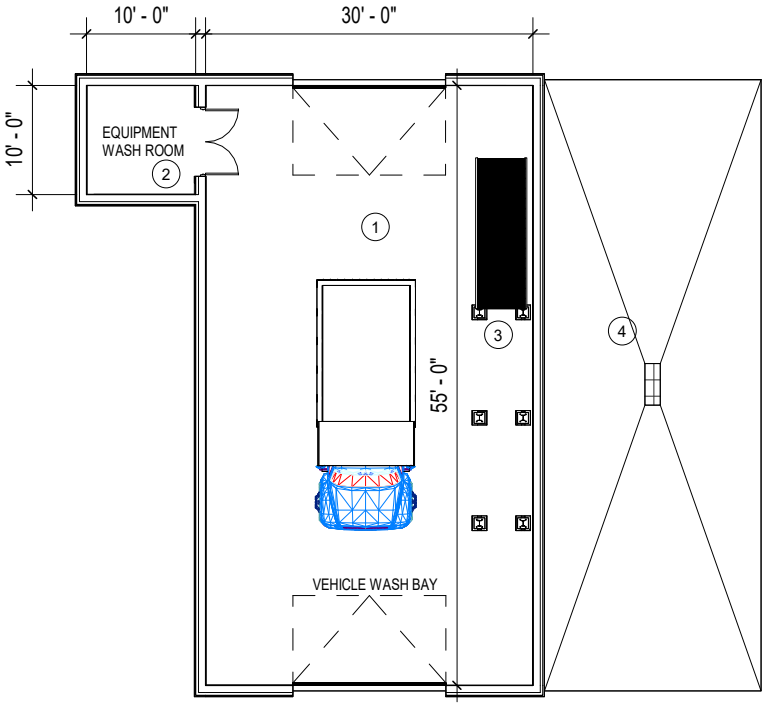
OCCUPANCY SENSORS
FOR LIGHTING CONTROLS

COMPONENTS:

1. COMPRESSOR

DRAFT





WASH BAY & EQUIPMENT ROOM - 1750 SF

1 1/16" = 1'-0"

ROOM FINISHES:

FLOORS: PVC PANELS

WALLS: PVC PANELS

CEILING: OPEN TO STRUCTURE

MEP/DATA REQUIREMENTS:

2" WATER SUPPLY

HEATING

VENTILATION

WATERPROOF DEVICES

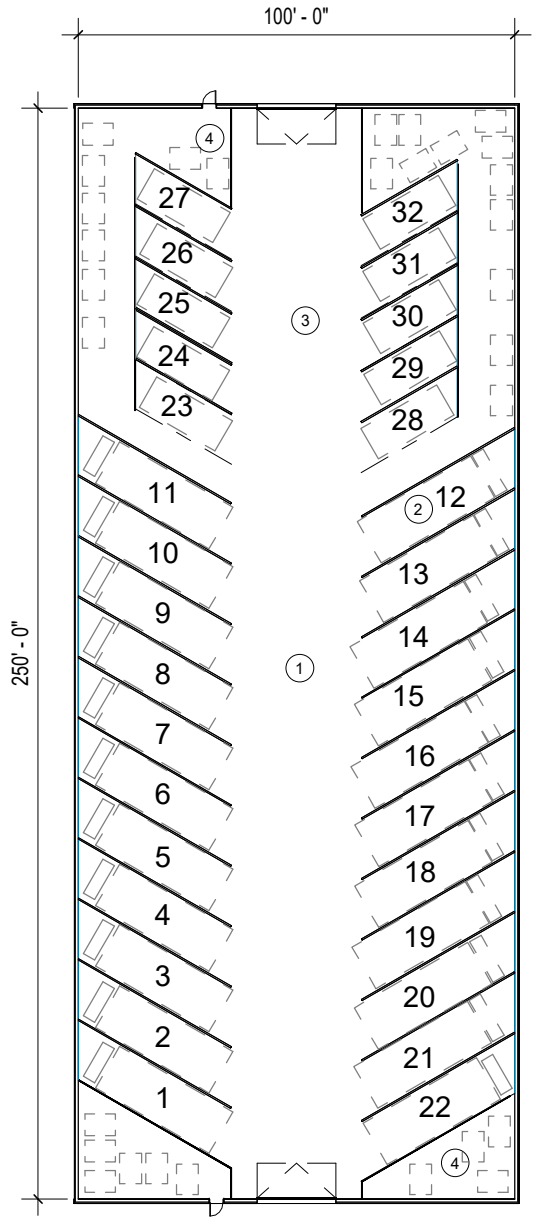
GFI ELECTRICAL OUTLETS

COMPONENTS:

1. UNDERCARRIAGE WASH
2. MANUAL WASH EQUIP. PACKAGE
3. CAT WALK
4. EXTERIOR KNOCK DOWN PAD

DRAFT

Weston & Sampson	ACTON, MA APRIL 2023	**WASH BAY & EQUIPMENT ROOM - 1750 SF**	E1



VEHICLE / EQUIPMENT STORAGE - 25,000 SF
1" = 40'-0"

ROOM FINISHES:

FLOORS: SEALED CONCRETE

WALLS: CMU, PAINTED / METAL PANEL

CEILING: OPEN TO STRUCTURE

MEP/DATA REQUIREMENTS:

HEATING

VENTILATION

COMPONENTS:

1. DRIVE-THRU AISLE
2. (22) LG VEHCILE PARKING
3. (10) SM VEHICLE PARKING
4. EQUIPMENT STORAGE

DRAFT

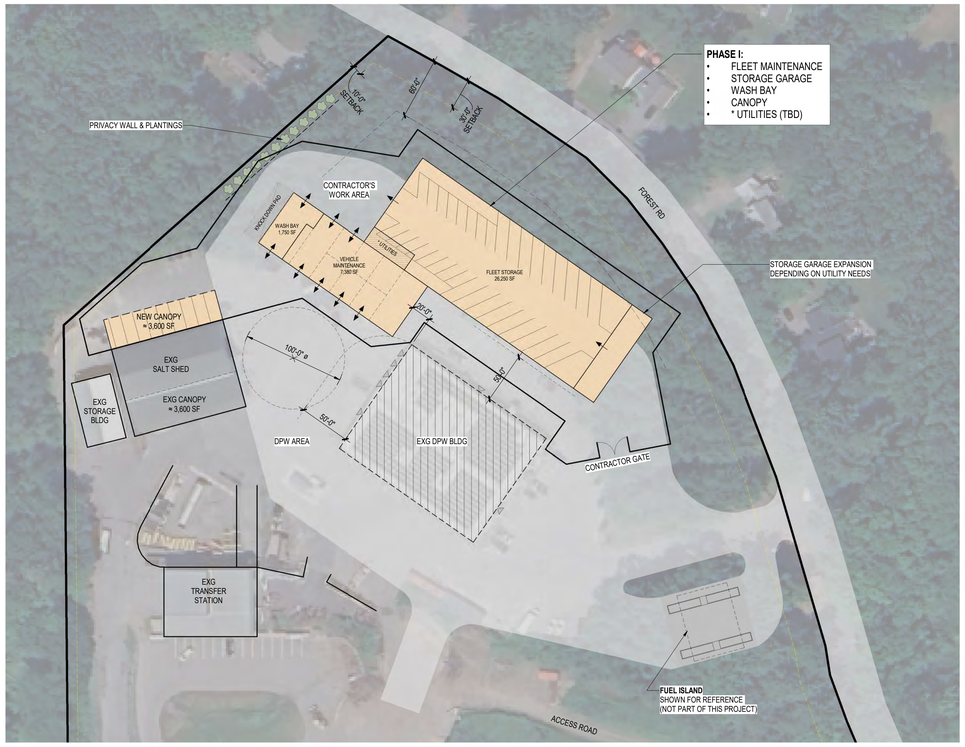
Weston & Sampson	ACTON, MA APRIL 2023	**VEHICLE / EQUIPMENT STORAGE - 25,000 SF**	F1

Town of Acton
New Public Works Facility
Schematic Design Package

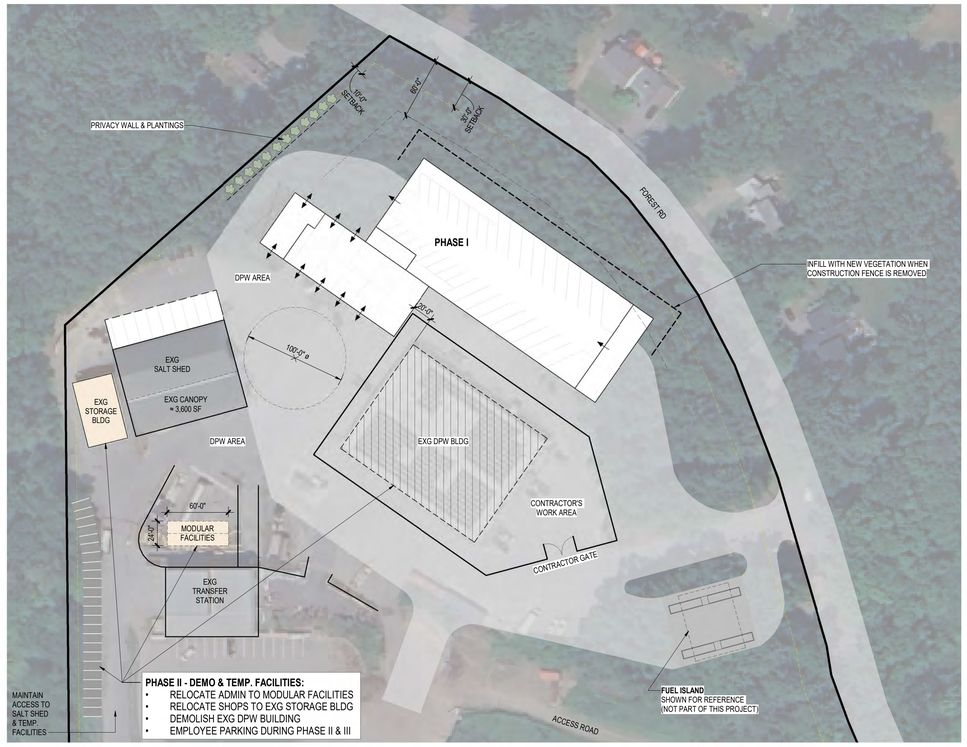
Review & Confirmation

Conceptual Phased Site Plans

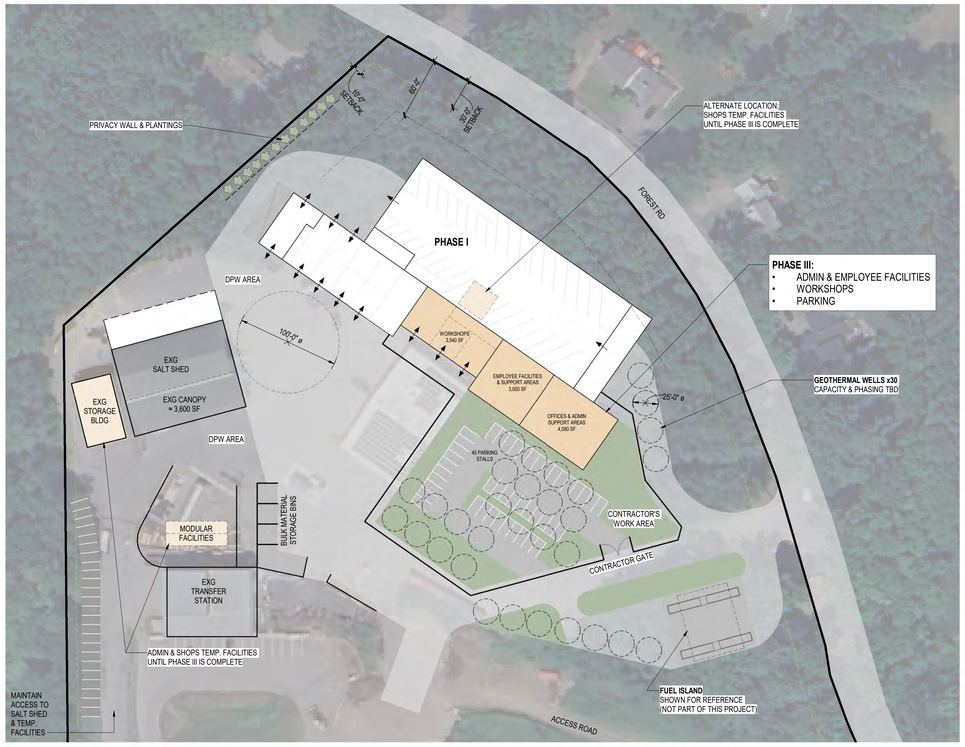
November 2024



2 SITE CONCEPT A - PHASE I
1" = 60'-0"



3 SITE CONCEPT A - PHASE II
1" = 60'-0"



1 SITE CONCEPT A - PHASE III
1" = 60'-0"



4 SITE CONCEPT A - COMPLETE
1" = 60'-0"

Town of Acton
Department of Public Works Facility

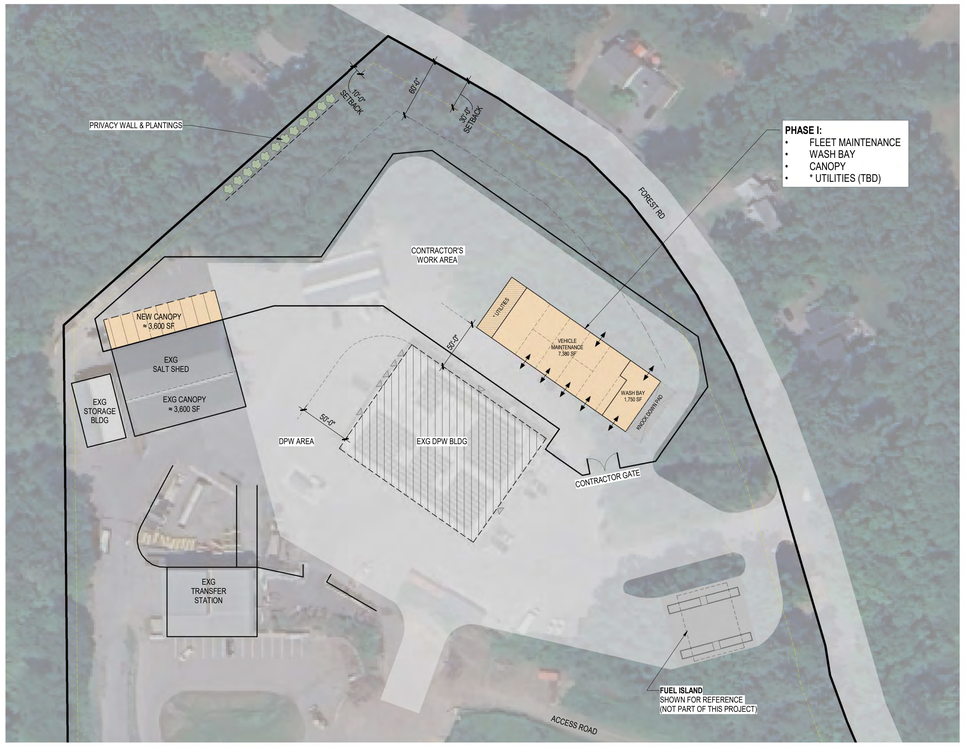
SITE CONCEPT A - PHASING PLANS

AUGUST 2024

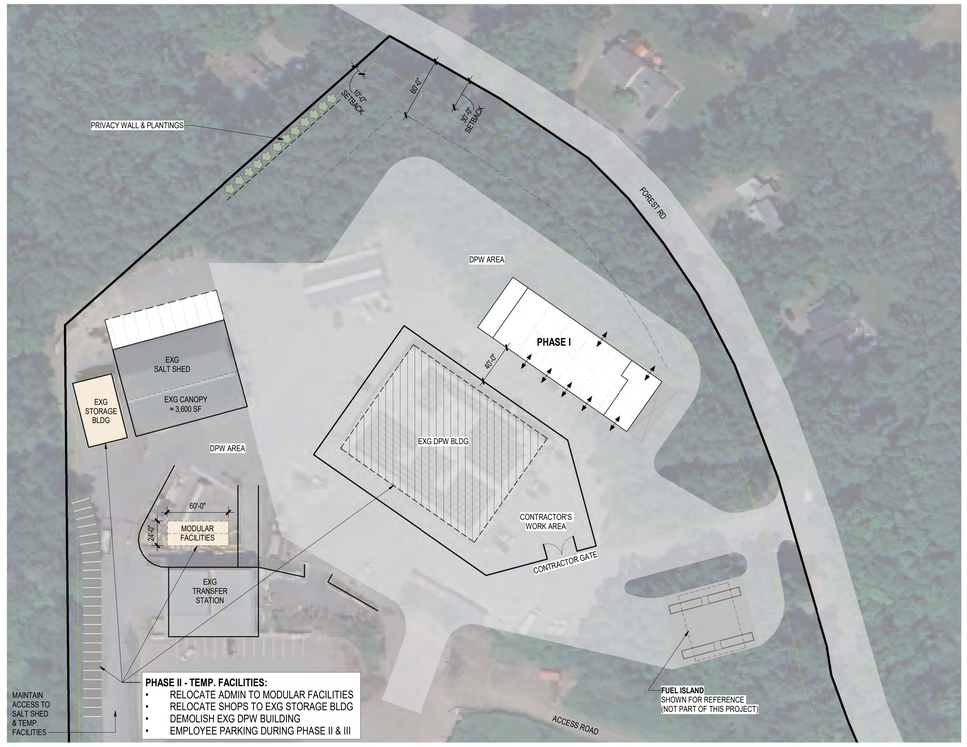
0' 30' 60' 120'
SCALE: 1" = 60'

TRUE

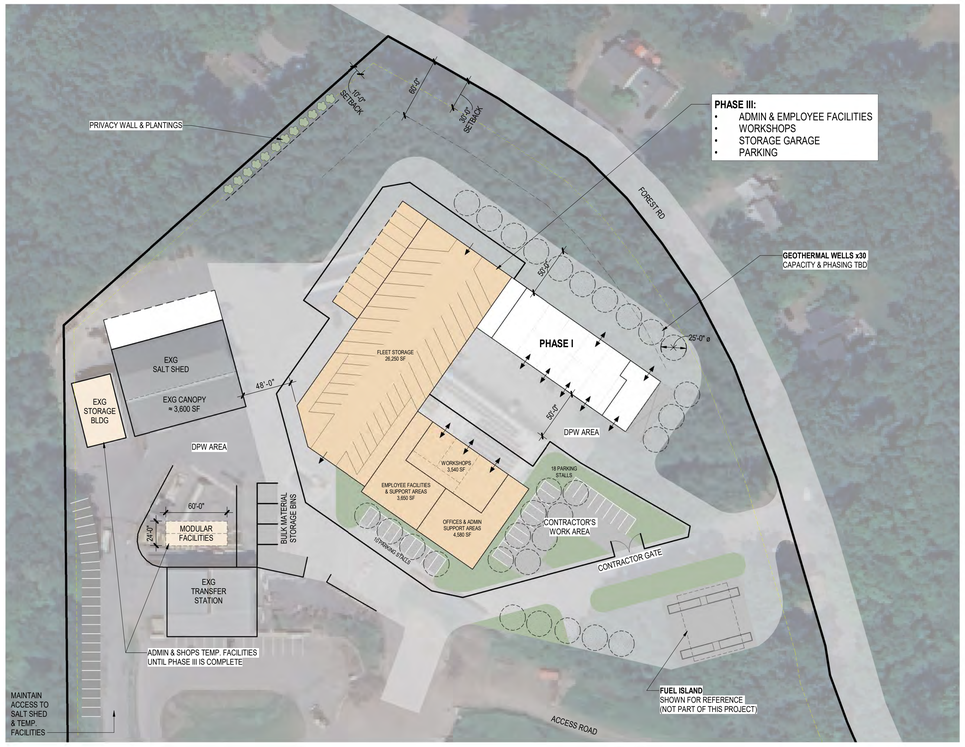
Weston & Sampson



1 SITE CONCEPT B - PHASE I
1" = 60'-0"



3 SITE CONCEPT B - PHASE II
1" = 60'-0"



2 SITE CONCEPT B - PHASE III
1" = 60'-0"



4 SITE CONCEPT B - COMPLETE
1" = 60'-0"

Town of Acton
Department of Public Works Facility

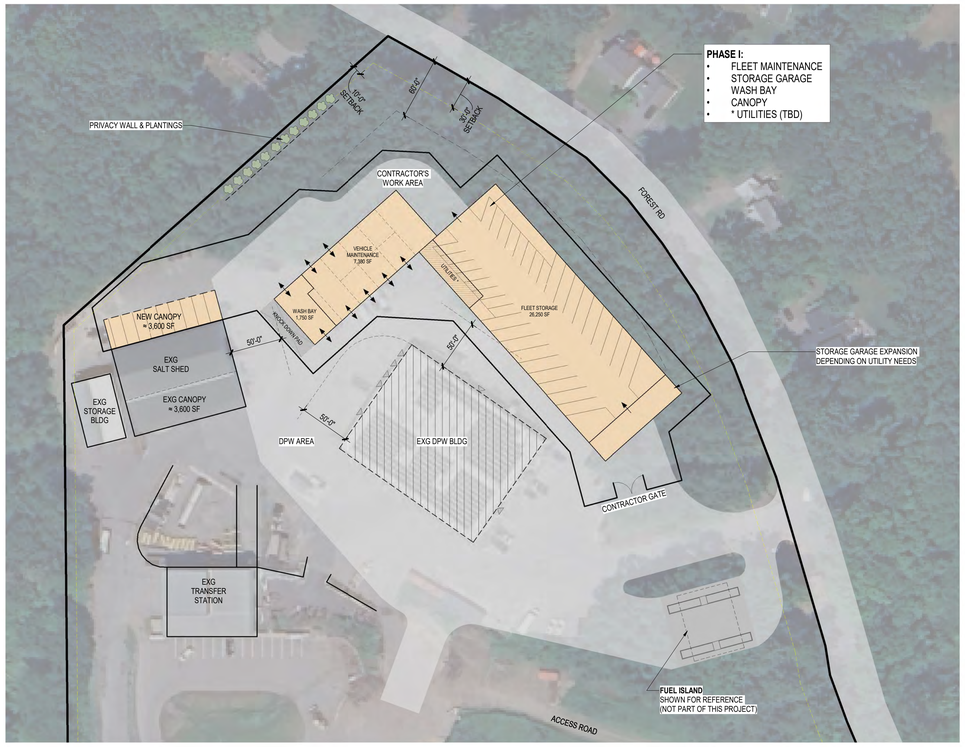
SITE CONCEPT B - PHASING PLANS

AUGUST 2024

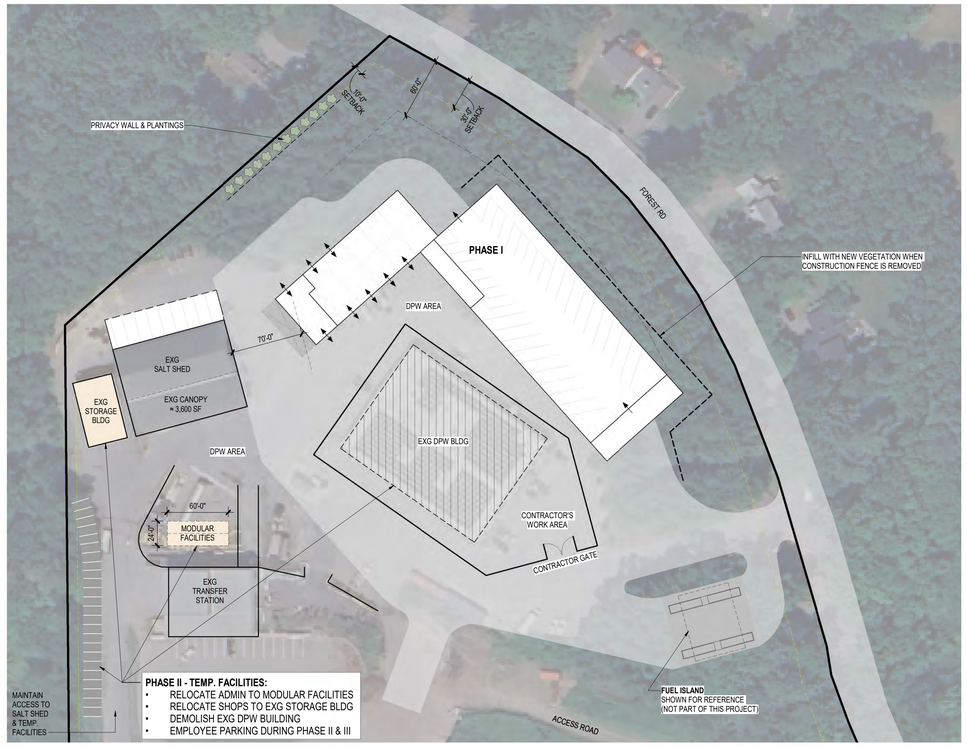
0' 30' 60' 120'
SCALE: 1" = 60'

TRUE

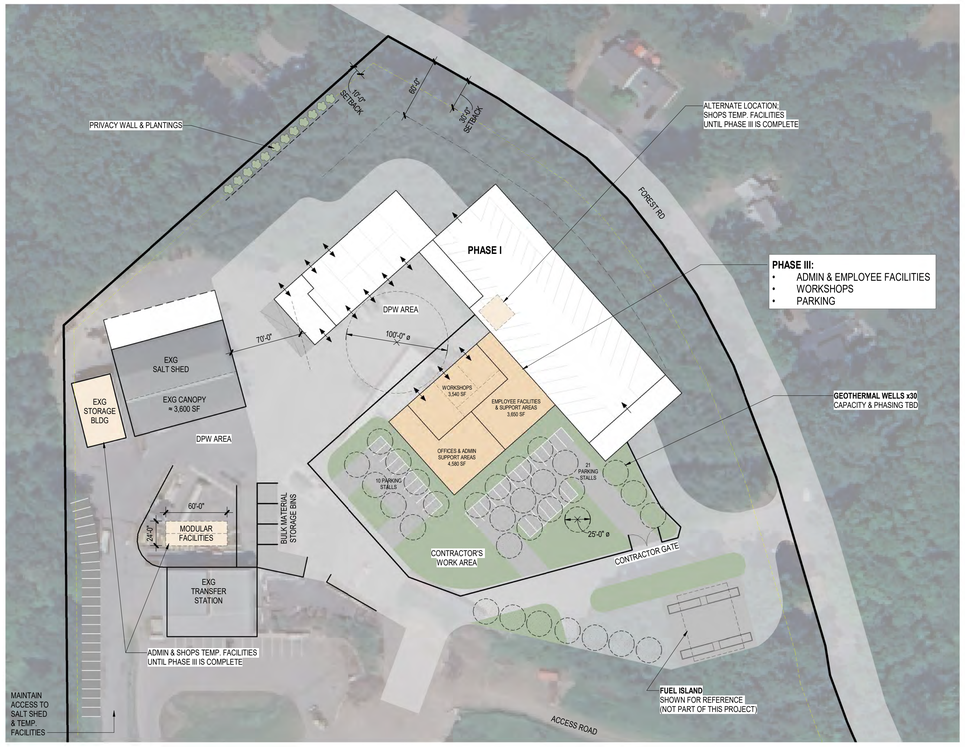
Weston & Sampson



2 SITE CONCEPT C - PHASE I
1" = 60'-0"



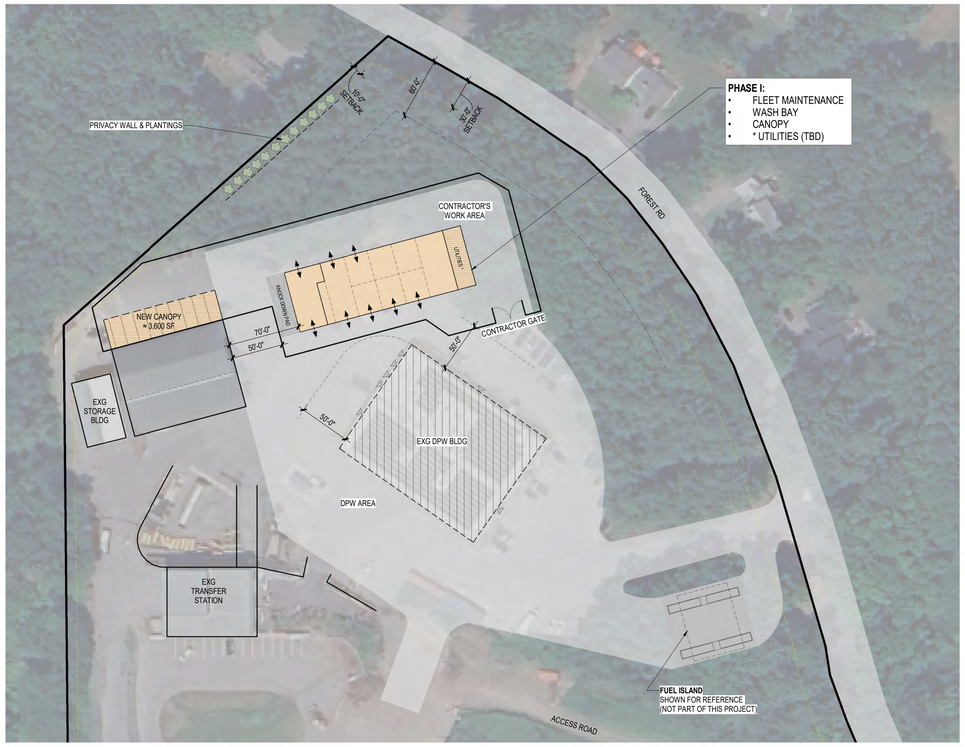
3 SITE CONCEPT C - PHASE II
1" = 60'-0"



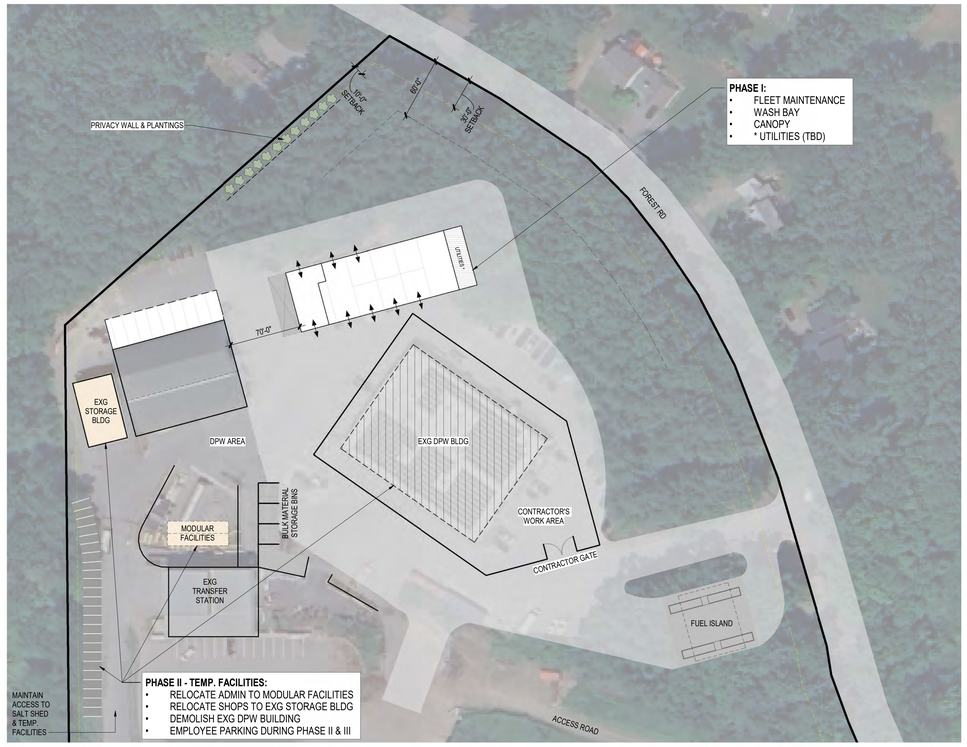
1 SITE CONCEPT C - PHASE III
1" = 60'-0"



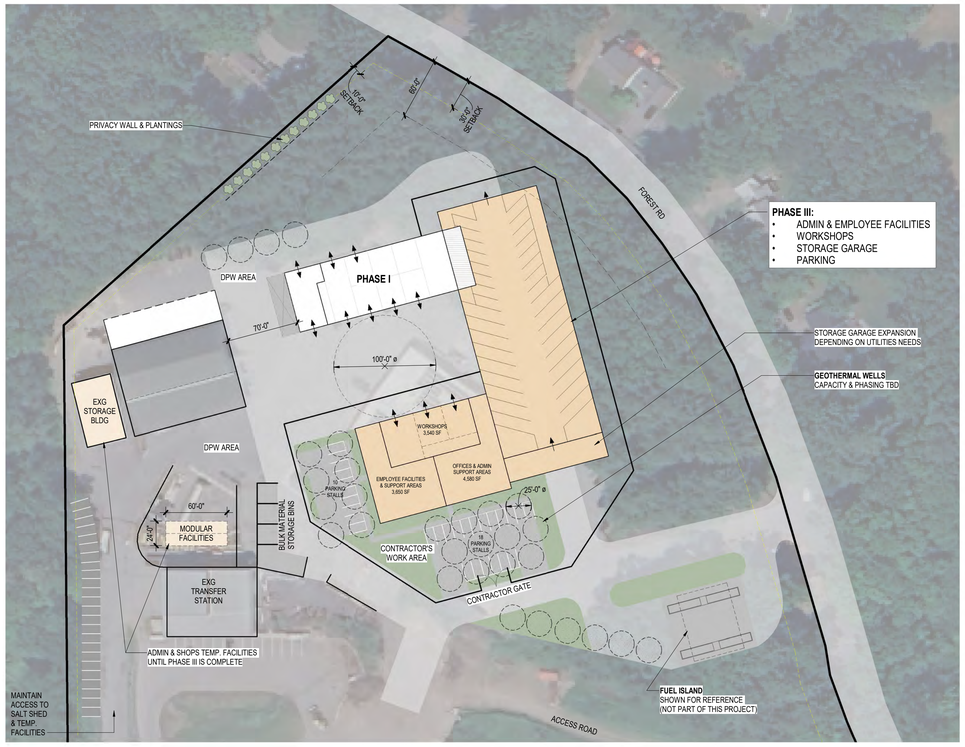
4 SITE CONCEPT C - COMPLETE
1" = 60'-0"



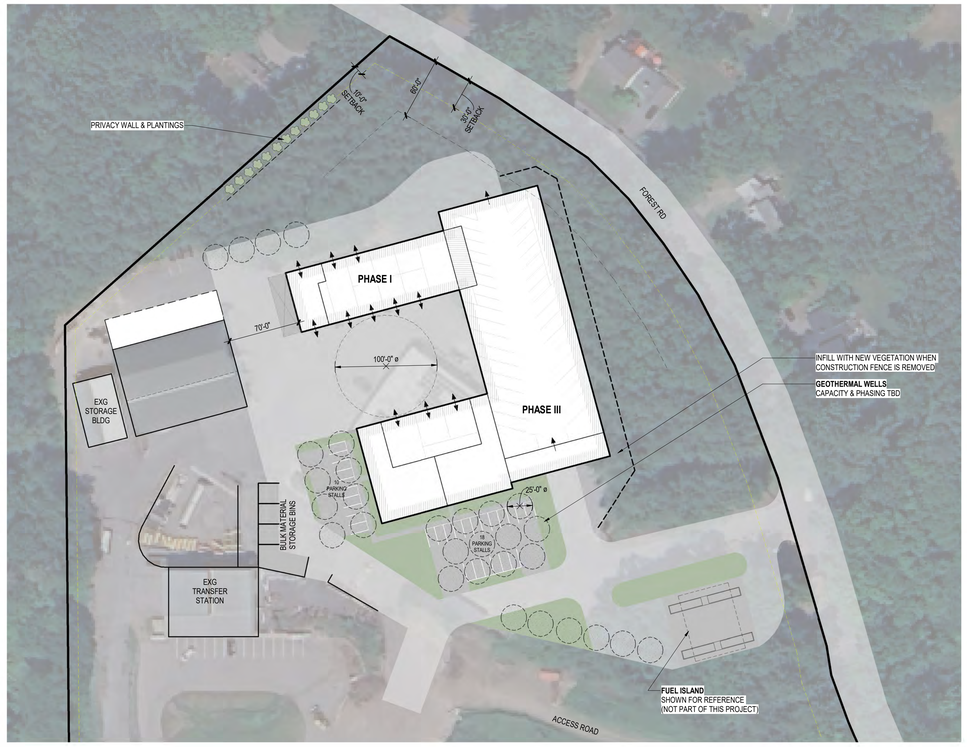
2 SITE CONCEPT D - PHASE I
1" = 60'-0"



3 SITE CONCEPT D - PHASE II
1" = 60'-0"



1 SITE CONCEPT D - PHASE III
1" = 60'-0"



4 SITE CONCEPT D - COMPLETE
1" = 60'-0"

Town of Acton
Department of Public Works Facility

SITE CONCEPT D - PHASING PLANS

AUGUST 2024

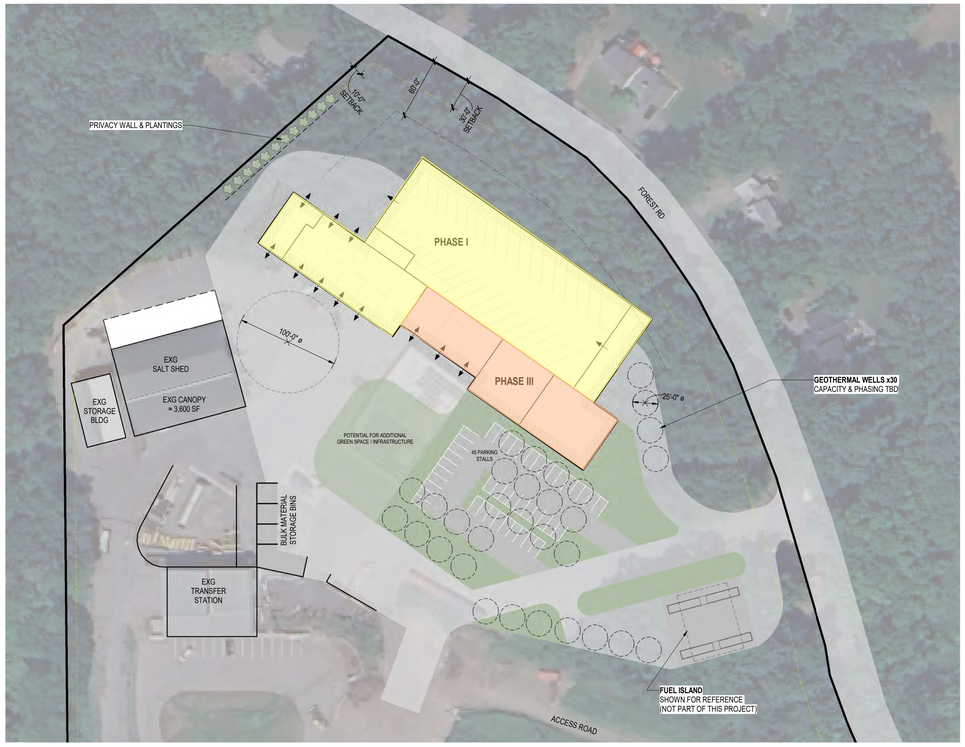
0' 30' 60' 120'
SCALE: 1" = 60'

TRUE

Weston & Sampson

Pros & Cons per Site Concept

Phased Site Concept A



Pros:

1. Phase I includes storage garage
2. Phase I can include ample utility space as needed
3. Temp. facilities are well situated during Phase I & III
4. Potential to move temp. facilities inside storage garage during Phase III
5. Allows for a lot of new green space
6. Occupied spaces are south facing for desired solar access
7. Majority of truck lights & noise contained within yard / facing away from abutters

Cons:

1. Maintenance functions close to neighbor
2. Cuts into exg vegetation a good bit
3. Septic & stormwater systems TBD and may impact phasing options and geothermal design
4. Construction work area is tight

Phased Site Concept B



Pros:

1. Large contractor work area
2. Temp. facilities are well situated during Phase I
3. Further away from neighbor
4. Allows for additional canopy storage
5. Occupied spaces are south facing for desired solar access
6. Majority of truck lights & noise contained within courtyard

Cons:

1. Close to Forest Road
2. Minimal new green space
3. Temp. facilities are far from Phase I
4. Chamfered storage garage corner loses two parking stalls
5. Septic & stormwater systems TBD and may impact phasing options and geothermal design
6. Fleet storage is not available until Phase III is complete
7. Courtyard layout is not ideal of site plowing
8. Pinch point at salt shed during Phase III

Phased Site Concept C



Pros:

1. Temp. facilities are well situated during Phase I & III
2. Potential to move temp. facilities inside storage garage during Phase III
3. Further away from neighbor
4. Allows for a lot of new green space
5. Occupied spaces are south facing for desired solar access
6. Majority of truck lights & noise contained within courtyard

Cons:

1. Septic & stormwater systems TBD and may impact phasing options and geothermal design
2. Courtyard layout is not ideal of site plowing
3. Pinch point at salt shed during Phase I

Phased Site Concept D



Pros:

1. Temp. facilities are well situated during Phase I & III
2. Requires the least site clearing
3. Further away from neighbor
4. Allows for some new green space
5. Occupied spaces are south facing for desired solar access
6. Majority of truck lights & noise contained within yard / facing away from abutters

Cons:

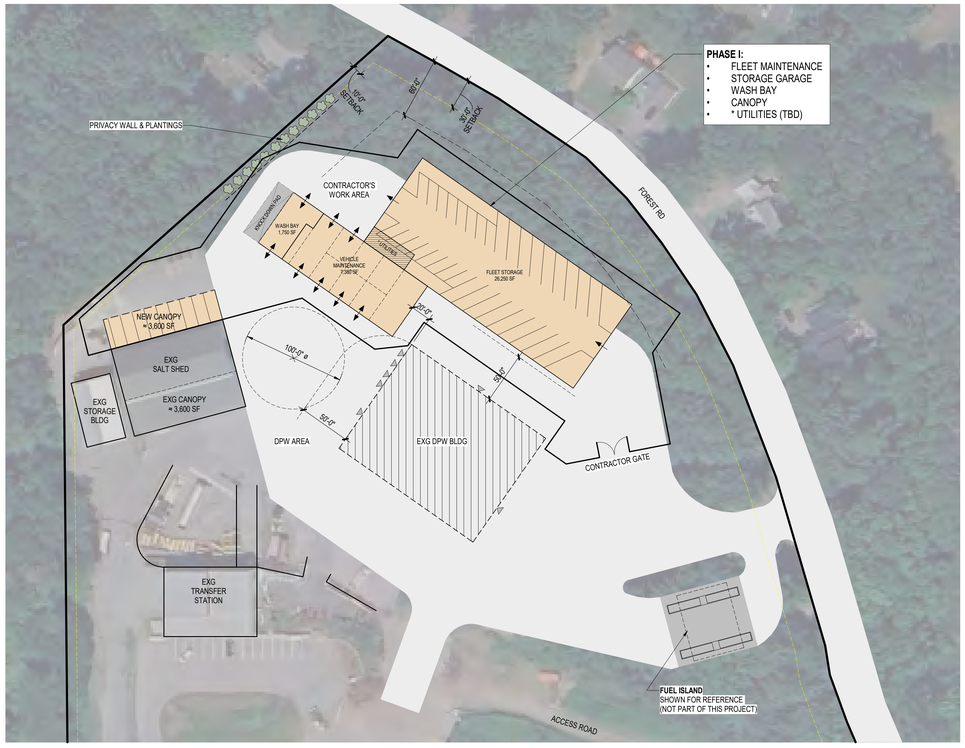
1. Septic & stormwater systems TBD and may impact phasing options and geothermal design
2. Courtyard layout is not ideal of site plowing
3. Minimal new green space
4. Fleet storage is not available until Phase III is complete
5. Pinch point at salt shed during Phase I

Town of Acton
New Public Works Facility
Schematic Design Package

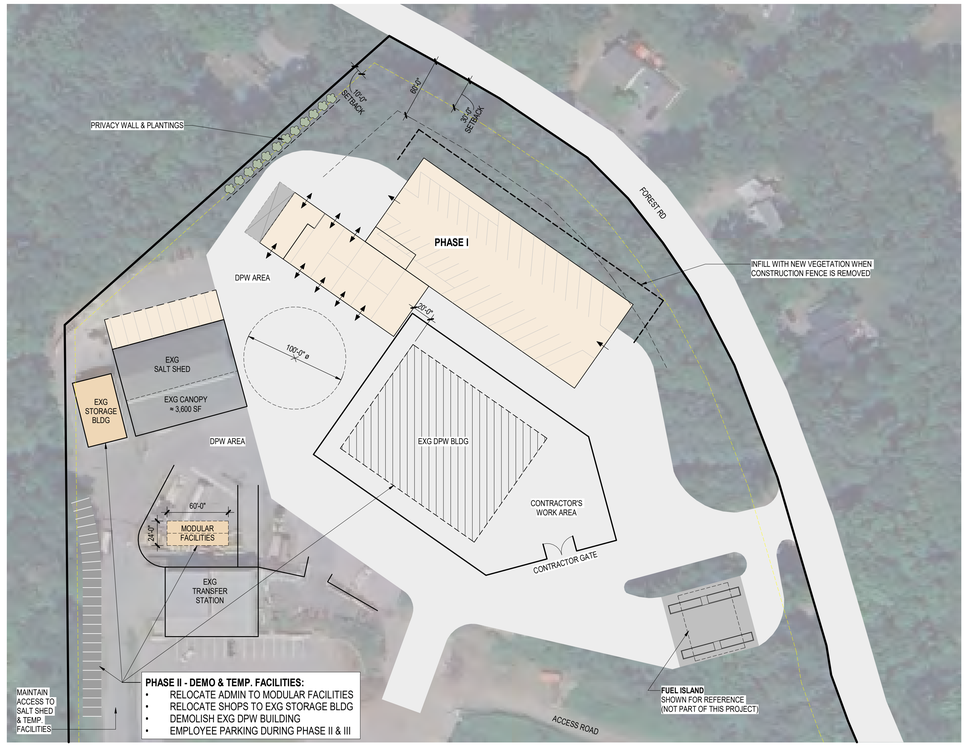
Review & Confirmation

Preferred Conceptual Phased Site Plan

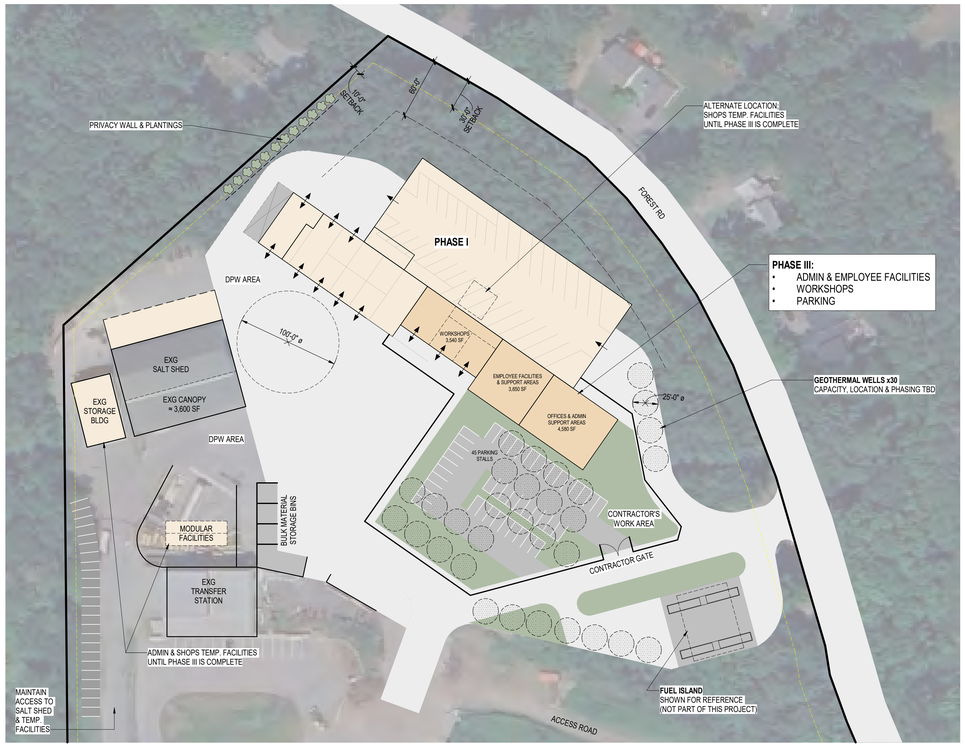
November 2024



2 SITE CONCEPT A - PHASE I
1" = 60'-0"



3 SITE CONCEPT A - PHASE II
1" = 60'-0"



1 SITE CONCEPT A - PHASE III
1" = 60'-0"



4 SITE CONCEPT A - COMPLETE
1" = 60'-0"

Town of Acton
NEW PUBLIC WORKS FACILITY

SITE CONCEPT A - PHASING PLANS

AUGUST 2024

0' 30' 60' 120'
SCALE: 1" = 60'

TRUE

Weston & Sampson

Town of Acton
New Public Works Facility
Schematic Design Package

2. Schematic Design Drawings

November 2024

TOWN OF ACTON

NEW PUBLIC WORKS FACILITY
14 FOREST ROAD, ACTON MA 01720



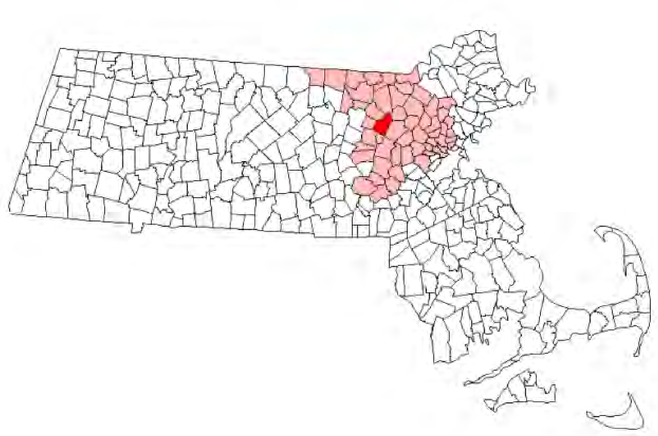
DRAWING LIST

GENERAL	
G101	CODE SUMMARY & PLANS
G102	CODE SUMMARY & PLANS
G103	CODE SUMMARY - ENERGY
1.C00	EXISTING CONDITIONS PLAN
1.C10	PH1 - SITE DEMO PLAN
1.C20	PH1 - SITE LAYOUT & UTILITY PLAN
1.C30	PH1 - GRADING & DRAINAGE PLAN
2.C10	PH2 - SITE DEMO PLAN
3.C20	PH3 - SITE LAYOUT & UTILITY PLAN
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ARCHITECTURAL	
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0.A02	PARTITION TYPES
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1.A20	PH1 - OVERALL ELEVATIONS
1.A21	PH1 - 3D VIEWS
1.A30	PH1 - BUILDING SECTIONS
1.A40	PH1 - WALL SECTIONS
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3.A12	PH3 - OVERALL REFLECTED CEILING PLAN - BELOW MEZZANINE
3.A14	PH3 - OVERALL ROOF PLAN
3.A15	PH3 - LARGE SCALE ADMIN & WORKSHOPS FLOOR & MEZZANINE PLANS
3.A16	PH3 - LARGE SCALE ADMIN REFLECTED CEILING PLAN
3.A20	PH3 - OVERALL ELEVATIONS
3.A21	PH3 - 3D VIEWS
3.A30	PH3 - BUILDING SECTIONS
3.A40	PH3 - WALL SECTIONS
1.EQ10	MAINTENANCE EQUIPMENT LAYOUT
2.EQ10	TEMPORARY SHOP EQUIPMENT FIT-OUT
3.EQ10	WORKSHOPS EQUIPMENT LAYOUT PLAN

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MASSACHUSETTS MUNICIPAL MAP N.T.S.



LOCUS MAP N.T.S.



PARCEL MAP N.T.S.

COA

Issue Date: November 1, 2024

Issued For: SCHEMATIC DESIGN

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PARTITION LETTERING: IBC 2015 - 703.7 MARKING AND IDENTIFICATION

4 HOUR FIRE WALL - PROTECT ALL OPENINGS

3 HOUR FIRE WALL - PROTECT ALL OPENINGS

2 HOUR FIRE WALL - PROTECT ALL OPENINGS

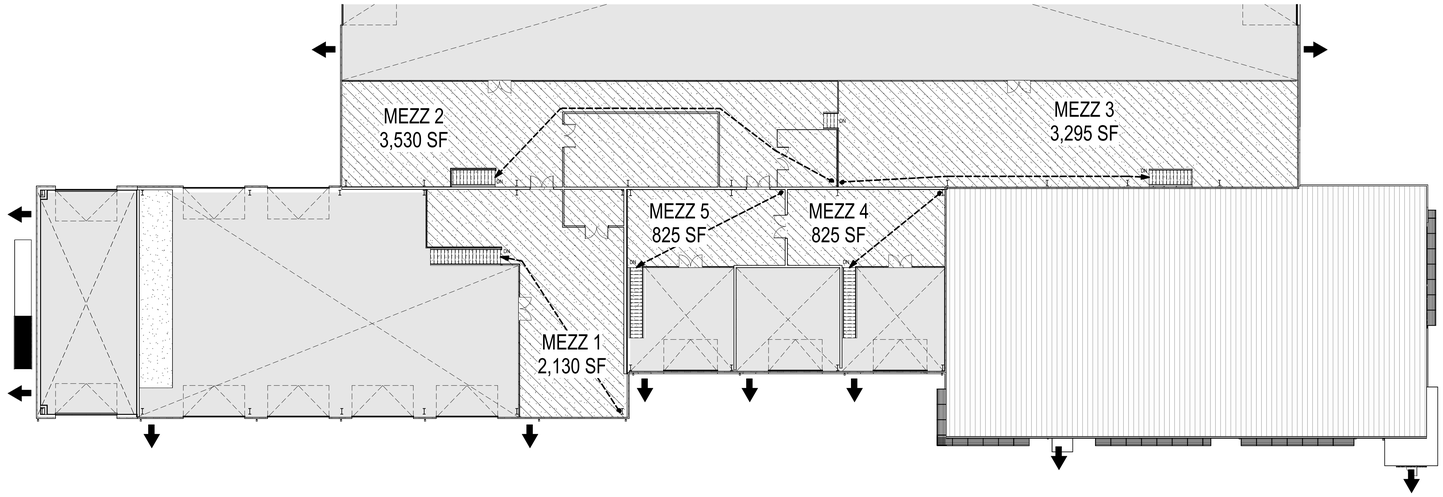
1 HOUR FIRE WALL - PROTECT ALL OPENINGS

1 HOUR SMOKE BARRIER - PROTECT ALL OPENINGS

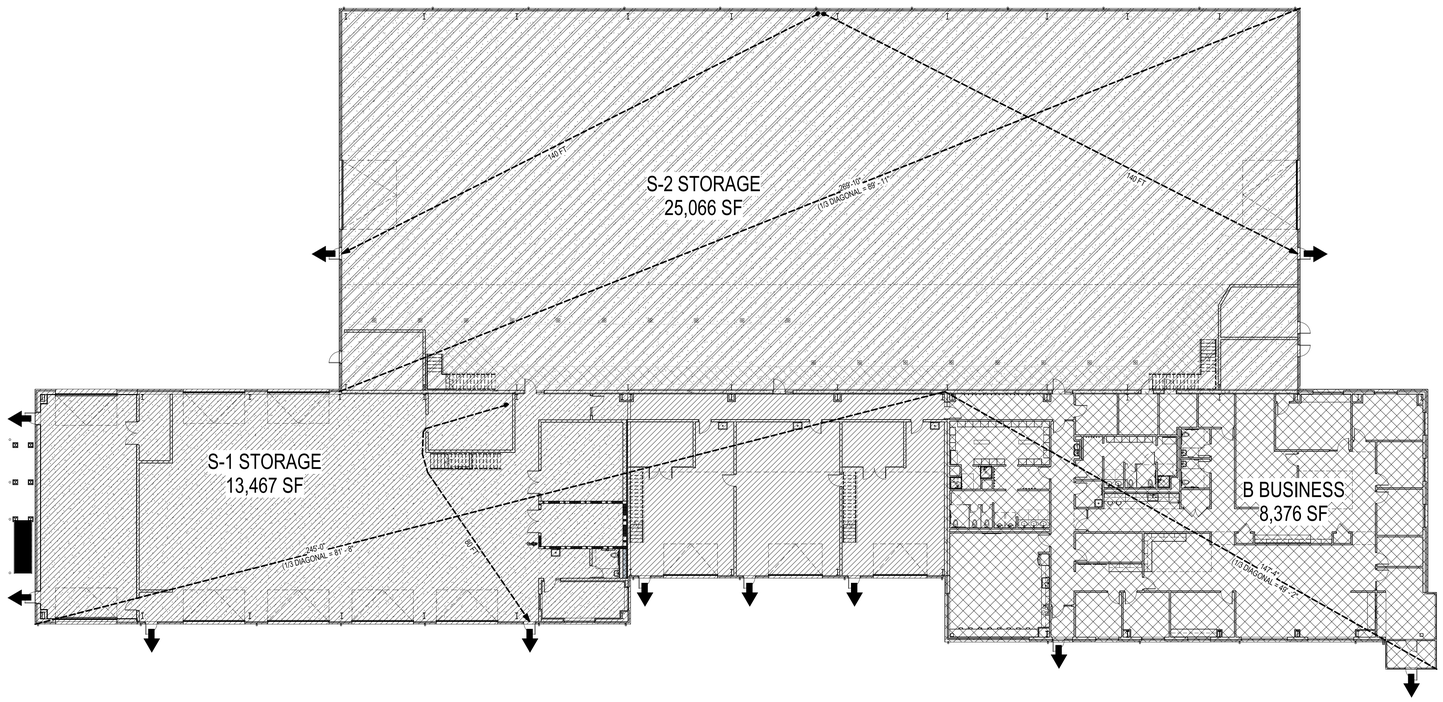
SMOKE BARRIER PARTITIONS - PROTECT ALL OPENINGS

APPLICABILITY:
- APPLY TO OUTSIDE OF FIRE RATED SHAFTS AND TO BOTH SIDES OF PARTITIONS AT INTERVALS NOT TO EXCEED 30'-0" FOR ENTIRE LENGTH OF PARTITION OR WALL OR TWICE ANY PARTITION 30'-0" IN LENGTH OR LESS. MINIMUM 15'-0" FROM EACH END OF PARTITION ALSO.
- LOCATE IDENTIFICATION IN ALL ACCESSIBLE FLOOR, FLOOR-CEILING AND ATTIC SPACES. LOCATE IDENTIFICATION WITHIN 12 - 18 INCHES ABOVE FINISHED CEILINGS
- APPLY STENCILED LETTERING BY SPRAY OR BRUSH OR PROVIDE PERMANENT SIGNAGE. IDENTIFICATION SHALL BE WATERPROOF, FADE-PROOF, AND NON-COMBUSTIBLE. SIGNAGE SHALL BE MECHANICALLY FASTENED OR PERMANENTLY ADHERED TO PARTITION OR SHAFT.
- STENCIL CHARACTER HEIGHT - 3" MINIMUM
- COLOR - EASILY IDENTIFIABLE COLOR, CONTRASTING WITH BACKGROUND ACCEPTABLE TO OWNER

1 CHAPTER 7 CODE RATED WALL LABELS
1 1/2" = 1'-0"



5 PH3 - CODE PLAN - MEZZANINE PLAN - OCCUPANCY
1/16" = 1'-0" 1/ 1.A20



4 PH3 - CODE PLAN - OVERALL FLOOR PLAN - USE GROUP
1/16" = 1'-0" 1/ 1.A20

USE GROUP LEGEND

- USE GROUP: S-1 STORAGE
- USE GROUP: B BUSINESS
- USE GROUP: S-2 STORAGE
- MEZZANINE

DEFERRED SUBMITTALS IBC 107.3.4.1

SPECIFICATION NUMBER

DIVISION 5
05 50 00 – METAL FABRICATIONS
- MEZZ GUARDRAILS
- STAIRS
- HOSE REEL SUPPORTS
- SHIPS LADDERS
- EXTERIOR ROOF ACCESS LADDER
- BOLLARDS

DIVISION 11
11 42 23 – FALL PROTECTION
- ROOF FALL PROTECTION

DIVISION 13
13 42 00 – PRE-ENGINEERED METAL BUILDING

DIVISION 21
21 13 13 – WET PIPE SPRINKLER SYSTEMS
21 13 16 – DRY PIPE SPRINKLER SYSTEMS

DIVISION 22
22 11 13 – FACILITY NATURAL-GAS PIPING
- ANCHOR / RESTRAINTS

DIVISION 23
23 05 29 – HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
23 05 48 – VIBRATIONS AND SEISMIC CONTROLS FOR HVAC
23 21 13 – HYDRONIC PIPING
23 31 13 – METAL DUCTS
23 34 24 – HVAC POWER VENTILATORS
23 52 16 – CONDENSING BOILERS
23 72 00 – AIR TO AIR ENERGY RECOVERY EQUIPMENT
23 74 16.11 – PACKAGED, SMALL CAPACITY ROOFTOP AIR-CONDITIONING UNITS

DIVISION 27
27 05 36 – CABLE TRAYS FOR COMMUNICATIONS SYSTEMS
- ANCHORS AND SUPPORTS FOR CABLE TRAYS

CODE SUMMARY:

THE PROPOSED ACTON DEPARTMENT OF PUBLICS WORKS FACILITY CONSISTS OF A NON-SEPARATED "MIXED-USE" BUILDING PROGRAM, INCLUDING THREE (3) MAIN OPERATIONAL COMPONENTS, AS FOLLOWS:

1. **USE GROUP "B", BUSINESS**: A ONE-STORY ADMINISTRATION WING, CONSISTING OF EMPLOYEE SUPPORT SPACES (E.I. LUNCH/TRAINING ROOM, MEN'S & WOMEN'S LOCKER ROOM ETC.), DIRECTORS' OFFICES, SHARED ADMINISTRATIVE OFFICE, PUBLIC SERVICE COUNTERS AND OFFICE SUPPORT SPACES.

2. **USE GROUP "S-1" MODERATE HAZARD USE**: SINGLE-STORY, DOUBLE-HEIGHT VEHICLE MAINTENANCE AND DEPARTMENT SHOP AREAS AND ADJACENT VEHICLE WASH-BAY. MAINTENANCE AND SHOP AREAS HAVE ASSOCIATED OPEN MEZZANINE SPACE.

3. **USE GROUP "S-2" LOW HAZARD USE**: SINGLE-STORY, MINIMALLY HEATED VEHICLE & EQUIPMENT STORAGE GARAGE AREA.

THE BUILDING IS STEEL-FRAMED WITH CONCRETE SLAB FLOORS AND MEZZANINE LEVEL STEEL DECK AND CONCRETE SLAB. THE BUILDING ENCLOSURE CONSISTS OF A INSULATED STANDING SEAM METAL ROOF SYSTEM, FACTORY FOAMED IN PLACE INDUSTRIAL METAL PANEL WALL SYSTEM AND BRICK VENEER ON METAL STUD BACKUP WALL WITH AN INSULATED CMU BASE WALL. ALUMINUM STOREFRONT GLAZING IS PROVIDED AT THE ADMINISTRATION WING AND TRANSLUCENT PANEL DAYLIGHT SYSTEMS ARE INCORPORATED INTO THE WALL PANEL SYSTEM AT THE INDUSTRIAL SHOP AREAS.

SPECIFIC ASPECTS OF THIS BUILDING TO NOTE ARE AS FOLLOWS:

1. A 2-HOUR FIRE-RESISTANCE RATED FLUID STORAGE ROOM IS PROVIDED TO STORE FLAMMABLE / HAZARDOUS FLUIDS USED FOR THE MAINTENANCE & REPAIR OF VEHICLES
2. A STANDBY GENERATOR, WHICH IS HOUSED WITHIN A SOUND-ATTENUATED ENCLOSURE IS LOCATED ON THE XXXX SIDE OF THE EXTERIOR OF THE BUILDING AND IS SIZED TO PROVIDE FULL OPERATIONAL POWER TO THE FACILITY.
3. THE BUILDING IS FULLY SPRINKLED PER NFPA 13 REQUIREMENTS, AND WILL HAVE AN EMERGENCY VOICE / ALARM COMMUNICATION SYSTEM.
4. WITH EXCEPTIONS OF MEZZANINES, THE BUILDING AND FACILITY ARE FULLY ACCESSIBLE AND MEET ADA AND CMR 521 MASSACHUSETTS ARCHITECTURAL ACCESS BOARD REGULATIONS.

GENERAL BUILDING INFORMATION:
ALL AREAS ARE SHOWN IN GROSS SQUARE FEET (GSF).

BUILDING FOOTPRINT AREA (NOT INCLUDING VEHICLE CANOPY):	**46,910 GSF**
TOTAL BUILDING SQUARE FOOT AREA (NOT INCLUDING MEZZANINES):	**46,910 GSF**
1. USE GROUP "B" , BUSINESS (ADMINISTRATION / STAFF WING)	**8,376 GSF**
2. USE GROUP "S-1", MODERATE HAZARD STORAGE (VEHICLE MAINTENANCE / WASH / WORKSHOPS):	**13,467 GSF**
3. USE GROUP "S-2", LOW HAZARD STORAGE (VEHICLE & EQUIPMENT STORAGE GARAGE)	**25,066 GSF**
BUILDING HEIGHT (TO ROOF RIDGE AT VEHICLE STORAGE AREA):	**33' - 10"**

APPLICABLE CODES AND STANDARDS:
- MASSACHUSETTS STATE BUILDING CODE & APPROPRIATE AMENDMENTS:
  - 780 CMR NINTH EDITION
  - IBC 2015
- 2015 INTERNATIONAL MECHANICAL CODE (IMC)
- 248 CMR 10.00 UNIFORM STATE PLUMBING CODE (USPC)
- 2023 NATIONAL ELECTRICAL CODE
- 2023 MASSACHUSETTS ENERGY CODE
  - 2021 IECC W/ MA AMENDMENTS
  - 225 CMR 23.00 - MA COMMERCIAL STRETCH ENERGY CODE
  - APPENDIX CC - MA MUNICIPAL OPT-IN SPECIALIZED ENERGY CODE
- 2019 MASSACHUSETTS COMPREHENSIVE FIRE CODE
  - 527 CMR, BOARD OF FIRE PREVENTION REGULATIONS
  - NFPA 1 FIRE CODE, 2015 EDITION
- 271 CMR: BOARD OF EXAMINERS OF SHEET METAL WORKERS
- 521 CMR ARCHITECTURAL ACCESS BOARD REGULATIONS

BUILDING CODE ANALYSIS:

CHAPTER 3 - USE AND OCCUPANCY CLASSIFICATION

(SECT. 304) USE GROUP B (BUSINESS):	**8,376 GSF**
(SECT. 311.2) USE GROUP S-1 (MODERATE-HAZARD STORAGE):	**13,467 GSF**
(SECT. 311.3) USE GROUP S-2 (LOW-HAZARD STORAGE):	**25,066 GSF**
TOTAL BUILDING:	**46,910 GSF**

CHAPTER 5- GENERAL BUILDING HEIGHTS AND AREAS

(SECT. 504.3) ALLOWABLE BUILDING HEIGHT
TYPE IIB CONSTRUCTION
"B" AND "S" OCCUPANCY, SPRINKLED
ALLOWABLE HEIGHT: **75' - 0"**
PROPOSED HEIGHT (COMPLIANT): **33' - 10"**

(SECT. 504.4) ALLOWABLE NUMBER OF STORIES
"S-1" OCCUPANCY (MOST RESTRICTIVE)
ALLOWABLE STORIES: **3 STORIES**
PROPOSED STORIES (COMPLIANT): **1 STORY**

(SECT. 506.2) ALLOWABLE BUILDING AREA
GROUP "S-1" (MOST RESTRICTIVE): **70,000 SF**
(FOR 1-STORY STRUCTURE OF TYPE IIB CONSTRUCTION, W/ SPRINKLER SYSTEM)
PROPOSED AREA FOR TOTAL BUILDING: **46,910 GSF**
PROPOSED HEIGHT FOR TOTAL BUILDING: **1 STORY**

(SECT. 505.2.1) MEZZANINES

MEZZANINE 1: (MAINTENANCE)
MAINTENANCE AREA: = 18,735 SF
ALLOWABLE MEZZANINE AREA: = 18,735 x 1/2 = 9,367 SF
ACTUAL MEZZANINE AREA: = 2,130 SF

MEZZANINE 2 + 3: (STORAGE)
FLEET STORAGE AREA: = 23,777 SF
ALLOWABLE MEZZANINE AREA: = 23,777 x 1/2 = 11,888 SF
ACTUAL MEZZANINE AREA: = 6,825 SF

MEZZANINE 4: (WORKSHOP)
WORKSHOP AREA: = 1,060 SF
ALLOWABLE MEZZANINE AREA: = 1,060 x 1/2 = 530 SF
ACTUAL MEZZANINE AREA: = 825 SF

MEZZANINE 5: (WORKSHOP)
WORKSHOP AREA: = 1,100 SF
ALLOWABLE MEZZANINE AREA: = 1,100 x 1/2 = 550 SF
ACTUAL MEZZANINE AREA: = 825 SF

(SECT. 508.3.2) MIXED USE AND OCCUPANCY, NON-SEPARATED OCCUPANCIES
GROUP "S-1" (MOST RESTRICTIVE OCCUPANCY)
ALLOWABLE AREA FOR USE GROUP S: **70,000 SF**
ALLOWABLE HEIGHT FOR USE GROUP S: **1 STORY, SPRINKLED**

(SECT. 509) INCIDENTAL USES
AUTOMATIC SPRINKLER SYSTEM PROVIDED
FURNACE ROOM WITH > 400,000 BTUh
BOILER ROOM WITH > 15 PSI AND > 10 HORSEPOWER

INCIDENTAL USES - 1 OR 2 HOUR SEPARATION PROVIDED AT ELECTRICAL ROOM > KVA - AUTOMATIC SPRINKLER SYSTEM AND 1-HOUR SEPARATION PROVIDED AT FLUID STORAGE ROOM.

CHAPTER 6 - TYPES OF CONSTRUCTION

(TABLE 601) FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS

CONSTRUCTION TYPE IIB - BUILDING ELEMENTS
STRUCTURAL FRAME (INC. COLUMNS, GIRDERS AND TRUSSES): 0 HRS
BEARING WALLS - EXTERIOR: 0 HRS
BEARING WALLS - INTERIOR: 0 HRS
NON BEARING WALLS AND PARTITIONS - EXTERIOR: 0 HRS
NON BEARING WALLS AND PARTITIONS - INTERIOR: 0 HRS
FLOOR CONSTRUCTION: 0 HRS
ROOF CONSTRUCTION: 0 HRS

(TABLE 602) FIRE RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE

CONSTRUCTION TYPE IIB
FIRE SEPARATION DISTANCE = X
SEPARATION DISTANCE TO FUELING FACILITY: X > 30
OCCUPANCY USE GROUP S-1: 0 HRS
OCCUPANCY USE GROUP S-2: 0 HRS

(SECT. 602.2) CONSTRUCTION TYPE IIB, NONCOMBUSTIBLE, FULLY SPRINKLED

CHAPTER 9 - FIRE PROTECTION SYSTEMS

(SECT. 903.2.9) USE GROUP S-1
REQUIRE AUTOMATIC SPRINKLER SYSTEMS WHERE FIRE AREAS EXCEED 12,000 SF, OR WHERE FIRE AREAS USED FOR THE STORAGE OR REPAIR OF COMMERCIAL MOTOR VEHICLES EXCEED 5,000 SF.

(SECT. 903.3.1.1) ALTERNATIVE PROTECTION
AN NFPA-13 COMPLIANT AUTOMATIC SPRINKLER SYSTEM WILL BE PROVIDED AT ALL INTERIOR BUILDING AREAS. SHOP AND VEHICLE STORAGE AREA WILL HAVE DRY-PIPE ZONES.

(SECT. 907.5.2.2) EMERGENCY VOICE / ALARM COMMUNICATION SYSTEM
AS REQUIRED UNDER SECTION 505.2.1, EXCEPTION #2, AN NFPA-72 COMPLIANT EMERGENCY VOICE / ALARM COMMUNICATION SYSTEM WILL BE PROVIDED.

CHAPTER 10 - MEANS OF EGRESS

(TABLE 1004.1.2) MAXIMUM FLOOR AREA ALLOWANCE PER OCCUPANT

STORAGE AREA S-1		=	300 GSF / OCC
STORAGE AREA S-2		=	300 GSF / OCC
BUSINESS / OFFICE AREA B		=	100 GSF / OCC
ASSEMBLY (MUSTER ROOM)		=	15 NSF / OCC
LOCKER ROOM		=	50 GSF / OCC
MEZZANINES (S-1, S-2)		=	300 GSF / OCC
MECHANICAL ROOM		=	300 GSF / OCC

(SECT. 1004) OCCUPANT LOAD

STORAGE AREA S-1 :	13,467 SF (+ 300 SF/OCC)	=	45 OCCUPANTS
MEZZ: 1	2,130 SF (+ 300 SF/OCC)	=	7 OCCUPANT
MEZZ: 4	825 SF (+ 300 SF/OCC)	=	3 OCCUPANTS
MEZZ: 5	824 SF (+ 300 SF/OCC)	=	3 OCCUPANTS
STORAGE AREA S-2:	23,777 SF (+ 300 SF/OCC)	=	79 OCCUPANTS
MEZZ: 2	3,530 SF (+ 300 SF/OCC)	=	11 OCCUPANTS
MEZZ: 3	3,295 SF (+ 300 SF/OCC)	=	11 OCCUPANTS
BUSINESS / OFFICE AREA B:	8,376 SF (+ 100 SF/OCC)	=	84 OCCUPANTS
MUSTER ROOM:	697 NSF (+ 15 SF/OCC)	=	46 OCCUPANTS
MALE LOCKER ROOMS:	682 SF (+ 50 SF/OCC)	=	14 OCCUPANT
FEMALE LOCKER ROOMS:	309 SF (+ 50 SF/OCC)	=	6 OCCUPANT
MECHANICAL ROOM:	772 SF (+ 300 SF/OCC)	=	3 OCCUPANT
TOTAL:		=	**312 OCCUPANTS**

(SECT. 1005) MEANS OF EGRESS SIZING

STORAGE AREA S-1 (INCLUDING MEZZANINES AND MECHANICAL ROOM):			
DOORWAY WIDTH REQUIRED MIN.	58 OCC @ 0.2 IN. PER OCC	=	12 IN
DOORWAY WIDTH PROVIDED	34" (x 7 DOORS)	=	238 IN
STORAGE AREA S-2 (INCLUDING MEZZANINE):			
DOORWAY WIDTH REQUIRED MIN.	101 OCC @ 0.2 IN PER OCC	=	20 IN
DOORWAY WIDTH PROVIDED	34" (x 2 DOORS)	=	68 IN
BUSINESS / OFFICE AREA B:			
DOORWAY WIDTH REQUIRED MIN.	150 OCC @ 0.2 IN PER OCC	=	30 IN
DOORWAY WIDTH PROVIDED	34" (x 2 DOORS)	=	68 IN

(SECT. 1006) NUMBER OF EXITS AND EXIT ACCESS DOORWAYS

(TABLE 1006.2.1) MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (FT)		
B AND **S** OCCUPANCIES, WITH SPRINKLER SYSTEM	=	100 FT
MAXIMUM PROVIDED	=	99FT
(TABLE 1006.2.1) SPACE WITH ONE EXIT		
S OCCUPANCY (MOST RESTRICTIVE) MAXIMUM OCCUPANCY	=	29
MAXIMUM PROVIDED	=	8
(TABLE 1006.3.1) MINIMUM NUMBER OF EXITS PER STORY		
REQUIRED FOR 1-500 OCCUPANTS	=	2
PROVIDED	=	17

(SECT. 1007) EXIT AND EXIT ACCESS DOORWAY CONFIGURATION
1007.1.1 EXCEPTION #2: WHERE A BUILDING IS EQUIPPED THROUGHOUT WITH AN AUTOMATIC SPRINKLER SYSTEM, THE SEPARATION DISTANCE OF THE EXIT DOORS OR EXIT ACCESS DOORWAYS SHALL NOT BE LESS THAN ONE-THIRD OF THE LENGTH OF THE MAXIMUM OVERALL DIAGONAL DIMENSIONS OF THE AREA SERVED.

(SECT. 1016.2) EGRESS THROUGH INTERVENING SPACES
1016.2.2 EXCEPTION - MEANS OF EGRESS ARE PERMITTED THROUGH ADJOINING OR INTERVENING ROOMS OR SPACES WHEN THE ADJOINING OR INTERVENING ROOMS OR SPACES ARE THE SAME OR LESSER HAZARD OCCUPANCY GROUP.

(SECT. 1017) EXIT ACCESS TRAVEL DISTANCE
EXITS SHALL BE SO LOCATED ON EACH STORY THAT THE MAXIMUM LENGTH OF EXIT ACCESS TRAVEL, MEASURED FROM THE MOST REMOTE POINT WITHIN A STORY ALONG THE NATURAL AND UNOBSTRUCTED PATH OF EGRESS TRAVEL TO THE EXTERIOR EXIT DOOR AT THE LEVEL OF EXIT DISCHARGE SHALL NOT EXCEED THE DISTANCE GIVEN IN TABLE 1017.2:

(TABLE 1017.2) EXIT ACCESS TRAVEL DISTANCE (WITH SPRINKLER SYSTEM)

USE GROUP S-1 ALLOWABLE (MOST RESTRICTIVE):	=	250 FT MAX
MAXIMUM PROVIDED:	=	80 FT

(TABLE 1020.1) CORRIDORS FIRE-RESISTANCE RATING
OCCUPANCY B AND S, OCCUPANT LOAD > 30 WITH SPRINKLER SYSTEM = 0 HR

FIRE PREVENTION REGULATIONS - CMR 527

SECT. 4: OIL BURNING EQUIPMENT
(SECT. 4.03, 6b) UNENCLOSED TANKS: INSTALLATION INSIDE BUILDINGS
FLUID STORAGE FIRE RESISTANCE RATING: = 2 HR*

*(NOTE: THE AGGREGATED CAPACITY OF ANY UNENCLOSED TANKS, INSTALLED INSIDE A BUILDING SEPARATED FROM ANOTHER PORTION OF A BUILDING BY A FIRE SEPARATION, SHALL BE 1320 GALLONS. THE FIRE SEPARATION WALL SHALL CONSIST OF TWO-HOUR RATED FIRE RESISTIVE ASSEMBLIES WITH OPENING PROTECTION AND CONTINUITY IN CONFORMANCE).

ADDRESS IDENTIFICATION SIGNAGE: IBC 502.1

14

8in

APPLICABILITY:
- VERIFY SPECIFIC REQUIREMENTS WITH LOCAL FIRE CODE OFFICIAL
- CHARACTER HEIGHT - 8" MINIMUM W/ 1/2" STROKE MINIMUM
- COLOR - EASILY IDENTIFIABLE COLOR, CONTRASTING WITH BACKGROUND

2 EXTERIOR SIGNAGE - ADDRESS
1 1/2" = 1'-0"

WARNING: THROUGH-PENETRATION FIRESTOP SYSTEM - DO NOT DISTURB

NOTIFY FACILITY MANAGER / OWNER OF ANY DAMAGE

- CONTRACTOR'S NAME, ADDRESS, PHONE NUMBER
- THROUGH-PENETRATION FIRESTOP SYSTEMS DESIGNATION OF APPLICABLE TESTING AND INSPECTION AGENCY
- DATE OF INSTALLATION
- THROUGH-PENETRATION FIRESTOP SYSTEMS MANUFACTURER'S NAME
- INSTALLER'S NAME

PRESSURE-SENSITIVE, SELF ADHESIVE PRE-PRINTED VINYL LABELS

FOR ALL RATED WALL ASSEMBLIES, BOTH SIDES
- REFER TO "FIRESTOPPING" SPECIFICATION FOR ADDITIONAL INFORMATION

3 RATED WALL LABEL
1 1/2" = 1'-0"

0' 6" 1' 2'
SCALE: 1 1/2" = 1'-0"

0' 8' 16' 32'
SCALE: 1/16" = 1'-0"

Project:
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14 FOREST ROAD, ACTON MA 01720

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Consultants:

Revisions:

No.	Date	Description

COA:

Seal:

Issued For:
SCHEMATIC DESIGN

Scale: As indicated

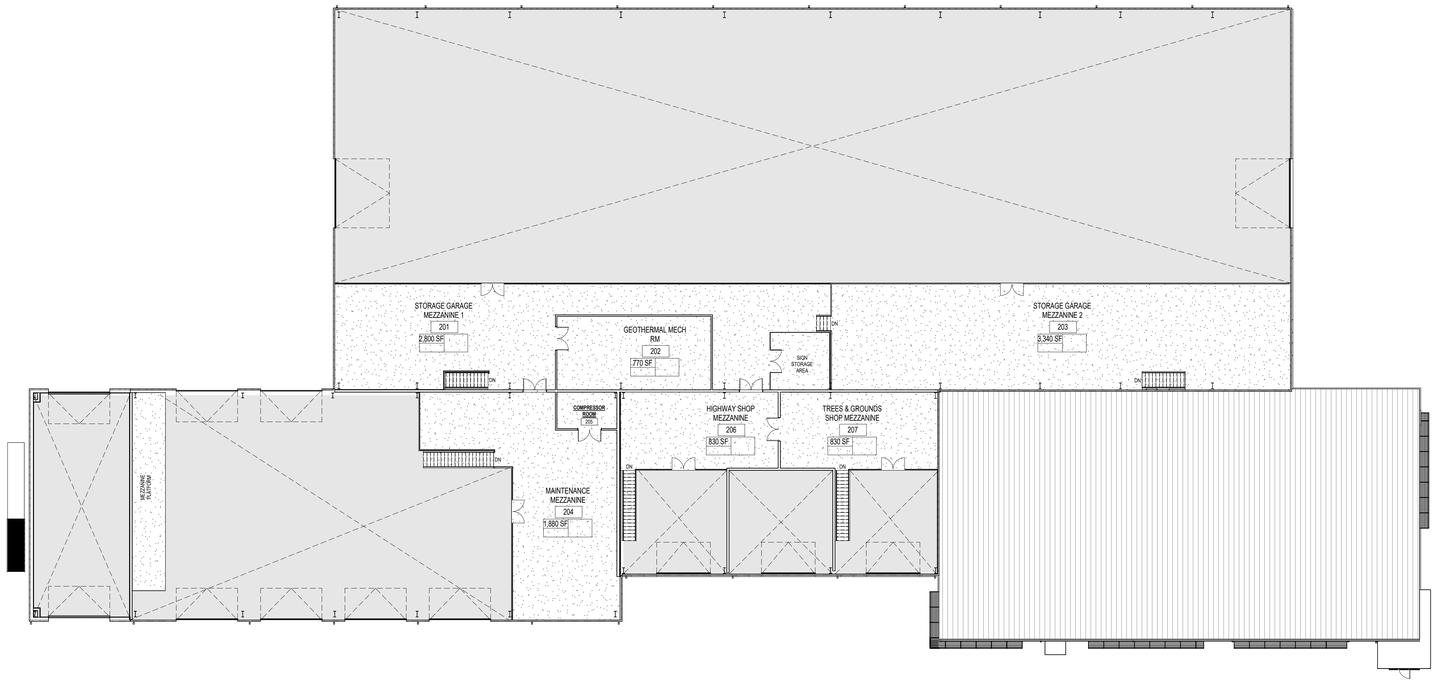
Key Plan:

Date:	11/01/2024
Draw By:	DRD
Reviewed By:	Checker
Approved By:	Approver
W&S Project No.:	ENG24-1080
W&S File No.:	XXX

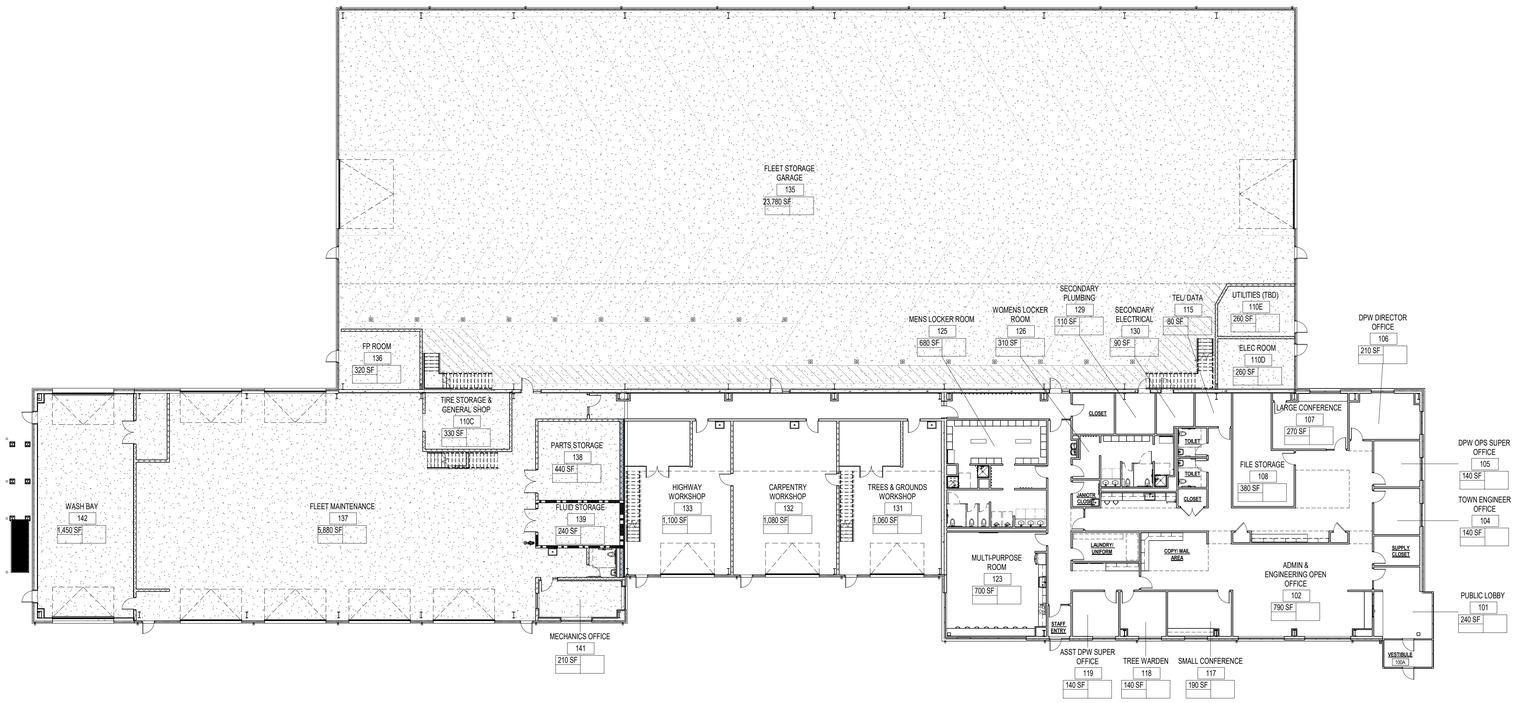
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CODE SUMMARY & PLANS

Sheet Number:
G101

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2 PH3 - CODE PLAN - MEZZANINE PLAN - OCCUPANCY
1/16" = 1'-0" 1/ 1.A20



1 PH3 - CODE PLAN - OVERALL FLOOR PLAN - OCCUPANCY
1/16" = 1'-0" 1/ 1.A20

0' 4' 8' 16'
SCALE: 1/8" = 1'-0"

CODE PLAN LEGEND

EXIT CAPACITY
- XX / XX — ACTUAL EGRESS OF DOOR OR STAIR / MAXIMUM ALLOWABLE EGRESS CAPACITY OF DOOR OR STAIR

ROOM NAME
- 101 — ROOM NUMBER
- 150 / 50SF/P / 3P — MAXIMUM NUMBER OF ALLOWABLE OCCUPANTS; AREA IN NET SQUARE FEET (GROSS SQUARE FEET); OCCUPANCY LOAD FACTOR
- 115' — PATH OF MAXIMUM TRAVEL DISTANCE TO EXIT
- 15 — DIRECTION OF TRAVEL TO EXIT

FIRE EXTINGUISHERS:
- FE = FIRE EXTINGUISHER, BRACKET MOUNTED
- FEC = FIRE EXTINGUISHER, CABINET MOUNTED (SEMI-RECESSED)

SEPARATIONS ARE DESIGNATED AS FOLLOWS:
- 2 HOUR FIRE-RESISTANCE RATED FIRE BARRIER
- 1 HOUR FIRE-RESISTANCE RATED FIRE BARRIER
- SMOKE RESISTANT SEPARATION

CODE PLAN NOTES

NEW & EXISTING CONSTRUCTION

A. ALL SPACES, FACILITIES AND PROGRAMS REQUIRED BY CODE TO BE ACCESSIBLE TO PHYSICALLY DISABLED PERSONS SHALL BE ACCESSIBLE.

- WHERE A WORKSTATION IS PROVIDED, AN ACCESSIBLE WORKSTATION IS REQUIRED.

- WHERE A SINK IS PROVIDED, AN ACCESSIBLE SINK WITH PIPE PROTECTION IS REQUIRED.

- ALL LABS AND SHOPS SHALL HAVE AN ACCESSIBLE EYE AND BODY WASH.

- ALL ACCESSORIES SHALL MEET REACH RANGES FOR FRONT OR SIDE APPROACH.

- ALL ACCESSIBLE ROUTES THROUGH BUILDING SHALL PROVIDE A MINIMUM 32 INCHES CLEARANCE (DOORWAYS IN PARTICULAR).

- ALL ACCESSIBLE SPACES, FURNISHING FIXTURES AND EQUIPMENT, AND ALL OPERATIONAL AND ACCESSIBLE ROUTE CLEARANCES SHALL MEET REQUIREMENTS OF SECTION 504, REHABILITATION ACT 1973 INCLUDING UNIFORM FEDERAL ACCESSIBILITY STANDARDS (UFAS) AND 504 REGULATIONS, ICC/ANSI A117.1 - 2003, AND THE AMERICANS WITH DISABILITIES ACT, TITLE II, INCLUDING THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG) AND ADA REGULATIONS.

- REFER TO A012 FOR MOUNTING HEIGHTS FOR ACCESSIBLE FIXTURES.

B. NEW AND EXISTING SMOKE PARTITIONS, INCLUDING STORAGE ROOMS OVER 100 SQUARE FEET, SHALL HAVE PENETRATIONS AND VOIDS FIRESTOPPED IN ACCORDANCE WITH DIVISION 07 SPECIFICATION SECTION "PENETRATION FIRESTOPPING". ALL HEAD-OF-WALL JOINTS AND FLOOR-TO-WALL JOINTS AT NEW AND EXISTING SMOKE RESISTANT PARTITIONS SHALL BE SEALED IN ACCORDANCE WITH DIVISION 07 SPECIFICATION SECTION "FIRESTOPPING".

C. NEW AND EXISTING FIRE-RESISTANCE RATED WALLS SHALL HAVE PENETRATIONS AND VOIDS FIRESTOPPED IN ACCORDANCE WITH DIVISION 07 SPECIFICATION SECTION "FIRESTOPPING". ALL HEAD-OF-WALL JOINTS AND FLOOR-TO-WALL JOINTS AT NEW AND EXISTING FIRE-RATED WALLS SHALL BE SEALED IN ACCORDANCE WITH DIVISION 07 SPECIFICATION SECTION "FIRESTOPPING".

D. ALL PENETRATIONS THROUGH FLOORS, INCLUDING FLOOR OF DUCTWORK ENCLOSURES, SHALL BE FIRESTOPPED IN ACCORDANCE WITH DIVISION 07 SECTION "FIRESTOPPING". PENETRATIONS THROUGH FLOORS OF RATED ROOMS OR FLOOR SYSTEMS SHALL BE FIRESTOPPED TO MEET RATING OF ROOM OR FLOOR SYSTEM.

FOR INTERIOR FINISHES

INTERIOR FINISHES SHALL BE PROVIDED AND CONFIRMED TO HAVE THE FOLLOWING CLASSIFICATION RATINGS :

WALLS AND CEILINGS (OTHER THAN TEXTILE)
BUSINESS AND EDUCATIONAL OCCUPANCIES:
- VERTICAL EXITS AND EXIT PASSAGEWAYS - CLASS A
- EXIT ACCESS CORRIDORS AND OTHER EXIT WAYS - CLASS B
- ROOMS AND ENCLOSED SPACES - CLASS C

ASSEMBLY OCCUPANCIES A-1, A-2:
- VERTICAL EXITS AND EXIT PASSAGEWAYS - CLASS A
- EXIT ACCESS CORRIDORS AND OTHER EXIT WAYS - CLASS A (LOBBIES CLASS B)
- ROOMS AND ENCLOSED SPACES - CLASS B (CLASS C IF <300 PEOPLE)

ASSEMBLY OCCUPANCIES A-3, A-4, A-5:
- VERTICAL EXITS AND EXIT PASSAGEWAYS - CLASS A
- EXIT ACCESS CORRIDORS AND OTHER EXIT WAYS - CLASS A
- ROOMS AND ENCLOSED SPACES - CLASS C

WALLS - TEXTILE
IBC 803.6.1.1 OR 803.6.1.2

CEILINGS - TEXTILE
CLASS A

FLOOR FINISH
OCCUPANCIES A, B, E, H, I-4, M, R-1, R-2, S
- VERTICAL EXITS, EXIT PASSAGEWAYS, AND EXIT ACCESS CORRIDORS - CLASS II
- OTHER AREAS - DOC FF-1 (CPSC 16 CFR, PART 1630)

OCCUPANCIES I-2, I-3
- VERTICAL EXITS, EXIT PASSAGEWAYS, AND EXIT ACCESS CORRIDORS - CLASS I
- OTHER AREAS - DOC FF-1 (CPSC 16 CFR, PART 1630)

Project:
NEW PUBLIC WORKS FACILITY
14 FOREST ROAD, ACTON MA 01720

TOWN OF ACTON

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Scale: As indicated

Key Plan:

NORTH

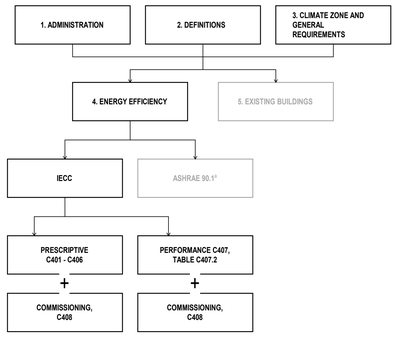
Date:	11/01/2024
Draw By:	DRD
Reviewed By:	Checker
Approved By:	Approver
W&S Project No.:	ENG24-1080
W&S File No.:	XXX

Drawing Title:
CODE SUMMARY & PLANS

Sheet Number:
G102

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ENERGY COMPLIANCE PATH C103.2



[a] ANSI/ASHRAE/IES Standard 90. 1-2019

IECC CLIMATE ZONE MAP

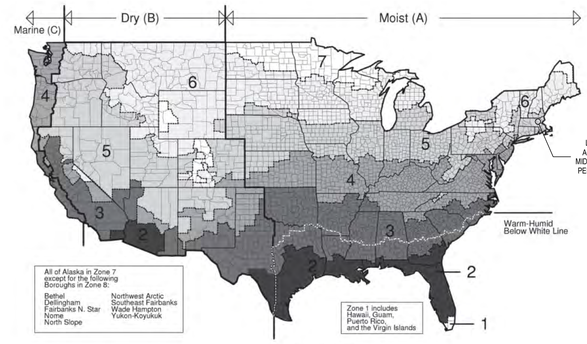


FIGURE C301.1CLIMATE ZONES

INTERNATIONAL ENERGY CONSERVATION CODE 2018 (IECC) - ZONE 5

ENERGY CODE: WALL TYPE VALUES

TABLE C402.1.4 - IECC 2018

CMU VENEER ON CONC BACK-UP WALL

MATERIAL	DEPTH	R-VALUE
CMU VENEER	4.00"	0.69
CAVITY	1.75"	1.67
CONT. RIGID INSULATION	3.00"	15.41
VAPOR RETARDER	0.06"	0.12
CONC BACK-UP WALL	8.00"	.80
TOTAL R-VALUE PROVIDED		18.69

COMPUTED U-VALUE: 1/R-VALUE = 1/18.69 = 0.053
REQUIRED U-VALUE = 0.078 FOR A MASS WALL
EQUIVALENT COMPUTED R-VALUE 12.8

CMU VENEER ON CMU BACK-UP WALL

MATERIAL	DEPTH	R-VALUE
CMU VENEER	4.00"	0.69
CAVITY	1.75"	1.67
CONT. RIGID INSULATION	3.00"	15.41
VAPOR RETARDER	0.06"	0.12
CONC BACK-UP WALL	8.00"	2.56
TOTAL R-VALUE PROVIDED		20.45

COMPUTED U-VALUE: 1/R-VALUE = 1/20.45 = 0.049
REQUIRED U-VALUE = 0.078 FOR A MASS WALL
EQUIVALENT COMPUTED R-VALUE 12.8

CMU VENEER ON METAL STUD BACK-UP WALL

MATERIAL	DEPTH	R-VALUE
CMU VENEER	4.00"	0.69
CAVITY	1.75"	1.67
CONT. RIGID INSULATION	3.00"	15.41
VAPOR RETARDER	0.06"	0.12
GYPSUM SHEATHING	0.63"	0.67
MTL STUD	8.00"	0.02
GYPSUM BOARD	0.63"	0.57
TOTAL R-VALUE PROVIDED		19.15

COMPUTED U-VALUE: 1/R-VALUE = 1/19.15 = 0.052
REQUIRED U-VALUE = 0.064 FOR A METAL FRAMED WALL
EQUIVALENT COMPUTED R-VALUE 15.6

INSULATED METAL WALL PANEL ON GIRTS

MATERIAL	DEPTH	R-VALUE
INSULATED METAL WALL PANEL	4.00"	26.00
TOTAL R-VALUE PROVIDED		26.00

COMPUTED U-VALUE: 1/R-VALUE = 1/26.00 = 0.038
REQUIRED U-VALUE = 0.052 FOR A METAL BUILDING WALL
EQUIVALENT COMPUTED R-VALUE 17.2

FIBER CEMENT SIDING ON CONTINUOUS RIGID INSULATION ON METAL STUD BACKUPWALL

MATERIAL	DEPTH	R-VALUE
FIBER CEMENT SIDING	0.25"	0.50
WEATHER BARRIER	0.06"	0.12
EXTERIOR SHEATHING	0.625"	0.56
CONT. RIGID INSULATION	2.00"	10.00
		11.18
VAPOR RETARDER	0.06"	0.12
MTL STUD W/ FIBERGLASS INSULATION	6.00"	21.00
TOTAL R-VALUE PROVIDED:		21.12 (R13 MIN REQ'D)
CONTINUOUS INSULATION:		+ 11.18 (R7.5ci MIN REQ'D)
COMPUTED U-VALUE: 1/R-VALUE = 1/32.30 = 0.030		32.30

REQUIRED R-VALUE: R13 + R7.5ci
REQUIRED U-VALUE = 0.064 FOR A METAL FRAMED WALL
EQUIVALENT COMPUTED R-VALUE 15.62

ENERGY CODE: ROOF TYPE VALUES

TABLE C402.1.4 - IECC 2018

STANDING SEAM METAL ROOF W/ THERMAL BLOCKS & LINER SYSTEM

MATERIAL	DEPTH	R-VALUE
STANDING SEAM METAL ROOF PANEL	N / A	0.00
THERMAL BLOCKS (UPPER INSULATION LAYER)	4"	13
BATT INSULATION (STRUCTURE LAYER)	8"	25
FABRIC LINER SYSTEM	0"	0.00
TOTAL R-VALUE		R-38

COMPUTED U-VALUE: 1/R-VALUE = 1/38 = 0.0263
REQUIRED U-VALUE = 0.035 FOR A METAL BUILDING

MEMBRANE ROOF ASSEMBLY - NEW WITH STEEL DECK

MATERIAL	DEPTH	R-VALUE
PVC MEMBRANE	.080"	0.33
1/2" PROTECTION BOARD	1/2"	0.45
RIGID INSULATION - 5" MINIMUM (R-30 MIN)	5"	30.6
INSIDE AIR VALUE	N/A	0.61
TOTAL R-VALUE		R-31.99

COMPUTED U-VALUE: 1/R-VALUE = 1/31.99 = 0.03125
REQUIRED U-VALUE = 0.032 (R30ci)
FOR INSULATION ENTIRELY ABOVE ROOF DECK

ASPHALT SHINGLE ROOF ASSEMBLY - NEW WITH STEEL DECK

MATERIAL	DEPTH	R-VALUE
ASPHALT SHINGLES	.100"	0.44
SYNTHETIC ROOF MEMBRANE	N/A	0.06
AIR SPACE	1 1/2"	1.53
RIGID INSULATION - 5" MINIMUM (R-30 MIN ci)	5"	30.00
VAPOR RETARDER	N/A	0.06
SHEATHING	1/2"	.11
INSIDE AIR VALUE	N/A	0.61
TOTAL R-VALUE		R-32.68

COMPUTED U-VALUE: 1/R-VALUE = 1/32.68 = 0.0306
REQUIRED U-VALUE = 0.032 (R30ci)
FOR INSULATION ENTIRELY ABOVE ROOF DECK

ENERGY CODE: FENESTRATION VALUES

TABLE C402.4 - IECC 2018

BUILDING ENVELOPE FENESTRATION - U-FACTORS

MATERIAL		SPECIFIED U-VALUE	MAX ALLOWED U-VALUE
FIXED FENESTRATION	0.27 SUMMER / 0.30 WINTER		0.38
OPERABLE FENESTRATION	0.27 SUMMER / 0.30 WINTER		0.45
ENTRANCE DOORS (PERSONNEL)		0.33	0.77
OPAQUE DOORS (OVERHEAD / NON-SWINGING)		0.057	0.37
OPAQUE DOORS (OVERHEAD / NON-SWINGING)		0.40	0.37

SOLAR HEAT GAIN COEFFICIENT (SHGC)	SHGC SPECIFIED	SOUTH, EAST, WEST	NORTH
ORIENTATION			
PROJECTION FACTOR - PF < 0.2	0.37	0.40	0.53
PROJECTION FACTOR - 0.2 ≤ PF < 0.5	0.37	0.48	0.58
PROJECTION FACTOR - PF ≥ 0.5	0.37	0.64	0.64

SKYLIGHTS	SPECIFIED VALUES	MAX ALLOWED VALUES
U-VALUE	0.40	0.50
SOLAR HEAT GAIN COEFFICIENT (SHGC)	0.40	0.40

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SCHEMATIC DESIGN

Scale: 1/8" = 1'-0"

Key Plan:

NORTH

Date:	11/01/2024
Draw By:	DRD
Reviewed By:	Checker
Approved By:	Approver
W&S Project No.:	ENG24-1080
W&S File No.:	XXX

Drawing Title:

CODE SUMMARY - ENERGY

Sheet Number:

G103

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FOREST ROAD

8" AC WATER

6" DI WATER

UG GAS

2" CS GAS 1970

2" POST

UPL 6

MAG

WG

WSO

GM

GG

MW

GPL

RB

UPL 18-9

UPL 18-10

ULT 18-10

UPL 18

UPL 10-2

ULT 10-3

T=59.41'
L=118.60'
R=789.64'
Δ=8°36'20"

T=52.80'
L=105.45'
R=789.64'
Δ=7°39'05"

T=40.92'
L=81.78'
R=789.64'
Δ=5°55'57"

T=34.25'
L=68.33'
R=396.55'
Δ=9°49'23"

T=36.27'
L=72.35'
R=398.55'
Δ=10°24'04"

T=50.02'
L=100.00'
R=1522.64'
Δ=4°19'55"

T=43.85'
L=87.67'
R=1522.64'
Δ=3°18'52"

N46°56'23"E
5.06'

IP

PLAN 544 OF 1969

145.00'
S46°56'23"W

255.63'
S46°56'23"W

30.0'

10.0'

WOODS

GRASS

BIT DRIVE

BIT BERM

BIT

SHIPPING CONTAINERS

EOP

UPL

BIT PARKING LOT

EQUIPMENT SHED

OVERHANGING AC UNIT

6" METAL POST

CONC PAD

10" BOL

BUILDING OVERHANG

SHED

FF=190.71'

DPW BUILDING

LSA

VGC

8 FOREST ROAD
N/F
TOWN OF ACTON
BK. 11701 PG. 501
PROPERTY ID: G4-76

ABANDONED GATE/VALVE

SHIPPING CONTAINER

BOLLARDS

SAND & SALT SHED

FF=191.58'

12"CMP

CB
R=190.88'
FILLED WITH WATER
I1=NOT VISIBLE (RECORD)
WATER LEVEL=188.08'

SMH
R=190.25'
I1=187.15' (6"DIP)

DMH W/ GAS TRAP
R=190.37'
NO PIPES OBSERVED
WATER LEVEL=187.57'

DMH W/ GAS TRAP
R=190.39'
I1=187.19' (6"DIP)

GENERATOR/
CONC PAD

VALVE

SBGR

1,000 GALLON
SEPTIC TANK

6"DIP

CB
R=188.79'
I1=184.79' (12"CMP)
I2=185.19' (12"CMP)

CB
R=188.84'
I1=184.74' (12"CMP)
I2=184.74' (12"CMP)

CB
R=188.96'
I1=184.86' (12"CMP)

SMH
RIM=190.08'

SMH
RIM=190.15'

SMH
RIM=190.08'

LEACHING MANHOLES

SMH
R=190.26'
SEPTIC LEACHING PIT
NO PIPES OBSERVED

SMH
R=190.26'
I1=186.36' (6"DIP)
I2=186.36' (6"DIP)
I3=186.36' (6"DIP)

SMH
R=190.31'
SEPTIC LEACHING PIT
NO PIPES OBSERVED

4" METAL POST

FF=189.71'

BUILDING OVERHANG

CONC PAD

CB
R=188.27'
I1=180.57' (12"CMP)
I2=180.57' (12"CMP)
I3=180.67' (12"CMP)

CB
R=188.42'
I1=180.72' (12"CMP)
I2=184.62' (10"PVC)

CB
R=187.92'
I1=180.22' (24"CMP)
I2=180.32' (12"PVC)
I3=RECORD-NOT OBSERVED

CB
R=188.01'
I1=184.71' (10"PVC)

CB
R=182.89'
I1=180.69' (12"RCP)

6" POST

GRATE

CONC RETWALL

CONCRETE RETAINING WALL

CONC BLOCKS

DMH W/
GAS TRAP
R=182.35'
FILLED

CB
R=188.86'
I1=RECORD DRAIN NOT FOUND
I2=184.96' (12"DIP)

RECORD CB
NOT FOUND
LIKELY UNDER
MATERIAL PILES

TRANSFER
STAITON

DMH W/ GAS TRAP
R=181.97'
FILLED

DONATION
BOXES

METAL BISER

JIB

CRW

PILE

METAL SHELTER

DPW
STORAGE
SHED
FF=195.03'

DMH
R=192.51'
I1=179.91' (24"RCP)
I2=179.91' (24"RCP)

24"CMP

18"PVC

24"RCP

WF

WF#A9

WF#A10

1" PLASTIC WATER LINE

2"X1" REDUCER

RETAINING WALL

MATERIAL STORAGE
COVERED
OPEN

UPL 18-10-2X-1

SHIPPING CONTAINER

8" METAL POST

INV 12" CMP
EL=184.49'

INV 12" RCP
EL=182.45'

INV 12" PVC
EL=189.58'

INV 10" PVC
EL=193.17'

S73°20'17"E
237.85'

6' CHAIN LINK FENCE

PLAN OF LEASE PLAN

T=28.23'
L=45.11'
R=30.00'
Δ=86°09'06"

ELEC METER

BENCHMARK: RRS BASE IN UTILITY POLE
EL=192.34'

Project:
TOWN OF ACTON, MA
NEW PUBLIC WORKS FACILITY

14 FOREST ROAD
ACTON, MA 01720

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EXISTING CONDITIONS PLAN

Sheet Number:
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WORK LIMITS / LIMITS OF CLEARING & GRUBBING

REMOVE POLE AND ASSOCIATED OVERHEAD UTILITIES (TYP. OF 2)

REMOVE UTILITY

TOWN TO RELOCATE SHED AND SHIPPING CONTAINERS PRIOR TO CONSTRUCTION.

PROVIDE TEMPORARY TRENCH PAVEMENT UNTIL BEGINNING OF PHASE 2 DEMOLITION.

TEMPORARY PARKING AREA FOR CONTRACTOR PERSONNEL VEHICLES DURING ALL PHASES OF CONSTRUCTION.

NOT IN CONTRACT

FOREST ROAD

PLAN 544 OF 1969

PLAN 544 OF 1989

PLAN OF LEASE PLAN

SCALE: 1" = 20'

0 20 50 100

Project:

TOWN OF ACTON, MA
NEW PUBLIC WORKS FACILITY

14 FOREST ROAD
ACTON, MA 01720

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PH1 - SITE DEMO PLAN

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FOREST ROAD

PLAN 544 OF 1969

MIXED DECIDUOUS & EVERGREEN TREE PLANTINGS FOR SCREENING (TYP. OF 29)

MIXED EVERGREEN TREE PLANTINGS FOR SCREENING (TYP. OF 20

LIMITS OF CLEARING (TYP.)

PRECAST CONC. SOUND & LIGHT BARRIER WALL (MIN. 8' HIGH). DESIGN BY OTHERS.

GSHP VERTICAL CLOSED-LOOP WELL FIELD (12 WELLS)

WELL FIELD VAULT

DOMESTIC WATER SERVICE

FIRE WATER SERVICE

~ VEHICLE STORAGE AND MAINTENANCE GARAGES ~
ROOFTOPS TO BE SOLAR-READY

DIESEL GENERATOR

BIT. CONC. PVMT.
PROVIDE TEMPORARY ACCESS RAMP BETWEEN FINISHED PAVEMENT AND ADJOINING GRADES. MAINTAIN UNTIL FINAL PAVING IN PHASE 3 IS COMPLETE.

TRANSFORMER

PULL BOX

~ BIT. CONC. PVMT. ~
(5" THICK)

BIT BERM

WELL FIELD SYSTEM PIPES

GRADE BREAK (TYP.)

WASTEWATER PIPES

OIL/WATER SEPARATOR

VENT PIPING

HOLDING TANK (10,000 GAL.)

BIT. CONC. PVMT.
PROVIDE TEMPORARY ACCESS RAMP BETWEEN FINISHED PAVEMENT AND ADJOINING GRADES. MAINTAIN UNTIL FINAL PAVING IN PHASE 3 IS COMPLETE.

UNDERGROUND UTILITY TO PROPOSED BUILDING

PROPOSED UTILITY POLE

OVERHEAD UTILITY FROM EXISTING POLE

NOT IN CONTRACT

PLAN OF LEASE PLAN

DPW BUILDING

SAND & SALT SHED

DPW STORAGE SHED

METAL SHELTER

GENERATOR/ CONC PAD

BIT PARKING LOT

SHIPPING CONTAINER

MATERIAL STORAGE COVERED OPEN

CONC RETWALL

CONC BLOCKS

TRANSFER STAITON

DONATION BINS

SCALE: 1" = 20'

0 20 50 100

Project:
TOWN OF ACTON, MA
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14 FOREST ROAD
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Reviewed By:
Aporoved By:

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PH1 - SITE LAYOUT & UTILITY PLAN

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1.C20

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PIPE TABLE			
PIPE	SIZE & TYPE	LENGTH	SLOPE
P-1	12" HDPE	175-LF	0.005
P-2	12" HDPE	43-LF	0.005
P-3	12" HDPE	42-LF	0.005
P-4	18" HDPE	97-LF	0.005
P-6	18" HDPE	68-LF	0.005

DMH-1
R:196.20
I (I):188.11 (OCS-1)
I (O):188.00 (DMH-2)

OCS-1
R:192.00
I (O):189.00 (DMH-1)

DMH-2
R:194.00
I (I):187.77 (DMH-1)
I (I):187.65 (CB-1)
I (O):187.15 (DMH-3)

CB-1
R:191.48
I (O):187.88 (DMH-2)

DMH-3
R:193.17
I (I):186.64 (DMH-2)
I (I):188.59 (CB-2)
I (O):186.54 (DMH-4)

CB-2
R:192.67
I (O):188.67 (DMH-3)

DMH-4
R:193.70
I (I):186.18 (DMH-3)
I (O):186.08 (DMH-5)

GRADE BREAK (TYP.)

FOREST ROAD

PLAN 544 OF 1969

DPW BUILDING
FF=190.71'

SAND & SALT SHED
FF=191.58'

DPW STORAGE SHED
FF=195.03'

8 FOREST ROAD
N/F
TOWN OF ACTON
BK. 11701 PG. 501
PROPERTY ID: G4-76

NOT IN CONTRACT

0 20 50 100
SCALE: 1" = 20'

Project:
TOWN OF ACTON, MA
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PH1 - GRADING & DRAINAGE PLAN

Sheet Number:
1.C30

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FOREST ROAD

PLAN 544 OF 1969

DEMOLISH AND DISPOSE OF EXISTING DPW BUILDING INCLUDING ALL FOUNDATIONS, UTILITIES, SEPTIC SYSTEM WITH ALL APPURTENANCES, AND REMAINING EQUIPMENT.

REMOVE AND DISPOSE OF ENTIRE STRUCTURE AND PIPES AS INDICATED (TYP. OF 4)

WORK LIMITS

REMOVE PIPE (TYP.)

REPLACE CATCH BASINS AS INDICATED ON 3.C30.

TEMPORARY MODULAR OFFICE SPACE TO BE MAINTAINED DURING PHASE 2 UNTIL OCCUPANCY OF NEW OFFICES DURING PHASE 3

REPLACE CATCH BASIN GRATE WITH WITH SOLID MANHOLE COVER AS INDICATED ON 3.C30.

REMOVE POLE WITH OVERHEAD UTILITIES.

REMOVE GAS SERVICE TO DRIVEWAY AND PLUG STUB FOR FUTURE USE.

PRESERVE EXISTING WATER SERVICE THROUGH SITE.

RELOCATE POLE AS INDICATED ON 3.C20

TEMPORARY PARKING AREA FOR CONTRACTOR PERSONNEL VEHICLES DURING ALL PHASES OF CONSTRUCTION.

MATERIAL STORAGE BINS AND SHIPPING CONTAINERS ON SITE TO BE RELOCATED BY TOWN.

N.I.C.

NOT IN CONTRACT

0 20 50 100

SCALE: 1" = 20'

Project:
TOWN OF ACTON, MA
NEW PUBLIC WORKS FACILITY

14 FOREST ROAD
ACTON, MA 01720

Weston & Sampson Engineers, Inc.
100 Foxborough Boulevard, Suite 250
Foxborough, MA 02035
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

COA:

Seal:

Issued For:
SCHEMATIC DESIGN

Scale: AS Indicated

Date: 11/01/2024
Drawn By: RSR
Reviewed By:
Approved By:

W&S Project No.: ENG24-1080
W&S File No.:

Drawing Title:
PH2 - SITE DEMO PLAN

Sheet Number:
2.C10

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P:\Mydrive\User 2999 and 15 more\My_Submission Drawing\Rev_Dwg\C2\ACSHEET.dwg, LAMDA Plot

FOREST ROAD

PLAN 544 OF 1969

LIMIT OF ON-THE-GROUND TOPO SURVEY

~ WORKSHOPS & ADMIN BUILDING ~
ROOFTOPS TO BE SOLAR-READY

LEACHING TRENCH (PRIMARY)
80'L x 3'W x 2'D (TYP. OF 3)

LEACHING TRENCH (RESERVE)
80'L x 3'W x 2'D (TYP. OF 3)

DISTRIBUTION BOX

4,000 GAL.
SEPTIC TANK

SANITARY SEWER TO SEPTIC

EV CHARGING SPACES
(TYP. OF 8)

BICYCLE PARKING AREA

ADA SPACES (TYP. OF 2)

CONC. SIDEWALK (TYP.)

GSHP VERTICAL CLOSED-LOOP
WELL FIELD (28 WELLS)

WELL FIELD VAULT

WELL FIELD
SYSTEM PIPES

STANDARD PARKING
SPACES (TYP. OF 30)

~ BIT. CONC. PVMT. ~
(5" THICK)

BIT. BERM

VG CURB

EOP

PERIMETER
~ LANDSCAPE STRIPS ~

INTERIOR
LANDSCAPE
ISLAND

LIGHT POLE WITH FULLY SHIELDED
LED FIXTURE (TYP. OF 6). ALL
FIXTURES SHALL COMPLY WITH
ACTON'S OUTDOOR LIGHTING
BYLAWS IN ACCORDANCE WITH THE
TOWN'S DARK SKIES INITIATIVE.

BIT. CURB (MATCH EXISTING)

VEHICLE BARRIER
ARM GATE AND
ACCESS KEY PAD

COVERED MATERIAL
STORAGE BINS (PUBLIC)

PROPOSED
RELOCATION OF
UTILITY POLE AND
OVERHEAD UTILITIES.

COVERED MATERIAL
STORAGE BINS (DPW)

NOT IN CONTRACT

GRADE BREAK (TYP.)

SCALE: 1" = 20'

0 20 50 100

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Drawn By: RSR
Reviewed By:
Aprroved By:

W&S Project No.: ENG24-1080
W&S File No.:

Drawing Title:
PH3 - SITE LAYOUT & UTILITY PLAN

Sheet Number:
3.C20

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FOREST ROAD

PLAN 544 OF 1969

N

GRADE BREAK (TYP.)

CB-3
R:191.75
I (O):187.75 (DMH-5)

WQU-1 (5' I.D.)
R:190.99
I (I):184.76 (DMH-5)
I (I):185.07 (DMH-6)
I (O):184.66 (DMH-7)

WQU-2
R:190.45
I (I):183.79 (DMH-10)
I (I):185.35 (DMH-11)
I (O):183.69 (DMH-12)

CB-9
R:190.70
I (O):186.69 (DMH-9)

DMH-9
R:190.64
I (I):186.47 (CB-9)
I (I):186.36 (CB-10)
I (I):186.74 (CB-8)
I (O):185.86 (DMH-10)

CB-6
R:190.02
I (O):186.00 (DMH-8)

DMH-6
R:190.74
I (I):186.15 (CB-4)
I (I):185.70 (CB-5)
I (O):185.20 (WQU-1)

CB-10
R:190.10
I (O):186.50 (DMH-9)

CB-4
R:190.35
I (O):186.35 (DMH-6)

DMH-5
R:191.85
I (I):185.66 (DMH-4)
I (I):187.64 (CB-3)
I (O):185.16 (WQU-1)

CB-5
R:189.75
I (O):185.75 (DMH-6)

CB-8
R:191.65
I (O):186.97 (DMH-9)

DMH-8
R:190.95
I (I):185.33 (CB-6)
I (I):185.99 (CB-7)
I (O):184.83 (DMH-10)

DMH-7 (5' I.D.)
R:189.95
I (I):184.58 (WQU-1)
15"Ø HDPE I (O):183.73 (MANIFOLD)
24"Ø HDPE I (O):181.17 (ISOLATOR ROW)
STORMTECH MC-4500 SUBSURFACE
INFILTRATION CHAMBERS (6x32)
BOT STONE:180.25
BOT CHAMBERS:181.00
TOP CHAMBERS:186.00
TOP STONE:187.00

CB-7
R:189.96
I (O):186.15 (DMH-8)

DMH-12
R:190.69
I (I):183.62 (WQU-2)

DMH-11
R:191.05
I (I):185.71 (CB-11)
I (O):185.61 (WQU-2)

OCS-2 (5' I.D.)
R:188.97
15"Ø HDPE I (I):183.73 (MANIFOLD)
I (O):183.75 (CB-12)

CB-12 (6' I.D.)
R:192.18
I (I):183.58 (OCS-2)
I (I):180.67 (EX-CB)
I (O):180.57 (CB-13)

CB-11
R:189.78
I (O):186.15 (DMH-11)

DMH-10
R:190.59
I (I):184.53 (DMH-8)
I (I):185.79 (DMH-9)
I (O):184.03 (WQU-2)

CB-13 (6' I.D.)
R:187.92
I (I):180.32 (CB-12)
I (O):180.22 (EX-DMH)
CONTRACTOR TO FIELD FIT I3 & I4

NOT IN CONTRACT

0 20 50 100
SCALE: 1" = 20'

PIPE TABLE			
PIPE	SIZE & TYPE	LENGTH	SLOPE
P-7	18" HDPE	80-LF	0.005
P-8	12" HDPE	18-LF	0.005
P-9	24" HDPE	75-LF	0.005
P-10	12" HDPE	36-LF	0.005
P-11	12" HDPE	6-LF	0.005
P-12	18" HDPE	21-LF	0.005
P-13	24" HDPE	12-LF	0.005
P-14	12" HDPE	131-LF	0.005
P-15	12" HDPE	30-LF	0.005
P-16	18" HDPE	55-LF	0.005
P-17	12" HDPE	44-LF	0.005
P-18	12" HDPE	38-LF	0.005
P-19	12" HDPE	25-LF	0.005
P-20	18" HDPE	8-LF	0.005
P-21	24" HDPE	42-LF	0.005
P-22	12" HDPE	85-LF	0.005
P-23	12" HDPE	46-LF	0.005
P-24	24" HDPE	11-LF	0.005
P-25	24" HDPE	29-LF	0.005
P-26	24" HDPE	35-LF	0.007

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Aporoved By:

W&S Project No.: ENG24-1080
W&S File No.:

Drawing Title:
PH3 - GRADING & DRAINAGE PLAN

Sheet Number:
3.C30

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GENERAL NOTES:

1. COORDINATE THE ARCHITECTURAL DRAWINGS WITH STRUCTURAL, PLUMBING, FIRE PROTECTION, MECHANICAL, AND ELECTRICAL / FIRE ALARM DRAWINGS FOR THE VERIFICATION OF ALL PROJECT REQUIREMENTS.
2. FINISH FIRST FLOOR SLAB ELEVATION HIGH POINT IS 0'-0" FOR THIS PROJECT.
3. ALL INTERIOR DIMENSIONS ARE TAKEN FROM FACE OF STUD / FACE OF MASONRY / CENTERLINE OF COLUMN TO FACE OF STUD / FACE OF MASONRY / CENTERLINED OF COLUMN UNLESS SPECIFICALLY NOTED OTHERWISE. DO NOT SCALE DRAWINGS. REFER TO ENLARGED PLANS AND DETAILS FOR FURTHER DIMENSIONING INFORMATION. ALL WORK LINES AND LEVELS SHALL BE LAID OUT BY WRITTEN DIMENSIONS. ANY DEVIATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGNER. ALL DEVIATIONS AND DISCREPANCIES SHALL BE CORRECTED BY THE CONTRACTOR BEFORE HE BEGINS HIS PORTION OF THE WORK.
4. FIRE EXTINGUISHER AND CABINET QUANTITIES AND LOCATIONS TO BE COORDINATED WITH THE TOWN FIRE DEPARTMENT PRIOR TO ORDERING AND INSTALLATION. CONFORM TO THE STATE FIRE REGS AND NFPA.
5. COORDINATE MASTER BOX, KNOX BOX, AND BEACON LOCATIONS WITH THE ELECTRICAL / FIRE ALARM DRAWINGS AND THE TOWN FIRE DEPARTMENT REQUIREMENTS. ELECTRICAL CONTRACTOR TO PROVIDE KNOX BOX THAT MEET THE TOWN FIRE DEPARTMENT REQUIREMENTS.
6. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS & CONDITIONS PRIOR TO THE WORK AND SHALL NOTIFY THE DESIGNER REGARDING ANY DISCREPANCIES.
7. THE CONTRACTOR SHALL SUBMIT ALL SHOP DRAWINGS, SAMPLES, CATALOG CUTS ETC., INCLUDING COLOR CHARTS FOR PAINTS, FOR ALL INTERIOR FINISHES, TO THE DESIGNER FOR SELECTION, REVIEW AND APPROVAL WITH THE OWNER PRIOR TO FABRICATION OR INSTALLATION. THE COLORS MUST BE SUBMITTED IN A TIMELY MANNER AND TOGETHER FOR REVIEW AND COLOR BOARDS. FAILURE TO DO SO IN A TIMELY MANNER WILL FALL ON THE CONTRACTOR'S RESPONSIBILITY AND NOT ON THE OWNER. REFER TO EACH INDIVIDUAL SPECIFICATIONS FOR SIZE, QUANTITY AND TYPE OF COLOR SELECTION.
8. PERFORM ALL WORK IN ACCORDANCE WITH THE STATE BUILDING CODE, AS WELL AS LOCAL CODES AND ORDINANCES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS, BACKCHARGES AND FEES AS REQUIRED BY THE TOWN.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAILY REMOVAL AND LEGAL DISPOSAL OF ALL DEBRIS OFF SITE.
11. THE CONTRACTOR SHALL SEAL ALL THROUGH-WALL & FLOOR PENETRATIONS WITH 3M BARRIER CAULK (O.A.E.) AND SEALANT ON USG SAFING 2500 PSI GROUT. U.N.O. INSTALL ANY REQUIRED FIRE RATED PARTITIONS TO UNDERSIDE OF FLOOR AND ROOF DECK, INCLUDING DEFLECTION HEAD FIRE SAFING.
12. INSTALL A CONTINUOUS SEALANT BEAD ON BACKER ROD AT ALL JUNCTURES OF DISSIMILAR MATERIALS (E.G.: METAL TO CMU, STEEL TO ALUMINUM) AND ALL MATERIAL JOINTS AS REQUIRED BY THE MANUFACTURER'S SPECIFICATION AND RECOMMENDATIONS, INDUSTRY STANDARDS AND GOOD PRACTICE.
13. PROVIDE CONTINUOUS GALVANIZED METAL EDGE TRIM AT ALL GWB WORK.
14. THE CONTRACTOR SHALL INSTALL ALL INTERIOR FINISHES AT ALL SURFACES INDICATED ON THE DRAWINGS IN CONFORMANCE TO STATE BUILDING CODE. ALL DOORS SHALL HAVE LEVER HARDWARE TO CONFORM TO 521 CMR.
15. INSTALL USG .093 (OR APPROVED EQUAL) CONTROL JOINTS AT 30'-0" O.C. MAX. OR AS PER MANUFACTURER'S SUGGESTED DETAILS AND SPECIFICATIONS.
16. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING A GAP FILLING SYSTEM OR OTHER SYSTEM WHICH SPANS ANY GAP IN THE EXTERIOR WALL SYSTEM WHICH DOES NOT MEET THE MAXIMUM SPAN OF THE APPROVED AIR BARRIER MEMBRANE SYSTEM. THIS SYSTEM SHALL BE PROVIDED TO ALLOW FOR A COMPLETE AIR BARRIER MEMBRANE INSTALLATION. THE SYSTEM SHALL BE COMPATIBLE WITH THE APPROVED AIR BARRIER PRODUCT AND SHALL BE APPROVED BY THE DESIGNER PRIOR TO INSTALLATION.
17. THE ELECTRICAL CONTRACTOR SHALL PROVIDE DISCONNECT SWITCHES, STARTERS AND ALL LINE VOLTAGE WIRING AND CONDUIT TO OH DOOR OPERATORS. THE HAND-OFF-AUTO SWITCH, PUSH BUTTON CONTROL STATION (MOMENTARY UP-STOP-DOWN) AND CONTROLLER IS FURNISHED BY THE OVERHEAD DOOR MANUFACTURER AND INSTALLED BY THE ELECTRICAL CONTRACTOR. THE ELECTRICAL CONTRACTOR IS TO PROVIDE CONDUIT AND WIRING BETWEEN THE HAND-OFF-AUTO SWITCH, THE PUSH BUTTON CONTROL STATION AND CONTROLLER PER OVERHEAD DOOR MANUFACTURER REQUIREMENTS. FURNISHING AND INSTALLATION OF THE MOTOR UNIT, OPTICAL SENSORS, PNEUMATIC DOOR SAFETY BOTTOM, LOW VOLTAGE WIRING AND ALL OTHER ACCESSORIES ASSOCIATED WITH THE OVERHEAD DOORS SHALL BE THE RESPONSIBILITY OF THE OVERHEAD DOOR CONTRACTOR.
18. ALL STRUCTURAL ELEMENTS WHICH PASS IN FRONT OF WINDOWS / CLERESTORIES SHALL BE BACK PAINTED.
19. ALL STRUCTURAL ELEMENTS SHOWN ON THE ARCHITECTURAL DRAWINGS ARE FOR INFORMATION ONLY. REFER TO STRUCTURAL DRAWINGS FOR EXACT SIZES AND LOCATION OF STRUCTURAL ELEMENTS.
20. THE CONTRACTOR SHALL PROVIDE SUPPLEMENTAL FRAMING AND OR BLOCKING AS NECESSARY TO SUPPORT ALL EXTERIOR WALL MOUNTED ELEMENTS.
21. ALL OPENINGS IN EXTERIOR WALLS FOR PLUMBING, FIRE PROTECTION, MECHANICAL, AND ELECTRICAL / FIRE ALARM SYSTEMS SHALL BE SEALED WEATHER-TIGHT BY THE CONTRACTOR. CONTRACTOR TO PROVIDE FIRE RATED SEALANTS AS REQUIRED AT FIRE RATED WALL, FLOOR, CEILING, AND ROOF ASSEMBLIES.
22. THE CONTRACTOR IS TO FIELD MEASURE OH DOOR OPENINGS TO ENSURE PROPER FIT OF OH DOORS.
23. ALL EXPOSED SURFACES (INCLUDING, BUT NOT LIMITED TO; WALLS, UNDERSIDE OF EXPOSED ROOF AND FLOOR DECK, STRUCTURAL STEEL, MISCELLANEOUS METALS, DOORS/FRAMES, DUCTWORK, CONDUIT, AND PIPING) SHALL BE PRIMED AND PAINTED.
24. BLOCKING SHALL BE PROVIDED FOR ALL WALL MOUNTED EQUIPMENT (INCLUDING, BUT NOT LIMITED TO; PLUMBING FIXTURES, TOILET ACCESSORIES, UTILITY SINKS, FIRE EXTINGUISHER CABINETS, SHELVING, COUNTERS, CASEWORK, CABINETS, MEDIA EQUIPMENT, AND WINDOW TREATMENTS). PROVIDE ADDITIONAL METAL STUD FRAMING AS REQUIRED TO SUPPORT BLOCKING.
26. THE AIR BARRIER MEMBRANE (ABM) SHALL BE CONTINUOUS THROUGH THE BUILDING ENVELOPE AND BETWEEN THE WALL AND ROOF SYSTEMS INSTALLED ON THE WINTER WARM SIDE OF THE INSULATION. OPENINGS AND PENETRATIONS IN THE BUILDING ENVELOPE SHALL BE SEALED WITH SEALANT MATERIALS OR CLOSED WITH GASKETING SYSTEMS WHICH IS COMPATIBLE WITH THE ABM SYSTEM AND MEETS THE PERFORMANCE REQUIREMENTS IN THE SPEC. SYSTEM SHALL BE COMPATIBLE WITH THE CONSTRUCTION MATERIALS AND LOCATION. JOINTS AND SEAMS SHALL BE SEALED IN THE SAME MANNER OR TAPED OR COVERED WITH A MOISTURE VAPOR-PERMEABLE WRAPPING MATERIAL. SEALING MATERIALS SPANNING JOINTS BETWEEN CONSTRUCTION MATERIALS SHALL ALLOW FOR EXPANSION AND CONTRACTION OF THE CONSTRUCTION MATERIALS. AT ALL OH DOOR JAMBS AND HEADERS, THE ABM SHALL TERMINATE AT THE STEEL FACE WHERE THE INSULATION ABUTS STEEL FRAMED OPENINGS. TERMINATE ABM ON THE INSIDE FACE OF EXTERIOR WALL SYSTEM AT DOORS, WINDOWS, LOUVERS, AND CLERESTORIES. THE TERMS VAPOR RETARDER, AND AIR MOISTURE BARRIER ARE SYNONYMOUS WITH ABM.
27. METAL BUILDING SYSTEM SHALL BE A SINGLE SOURCE MANUFACTURED SYSTEM. ALL ACCESSORIES, NOT LIMITED TO; PRIMARY FRAMING, WALLS, ROOF INSULATION, EXTRUSIONS, TRIMS, FASTENERS, GASKETS, SUBGIRT FRAMING, ETC SHALL BE PROVIDED BY THE METAL BUILDING SYSTEM MANUFACTURER. METAL WALL PANEL COLOR TO BE SELECTED BY THE DESIGNER FROM THE MANUFACTURES STANDARD COLOR SELECTION WITH FINISH PROTECTIONS AS SPECIFIED.
28. ALL WALL/PARAPET FLASHING SHALL TERMINATE WITH A MINIMUM 8" VERTICAL LEG TO ALLOW FOR PROPER INTERFACE WITH THE ABM. ABM SHALL BE INSTALLED BEHIND FLASHING AND THE FLASHING SHALL BE INTEGRATED INTO THE ABM SYSTEM USING A SELF-ADHERED MEMBRANE FLASHING WITH MINIMUM OVERLAP REQUIREMENTS PER MANUFACTURER.
29. ALL EXTERIOR AND INTERIOR MATERIAL SURFACE COLOR AND TEXTURES SHALL BE SELECTED BY THE DESIGNER FROM THE MANUFACTURES STANDARD & PREMIUM FINISH / COLOR SELECTIONS. ONCE ALL COLORS HAVE BEEN SUBMITTED, THE OWNER WILL REVIEW AND PROVIDE GUIDANCE ON COLORS FOR INCLUSION IN THE MOCK-UP REFERENCED IN DIVISION 1 OF THE SPECIFICATIONS.
30. DETAILS AND NOTES SHOWN ON THE ARCHITECTURAL DRAWINGS SHALL BE APPLICABLE TO ALL PARTS OF THE ARCHITECTURAL WORK EXCEPT WHERE SPECIFICALLY REQUIRED OTHERWISE BY THE CONTRACT DOCUMENTS. CONDITIONS NOT SPECIFICALLY SHOWN SHALL BE SIMILAR TO THOSE SHOWN FOR LIKE CONDITIONS AS DETERMINED BY THE DESIGNER.
31. PROVIDE ALL ACCESSIBLE FIXTURES, CONTROLS & ACCESSORIES, AND APPROPRIATE CLEARANCES, AS REQUIRED FOR COMPLIANCE W/ STATE BUILDING CODE W/ ALL AMENDMENTS, TYP.
32. SEALANT DEPTH AT ALL EXTERIOR OPENINGS SHALL BE EQUAL TO THE WIDTH OF THE JOINT.
33. THE CONTRACTOR TO PROVIDE CANE PROTECTION AT ALL PANELS IN EGRESS PATHS (AS DETERMINED BY THE DESIGNER) WHICH EXTEND 4" OR MORE FROM FACE OF WALL AND ARE GREATER THAN 27" ABOVE FINISHED FLOOR.
34. FOR SITE LEGEND REFER TO DRAWING SERIES CX.00.
35. FOR STRUCTURAL LEGEND REFER TO DRAWING SERIES SX00.
36. FOR WALL TYPES, REFER TO DRAWING SERIES A000.
37. FOR CEILING LEGEND AND SOFFIT DETAILS REFER TO DRAWING SERIES A100.
38. FOR ROOF DETAILS, REFER TO DRAWING SERIES A600.
39. FOR LARGE SCALE TOILET AND STAIR PLANS, REFER TO DRAWING SERIES A700.
40. FOR INTERIOR ELEVATIONS, REFER TO DRAWING SERIES A700.
41. FOR DOOR NUMBERS AND DETAILS, REFER TO DRAWING SERIES A800.
42. FOR FINISH SCHEDULE, REFER TO DRAWING SERIES A900.
43. FOR CASEWORK ELEVATIONS, REFER TO DRAWING SERIES A900.
44. FOR FIRE PROTECTION LEGEND, REFER TO DRAWING SERIES FPX00.
45. FOR PLUMBING LEGEND, REFER TO DRAWING SERIES PX00.
46. FOR MECHANICAL LEGEND, REFER TO DRAWING SERIES MX00.
47. FOR ELECTRICAL LEGEND, REFER TO DRAWING SERIES EX00.
48. ALL NOTES AND DIMENSIONS DESIGNATED "TYPICAL" APPLY TO ALL LIKE OR SIMILAR CONDITIONS THROUGHOUT THE PROJECT.
49. SIGNAGE TO BE MOUNTED ON THE WALL, ADJACENT TO THE LEVER SIDE OF THE DOOR, AT A HEIGHT OF FIVE (5) FEET A.F.F. REFER TO THE FLOOR PLANS FOR LOCATIONS OF DIRECTIONAL SIGNAGE.
50. CONTRACTOR(S) TO TAKE AND VERIFY ALL DIMENSIONS AND CONDITIONS OF THE WORK AND BE RESPONSIBLE FOR COORDINATION OF THE SAME. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK.
51. GENERAL CONTRACTOR TO PROVIDE EXCAVATION & TRENCHING AT ALL UNDERGROUND UTILITIES IN EXISTING AND NEW BUILDINGS AS REQUIRED FOR MEP/FP UTILITIES AND COORDINATION. REFER TO MEP / FP DRAWINGS FOR OVERALL REQUIREMENTS. GENERAL CONTRACTOR TO COORDINATE INVERTS AND COMPACT ALL MATERIALS FOR PLACEMENT OF CONCRETE SLAB INFILL IN ACCORDANCE WITH ASTM D1557. GC TO PROVIDE SOIL COMPACTION, DOWELS, WWF MESH, VAPOR RETARDER AND TIE-INS, CONCRETE PLACEMENT AND ALL REQUIREMENTS TO CLOSE UP TRENCH ONCE MEP/FP SUB-TRADE WORK IS COMPLETE.
52. PROVIDE AN ACCENT WALL AT ALL ROOMS. ARCHITECT / ENGINEER TO PROVIDE LOCATION DURING CONSTRUCTION FOR ACCENT WALL IF NOT IDENTIFIED ON PROJECT PLANS.

ABBREVIATIONS:

A/C	AIR CONDITION
AC	ACOUSTICAL
ACT	ACOUSTICAL CEILING TILE
ADJ	ADJACENT
AFF	ABOVE FINISH FLOOR
ALT	ALTERNATE
ALUM	ALUMINUM
ANC BLT	ANCHOR BOLT
ANOD	ANODIZED
APPROX	APPROXIMATE
ARCH	ARCHITECT
ARGB	ABUSE RESISTANT GYPSUM BOARD
ASPH	ASPHALT
AVB	AIR VAPOR BARRIER
BC	BASE CABINET
BD	BOARD
BF	BRACE FRAME
BITUM	BITUMINOUS
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BENCH MARK
BOF	BOTTOM OF FOOTING
BOS	BOTTOM OF STEEL
BOTT	BOTTOM
BPL	BEARING PLATE
BRG	BEARING
BRK	BRICK
BS	BRICK SHELF
BSMT	BASEMENT
BVL	BEVELED
CAB	CABINET
CB	CEMENT BOARD / CATCH BASIN
CDM	CAVITY DRAINAGE MATERIAL
CF	CUBIC FEET
CH	CEILING HEIGHT
CIP	CAST IN PLACE
CJ	CONTROL JOINT
CL	CENTER LINE / COLUMN LINE
CL	CLOSET / CHAIN LINK
CLG	CEILING
CLOS	CLOSET
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CNTR	COUNTER
CO	CASED OPENING
COL	COLUMN
COMP	COMPOSITION
CONC	CONCRETE
CONST	CONSTRUCTION
CONT	CONTINUOUS
CONTC	CONTRACTOR
CONV	CONVECTOR
COORD	COORDINATE
CORR	CORRIDOR
CPET	COMMON PATH OF EGRESS TRAVEL
CPT	CARPET
CT	CERAMIC TILE
CTR	CENTER
CW	COLD WATER
CWT	CERAMIC WALL TILE
CY	CUBIC YARD
D	DRYER
D-PART	DEMOUNTABLE PARTITION
DBL	DOUBLE
DEMO	DEMOLITION
DF	DRINKING FOUNTAIN
DH	DOUBLE HUNG
DI	DRAIN INLET
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIST	DISTANCE
DL	DRAIN LEADER
DN	DOWN
DR	DOOR
DS	DOWNSPOUT
DTL	DETAIL
DW	DISHWASHER
DWG	DRAWING
EA	EACH
EF	EACH FACE
EIFS	EXTERIOR INSULATED FINISH SYSTEM
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRIC
ELEV	ELEVATOR
EMER	EMERGENCY
ENCL	ENCLOSURE
EOC	EDGE OF CONCRETE
EP	ELECTRICAL PANEL
EQ	EQUAL
EQUIP	EQUIPMENT
ER	EXISTING TO REMAIN
ES	EXPOSED STRUCTURE
EW	EACH WAY
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR
FA	FIRE ALARM
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
FAK	FIRST AID KIT
FB	FIRE BLANKET
FC	FILE CABINET
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FF	FINISH FLOOR
FFE	FINISH FLOOR ELEVATION
FG	FIBERGLASS
FIN	FINISH
FLASH	FLASHING
FLR	FLOOR
FLUOR	FLUORESCENT
FOC	FACE OF CONCRETE
FOF	FACE OF FINISH
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FOUND	FOUNDATION
FP	FIREPROOF(ING)
FR	FIRE RETARDANT
FRP	FIBERGLASS REINFORCED WALL PANEL
FRTW	FIRE RETARDANT TREATED WOOD
FSB	FILED SUB BID
FT	FEET
FTG	FOOTING
FUR	FURRING
GA	GAUGE
GALV	GALVANIZED
GB	GRAB BAR
GC	GENERAL CONTRACTOR
GDRL	GUARD RAIL
GL	GLASS
GLAZ	GLAZED BLOCK
GLB	GLASS BLOCK
GN	GOOSENECK
GRT	GROUT
GWB	GYPSUM WALL BOARD
HB	HOSE BIB
HC	HANDICAP
HD	HEAVY DUTY
HDWR	HARDWARE
HM	HOLLOW METAL
HOR	HORIZONTAL
HP	HIGH POINT
HT	HEIGHT
HTR	HEATER
HVAC	HEATING, VENTILATING, & AIR CONDITIONING
HW	HOT WATER
ID	INSIDE DIAMETER
IN	INCH
INCL	INCLUDED
INFO	INFORMATION
INSUL	INSULATION
INT	INTERIOR
INV	INVERT
IRGWB	IMPACT-RESISTANT GWB
JAN	JANITOR
JST	JOIST
JT	JOINT
KD	KNOCK-DOWN
KIP	1,000 LBS
KO	KNOCKOUT
KPLT	KICKPLATE
L	LENGTH
LAM	LAMINATE
LAV	LAVATORY
LBL	LABEL
LC	LEAD COATED
LCC	LEAD COATED COPPER
LGMF	LIGHT-GAUGE METAL FRAMING
LIN	LINOLEUM
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LP	LOW POINT
LSC	LIFE SAFETY CODE
LT	LIGHT
M	METER
MANUF	MANUFACTURER
MAS	MASONRY
MAT	MATERIAL
MAX	MAXIMUM
MB	MOISTURE BARRIER
MBL	MARBLE
MBM	METAL BUILDING MANUFACTURER
MBR	MEMBER
MC	MEDICINE CABINET
MDF	MEDIUM DENSITY FIBERBOARD
MDO	MEDIUM DENSITY OVERLAY
MECH	MECHANICAL
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MIR	MIRROR
MISC	MISCELLANEOUS
ML	MATCH LINE
MLDG	MOULDING
MO	MASONRY OPENING
MOD	MODULAR
MR	MOISTURE RESISTANT
MRGB	MOISTURE RESISTANT GYPSUM BOARD
MS	METAL STUD
MTD	MOUNTED
MTL	METAL
MTP	METAL TOILET PARTITION
N/A	NOT APPLICABLE
NAT	NATURAL
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
NUM	NUMBER
NW	NEW
OA	OVERALL
OC	ON CENTER
OD	OUTSIDE DIAMETER
OH	OVERHEAD DOOR
OPNG	OPENING
OPP	OPPOSITE
OPPHAND	OPPOSITE HAND
OSB	ORIENTED STRAND BOARD
OTS	OPEN TO STRUCTURE
OW	OPERABLE WALL
OZ	OUNCE
PART BD	PARTICLE BOARD
PAV	PAVING
PCP	PRECAST CONCRETE PLANK
PERIM	PERIMETER
PL	PROPERTY LINE / PLATE
PLAM	PLASTIC LAMINATE
PLAS	PLASTIC
PLY	PLYWOOD
PMJF	PRE-MOLDED JOINT FILLER
PNT	PAINT
PR	PAIR
PREFIN	PREFINISHED
PRFB	POURED RESIN FLOOR BASE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE TREATED
PTD	PAPER TOWEL DISPENSER
PTN	PARTITION
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
QT	QUARRY TILE
R	RISER
R & D	REMOVE & DISPOSE
R & R	REMOVE AND REPLACE
R & S	REMOVE AND SALVAGE
RAD	RADIUS
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
REF	REFRIGERATOR
REFURB	REFURBISH
REINF	REINFORCEMENT
RELOC	RELOCATED
REM	REMOTE
REQ'D	REQUIRED
RES	RESILIENT
REV	REVISION
RFG	ROOFING
RFI	RIGID FOAM INSULATION
RFS	RESINOUS FLOOR SYSTEM
RH	RIGHT HAND
RL	ROOF LADDER
RM	RUBBER MAT
RM	ROOM
RO	ROUGH OPENING
RT	RUBBER TILE
RTU	ROOF TOP UNIT
RUB	RUBBER
S	SEALANT
S.L.	STRUCTURAL LINE
SACI	SPRAY-APPLIED CELLULOSE INSULATION
SACP	SECURITY ALARM CONTROL PANEL
SAFI	SPRAY-APPLIED FOAM INSULATION
SCHED	SCHEDULE
SCR	SHOWER CURTAIN ROD
SCW	SOLID CORE WOOD
SD	SOAP DISPENSER
SECT	SECTION
SF	SQUARE FEET
SH	SINGLE HUNG
SHR	SHOWER
SIM	SIMILAR
SND	SANITARY NAPKIN DISPENSER
SNV	SANITARY NAPKIN VENDOR
SOLSUR	SOLID SURFACE (COUNTER)
SPC	SPECIAL
SPEC	SPECIFICATION
SQ	SQUARE
SR	SHEET RUBBER
SS	STAINLESS STEEL
STD	STANDARD
STL	STEEL
STOR	STORAGE
STRUCT	STRUCTURE or STRUCTURAL
SUSP	SUSPENDED or SUSPENSION
SV	SHEET VINYL
SYS	SYSTEM(S)
T & B	TOP AND BOTTOM
T & G	TONGUE AND GROOVE
TB	TRASH BARREL
TBA	TO BE ABANDONED
TBB	TILE BACKER BOARD
TBD	TO BE DETERMINED
TBOC	TOP BACK OF CURB
TEL	TELEPHONE
TEMP	TEMPORARY
THK	THICK(NESS)
THRESH	THRESHOLD
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOL	TOP OF LANDING
TOP	TOP OF PLATE
TOS	TOP OF STEEL
TOW	TOP OF WALL
TP	TRANSLUCENT PANEL
TR	TREAD
TS	TUBULAR STEEL
TTD	TOILET TISSUE DISPENSER
TW	TO WEATHER
TYP	TYPICAL
UC	UNDERCUT
UG	UNDERGROUND
UND	UNDERSIDE (OF DECK)
UNFIN	UNFINISHED
UNO	UNLESS NOTED OTHERWISE
UV	UNIT VENTILATOR
VB	VINYL BASE / VAPOR BARRIER
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VEST	VESTIBULE
VIF	VERIFY IN FIELD
VPD	VENEER PLASTER BASE
VS	VENT STACK
VT	VINYL TREAD
VTS	VINYL TRANSITION STRIP
VWB	VINYL WALL BASE
VWC	VINYL WALL COVERING
W	WASHER
W/	WITH
W/O	WITHOUT
WB	WOOD BASE
WC	WALL CABINET
WD	WOOD
WDC	WATERPROOFING, DAMPPROOFING, & CAULKING CONTRACTOR
WF	WIRE FABRIC
WG	WIRE GLASS
WH	WALL HUNG
WIN	WINDOW
WP	WATER PROTECTION
WPG	WATERPROOF(ING)
WR	WATER RESISTANT
WS	WATER STOP
WT	WEIGHT
WWF	WELDED WIRE FABRIC

SYMBOLS:

- EXTERIOR ELEVATION (X / AX.XX)
- INTERIOR ELEVATION (1 / A1.01 / 1)
- BUILDING SECTION (X / AX.XX)
- WALL SECTION (X / AX.XX)
- DETAIL (X / AX.XX)
- PARTITION TYPE (X)
- EXTERIOR WALL ASSEMBLY (XX)
- DOOR TYPE or VISION PANEL (VP) (X)
- WINDOW TYPE (X)
- ROOF TYPE (X)
- SPECIFIC DEMOLITION NOTE (X)
- SPECIFIC CONSTRUCTION NOTE (X)
- CHANGE IN PLANE (X)
- LEADER
- DIMENSION (3'-0")
- CHANGE IN ELEVATION
- CONTROL JOINT (C J)
- ELEVATION or WORK POINT (WP)
- COLUMN GRID (A / 1)
- EXISTING COLUMN GRID (A / 1)
- ALIGN SURFACES (ALIGN)
- REVISION MARKER (X)
- ROOM TAG (ADMINISTRATION / 100)
- DRAWING TITLE (1 View Name / 1/8" = 1'-0" / 1/A201 ORIGINAL TAG REFERENCE LOCATED NEXT TO SCALE)

LEGEND:

- RIGID/SEMI-RIGID INSULATION
- CONCRETE
- SAND / P.C. CONCRETE
- PARTICLE BOARD / MDF
- PLYWOOD/MDO
- FINISH WOOD
- ALUMINUM
- STEEL
- PVC
- FIBER CEMENT
- CONCRETE MASONRY UNIT
- BRICK
- MORTAR
- GROUT
- TERRA COTTA
- EARTH
- GRAVEL
- SPRAY FOAM
- INSULATED METAL PANEL
- WOOD STUDS/FRAMING (DIMENSIONAL LUMBER)
- WOOD BLOCKING
- BATT INSULATION / SOUND ATTENUATION BLANKET
- MATCHLINE

Project:
NEW PUBLIC WORKS FACILITY
14 FOREST ROAD, ACTON MA 01720

TOWN OF ACTON

Weston & Sampson
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Consultants:

Revisions:

No.	Date	Description

COA:

Seal:

Issued For:
SCHEMATIC DESIGN

Scale: As indicated

Key Plan:

Date: 11/01/2024
Draw By: DRD
Reviewed By: Checker
Approved By: Approver
W&S Project No.: ENG24-1080
W&S File No.: XXX

Drawing Title:
ABBREVIATIONS, SYMBOLS, LEGEND & GENERAL NOTES

Sheet Number:
0.A00

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WALL TYPE NOTES:

1. WALL TYPES LISTED REPRESENT SEVERAL TYPES OF WALL CONSTRUCTION, ALL OF WHICH MAY NOT BE USED ON THIS PROJECT. REFER TO FLOOR PLANS FOR WALL TYPE DESIGNATIONS.
2. EXTEND ALL METAL STUDS AND GYPSUM BOARD TO UNDERSIDE OF DECK. WHERE ABUSE RESISTANT GYPSUM BOARD (ARGB) IS USED, EXTEND ARGB TO 6" ABOVE FINISH CEILING, CONTINUE WITH GYPSUM BOARD TO UNDERSIDE OF DECK.
3. AT ALL NON-FIRE RATED PARTITIONS, FILL VOIDS WITH SOUND ATTENUATION INSULATION INCLUDING, BUT NOT LIMITED TO, FLUTES IN METAL FLOOR / ROOF DECK, VOIDS BETWEEN PARTITIONS AND STRUCTURAL MEMBERS, PENETRATIONS OF DUCTWORK, ELECTRICAL CONDUIT, PIPING, ETC.
4. GYPSUM BOARD AND ARGB USED IN A ONE, TWO, OR THREE HOUR FIRE-RESISTANCE RATED PARTITION MUST BEAR THE U.L. CLASSIFICATION MARKING.

   SMOKE PARTITIONS:

5. NON-FIRE-RESISTANCE RATED PARTITIONS REQUIRED TO RESIST THE PASSAGE OF SMOKE ARE DESIGNATED AS "SMOKE RESISTANT" WITH AN ASTERISK (*) LOCATED BELOW THE WALL TYPE DESIGNATION. EXTEND ALL SMOKE PARTITIONS TO THE UNDERSIDE OF METAL FLOOR / ROOF DECK AND / OR STRUCTURE ABOVE. PENETRATIONS AND VOIDS SHALL BE FIRESTOPPED IN ACCORDANCE WITH DIVISION 07 SPECIFICATION SECTION "FIRESTOPPING". ALL HEAD-OF-WALL JOINTS AND FLOOR-TO-WALL JOINTS SHALL BE SEALED IN ACCORDANCE WITH SPECIFICATION SECTION "FIRESTOPPING".

   SMOKE BARRIERS:

6. FOR THE PURPOSE OF SUBDIVIDING BUILDING SPACES, SMOKE BARRIERS ARE FIRE-RESISTANCE RATED PARTITIONS, DESIGNATED WITH AN "S" LOCATED ADJACENT TO THE WALL TYPE DESIGNATION.
7. PROVIDE SMOKE DAMPERS AT DUCTWORK PENETRATIONS IN ALL ONE, TWO, AND THREE HOUR FIRE-RESISTANCE RATED SMOKE BARRIERS.
8. REFER TO FIRE-RESISTANCE RATED CONSTRUCTION FOR ADDITIONAL REQUIREMENTS.

   FIRE-RESISTANCE RATED CONSTRUCTION:

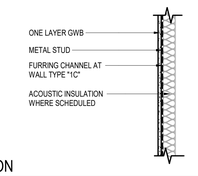
9. ALL FIRE-RESISTANCE RATED PARTITIONS RESIST THE PASSAGE OF SMOKE AND ARE CONSIDERED SMOKE RESISTANT WITHOUT THE ASTERISK DESIGNATION. EXTEND ALL FIRE-RESISTANCE RATED PARTITIONS TO THE UNDERSIDE OF METAL FLOOR/ROOF DECK AND/OR STRUCTURE ABOVE. PENETRATIONS AND VOIDS SHALL BE FIRESTOPPED IN ACCORDANCE WITH SPECIFICATION SECTION "FIRESTOPPING". ALL HEAD-OF-WALL JOINTS AND FLOOR-TO-WALL JOINTS SHALL BE SEALED IN ACCORDANCE WITH SPECIFICATION SECTION "FIRE-RESISTIVE JOINT SYSTEMS."

   X — WALL TYPE
   12'-0" A.F.F. — (HEIGHT OF WALL IF APPLICABLE. IF NO DIMENSION, THEN WALL IS TO UNDERSIDE OF DECK)

10. GYPSUM BOARD AT EXTERIOR WALLS IS TO GO TO THE UNDERSIDE OF DECK AND HAVE THE ROOF VAPOR BARRIER / FABRIC LINER EXTEND AND SEALED AGAINST THE BACK SIDE OF THE GYPSUM BOARD.

1

SECTION



PLAN

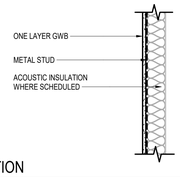


MARK	CORE SIZE	GWB THICK	GWB HEIGHT	TOTAL PARTITION THICK	ACOUSTIC INSUL	FIRE RATING / UL DESIGN NO.
1	2 1/2"	5/8"	FULL HEIGHT	3 1/8"	NO	-
1A	2 1/2"	5/8"	FULL HEIGHT	3 1/8"	YES	-
1B	2 1/2"	5/8"	6" ABOVE FINISHED CLG	3 1/8"	NO	-
1C	7/8"	5/8"	6" ABOVE FINISHED CLG	1 1/2"	NO	-

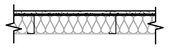
2 1/2" METAL STUD

2

SECTION



PLAN

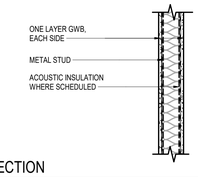


MARK	CORE SIZE	GWB THICK	GWB HEIGHT	TOTAL PARTITION THICK	ACOUSTIC INSUL	FIRE RATING / UL DESIGN NO.
2	3 5/8"	5/8"	FULL HEIGHT	4 1/4"	NO	-
2A	3 5/8"	5/8"	FULL HEIGHT	4 1/4"	YES	-
2B	3 5/8"	5/8"	6" ABOVE FINISHED CLG	4 1/4"	NO	-

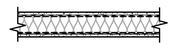
3 5/8" METAL STUD - 1 LAYER GWB - 1 SIDE

3

SECTION



PLAN

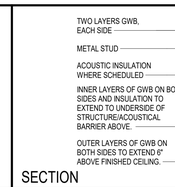


MARK	CORE SIZE	GWB THICK	GWB HEIGHT	TOTAL PARTITION THICK	ACOUSTIC INSUL	FIRE RATING / UL DESIGN NO.
3	3 5/8"	5/8"	FULL HEIGHT	4 7/8"	NO	-
3A	3 5/8"	5/8"	FULL HEIGHT	4 7/8"	YES	-
3B	3 5/8"	5/8"	6" ABOVE FINISHED CLG	4 7/8"	NO	-

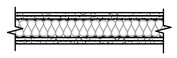
3 5/8" METAL STUD - 1 LAYER GWB - BOTH SIDES

4

SECTION



PLAN

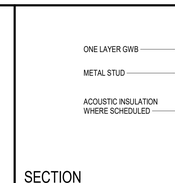


MARK	CORE SIZE	GWB THICK	GWB HEIGHT	TOTAL PARTITION THICK	ACOUSTIC INSUL	FIRE RATING / UL DESIGN NO.
4	3 5/8"	(2) 5/8"	FULL HEIGHT	6 1/8"	NO	-
4A	3 5/8"	(2) 5/8"	6" ABOVE FINISHED CLG	6 1/8"	NO	-
4B - 2H	3 5/8"	(2) 5/8"	FULL HEIGHT	6 1/8"	YES	2 HR PARTITION - U419

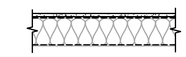
3 5/8" METAL STUD - 2 LAYER GWB - BOTH SIDES

5

SECTION



PLAN

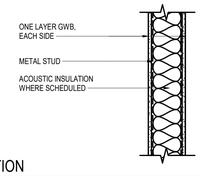


MARK	CORE SIZE	GWB THICK	GWB HEIGHT	TOTAL PARTITION THICK	ACOUSTIC INSUL	FIRE RATING / UL DESIGN NO.
5	6"	5/8"	FULL HEIGHT	6 5/8"	NO	-
5A	6"	5/8"	FULL HEIGHT	6 5/8"	YES	-
5B	6"	5/8"	6" ABOVE FINISHED CLG	6 5/8"	NO	-

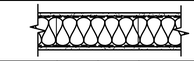
6" METAL STUD - 1 LAYER GWB - 1 SIDE

6

SECTION



PLAN

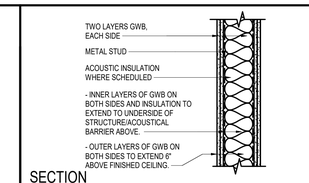


MARK	CORE SIZE	GWB THICK	GWB HEIGHT	TOTAL PARTITION THICK	ACOUSTIC INSUL	FIRE RATING / UL DESIGN NO.
6	6"	5/8"	FULL HEIGHT	7 1/4"	NO	-
6A	6"	5/8"	FULL HEIGHT	7 1/4"	YES	-
6B	6"	5/8"	6" ABOVE FINISHED CLG	7 1/4"	NO	-
6C	8"	5/8"	FULL HEIGHT	9 1/4"	NO	-

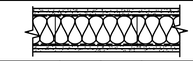
6" METAL STUD - 1 LAYER GWB - BOTH SIDES

7

SECTION



PLAN

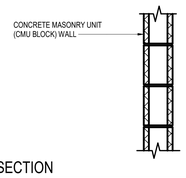


MARK	CORE SIZE	GWB THICK	GWB HEIGHT	TOTAL PARTITION THICK	ACOUSTIC INSUL	FIRE RATING / UL DESIGN NO.
7 - 2h	6"	5/8"	FULL HEIGHT	8 1/2"	YES	2 HR PARTITION - U411

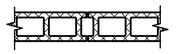
6" METAL STUD - 2 LAYERS GWB - BOTH SIDES

8

SECTION



PLAN

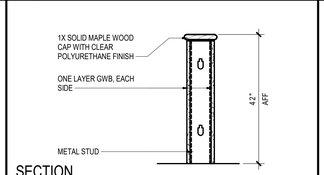


MARK	CORE SIZE	GWB THICK	GWB HEIGHT	TOTAL THICK	ACOUSTIC INSUL	FIRE RATING / UL DESIGN NO.
8	6" NOM	-	-	5 5/8"	NO	-
8 - 1H	6" NOM	-	-	5 5/8"	NO	1 HR PARTITION - U906
8A	8" NOM	-	-	7 5/8"	NO	-
8A - 1H	8" NOM	-	-	7 5/8"	NO	1 HR PARTITION - U905
8A - 2H	8" NOM	-	-	7 5/8"	NO	2 HR PARTITION - U905
8B	12" NOM	-	-	11 5/8"	NO	-
8B - 1H	12" NOM	-	-	11 5/8"	NO	1 HR PARTITION - U905
8B - 2H	12" NOM	-	-	11 5/8"	NO	2 HR PARTITION - U905

CMU WALLS

9

SECTION



PLAN

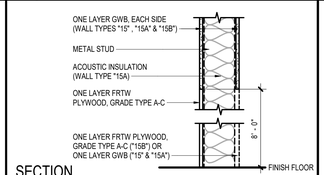


MARK	CORE SIZE	GWB THICK	GWB HEIGHT	TOTAL THICK	ACOUSTIC INSUL	FIRE RATING / UL DESIGN NO.
9	3 5/8"	5/8"	UP TO 41"	4 7/8"	NO	-

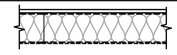
PARTIAL HEIGHT WALLS

15

SECTION



PLAN

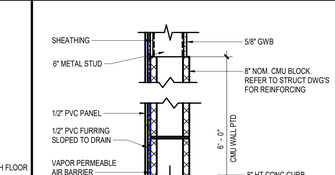


MARK	SHEATHING	SHEATHING HEIGHT	CORE SIZE	SHEATHING	SHEATHING HEIGHT	ACOUSTIC INSUL
15	PLY - 1 SIDE, GWB OTHER	UP TO 8'-0"	6" MS	GWB ABOVE	FULL HEIGHT	NO
15A	PLY - 1 SIDE, GWB OTHER	UP TO 8'-0"	6" MS	GWB ABOVE	FULL HEIGHT	YES
15B	PLY - 2 SIDES	UP TO 8'-0"	6" MS	GWB ABOVE	FULL HEIGHT	NO
15C	PLY - 1 SIDE	UP TO 8'-0"	6" MS	GWB ABOVE	FULL HEIGHT	RIGID INSULATION

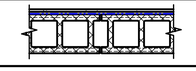
METAL STUD FULL HEIGHT WITH PLYWOOD UP TO 8'-0", GWB ABOVE PLYWOOD TO UNDERSIDE OF STRUCTURE (SEE PLANS FOR THE LOCATION OF GWB / PLYWOOD)

16

SECTION



PLAN

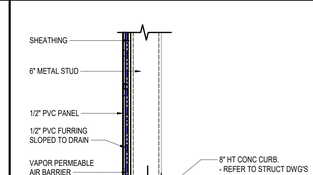


MARK	ASSEMBLY DESCRIPTION
16	PARTITION CMU WALL

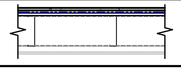
VEHICLE WASH BAY WALL ASSEMBLIES

16

SECTION



PLAN

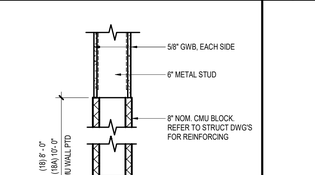


MARK	ASSEMBLY DESCRIPTION
16A	PARTITION CMU WALL

VEHICLE WASH BAY WALL ASSEMBLIES

18

SECTION



PLAN



MARK	CORE SIZE	GWB THICK	GWB HEIGHT	TOTAL PARTITION THICK	ACOUSTIC INSUL	FIRE RATING / UL DESIGN NO.
18	VARIES	5/8"	FULL HEIGHT	VARIES	NO	-
18A	VARIES	5/8"	FULL HEIGHT	VARIES	NO	-

STACKED PARTITION: 8" CMU / 6" METAL STUD - 1 LAYER GWB - BOTH SIDES

NOT USED

0' 6" 1' 2'
SCALE: 1" = 1'-0"

Project:
NEW PUBLIC WORKS FACILITY
14 FOREST ROAD, ACTON MA 01720

TOWN OF ACTON

Weston & Sampson
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Consultants:

Revisions:

No.	Date	Description

COA:

Seal:

Issued For:
SCHEMATIC DESIGN

Scale: As indicated

Key Plan:

Date:	11/01/2024
Draw By:	DRD
Reviewed By:	Checker
Approved By:	Approver
W&S Project No.:	ENG24-1080
W&S File No.:	XXX

Drawing Title:
PARTITION TYPES

Sheet Number:
0.A02

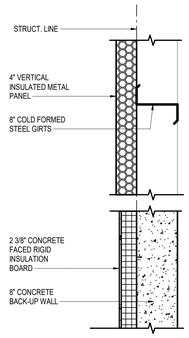
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LOWER WALL ASSEMBLY
EXTERIOR
- 2 3/8" CONCRETE FACED RIGID INSULATION BOARD (R-10)
- 8" CONCRETE BACK-UP WALL

INTERIOR

UPPER WALL ASSEMBLY
EXTERIOR
- 4" VERTICAL INSULATED METAL PANEL, MIN R-26, BRAKE METAL TRIM, BY MBM
- 8" COLD FORMED STEEL GIRTS, BY MBM
- STEEL BUILDING FRAME, BY MBM

INTERIOR



LOWER WALL ASSEMBLY
(UP TO 3'-4" HT)
(1'-2 5/8" TOTAL THICKNESS)
EXTERIOR
- 4" NOMINAL CMU VENEER
- AIR SPACE
- 3" RIGID INSULATION
- CONTINUOUS AIR & VAPOR BARRIOR
- 1/2" EXTERIOR SHEATHING
- 6" COLD FORMED METAL FRAMING, 16 Ga. @ 16" O.C. MAX.
- 5/8" GYPSUM WALL BOARD

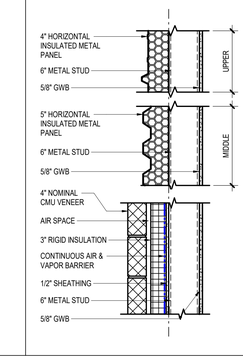
INTERIOR

MIDDEL WALL ASSEMBLY
(11 5/8" TOTAL THICKNESS)
EXTERIOR
- 5" HORIZONTAL INSULATED METAL PANEL, 36" WIDTH, MIN R-26, BREAK METAL TRIM, BY MBM
- 6" COLD FORMED METAL FRAMING, 16 Ga. @ 16" O.C. MAX.
- 5/8" GYPSUM WALL BOARD

INTERIOR

UPPER WALL ASSEMBLY (ABOVE MEZZANINE)
(10 5/8" TOTAL THICKNESS)
EXTERIOR
- 4" HORIZONTAL INSULATED METAL PANEL, 36" WIDTH, MIN R-26, BREAK METAL TRIM, BY MBM
- 6" COLD FORMED METAL FRAMING, 16 Ga. @ 16" O.C. MAX.
- 5/8" GYPSUM WALL BOARD

INTERIOR



LOWER WALL ASSEMBLY
(UP TO 3'-4" HT)
(1'-4" TOTAL THICKNESS)
EXTERIOR
- 4" NOMINAL CMU VENEER
- AIR SPACE
- 3" RIGID INSULATION
- CONTINUOUS AIR & VAPOR BARRIOR
- 8" CONCRETE BACK-UP WALL

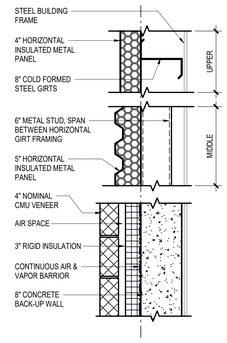
INTERIOR

MIDDEL WALL ASSEMBLY
(1' - 1" TOTAL THICKNESS)
EXTERIOR
- 5" HORIZONTAL INSULATED METAL PANEL, 36" WIDTH, MIN R-26, BREAK METAL TRIM, BY MBM
- 6" COLD FORMED METAL FRAMING, 16 Ga. @ 16" O.C. MAX. TO SPAN BETWEEN HORIZONTAL GIRT FRAMING.

INTERIOR

UPPER WALL ASSEMBLY (ABOVE MEZZANINE)
EXTERIOR
(1'-0" TOTAL THICKNESS)
- 4" VERTICAL INSULATED METAL PANEL, 42" WIDTH, MIN R-26, BREAK METAL TRIM, BY MBM
- 8" COLD FORMED STEEL GIRTS, BY MBM
- STEEL BUILDING FRAME, BY MBM

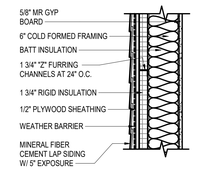
INTERIOR



EXTERIOR WALL ASSEMBLIES

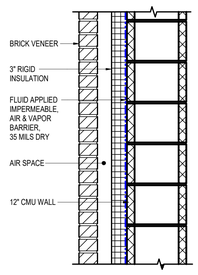
TYPE A UPPER

WALL ASSEMBLY
EXTERIOR
- FIBER CEMENT LAP SIDING - 5" EXPOSURE
- WEATHER BARRIER
- 1/2" PLYWOOD SHEATHING
- 1 3/4" "Z" FURRING CHANNELS AT 24" O.C.
- 1 3/4" RIGID INSULATION, R-VALUE OF 7.5
- 6" COLD FORMED METAL FRAMING AT 16" O.C. MAX
- BATT INSULATION, R-VALUE OF 19.2
- 5/8" MOISTURE RESISTANT GYP BOARD



TYPE A LOWER

WALL ASSEMBLY
(1' - 9" TOTAL THICKNESS)
EXTERIOR
- BRICK VENEER
- AIR SPACE
- 3" RIGID INSULATION
- FLUID APPLIED, CONTINUOUS AIR & VAPOR BARRIER, IMPERMEABLE
- 12" CMU



EXTERIOR WALL ASSEMBLIES: NOTE: SEE DETAILS ON A6 & A7 SERIES FOR ADDITIONAL INFORMATION. "F" USED FOR FUME SEPERATION WALLS. "I" NOT USED FOR CLARITY.

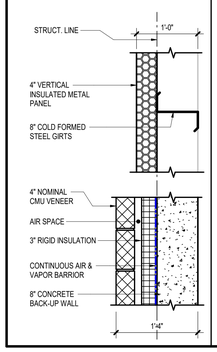
TYPE A

LOWER WALL ASSEMBLY
(UP TO 3'-4" HT AT SHOPS & VEHICLE MAINT.)
(UP TO 5'-5" HT AT VEHICLE STORAGE)
(1'-4" TOTAL THICKNESS)
EXTERIOR
- 4" NOMINAL CMU VENEER
- AIR SPACE
- 3" RIGID INSULATION
- CONTINUOUS AIR & VAPOR BARRIER
- 8" CONCRETE BACK-UP WALL

INTERIOR

UPPER WALL ASSEMBLY
(1'-0" TOTAL THICKNESS)
EXTERIOR
- 4" VERTICAL INSULATED METAL PANEL, MIN R-26, BREAK METAL TRIM, BY MBM
- 8" COLD FORMED STEEL GIRTS, BY MBM
- STEEL BUILDING FRAME, BY MBM

INTERIOR



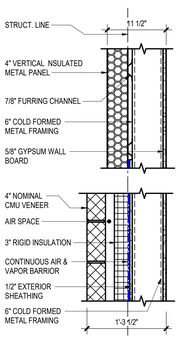
TYPE B

LOWER WALL ASSEMBLY
(UP TO 3'-4" HT)
(1'-3 1/2" TOTAL THICKNESS)
EXTERIOR
- 4" NOMINAL CMU VENEER
- AIR SPACE
- 3" RIGID INSULATION
- CONTINUOUS AIR & VAPOR BARRIER
- 1/2" EXTERIOR SHEATHING
- 6" COLD FORMED METAL FRAMING, AT 16" O.C. MAX.
- 5/8" GYPSUM WALL BOARD

INTERIOR

UPPER WALL ASSEMBLY
(0'-11 1/2" TOTAL THICKNESS)
EXTERIOR
- 4" VERTICAL INSULATED METAL PANEL, MIN R-26, BREAK METAL TRIM, BY MBM
- 7/8" FURRING CHANNEL AT 16" O.C., COORDINATE WITH METAL PANEL FASTENER REQUIREMENTS, BY MBM
- 6" COLD FORMED METAL FRAMING, AT 16" O.C. MAX.
- 5/8" GYPSUM WALL BOARD

INTERIOR



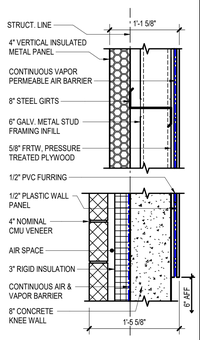
TYPE C

LOWER WALL ASSEMBLY
(UP TO 3'-4" HT)
(1'-4" TOTAL THICKNESS)
EXTERIOR
- 4" NOMINAL CMU VENEER
- AIR SPACE
- 3" RIGID INSULATION
- CONTINUOUS AIR & VAPOR BARRIER
- 8" CONCRETE BACK-UP WALL (3' - 4" HT)
- CONTINUOUS AIR & VAPOR BARRIER
- 1/2" PVC FURRING SLOPED TO DRAIN, SHIM AS NEEDED
- 1/2" PLASTIC WALL PANEL

INTERIOR

UPPER WALL ASSEMBLY
(1'-1 5/8" TOTAL THICKNESS)
EXTERIOR
- 4" VERTICAL INSULATED METAL PANEL, MIN R-26, BREAK METAL TRIM, BY MBM
- 8" COLD FORMED STEEL GIRTS, BY MBM
- 6" GALVANIZED STEEL STUD FRAMING, SPAN BETWEEN HORIZONTAL GIRT FRAMING, TYP.
- 5/8" FIRE RETARDENT TREATED, PRESSURE TREATED A-C PLYWOOD SHEATHING AT ALL WASH BAY WALLS, TYP.
- CONTINUOUS VAPOR PERMEABLE AIR BARRIER
- 1/2" PVC FURRING SLOPED TO DRAIN, SHIM AS NEEDED
- 1/2" PLASTIC WALL PANEL

INTERIOR



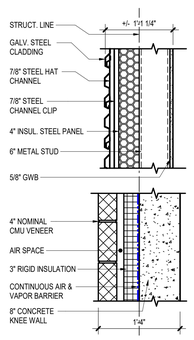
TYPE D

LOWER WALL ASSEMBLY
(1' - 4" TOTAL THICKNESS)
EXTERIOR
- 4" NOMINAL CMU VENEER
- AIR SPACE
- 3" RIGID INSULATION
- CONTINUOUS AIR & VAPOR BARRIER
- 8" CONCRETE BACK-UP WALL

INTERIOR

UPPER WALL ASSEMBLY
(+/- 1'- 1 1/4")
EXTERIOR
- GALV. STEEL CLADDING SYSTEM FACTORY PTD. PROVIDED BY METAL PANEL MANUF. INSTALLED BY METAL BLDG MANUF. G.C. TO COORDINATE INSTALL WITH METAL PANEL MANUF.
- 7/8" VERTICAL, GALV. STEEL HAT CHANNEL 16" O.C. PROVIDED AND INSTALLED BY METAL BLDG MANUF.
- 7/8" HORIZONTAL INTEGRAL GALV. STEEL CHANNEL CLIP PROVIDED AND INSTALLED BY METAL BLDG MANUF.
- 4" INSULATED GALV. STEEL PANEL BACK-UP SYSTEM INSTALLED HORIZONTALLY. PROVIDED AND INSTALLED BY METAL BLDG MANUF.
- 6" COLD-FORMED METAL FRAMING
- 5/8" GYPSUM WALL BOARD

INTERIOR



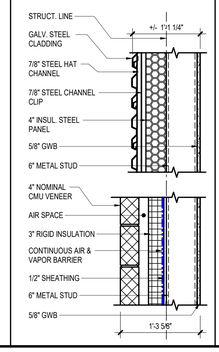
TYPE E

LOWER WALL ASSEMBLY
(1' - 3 5/8" TOTAL THICKNESS)
EXTERIOR
- 4" NOMINAL CMU VENEER
- AIR SPACE
- 3" RIGID INSULATION
- CONTINUOUS AIR & VAPOR BARRIER
- 1/2" EXTERIOR SHEATHING
- 6" COLD FORMED METAL STUD, AT 16" O.C. MAX
- 5/8" GYPSUM WALL BOARD

INTERIOR

UPPER WALL ASSEMBLY
(+/- 1'- 1 1/14")
EXTERIOR
- GALV. STEEL CLADDING SYSTEM FACTORY PTD. PROVIDED BY METAL PANEL MANUF. INSTALLED BY METAL BLDG MANUF. G.C. TO COORDINATE INSTALL WITH METAL PANEL MANUF.
- 7/8" VERTICAL, GALV. STEEL HAT CHANNEL 16" O.C. PROVIDED AND INSTALLED BY METAL BLDG MANUF.
- 7/8" INTEGRAL GALV. STEEL CHANNEL CLIP PROVIDED AND INSTALLED BY METAL BLDG MANUF.
- 4" INSULATED GALV. STEEL PANEL BACK-UP SYSTEM. PROVIDED AND INSTALLED BY METAL BLDG MANUF.
- 6" METAL STUD, REFER TO STRUCT DWG'S FOR SIZING AND SPACING
- 5/8" GYPSUM WALL BOARD

INTERIOR



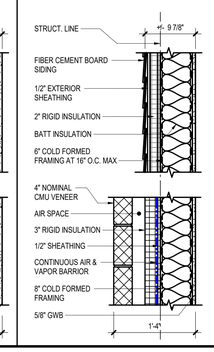
TYPE G

LOWER WALL ASSEMBLY
(1'-4" TOTAL THICKNESS)
EXTERIOR
- 4" NOMINAL CMU VENEER
- AIR SPACE
- 3" RIGID INSULATION
- CONTINUOUS AIR & VAPOR BARRIER
- 1/2" EXTERIOR SHEATHING
- 6" COLD-FORMED FRAMING W/ BATT INSULATION (R-30 +/-)
- 5/8" GWB

INTERIOR

UPPER WALL ASSEMBLY
(+/- 9 7/8" TOTAL THICKNESS)
EXTERIOR
- FIBER CEMENT SIDING
- WEATHER BARRIER
- 1/2" EXTERIOR PLYWOOD SHEATHING
- 2" RIGID INSULATION
- 1/2" EXTERIOR PLYWOOD SHEATHING
- 6" COLD-FORMED FRAMING W/ BATT INSULATION (R-30 +/-)
- 5/8" GWB

INTERIOR



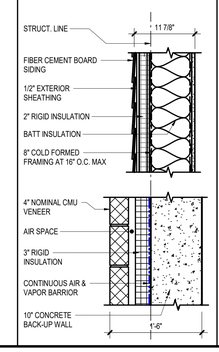
TYPE H

LOWER WALL ASSEMBLY
(1' - 6" TOTAL THICKNESS)
EXTERIOR
- 4" NOMINAL CMU VENEER
- AIR SPACE
- 3" RIGID INSULATION
- CONTINUOUS AIR & VAPOR BARRIER
- 10" CONCRETE BACK-UP WALL

INTERIOR

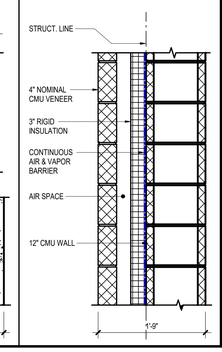
UPPER WALL ASSEMBLY
(+/- 11 7/8" TOTAL THICKNESS)
- FIBER CEMENT SIDING
- WEATHER BARRIER
- 1/2" EXTERIOR PLYWOOD SHEATHING
- 2" RIGID INSULATION
- 1/2" EXTERIOR PLYWOOD SHEATHING
- 8" COLD-FORMED FRAMING W/ BATT INSULATION (R-30 +/-)
- 5/8" GWB

INTERIOR



TYPE J

WALL ASSEMBLY
(1' - 9" TOTAL THICKNESS)
EXTERIOR
- 4" NOMINAL CMU VENEER
- AIR SPACE
- 3" RIGID INSULATION
- CONTINUOUS AIR & VAPOR BARRIER
- 12" CMU

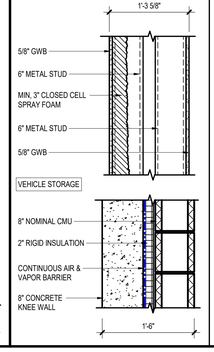


FUME SEPARATION WALL ASSEMBLIES:

TYPE F1 & F1A

LOWER WALL ASSEMBLY
(1' - 6" TOTAL THICKNESS)
(**F1**: UP TO 5'-4" HT)
(**F1A**: UP TO 3'-4" HT)
- 8" CONC. KNEE WALL
- CONTINUOUS AIR & VAPOR BARRIER
- 2" RIGID INSULATION
- AIR SPACE
- 8" NOMINAL CMU VENEER

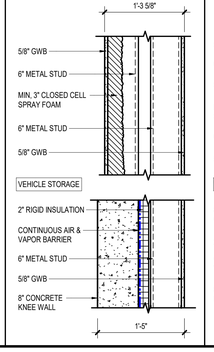
UPPER WALL ASSEMBLY
(1' - 3 5/8" TOTAL THICKNESS)
- 5/8" GYPSUM WALL BOARD
- 6" COLD FORMED METAL FRAMING, AT 16" O.C. MAX.
- MIN. 3" CLOSED CELL SPRAY FOAM BETWEEN STUDS
- 6" COLD FORMED METAL FRAMING, AT 16" O.C. MAX.
- 5/8" GYPSUM WALL BOARD



TYPE F2 & F2A

LOWER WALL ASSEMBLY
(1' - 6" TOTAL THICKNESS)
(**F2**: UP TO 5'-4" HT)
(**F2A**: UP TO 3'-4" HT)
- 8" CONC. KNEE WALL
- CONTINUOUS AIR & VAPOR BARRIER
- 2" RIGID INSULATION
- AIR SPACE
- 6" COLD FORMED METAL FRAMING, AT 16" O.C. MAX.
- 5/8" GYPSUM WALL BOARD

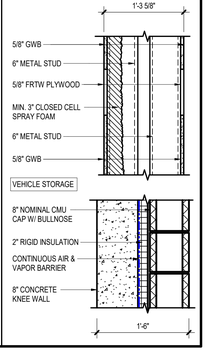
UPPER WALL ASSEMBLY
(1' - 3 5/8" TOTAL THICKNESS)
- 5/8" GYPSUM WALL BOARD
- 6" COLD FORMED METAL FRAMING, AT 16" O.C. MAX.
- MIN. 3" CLOSED CELL SPRAY FOAM BETWEEN STUDS
- 6" COLD FORMED METAL FRAMING, AT 16" O.C. MAX.
- 5/8" GYPSUM WALL BOARD



TYPE F3 & F3A

LOWER WALL ASSEMBLY
(1' - 6" TOTAL THICKNESS)
(**F3**: UP TO 5'-4" HT)
(**F3A**: UP TO 3'-4" HT)
- 8" CONC. KNEE WALL
- CONTINUOUS AIR & VAPOR BARRIER
- 2" RIGID INSULATION
- AIR SPACE
- 8" NOMINAL CMU VENEER

UPPER WALL ASSEMBLY
(1' - 3 5/8" TOTAL THICKNESS)
- 5/8" GYPSUM WALL BOARD ABOVE CMU VENEER UP TO MEZZANINE SLAB. GRADE TYPE A-C FRTW PLYWOOD UP 8' - 0". 5/8" GYPSUM WALL BOARD TO UNDERSIDE OF STRUCTURE
- 6" COLD FORMED METAL FRAMING, AT 16" O.C. MAX.
- MIN. 3" CLOSED CELL SPRAY FOAM BETWEEN STUDS
- 6" COLD FORMED METAL FRAMING, AT 16" O.C. MAX.
- 5/8" GYPSUM WALL BOARD ABOVE CMU VENEER UP TO MEZZANINE SLAB. GRADE TYPE A-C FRTW PLYWOOD UP 8' - 0". 5/8" GYPSUM WALL BOARD TO UNDERSIDE OF STRUCTURE



0' 6" 1' 2'
SCALE: 1" = 1'-0"

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Project:
NEW PUBLIC WORKS FACILITY
14 FOREST ROAD, ACTON MA 01720

TOWN OF ACTON

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Consultants:

Revisions:

No.	Date	Description

COA:

Seal:

Issued For:
SCHEMATIC DESIGN

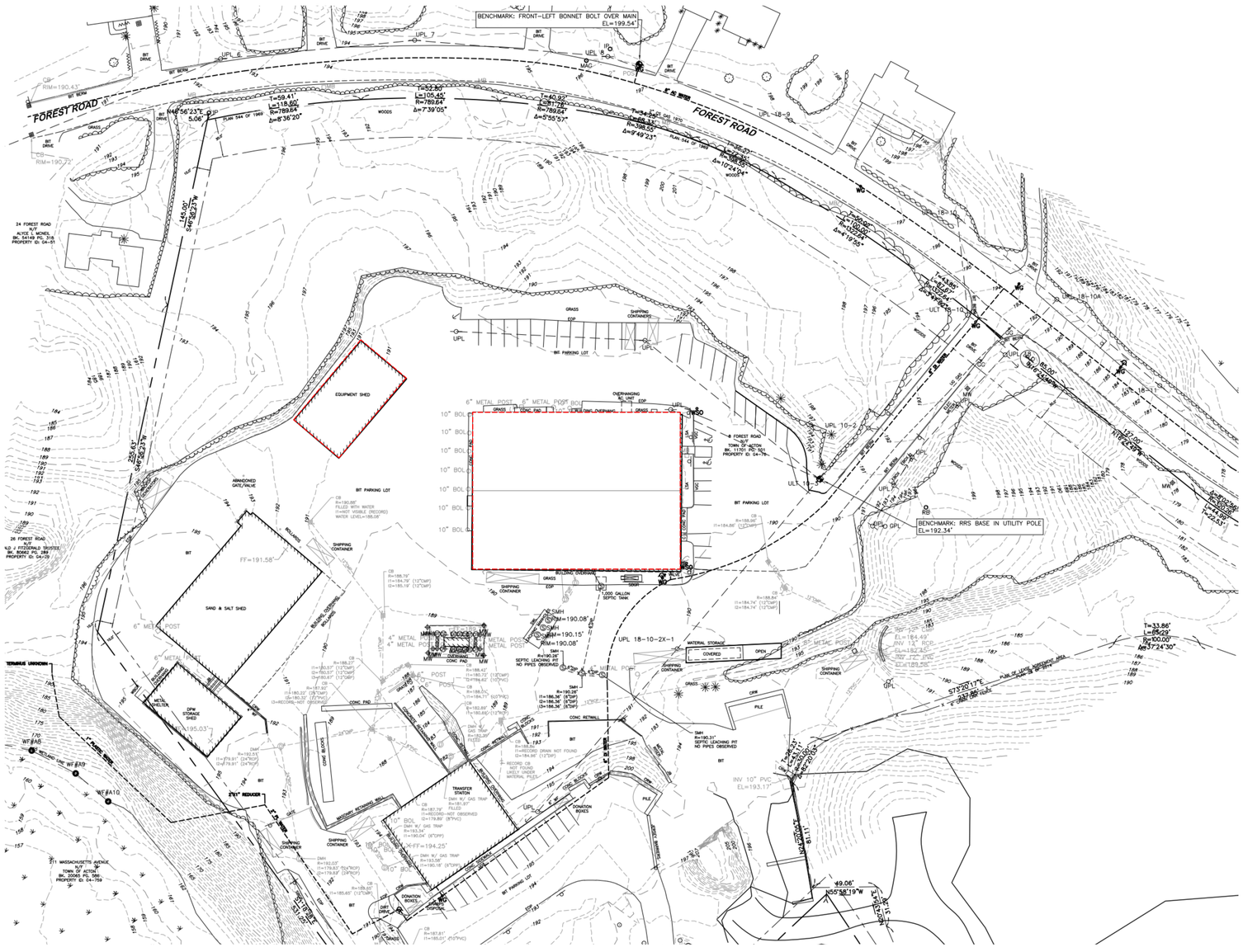
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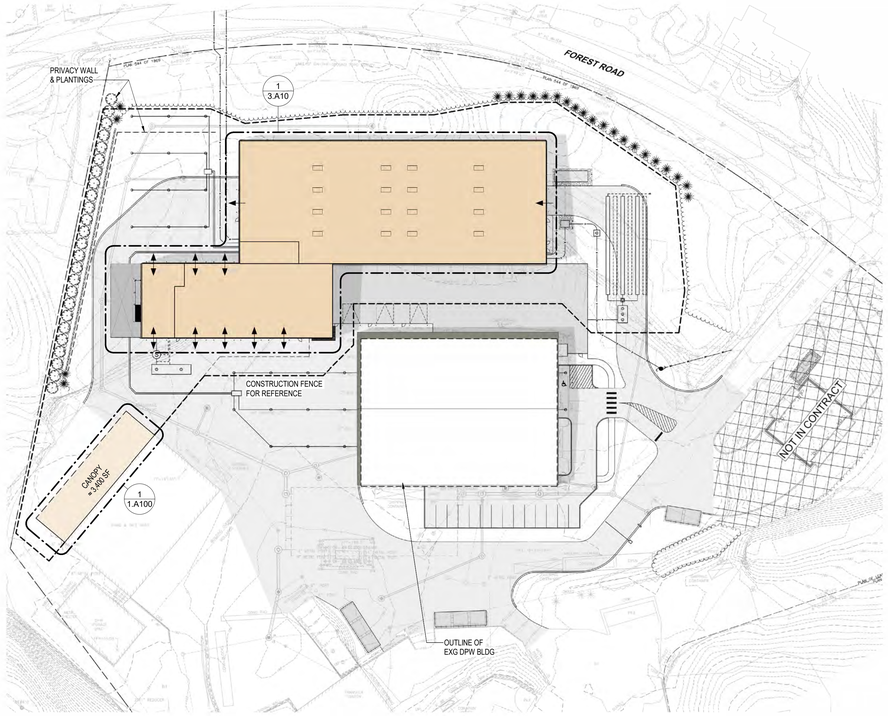
Key Plan:

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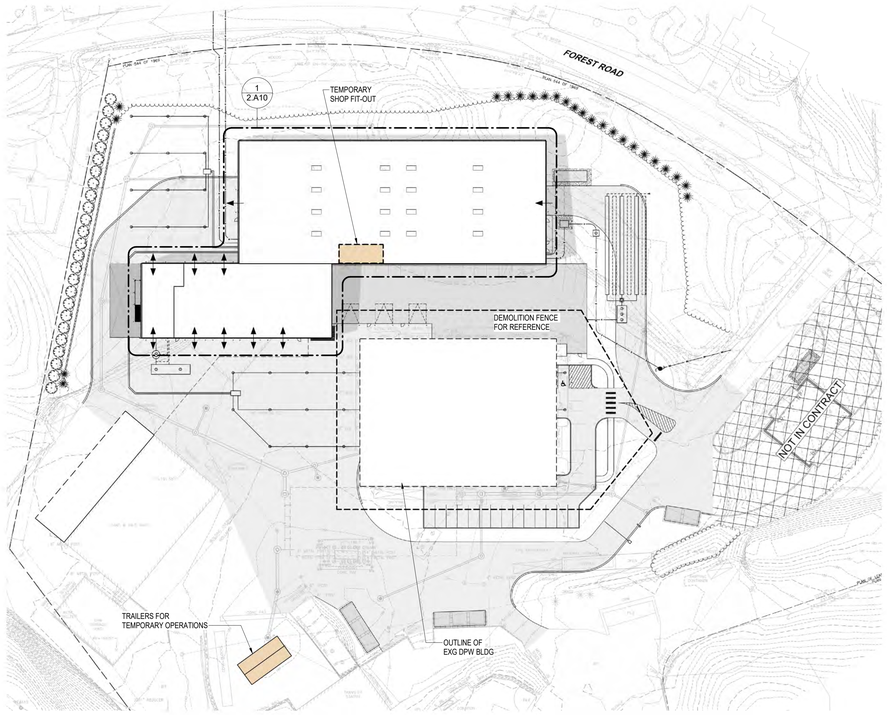
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EXTERIOR WALL ASSEMBLIES

Sheet Number:
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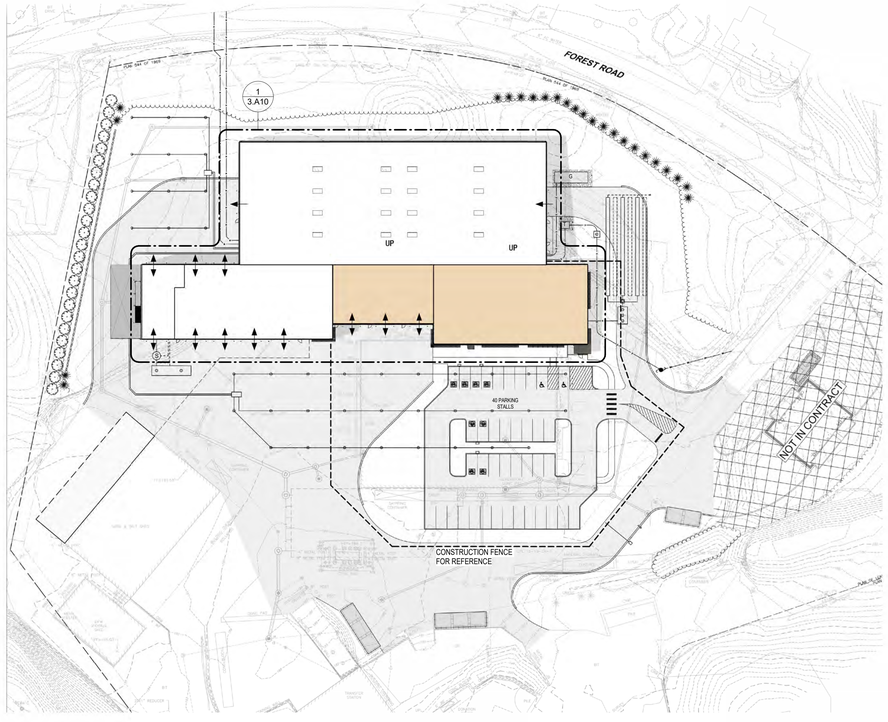

BENCHMARK: FRONT-LEFT BONNET BOLT OVER MAIN
EL=199.54'
FOREST ROAD
FOREST ROAD
BENCHMARK: RRS BASE IN UTILITY POLE
EL=192.34'
EQUIPMENT SHED
SAND & SALT SHED
DPW STORAGE SHED
METAL SHELTER
BIT PARKING LOT
GRASS
WOODS
CONC PAD
BUILDING OVERHANG
SHIPPING CONTAINER
MATERIAL STORAGE
COVERED
OPEN
TRANSFER STATION
DONATION BOXES
1,000 GALLON SEPTIC TANK
SEPTIC LEACHING PIT
NO PIPES OBSERVED
ABANDONED GATE/VALVE
24 FOREST ROAD N/F ALICE S. MCNEIL BK. 54149 PG. 316 PROPERTY ID: 04-51
26 FOREST ROAD N/F O. J. FITZGERALD TRUSTEE BK. 80062 PG. 189 PROPERTY ID: 04-29
11 MASSACHUSETTS AVENUE N/F TOWN OF ACTON BK. 20065 PG. 588 PROPERTY ID: 04-159
4 FOREST ROAD N/F TOWN OF ACTON BK. 11701 PG. 501 PROPERTY ID: 04-76
TERRACE UNKNOWN
WETLAND LINE WF BA9
WETLAND LINE WF A10
N46°56'23"E 5.06'
S46°56'23"W 145.55'
S46°56'23"W 255.43'
N43°03'37"W 195.03'
N55°58'19"W 49.06'
S73°20'17"E 337.82'
N16°42'09"W 422.53'
FF=191.58'
FF=194.25'
RIM=190.43'
RIM=190.72'
RIM=190.08'
RIM=190.15'
INV=190.24'
INV=190.08'
INV 10" PVC EL=193.17'
INV 12" RCP EL=189.85'
EL=184.49'
INV 12" RCP EL=182.35'
INV=190.37
UPL 18-10-2X-1
UPL 18-9
UPL 18-10
UPL 18-10A
UPL 10-2
UPL 18-11
UPL 18-12
ULT 18-12
UPL 7
UPL 6
UPL 8
MW
WG
SMH
CB
DMH
UPL
ULT
RB
IP
POB
T=59.41'
L=118.60'
R=789.64'
Δ=8°36'20"
T=52.30'
L=105.45'
R=789.64'
Δ=7°39'05"
T=40.93'
L=81.78'
R=789.64'
Δ=5°55'57"
T=34.58'
L=68.51'
R=398.55'
Δ=9°49'23"
T=33.86'
L=66.09'
R=100.00'
Δ=37°24'30"
T=60.46'
L=120.56'
R=398.55'
Δ=16°42'24"
T=60.46'
L=120.56'
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Δ=16°51'55"
T=44.50'
L=88.74'
R=100.00'
Δ=50°51'25



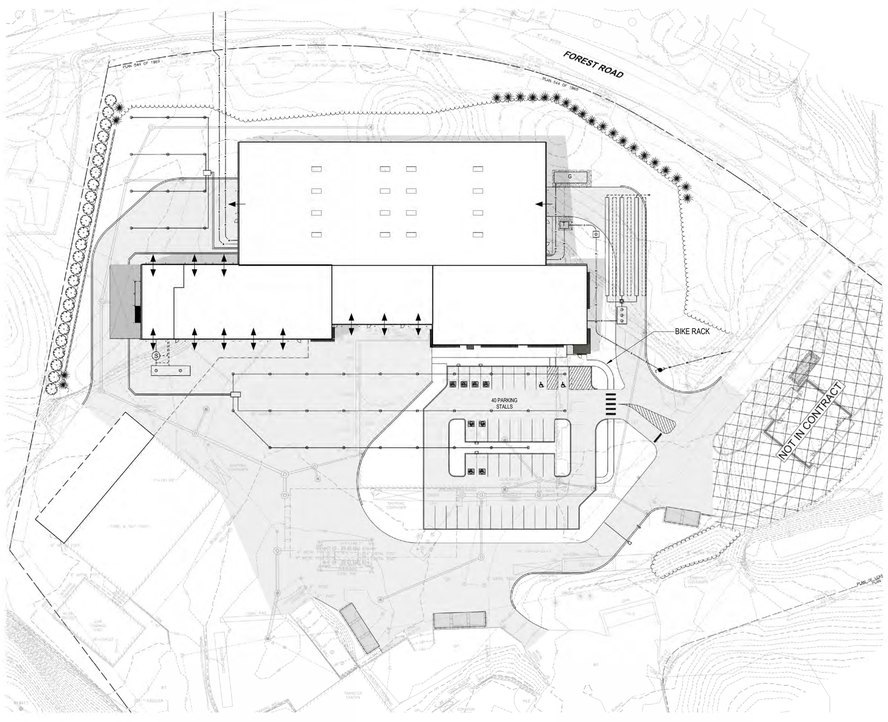
4 CONCEPTUAL SITE PLAN - PHASE 1
1" = 50'-0" 1/ 1.A20



3 CONCEPTUAL SITE PLAN - PHASE 2
1" = 50'-0" 1/ 1.A20



2 CONCEPTUAL SITE PLAN - PHASE 3
1" = 50'-0" 1/ 1.A20



1 CONCEPTUAL SITE PLAN - COMPLETE
1" = 50'-0"

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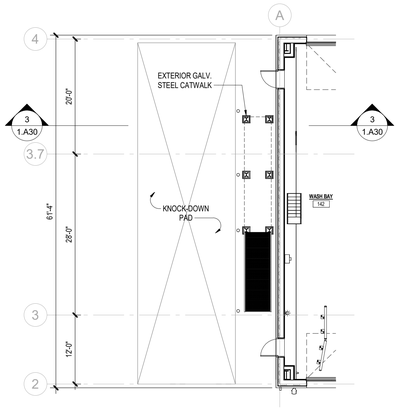
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PHASED SITE PLANS

Sheet Number:

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2 PH1 - PARTIAL PLAN - KNOCK-DOWN PAD
3/32" = 1'-0" 1/ 1.A20

UNDERSLAB RIGID INSULATION LEGEND:

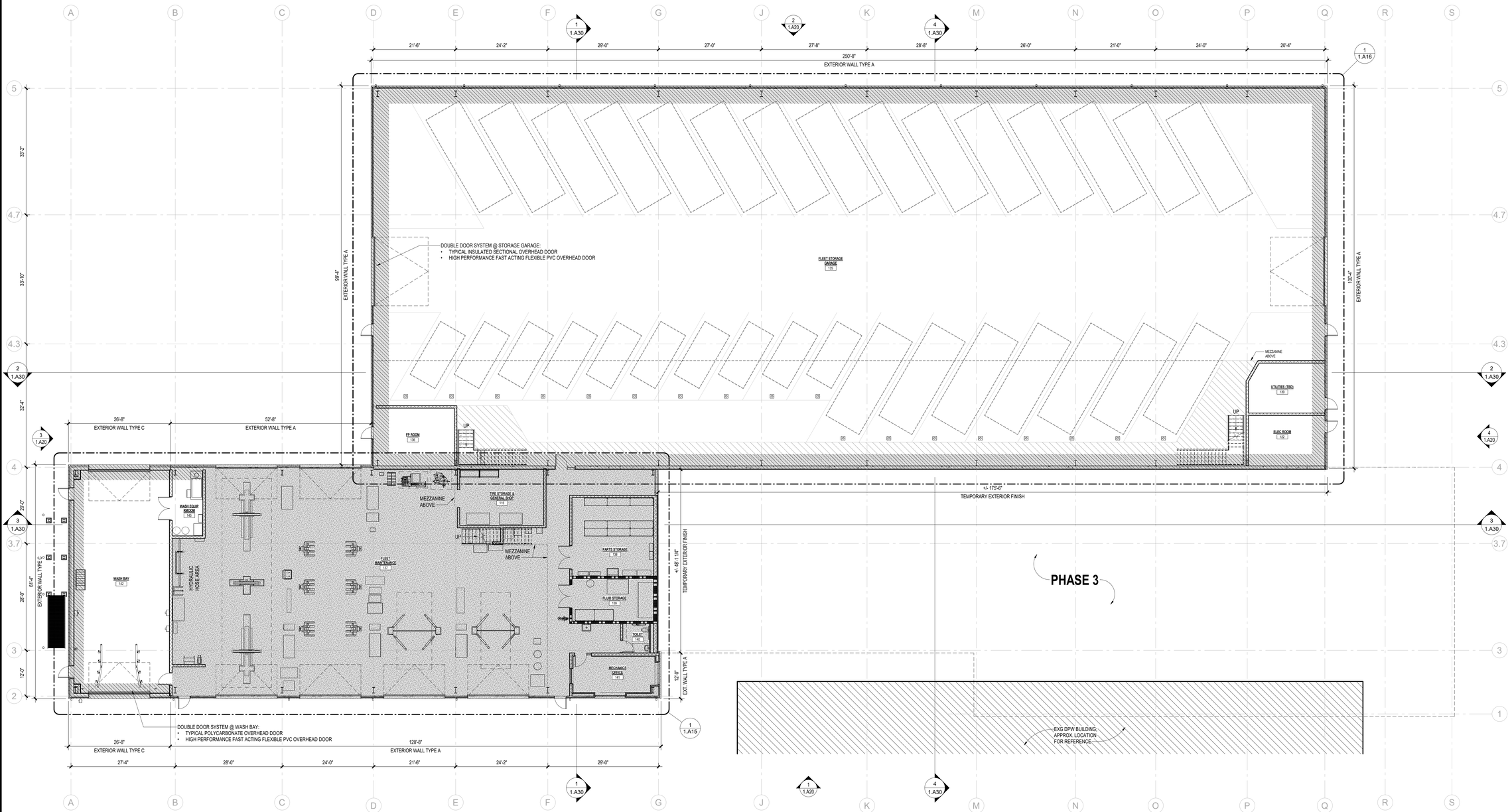
a) R-10 RIGID INSULATION
- STANDARD COMPRESSIVE STRENGTH (25 PSI)
- 4' - 0" HORIZONTAL FROM FOUNDATION WALL INWARDS
- 2' - 0" VERTICAL ON EXTERIOR SIDE OF FOUNDATION WALL

b) R-10 RIGID INSULATION
- HIGH COMPRESSIVE STRENGTH (60 PSI)
- 4' - 0" HORIZONTAL FROM FOUNDATION WALL INWARDS
- 2' - 0" VERTICAL ON EXTERIOR SIDE OF FOUNDATION WALL

c) R-15 RIGID INSULATION
- HIGH COMPRESIVE STRENGTH (60 PSI)
- COMPLETELY UNDER SLAB
- DOWN TO TOP OF FOOTING ON EXTERIOR SIDE OF FOUNDATION WALL

FLOOR PLAN GENERAL NOTES:

1. EQUIPMENT SHOWN FOR REFERENCE ONLY. SEE EQ DRAWINGS FOR MORE INFO.
2. FURNITURE SHOWN FOR INFORMATION ONLY (N.I.C.). SEE FURNITURE PLAN A921 FOR MORE INFO.
3. F.E. = FIRE EXTINGUISHER.
F.E.C = FIRE EXTINGUISHER CABINET
   - BRACKET MOUNTED
   - CABINET MOUNTED (SEMI-RECESSED)
4. ALL INTERIOR DIMENSIONS ARE TAKEN FROM FACE OF GYPSUM WALL BOARD TO FACE OF GYPSUM WALL BOARD OR FACE OF CMU UNLESS SPECIFICALLY NOTED OTHERWISE.
5. SEE SHEET A012 FOR PLUMBING FIXTURE SCHEDULE / MOUNTING HEIGHTS.
6. BOLLARDS:
   - EB: EXTERIOR BOLLARD, 6" DIAMETER (SEE CIVIL DWGS)
   - IB: INTERIOR BOLLARD, 6" DIAMETER (SEE DETAIL X / AXXX)
7. FUME SEPARATION PARTITION, SEE A031 - FUME SEPARATION ASSEMBLY, TYPE F1 AND F2.
8. BOX-OUT DIMENSIONS AT STRUCTURAL COLUMNS ARE APPROXIMATE. GENERAL CONTRACTOR TO INSTALL TIGHT TO STRUCTURE, TYPICAL.
9. NOT ALL TV / MONITOR LOCATIONS ARE SHOWN. COORDINATE PROPOSED LOCATIONS WITH ELECTRICAL &TELECOMMUNICATIONS DRAWINGS. PROVIDE BLOCKING AT EACH LOCATION ACCORDINGLY.
10. CG CORNER GUARD, SEE A901 FOR LOCATIONS.



1 PH1 - OVERALL FLOOR PLAN
3/32" = 1'-0" 1/ 1.A20

SCALE: 3/32" = 1'-0"

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PH1 - OVERALL FLOOR PLAN

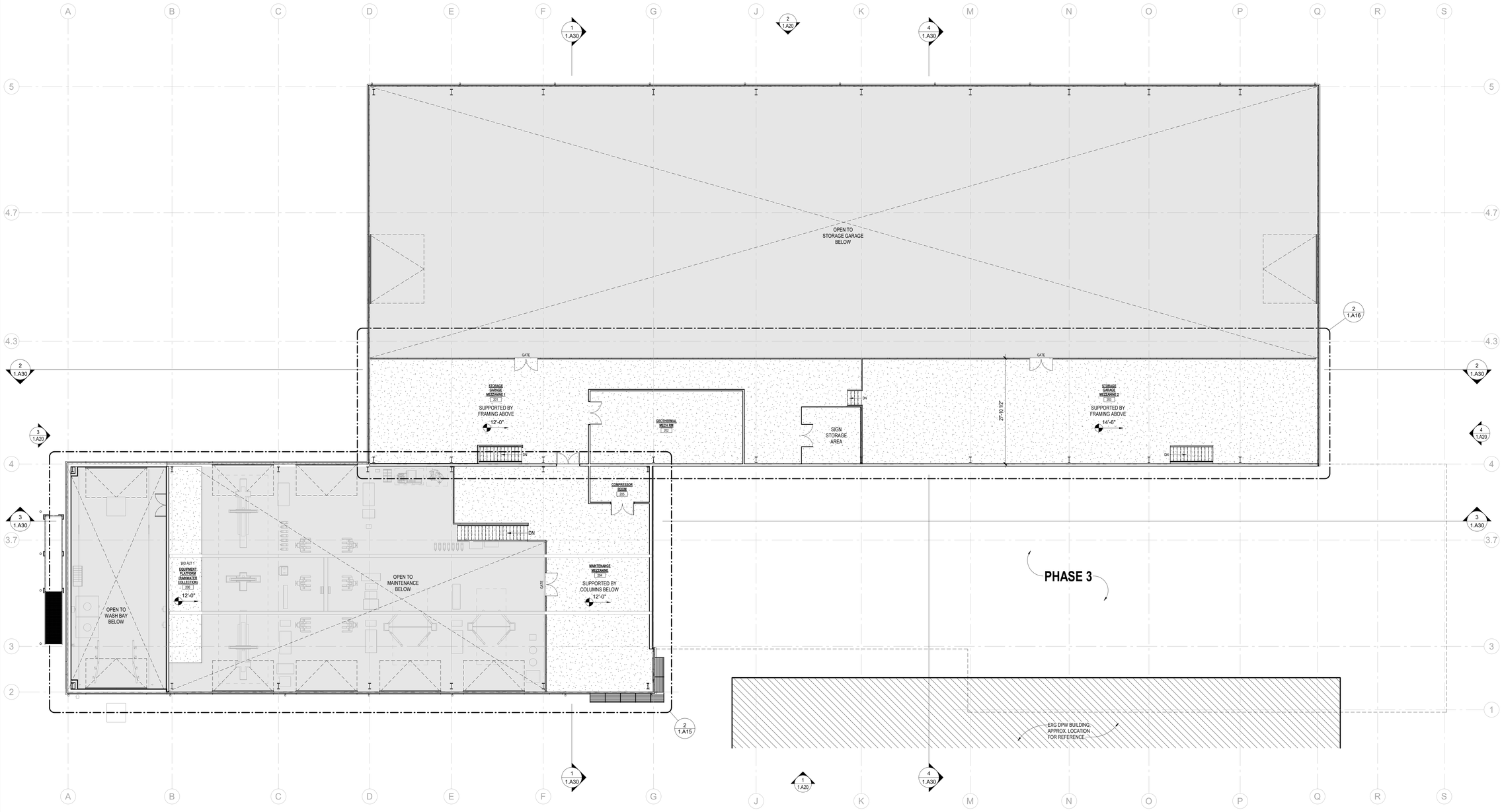
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MEZZANINE GENERAL NOTES:

1. AT EACH MEZZANINE SWING GATE LOCATION, PROVIDE 4" H (RED) LETTER SIGNAGE AT MEZZANINE FASCIA TO READ: 200LBS/SF MAXIMUM MEZZANINE LOADING
2. PROVIDE SAFETY CHAIN PER OSHA STANDARDS AT EACH SWING GATE.
3. PROVIDE SAFETY YELLOW PAINT AT MEZZANINE FLOOR AT EACH SWING GATE, AS INDICATED.
4. COORDINATE EXACT LOCATION WITH MECHANICAL, STRUCTURAL AND EQUIPMENT REQUIREMENTS.
5. DO NOT RUN ANY UTILITIES BELOW GATES EXPOSED AND MOUNTED TO WALLS.
6. PROVIDE TIE-OFF POINT FOR OSHA FALL ARREST SYSTEM NEAR MEZZANINE SWING-GATE ON PRIMARY STRUCTURAL ELEMENT.



1 PH1 - OVERALL MEZZANINE PLAN
3/32" = 1'-0" 1/ 1.A20

0' 4' 8' 16'
SCALE: 3/32" = 1'-0"

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Drawing Title:

PH1 - OVERALL MEZZANINE PLAN

Sheet Number:

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REFLECTED CEILING PLAN NOTES:

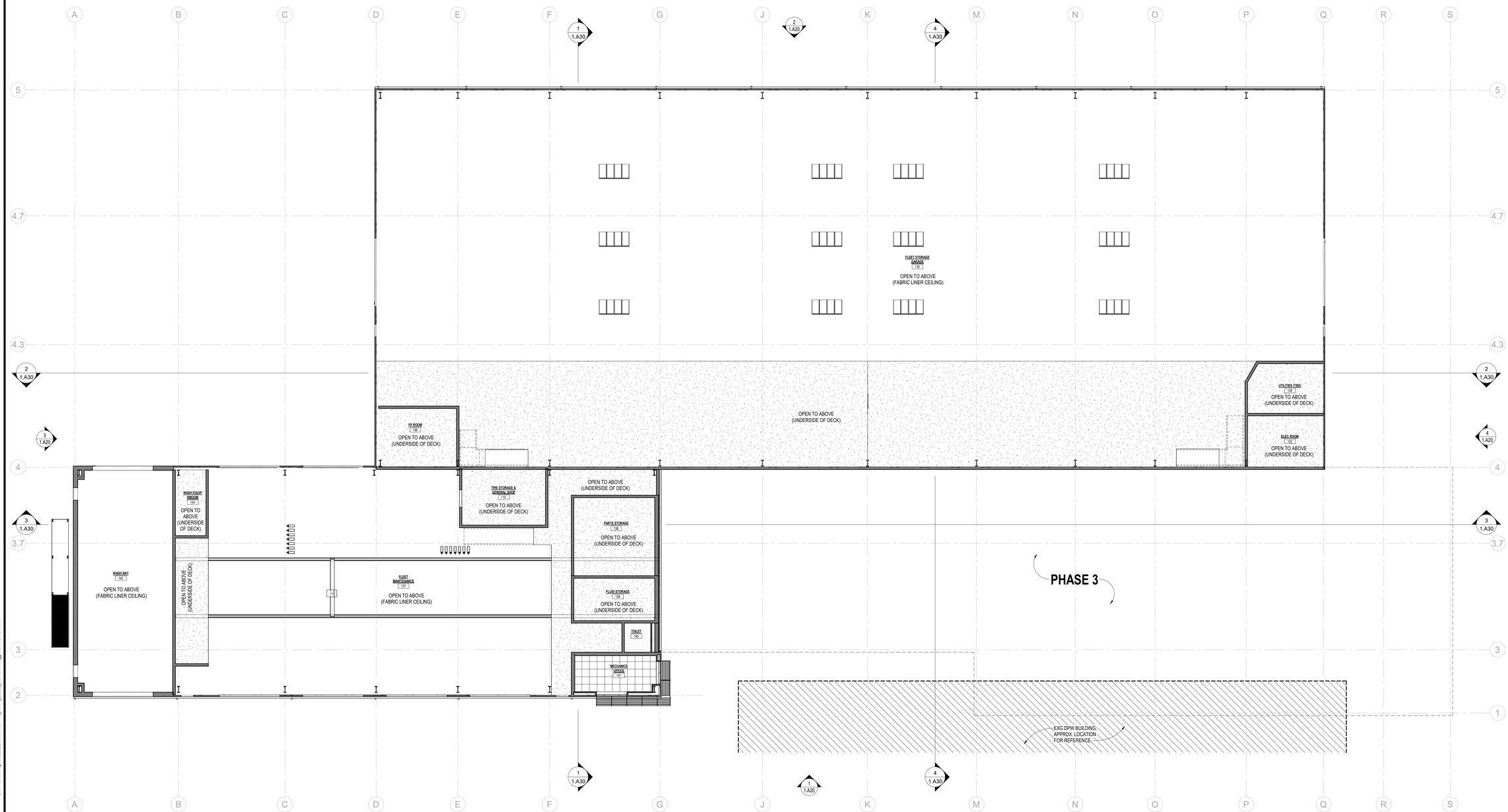
1. REFER TO M.E.P / F.P. DRAWINGS FOR LOCATION OF LIGHT FIXTURES, SPRINKLER HEADS, SUPPLIES, RETURNS AND ADDITIONAL CEILING INFORMATION.
2. ALL DIFFUSERS, SPRINKLER HEADS, ETC. AT ACT AREAS TO BE CENTERED ON TILE.
3. SUSPENDED ACT AT 9'-4" AFF UNLESS NOTED OTHERWISE (U.N.O.)
4. ALL GWB CEILINGS AND SOFFITS AT 9'-4" AFF (U.N.O.)
5. COORDINATE QUANTITY AND LOCATION OF LIGHT FIXTURES WITH ELECTRICAL DRAWINGS.
6. LIGHT FIXTURE SYMBOLS ON REFLECTED CEILING PLANS ARE DIAGRAMMATIC FOR REFERENCE ONLY. REFER TO ELECTRICAL DRAWINGS FOR TYPE OF LIGHT FIXTURES. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR QUANTITY OF LIGHT FIXTURES AS INDICATED ON THE ELECTRICAL DRAWINGS.
7. FOR CEILING HEIGHTS AND TYPES, REFER TO REFLECTED CEILING PLAN DRAWINGS.
8. NO SUSPENDED LOADS SHALL BE SUPPORTED BY THE ROOF DECK. THIS INCLUDES PIPING, DUCTWORK, MECHANICAL EQUIPMENT, STAGE RIGGING, CEILING, ETC. ALL STEEL FRAMING MEMBERS PREFERABLY UTILIZING A SYSTEM OF UNISTRUTS, BEAM CLAMPS, AND THREADED RODS. ALL ATTACHMENT DEVICES SHALL BE SUBMITTED FOR REVIEW AND ARE SUBJECT TO APPROVAL OF THE DESIGNER.
9. COORDINATE QUANTITY AND LOCATION FOR EXIT SIGNS WITH ELECTRICAL DRAWINGS.
10. COORDINATE QUANTITY AND LOCATION OF SPRINKLERS WITH FIRE PROTECTION DRAWINGS.

REFLECTED CEILING PLAN LEGEND:

CEILING TYPES:

- **TYPE A1**: 2' x 2' SUSPENDED ACOUSTICAL PANEL
- **TYPE A2**: 2' x 2' SUSPENDED ACOUSTICAL PANEL - MOISTURE RESISTANT
- **TYPE G1**: GYPSUM BOARD CEILING
- **TYPE G2**: GYPSUM BOARD CEILING - MOISTURE RESISTANT
- **TYPE G3**: 2-HR FIRE RATED CEILING UL DESIGN NO. U415

XX — SOFFIT DETAIL - REFER TO CEILING SERIES	R.H. — RADIANT HEATER
TYPE / A | X'-X" / HEIGHT — CEILING TAG	C.U.H. — CABINET UNIT HEATER
LIGHT FIXTURES	U.H. — UNIT HEATER
SURFACE MTD. LIGHT FIXTURE	EXIT SIGN
TRACK LIGHTING	MOTION DETECTOR
SUPPLY DIFFUSER - REF: MECH DWGS	SD — SMOKE DETECTOR
RETURN VENT - REF: MECH DWGS	OS — OCCUPANCY SENSOR
EXHAUST VENT - REF: MECH DWGS	PS — CEILING PHOTO SENSOR
CLG. MTD. / EXTERIOR SECURITY CAMERA	S — CEILING FLUSH MOUNTED SPEAKER
	F — FIRE ALARM SPEAKER / VISUAL SIGNAL
	F CLG — CEILING MOUNTED FIRE ALARM SPEAKER / VISUAL SIGNAL
	F — FIRE ALARM VISUAL SIGNAL
	CEILING MOUNTED SPRINKLER
	WALL MOUNTED SPRINKLER



1 PH1 - OVERALL REFLECTED CEILING PLAN - BELOW MEZZANINE
3/32" = 1'-0" 1/ 1.A20

SCALE: 3/32" = 1'-0"

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PH1 - OVERALL REFLECTED CEILING PLAN - BELOW MEZZANINE

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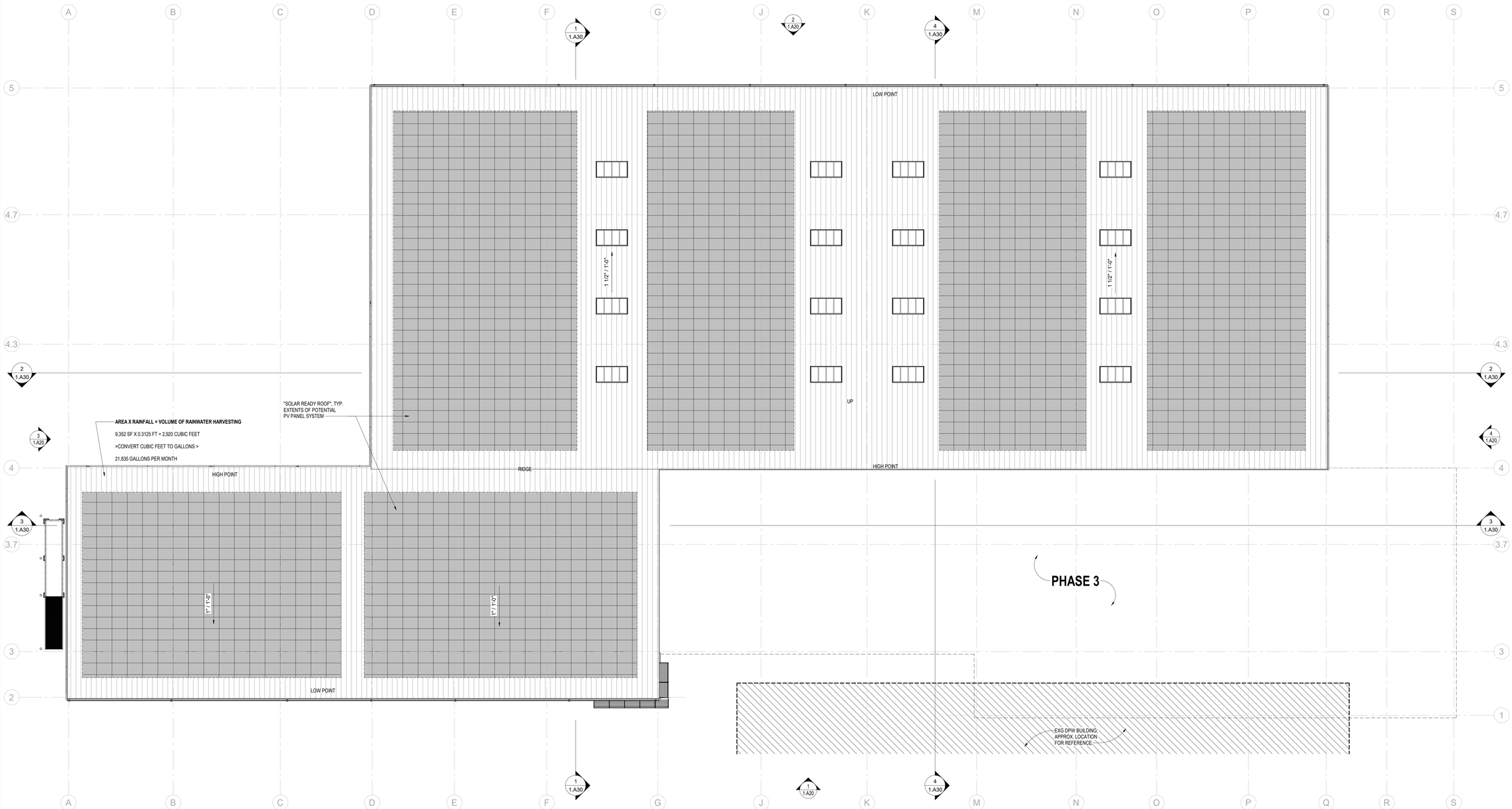
1.A12

GENERAL ROOF NOTES - METAL BUILDINGS

1. REFER TO EQUIPMENT, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL ROOF PENETRATIONS AND EQUIPMENT NOT SHOWN. ANY DISCREPANCIES REGARDING LOCATION OF EQUIPMENT SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT FOR RESOLUTION IN FIELD.
2. ROOF SLOPE = 1'-0" : 12'-0"
3. SEE GENERAL NOTES ON A012
4. ALL GUTTERS TO PITCH TOWARDS DOWNSPOUTS AT A MINIMUM 1/16" PER FOOT AND SUPPORTED AS PER METAL BUILDING MANUFACTURER.
5. ROOF PENETRATIONS TO BE CUT AND FLASHED BY METAL BUILDING MANUFACTURER.
6. PROVIDE ROOF FLASHING AT ALL PENETRATIONS INCLUDING BUT NOT LIMITED TO VENT STACKS, FLUES, AND EXHAUST FANS. REVIEW PLUMBING, EQUIPMENT, MECHANICAL, AND ELECTRICAL DRAWINGS FOR CONSTRUCTION NOT INDICATED ON THIS DRAWING.
7. PROVIDE CRICKETS AT ALL ROOFTOP EQUIPMENT AND PENETRATIONS TO CREATE ADEQUATE ROOF DRAINAGE.
8. SUPPLEMENTAL FRAMING AND CURBS FOR ALL ROOFTOP EQUIPMENT SHALL BE PROVIDED AND INSTALLED BY THE METAL BUILDING MANUFACTURER.

STANDING SEAM METAL ROOF ASSEMBLY (BY MBMI)

- STANDING SEAM METAL ROOF PANEL
- R-5 THERMAL BLOCKS AT PURLINS W/ UNFACED BATT INSULATION BETWEEN THERMAL BLOCKS (UPPER INSULATION LAYER)
- UNFACED BATT INSULATION LAYER BETWEEN PURLINS (STRUCTURE INSULATION LAYER)
- FABRIC LINER / VAPOR RETARDER, TAPE AND SEAL
- ALL PENETRATIONS AND EDGES
- MINIMUM R-VALUE OF 38



1 PH1 - OVERALL ROOF PLAN
3/32" = 1'-0" 1/ 1.A20

0' 4' 8' 16'
SCALE: 3/32" = 1'-0"

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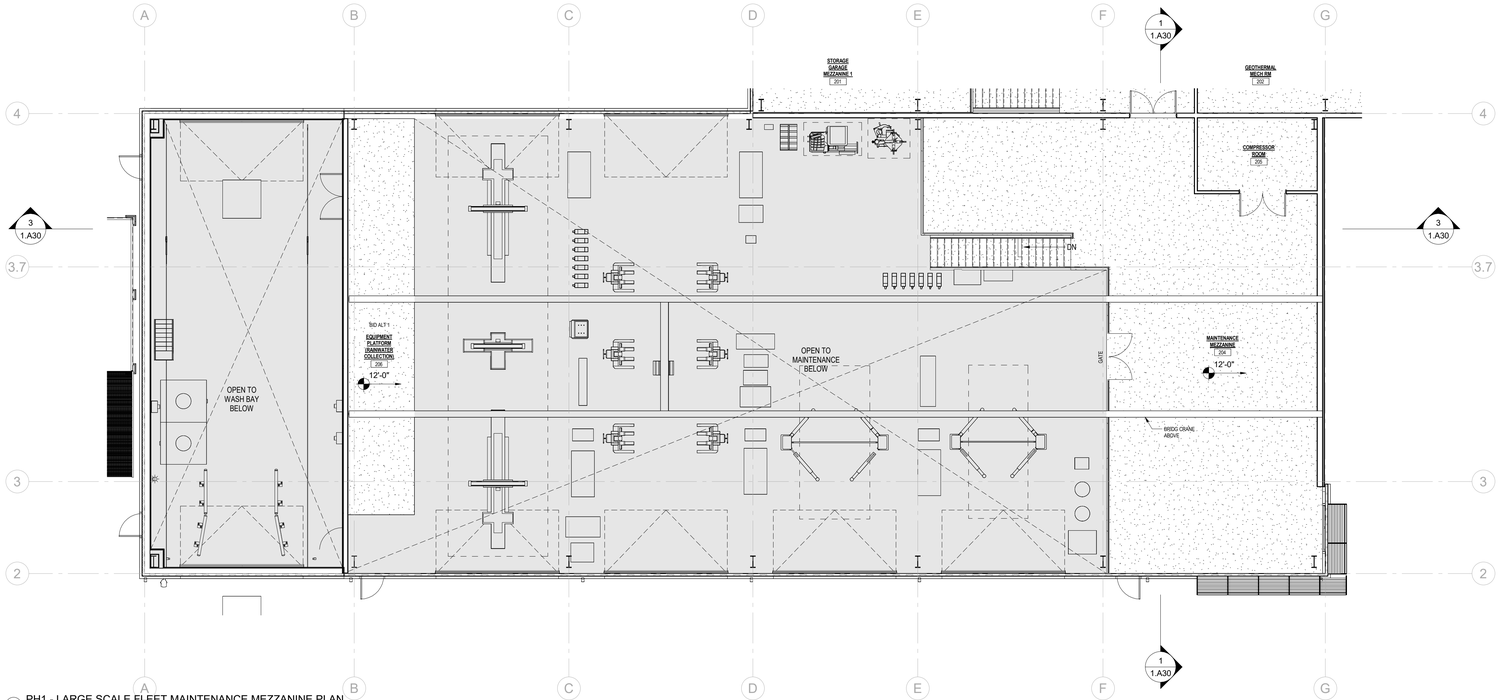
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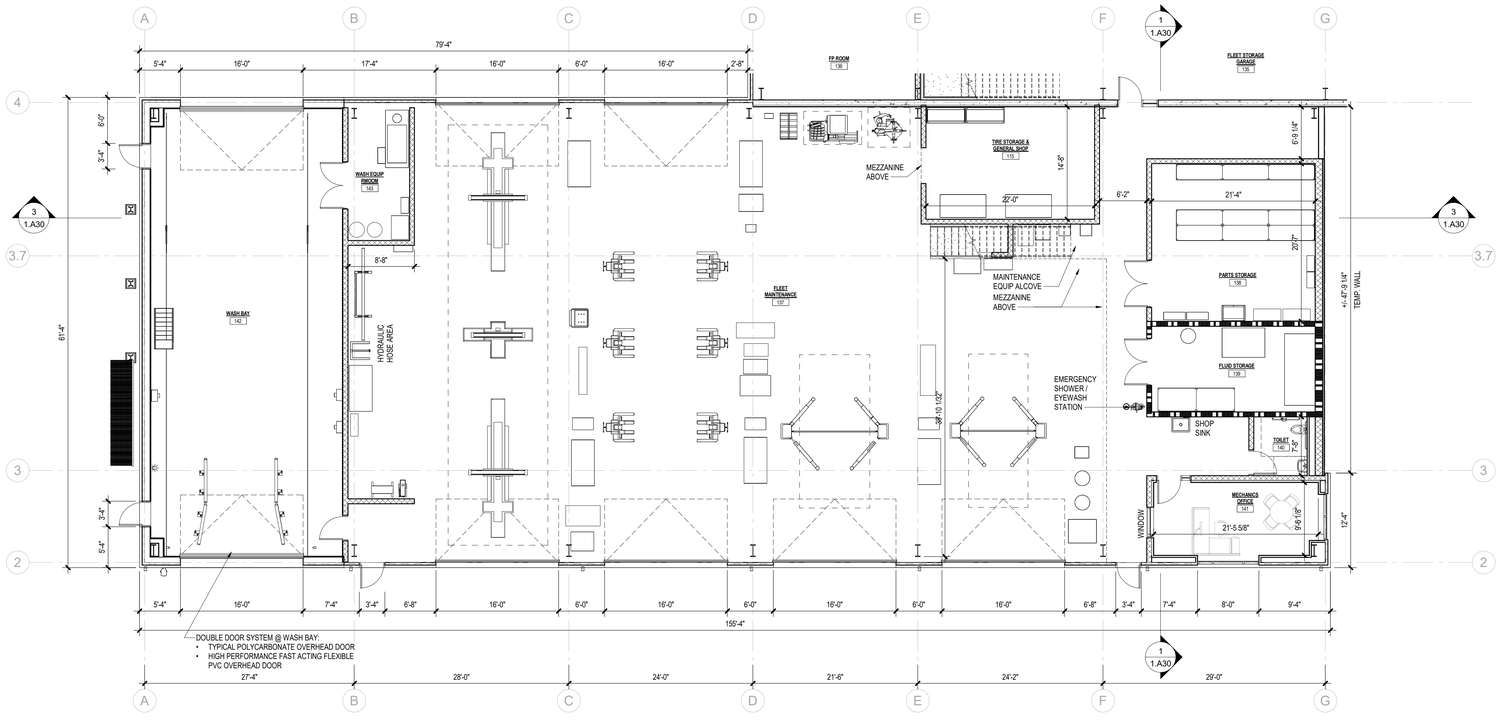
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2 PH1 - LARGE SCALE FLEET MAINTENANCE MEZZANINE PLAN
1/8" = 1'-0" 1/ 1.A11



1 PH1 - LARGE SCALE FLEET MAINTENANCE FLOOR PLAN
1/8" = 1'-0" 1/ 1.A10

0' 4' 8' 16'
SCALE: 3/32" = 1'-0"

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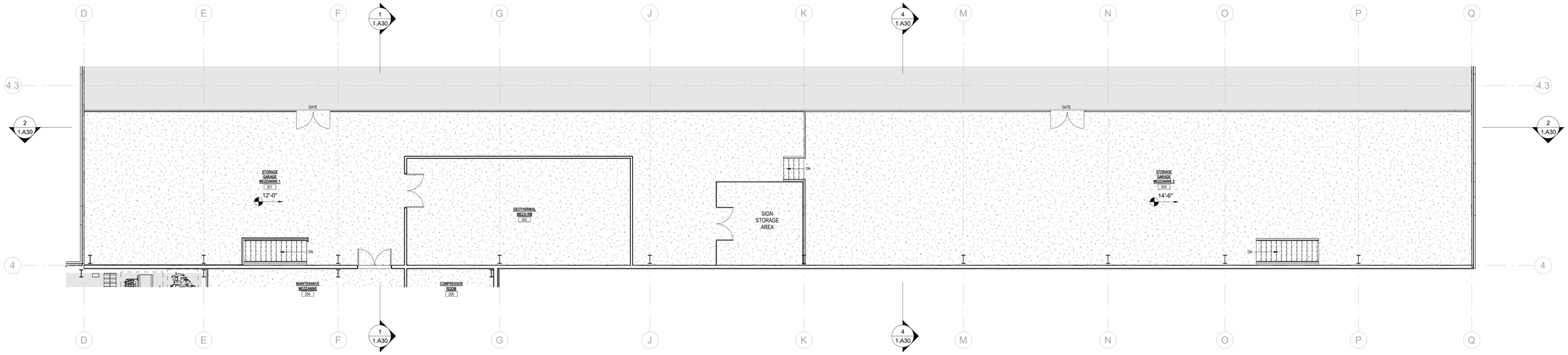
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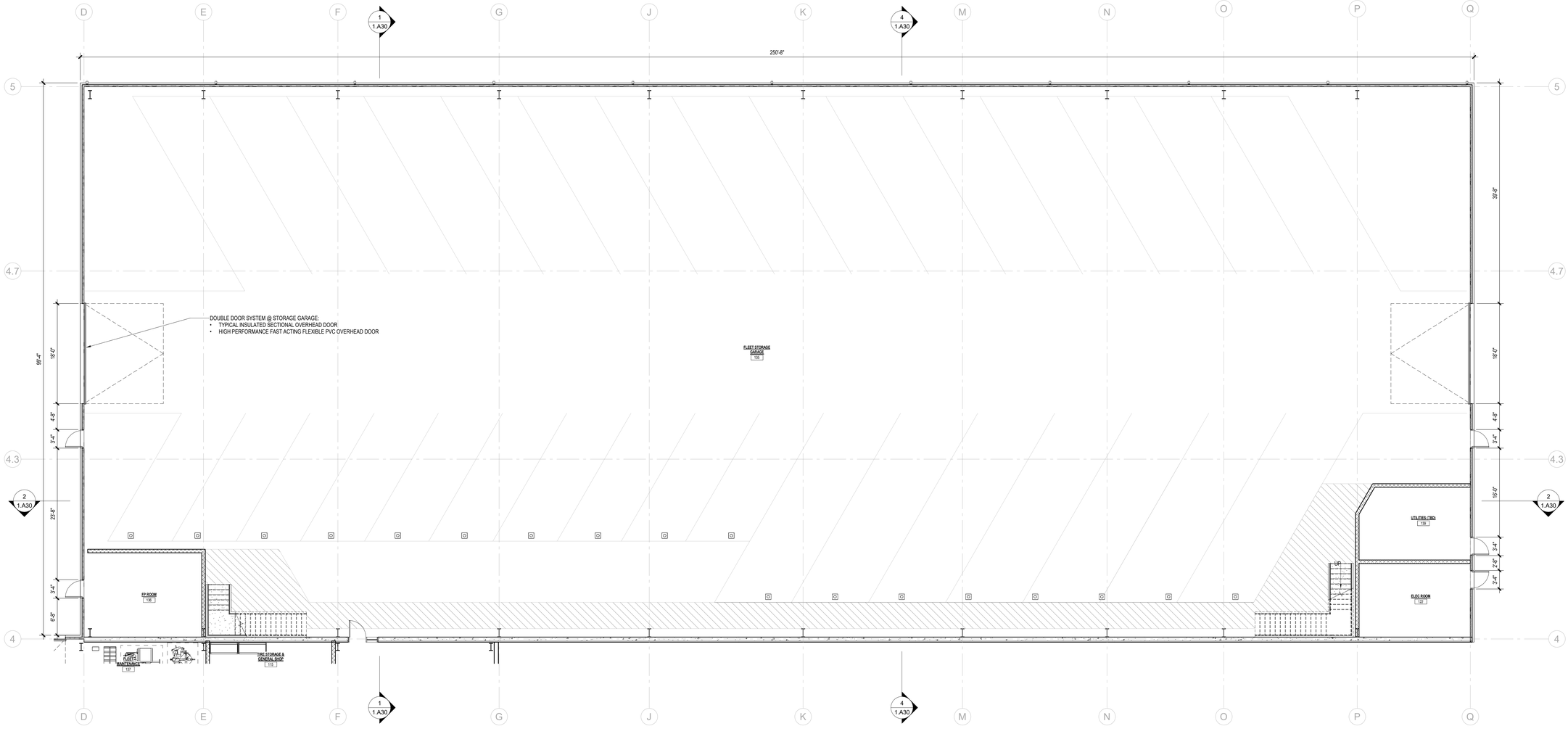
PH1 - LARGE SCALE FLEET MAINTENANCE FLOOR & MEZZANINE PLANS

Sheet Number:

1.A15



2 PH1 - LARGE SCALE FLEET STORAGE MEZZANINE PLAN
1/8" = 1'-0" 1/ 1.A11



1 PH1 - LARGE SCALE FLEET STORAGE FLOOR PLAN
1/8" = 1'-0" 1/ 1.A10

0' 4' 8' 16'
SCALE: 3/32" = 1'-0"

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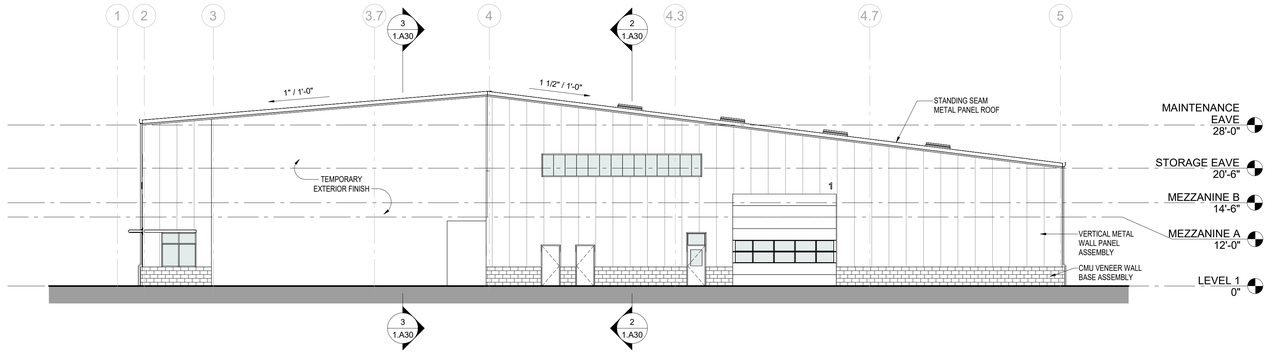
Drawing Title:

PH1 - LARGE SCALE FLEET STORAGE FLOOR & MEZZANINE PLAN

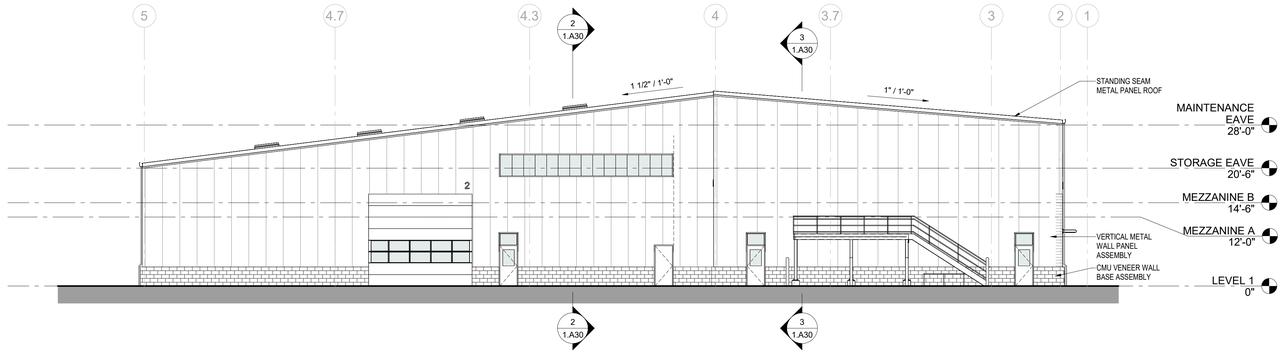
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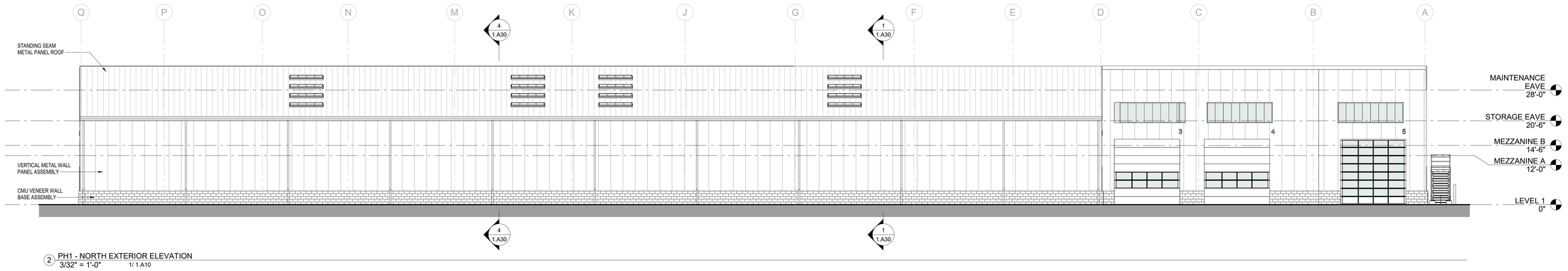
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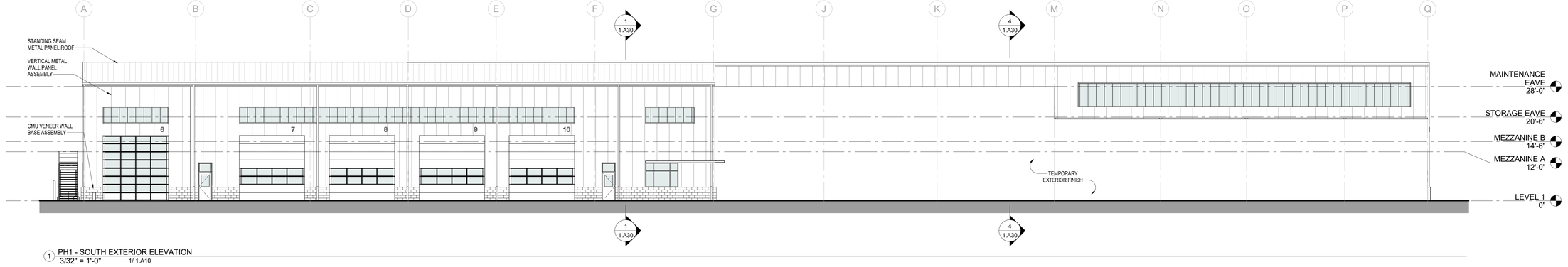
4 PH1 - EAST EXTERIOR ELEVATION
3/32" = 1'-0" 1/ 1.A10



3 PH1 - WEST EXTERIOR ELEVATION
3/32" = 1'-0" 1/ 1.A10



2 PH1 - NORTH EXTERIOR ELEVATION
3/32" = 1'-0" 1/ 1.A10



1 PH1 - SOUTH EXTERIOR ELEVATION
3/32" = 1'-0" 1/ 1.A10

0' 4' 8' 16'
SCALE: 1/8" = 1'-0"

WALL PANEL TYPES LEGEND:

EXTENTS OF WALL PANEL - WP-1, INSULATED WALL PANELS

EXTENTS OF WALL PANEL REFER TO EXTERIOR ELEVATIONS
- WP-2, INSULATED BACK-UP WALL PANELS WITH WP-3, UN-INSULATED WALL PANEL &
WP-4, UN-INSULATED WALL PANEL

WP-2, INSULATED BACK-UP WALL PANELS WITH WP-3, UN-INSULATED WALL PANEL

WP-2, INSULATED BACK-UP WALL PANELS WITH WP-4, UN-INSULATED WALL PANEL

WP-2, INSULATED BACK-UP WALL PANELS WITH WP-3, UN-INSULATED WALL PANEL

CMU VENEER LEGEND:

CONTROL JOINT LOCATION
- REFER TO X / AXXX FOR ADDITIONAL INFO

TYPE 1 - STANDARD GROUND FACE MASONRY BLOCK: 8" X 16"

TYPE 2 - MONUMENTAL POLISHED FACE MASONRY BLOCK: 4" X 24"

TYPE 3 - STANDARD GROUND FACE MASONRY BLOCK: 8" X 24"

TYPE 4 - STANDARD GROUND FACE MASONRY BLOCK: 16" X 24"

GROUND FACE BLOCK - FIELD
GF-1

GROUND FACE BLOCK - ACCENT
GF-2

BRICK VENEER LEGEND:

CONTROL JOINT LOCATION
- REFER TO X / AXXX FOR ADDITIONAL INFO

TYPE 1 - BRICK VENEER
BRICK: 2 2/3" x 8" (COMMON SIZE, RUNNING BOND)

NOTES:
1. COORDINATE OPENINGS NOT SHOWN WITH EQUIPMENT AND MEP/FP DRAWINGS.
2. FOR MOCK-UP REQUIREMENTS, SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

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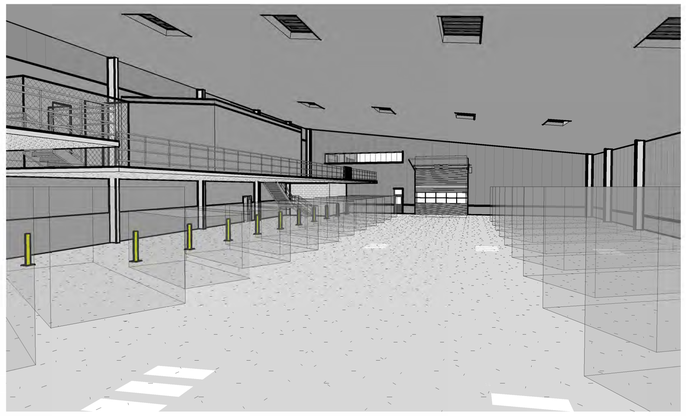
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PH1 - OVERALL ELEVATIONS

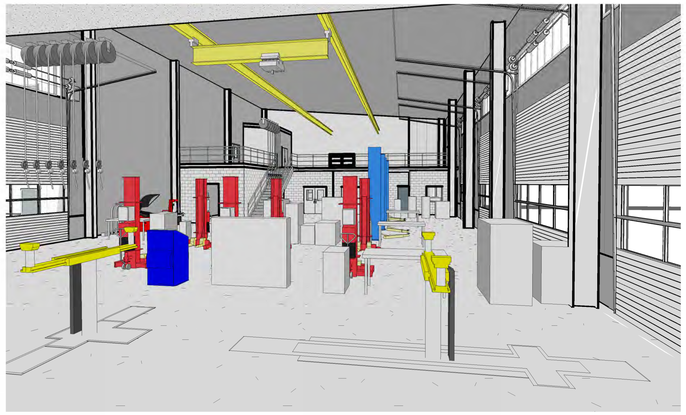
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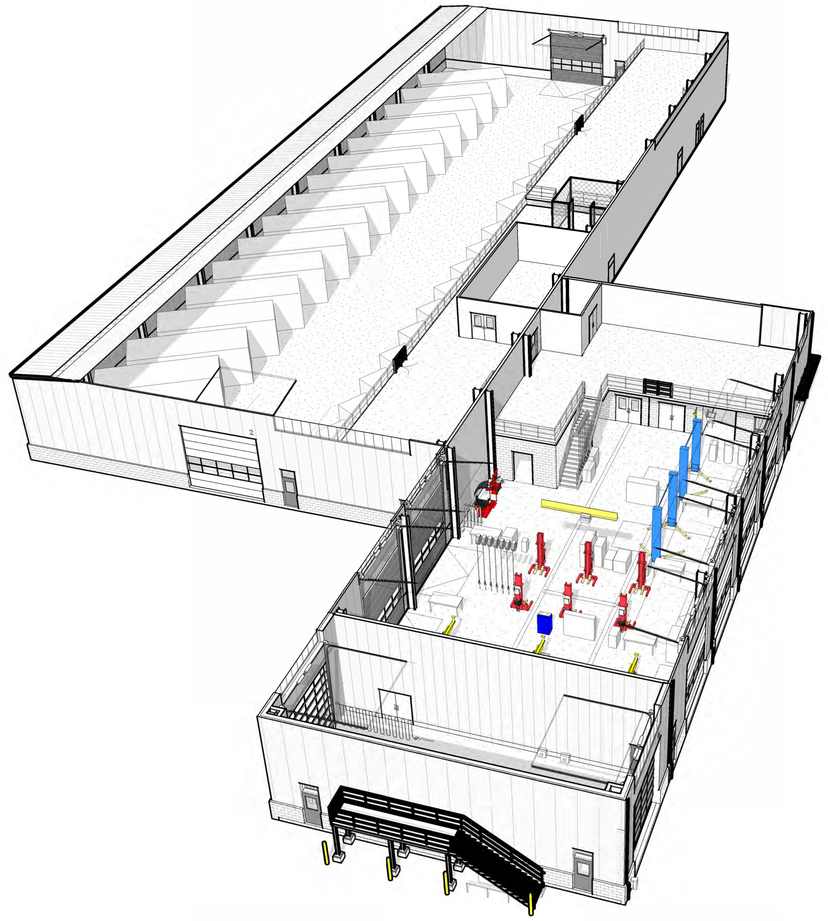
5 3D VIEW - FLEET STORAGE



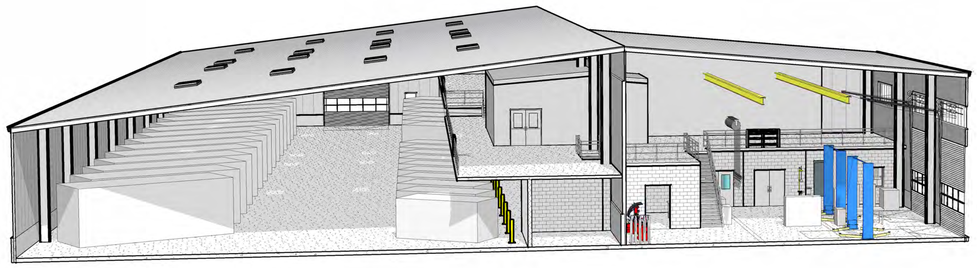
4 3D VIEW - FLEET MAINTENANCE



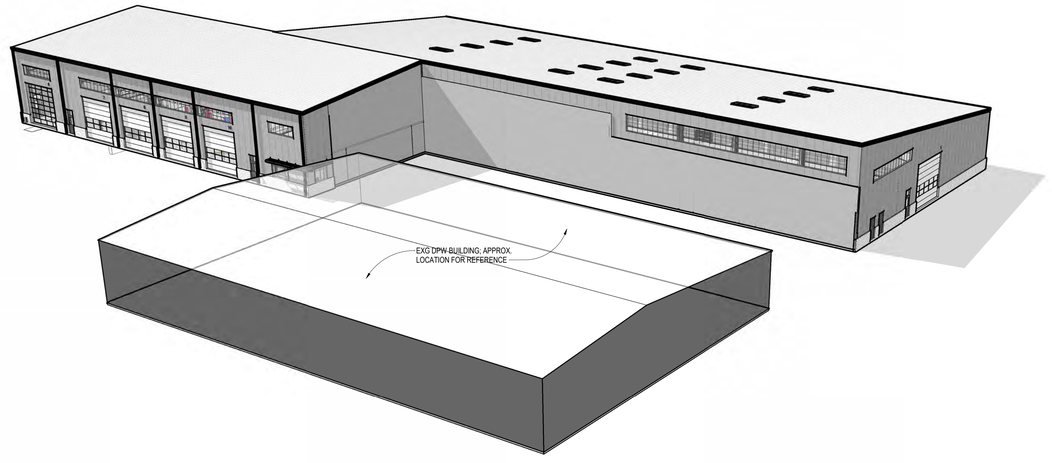
6 3D VIEW - FLEET MAINTENANCE



3 PH1 - 3D VIEW



2 PH1 - 3D VIEW - PERSPECTIVE SECTION CUT



1 PH1 - 3D VIEW LOOKING NORTHWEST

NOTE: 3D VIEWS ARE PROVIDED FOR REFERENCE ONLY. REFER TO PLANS, ELEVATIONS, SECTIONS, DETAILS AND SCHEDULES FOR BUILDING REQUIREMENTS.

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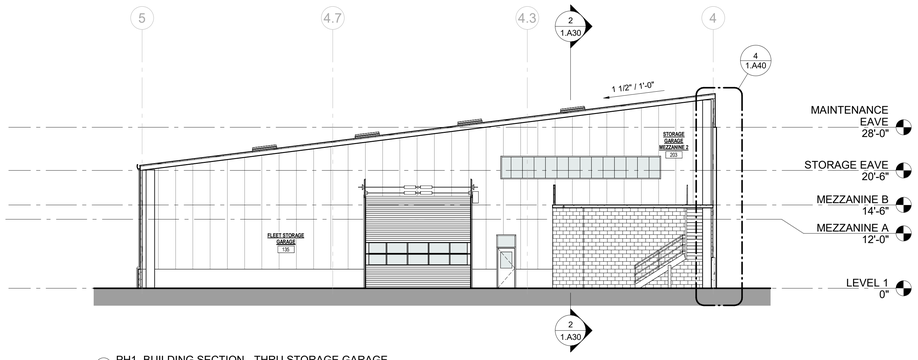
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PH1 - 3D VIEWS

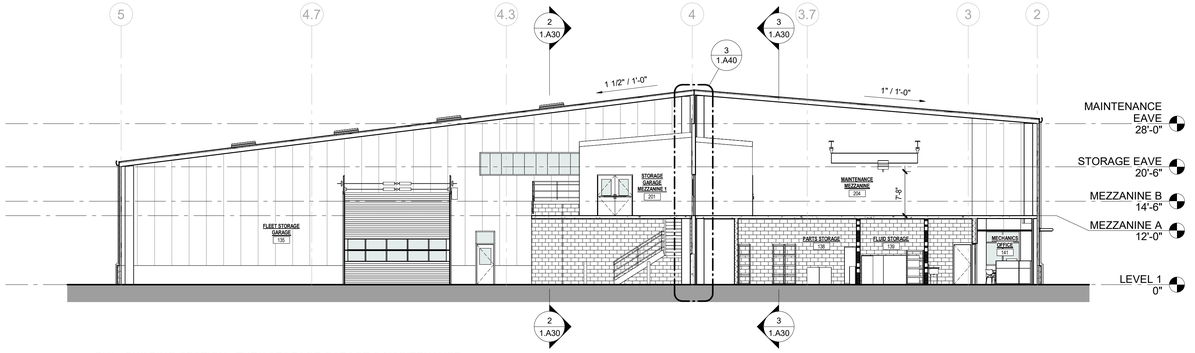
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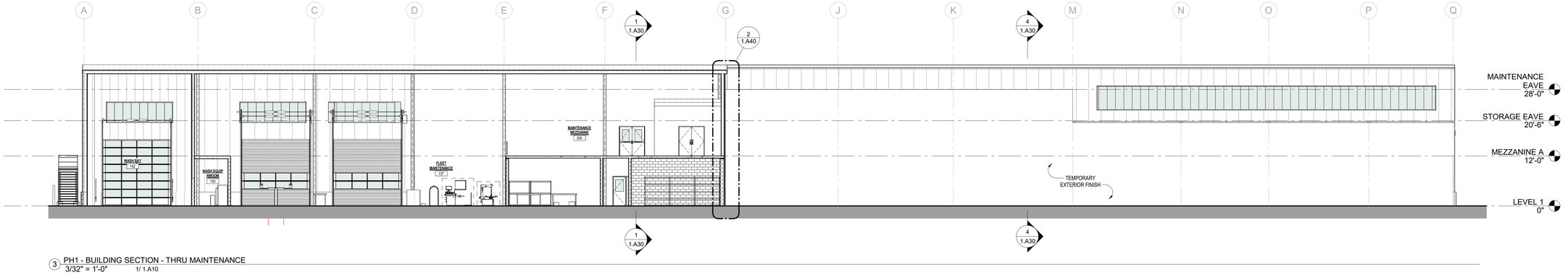
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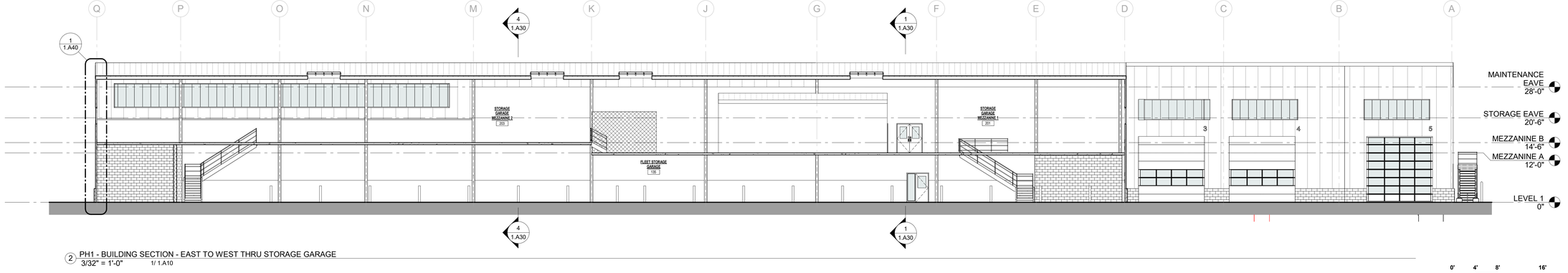
4 PH1 -BUILDING SECTION - THRU STORAGE GARAGE
3/32" = 1'-0" 1/ 1.A10



1 PH1 - BUILDING SECTION - THRU STORAGE GARAGE & MAINTENANCE
3/32" = 1'-0" 1/ 1.A10



3 PH1 - BUILDING SECTION - THRU MAINTENANCE
3/32" = 1'-0" 1/ 1.A10



2 PH1 - BUILDING SECTION - EAST TO WEST THRU STORAGE GARAGE
3/32" = 1'-0" 1/ 1.A10

0' 4' 8' 16'
SCALE: 1/8" = 1'-0"

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Scale: 3/32" = 1'-0"

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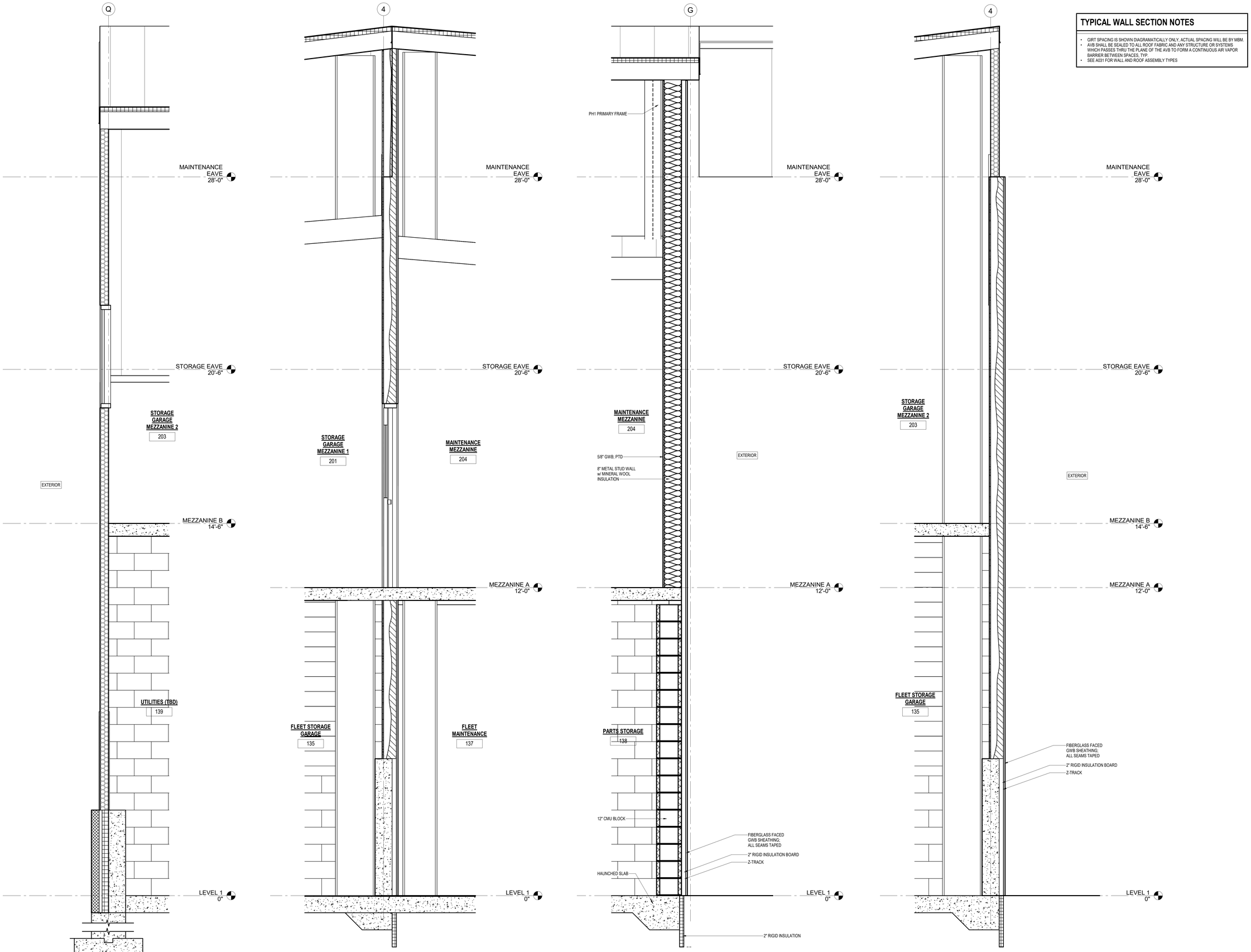
PH1 - BUILDING SECTIONS

Sheet Number:

1.A30

TYPICAL WALL SECTION NOTES

- GIRT SPACING IS SHOWN DIAGRAMATICALLY ONLY, ACTUAL SPACING WILL BE BY MBM.
- AVB SHALL BE SEALED TO ALL ROOF FABRIC AND ANY STRUCTURE OR SYSTEMS WHICH PASSES THRU THE PLANE OF THE AVB TO FORM A CONTINUOUS AIR VAPOR BARRIER BETWEEN SPACES, TYP.
- SEE A031 FOR WALL AND ROOF ASSEMBLY TYPES



1 PH1 - WALL SECTION 4
3/4" = 1'-0" 2/ 1.A30

3 PH1 - WALL SECTION 3
3/4" = 1'-0" 1/ 1.A30

2 PH1 - WALL SECTION 2
3/4" = 1'-0" 3/ 1.A30

4 PH1 - WALL SECTION 1
3/4" = 1'-0" 4/ 1.A30

0' 1' 2' 3'
SCALE: 3/4" = 1'-0"

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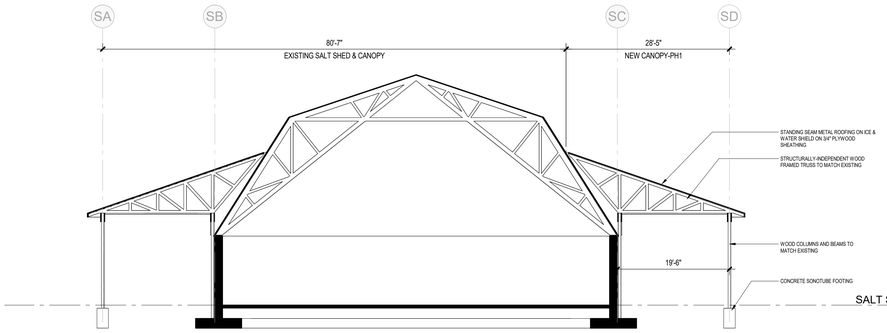
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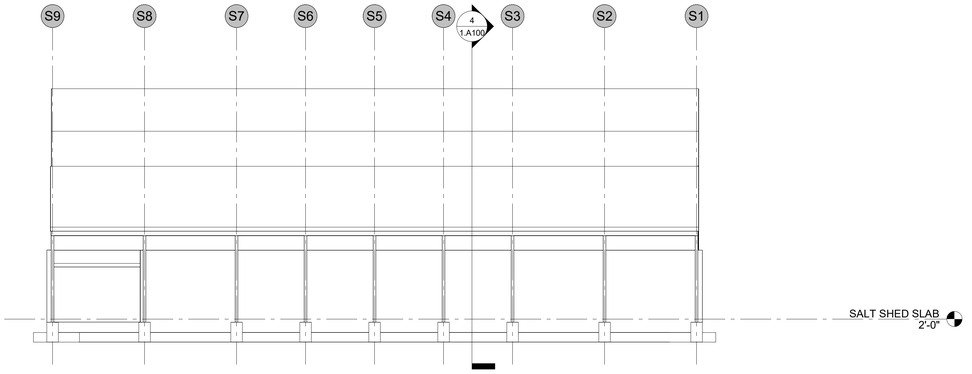
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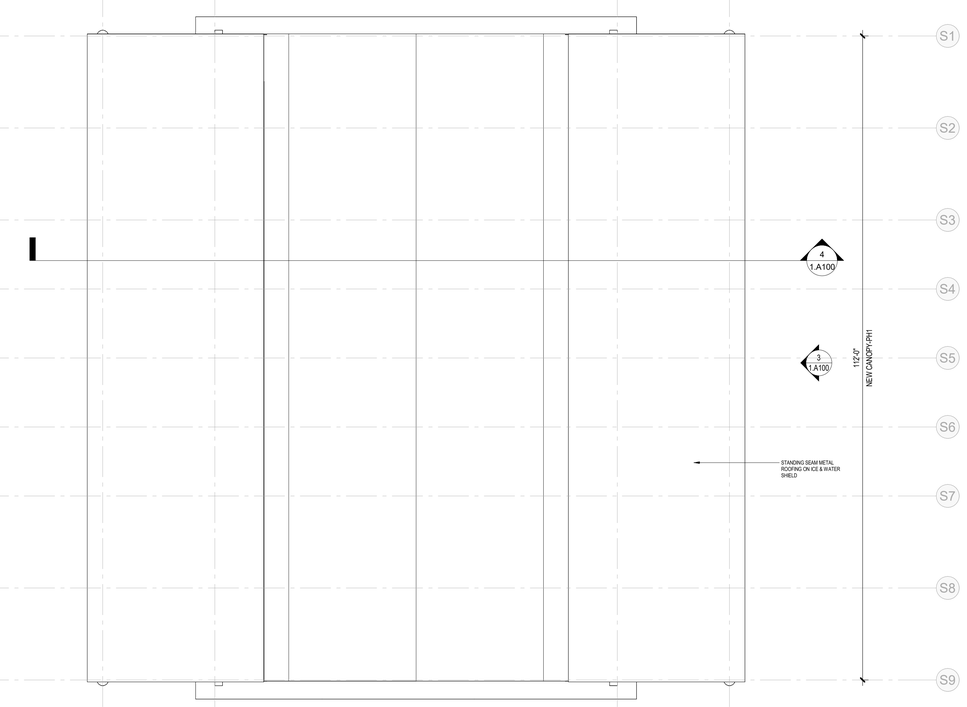
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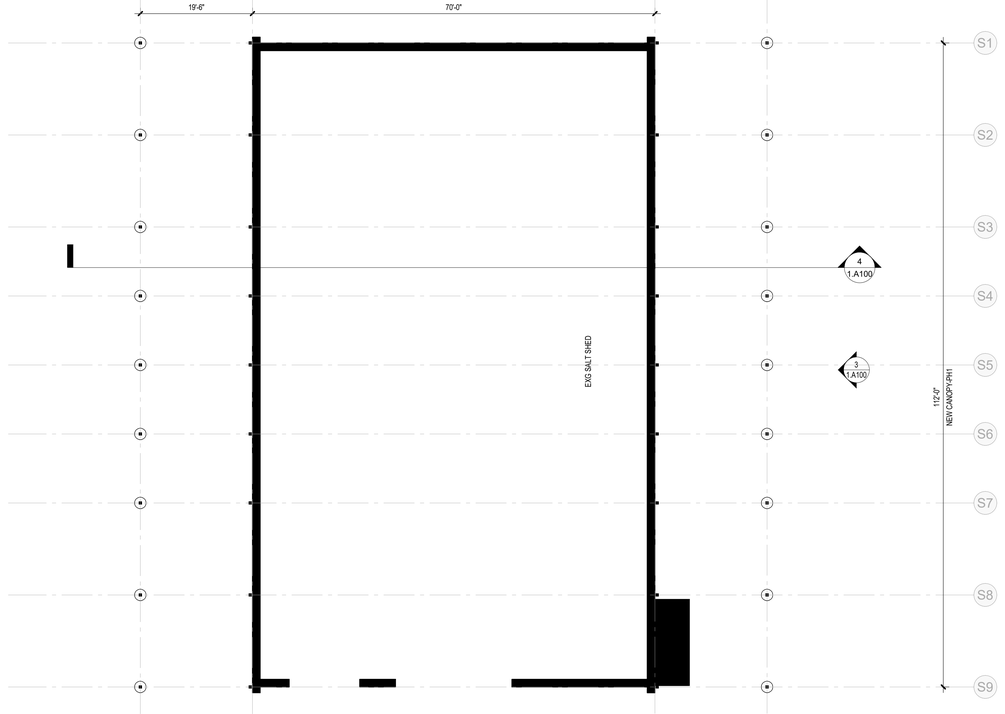
4 PH1 - STORAGE CANOPY SECTION
3/32" = 1'-0" 1/ 1.A100



3 PH1 - STORAGE CANOPY ELEVATION
3/32" = 1'-0" 1/ 1.A100



2 PREFERRED CONCEPTUAL SITE PLAN (ORIENTED PLAN NORTH)
3/32" = 1'-0" 1/ 1.A20



1 PREFERRED CONCEPTUAL SITE PLAN (ORIENTED PLAN NORTH)
3/32" = 1'-0" 4/ 0.A11

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Scale: 3/32" = 1'-0"

Key Plan:

NORTH

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Reviewed By:	-
Approved By:	-
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Drawing Title:

PH1 - STORAGE CANOPY PLANS

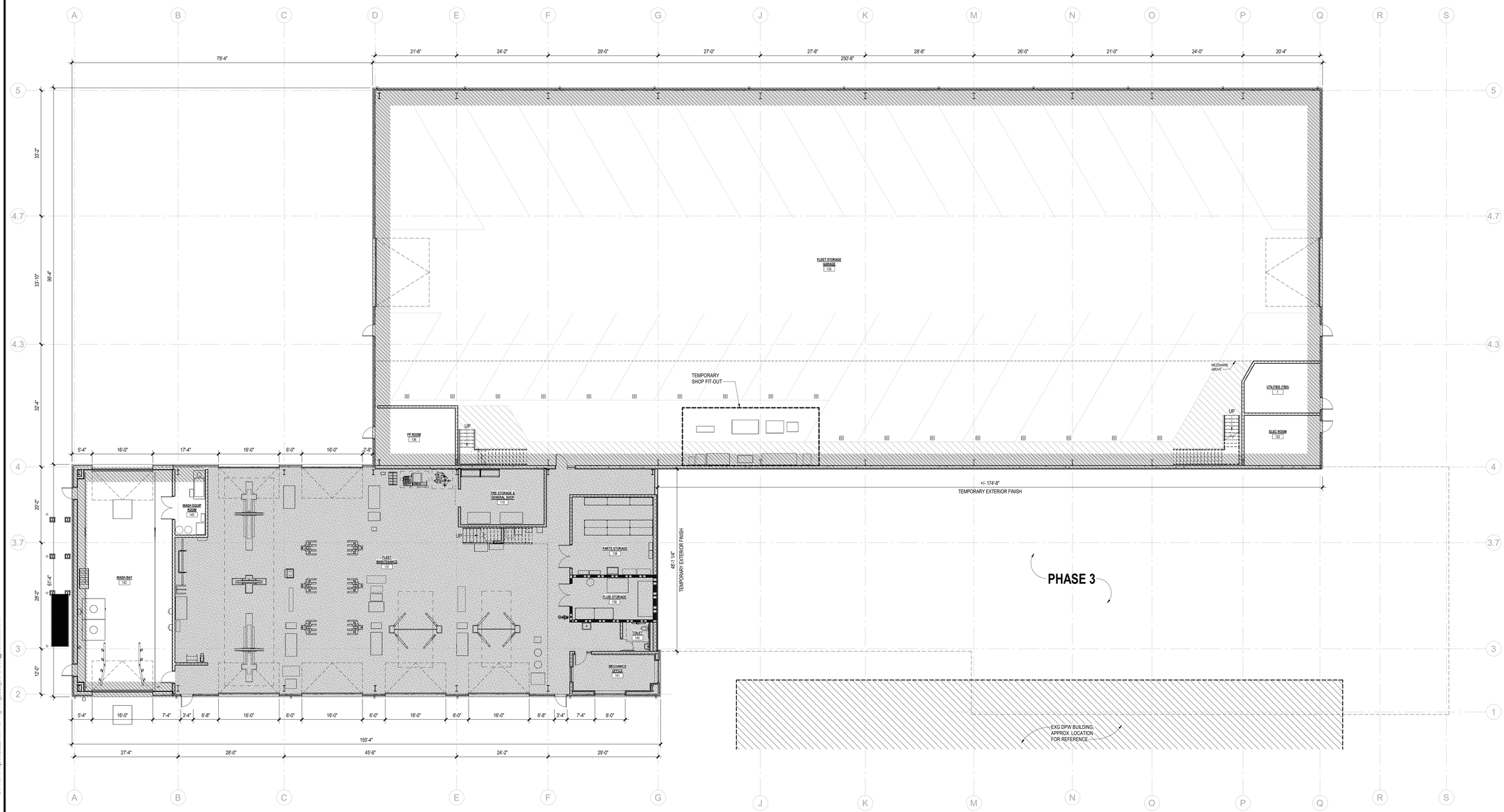
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FLOOR PLAN GENERAL NOTES:

1. EQUIPMENT SHOWN FOR REFERENCE ONLY. SEE EQ DRAWINGS FOR MORE INFO.
2. FURNITURE SHOWN FOR INFORMATION ONLY (N.I.C.). SEE FURNITURE PLAN A921 FOR MORE INFO.
3. F.E. = FIRE EXTINGUISHER.
   F.E.C = FIRE EXTINGUISHER CABINET
   - BRACKET MOUNTED
   - CABINET MOUNTED (SEMI-RECESSED)
4. ALL INTERIOR DIMENSIONS ARE TAKEN FROM FACE OF GYPSUM WALL BOARD TO FACE OF GYPSUM WALL BOARD OR FACE OF CMU UNLESS SPECIFICALLY NOTED OTHERWISE.
5. SEE SHEET A012 FOR PLUMBING FIXTURE SCHEDULE / MOUNTING HEIGHTS.
6. BOLLARDS:
   - EB: EXTERIOR BOLLARD, 6" DIAMETER (SEE CIVIL DWGS)
   - IB: INTERIOR BOLLARD, 6" DIAMETER (SEE DETAIL X / AXXX)
7. FUME SEPARATION PARTITION, SEE A031 - FUME SEPARATION ASSEMBLY, TYPE F1 AND F2.
8. BOX-OUT DIMENSIONS AT STRUCTURAL COLUMNS ARE APPROXIMATE. GENERAL CONTRACTOR TO INSTALL TIGHT TO STRUCTURE, TYPICAL.
9. NOT ALL TV / MONITOR LOCATIONS ARE SHOWN. COORDINATE PROPOSED LOCATIONS WITH ELECTRICAL &TELECOMMUNICATIONS DRAWINGS. PROVIDE BLOCKING AT EACH LOCATION ACCORDINGLY.
10. CG — CORNER GUARD, SEE A901 FOR LOCATIONS.



1 PH2 - OVERALL FLOOR PLAN
3/32" = 1'-0" 3/ 0.A11

0' 4' 8' 16'
SCALE: 3/32" = 1'-0"

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Drawing Title:

PH2 - OVERALL FLOOR PLAN

Sheet Number:

2.A10

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UNDERSLAB RIGID INSULATION LEGEND:

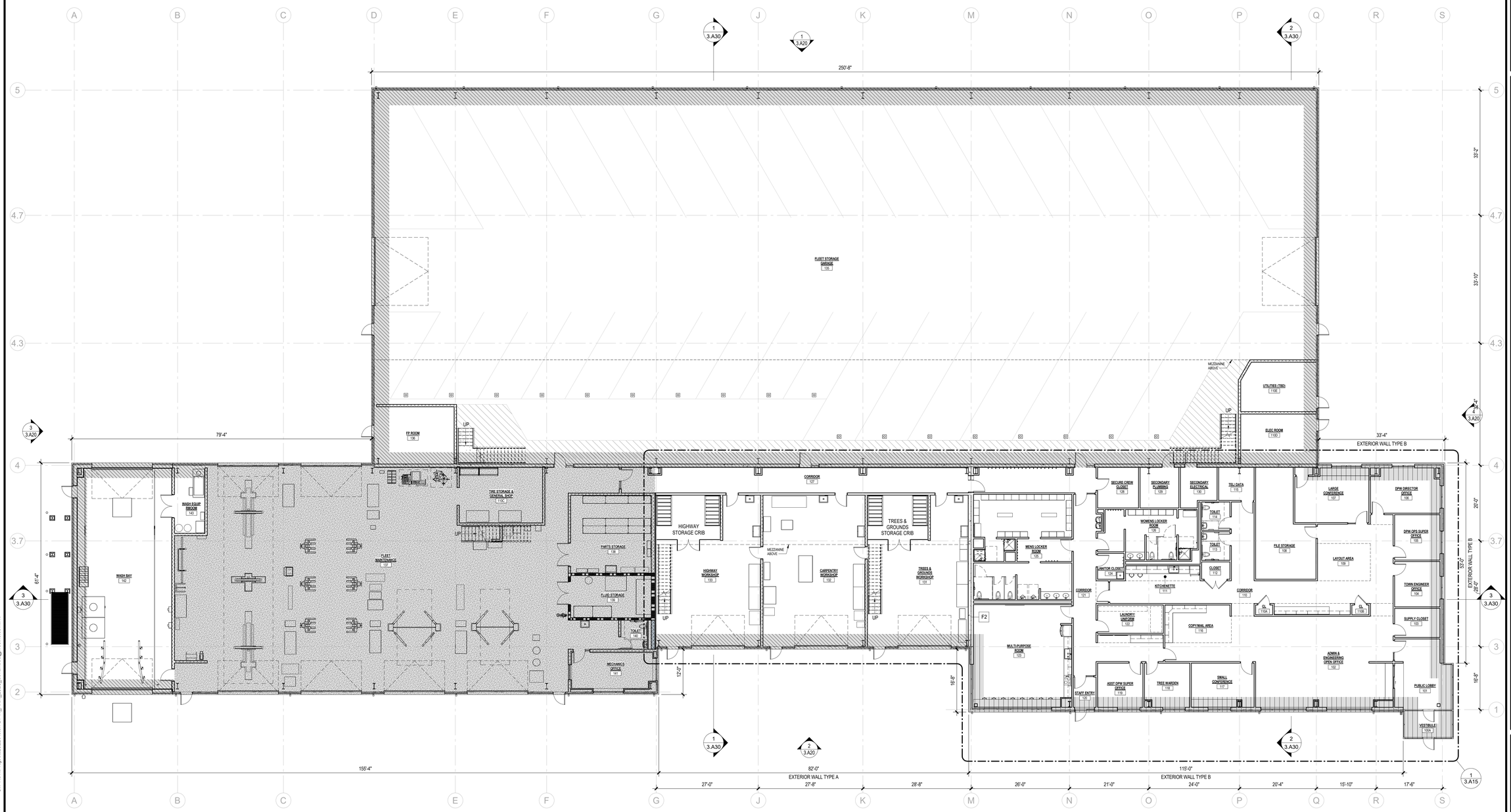
a) R-10 RIGID INSULATION
- STANDARD COMPRESSIVE STRENGTH (25 PSI)
- 4' - 0" HORIZONTAL FROM FOUNDATION WALL INWARDS
- 2' - 0" VERTICAL ON EXTERIOR SIDE OF FOUNDATION WALL

b) R-10 RIGID INSULATION
- HIGH COMPRESSIVE STRENGTH (60 PSI)
- 4' - 0" HORIZONTAL FROM FOUNDATION WALL INWARDS
- 2' - 0" VERTICAL ON EXTERIOR SIDE OF FOUNDATION WALL

c) R-15 RIGID INSULATION
- HIGH COMPRESIVE STRENGTH (60 PSI)
- COMPLETELY UNDER SLAB
- DOWN TO TOP OF FOOTING ON EXTERIOR SIDE OF FOUNDATION WALL

FLOOR PLAN GENERAL NOTES:

1. EQUIPMENT SHOWN FOR REFERENCE ONLY. SEE EQ DRAWINGS FOR MORE INFO.
2. FURNITURE SHOWN FOR INFORMATION ONLY (N.I.C.). SEE FURNITURE PLAN A921 FOR MORE INFO.
3. F.E. = FIRE EXTINGUISHER.
   F.E.C = FIRE EXTINGUISHER CABINET
   - BRACKET MOUNTED
   - CABINET MOUNTED (SEMI-RECESSED)
4. ALL INTERIOR DIMENSIONS ARE TAKEN FROM FACE OF GYPSUM WALL BOARD TO FACE OF GYPSUM WALL BOARD OR FACE OF CMU UNLESS SPECIFICALLY NOTED OTHERWISE.
5. SEE SHEET A012 FOR PLUMBING FIXTURE SCHEDULE / MOUNTING HEIGHTS.
6. BOLLARDS:
   - EB: EXTERIOR BOLLARD, 6" DIAMETER (SEE CIVIL DWGS)
   - IB: INTERIOR BOLLARD, 6" DIAMETER (SEE DETAIL X / AXXX)
7. FUME SEPARATION PARTITION, SEE A031 - FUME SEPARATION ASSEMBLY, TYPE F1 AND F2.
8. BOX-OUT DIMENSIONS AT STRUCTURAL COLUMNS ARE APPROXIMATE. GENERAL CONTRACTOR TO INSTALL TIGHT TO STRUCTURE, TYPICAL.
9. NOT ALL TV / MONITOR LOCATIONS ARE SHOWN. COORDINATE PROPOSED LOCATIONS WITH ELECTRICAL &TELECOMMUNICATIONS DRAWINGS. PROVIDE BLOCKING AT EACH LOCATION ACCORDINGLY.
10. CG — CORNER GUARD, SEE A901 FOR LOCATIONS.



1 PH3 - OVERALL FLOOR PLAN
3/32" = 1'-0"

0' 4' 8' 16'
SCALE: 3/32" = 1'-0"

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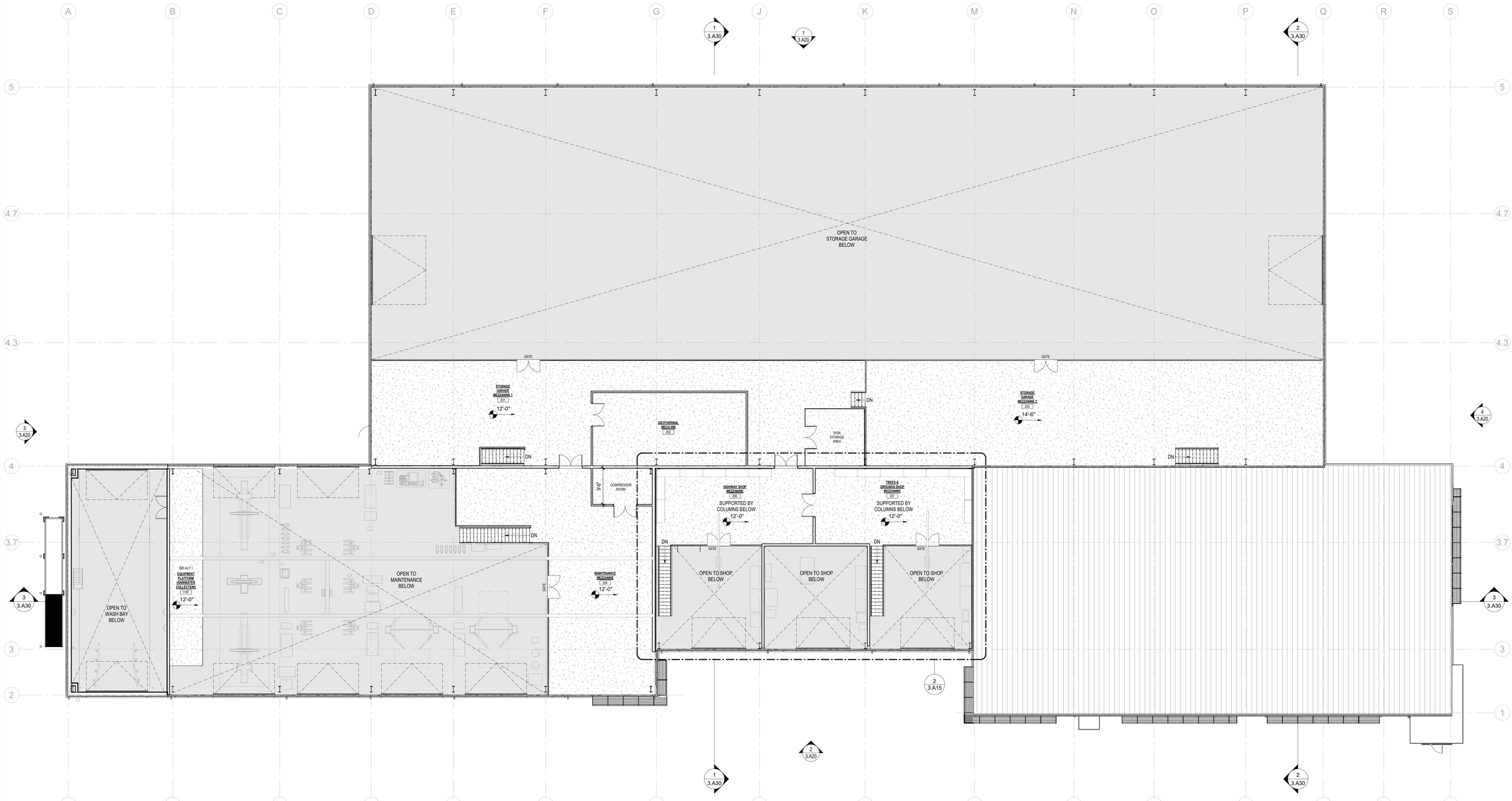
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Drawing Title:
PH3 - OVERALL FLOOR PLAN

Sheet Number:
3.A10

MEZZANINE GENERAL NOTES:

1. AT EACH MEZZANINE SWING GATE LOCATION, PROVIDE 4" H (RED) LETTER SIGNAGE AT MEZZANINE FASCIA TO READ: 200LBS/SF MAXIMUM MEZZANINE LOADING
2. PROVIDE SAFETY CHAIN PER OSHA STANDARDS AT EACH SWING GATE.
3. PROVIDE SAFETY YELLOW PAINT AT MEZZANINE FLOOR AT EACH SWING GATE, AS INDICATED.
4. COORDINATE EXACT LOCATION WITH MECHANICAL, STRUCTURAL AND EQUIPMENT REQUIREMENTS.
5. DO NOT RUN ANY UTILITIES BELOW GATES EXPOSED AND MOUNTED TO WALLS.
6. PROVIDE TIE-OFF POINT FOR OSHA FALL ARREST SYSTEM NEAR MEZZANINE SWING-GATE ON PRIMARY STRUCTURAL ELEMENT.



1 PH3 - OVERALL MEZZANINE PLAN
3/32" = 1'-0"

0' 4' 8' 16'
SCALE: 3/32" = 1'-0"

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Key Plan:

NORTH

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W&S File No.:	XXX

Drawing Title:

PH3 - OVERALL MEZZANINE PLAN

Sheet Number:

3.A11

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REFLECTED CEILING PLAN NOTES:

1. REFER TO M.E.P / F.P. DRAWINGS FOR LOCATION OF LIGHT FIXTURES, SPRINKLER HEADS, SUPPLIES, RETURNS AND ADDITIONAL CEILING INFORMATION.
2. ALL DIFFUSERS, SPRINKLER HEADS, ETC. AT ACT AREAS TO BE CENTERED ON TILE.
3. SUSPENDED ACT AT 9'-4" AFF UNLESS NOTED OTHERWISE (U.N.O.)
4. ALL GWB CEILINGS AND SOFFITS AT 9'-4" AFF (U.N.O.)
5. COORDINATE QUANTITY AND LOCATION OF LIGHT FIXTURES WITH ELECTRICAL DRAWINGS.
6. LIGHT FIXTURE SYMBOLS ON REFLECTED CEILING PLANS ARE DIAGRAMMATIC FOR REFERENCE ONLY. REFER TO ELECTRICAL DRAWINGS FOR TYPE OF LIGHT FIXTURES. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR QUANTITY OF LIGHT FIXTURES AS INDICATED ON THE ELECTRICAL DRAWINGS.
7. FOR CEILING HEIGHTS AND TYPES, REFER TO REFLECTED CEILING PLAN DRAWINGS.
8. NO SUSPENDED LOADS SHALL BE SUPPORTED BY THE ROOF DECK. THIS INCLUDES PIPING, DUCTWORK, MECHANICAL EQUIPMENT, STAGE RIGGING, CEILING, ETC. ALL STEEL FRAMING MEMBERS PREFERABLY UTILIZING A SYSTEM OF UNISTRUTS, BEAM CLAMPS, AND THREADED RODS. ALL ATTACHMENT DEVICES SHALL BE SUBMITTED FOR REVIEW AND ARE SUBJECT TO APPROVAL OF THE DESIGNER.
9. COORDINATE QUANTITY AND LOCATION FOR EXIT SIGNS WITH ELECTRICAL DRAWINGS.
10. COORDINATE QUANTITY AND LOCATION OF SPRINKLERS WITH FIRE PROTECTION DRAWINGS.

REFLECTED CEILING PLAN LEGEND:

CEILING TYPES:

TYPE A1: 2' x 2' SUSPENDED ACOUSTICAL PANEL

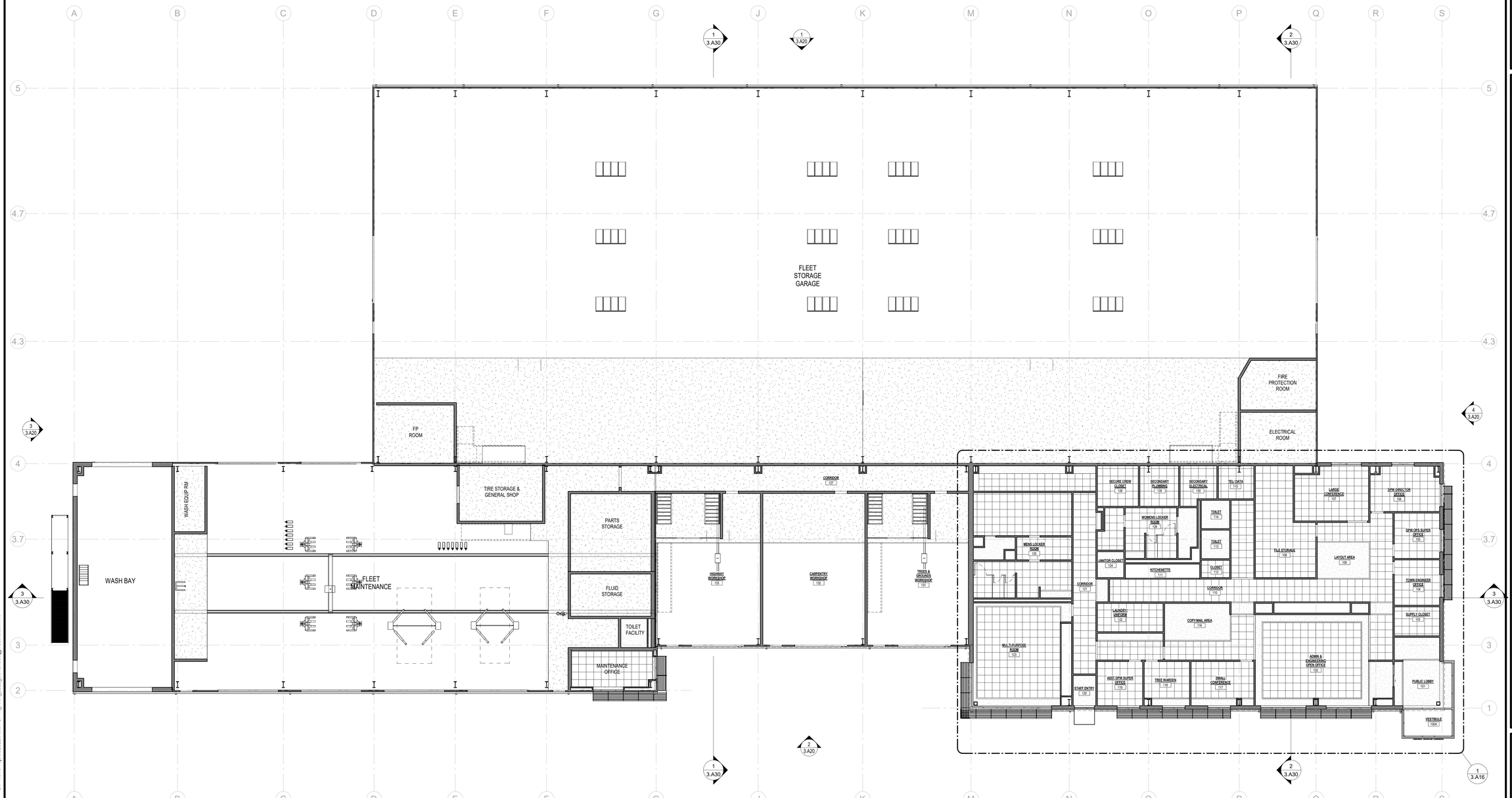
TYPE A2: 2' x 2' SUSPENDED ACOUSTICAL PANEL - MOISTURE RESISTANT

TYPE G1: GYPSUM BOARD CEILING

TYPE G2: GYPSUM BOARD CEILING - MOISTURE RESISTANT

TYPE G3: 2-HR FIRE RATED CEILING UL DESIGN NO. U415

XX	SOFFIT DETAIL - REFER TO CEILING SERIES	R.H.	RADIANT HEATER
TYPE A | X'-X" HEIGHT	CEILING TAG	C.U.H.	CABINET UNIT HEATER
		U.H.	UNIT HEATER
	LIGHT FIXTURES		EXIT SIGN
			MOTION DETECTOR
	SURFACE MTD. LIGHT FIXTURE	SD	SMOKE DETECTOR
	TRACK LIGHTING	OS	OCCUPANCY SENSOR
	SUPPLY DIFFUSER - REF: MECH DWGS	PS	CEILING PHOTO SENSOR
	RETURN VENT - REF: MECH DWGS	S	CEILING FLUSH MOUNTED SPEAKER
	EXHAUST VENT - REF: MECH DWGS	F	FIRE ALARM SPEAKER / VISUAL SIGNAL
	CLG. MTD. / EXTERIOR SECURITY CAMERA	F CLG	CEILING MOUNTED FIRE ALARM SPEAKER / VISUAL SIGNAL
		F	FIRE ALARM VISUAL SIGNAL
			CEILING MOUNTED SPRINKLER
			WALL MOUNTED SPRINKLER



1 PH3 - OVERALL REFLECTED CEILING PLAN - BELOW MEZZANINE
3/32" = 1'-0" 1/ 1.A20

SCALE: 3/32" = 1'-0"

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Drawing Title:

PH3 - OVERALL REFLECTED CEILING PLAN - BELOW MEZZANINE

Sheet Number:

3.A12

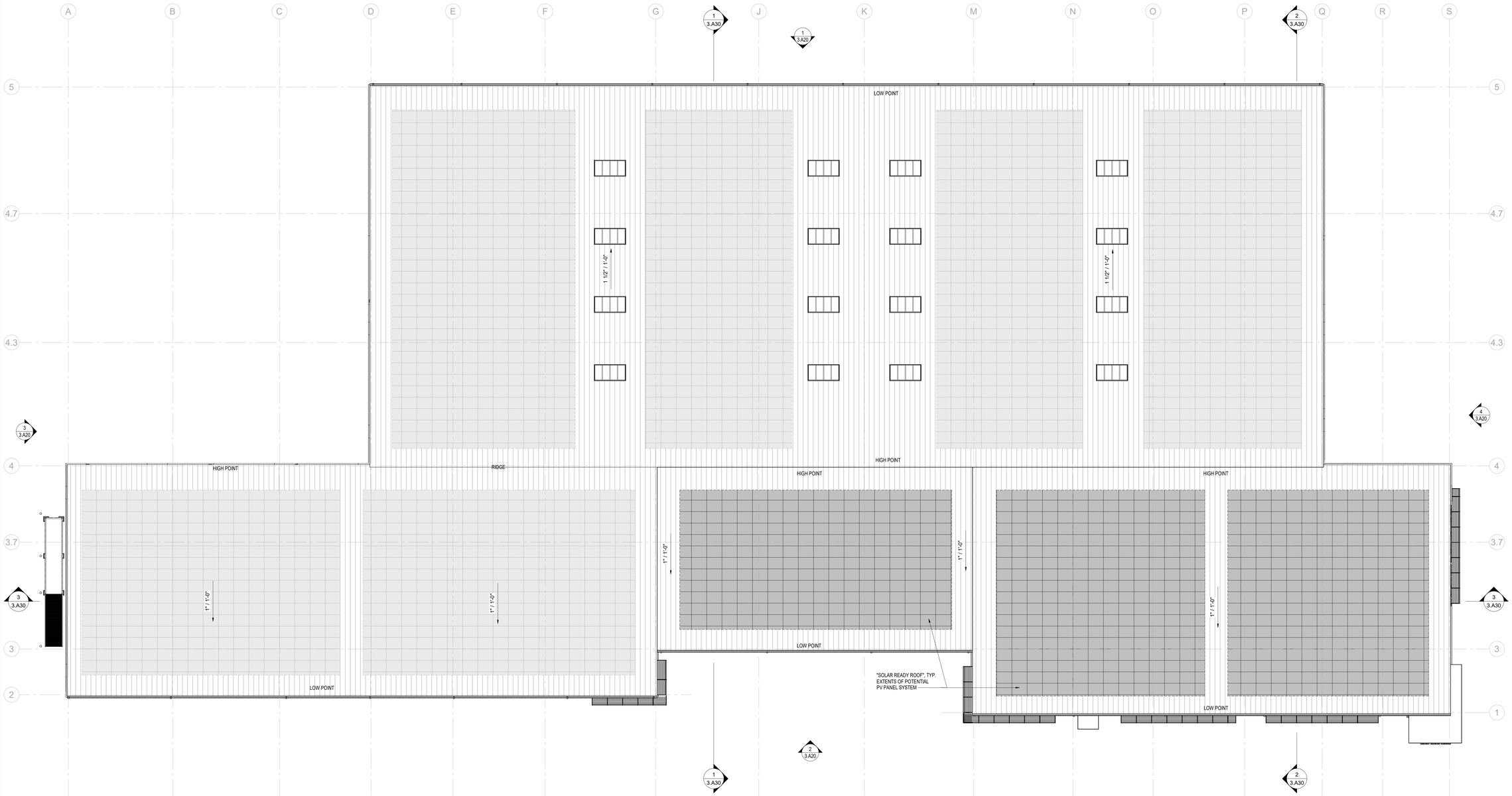
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GENERAL ROOF NOTES - METAL BUILDINGS

1. REFER TO EQUIPMENT, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL ROOF PENETRATIONS AND EQUIPMENT NOT SHOWN. ANY DISCREPANCIES REGARDING LOCATION OF EQUIPMENT SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT FOR RESOLUTION IN FIELD.
2. ROOF SLOPE = 1'-0" : 12'-0"
3. SEE GENERAL NOTES ON A012
4. ALL GUTTERS TO PITCH TOWARDS DOWNSPOUTS AT A MINIMUM 1/16" PER FOOT AND SUPPORTED AS PER METAL BUILDING MANUFACTURER.
5. ROOF PENETRATIONS TO BE CUT AND FLASHED BY METAL BUILDING MANUFACTURER.
6. PROVIDE ROOF FLASHING AT ALL PENETRATIONS INCLUDING BUT NOT LIMITED TO VENT STACKS, FLUES, AND EXHAUST FANS. REVIEW PLUMBING, EQUIPMENT, MECHANICAL, AND ELECTRICAL DRAWINGS FOR CONSTRUCTION NOT INDICATED ON THIS DRAWING.
7. PROVIDE CRICKETS AT ALL ROOFTOP EQUIPMENT AND PENETRATIONS TO CREATE ADEQUATE ROOF DRAINAGE.
8. SUPPLEMENTAL FRAMING AND CURBS FOR ALL ROOFTOP EQUIPMENT SHALL BE PROVIDED AND INSTALLED BY THE METAL BUILDING MANUFACTURER.

STANDING SEAM METAL ROOF ASSEMBLY (BY MBMI)

- STANDING SEAM METAL ROOF PANEL
- R-5 THERMAL BLOCKS AT PURLINS W/ UNFACED BATT INSULATION BETWEEN THERMAL BLOCKS (UPPER INSULATION LAYER)
- UNFACED BATT INSULATION LAYER BETWEEN PURLINS (STRUCTURE INSULATION LAYER)
- FABRIC LINER / VAPOR RETARDER, TAPE AND SEAL
- ALL PENETRATIONS AND EDGES
- MINIMUM R-VALUE OF 38



1 PH3 - OVERALL ROOF PLAN
3/32" = 1'-0" 1/ 1.A20

0' 4' 8' 16'
SCALE: 3/32" = 1'-0"

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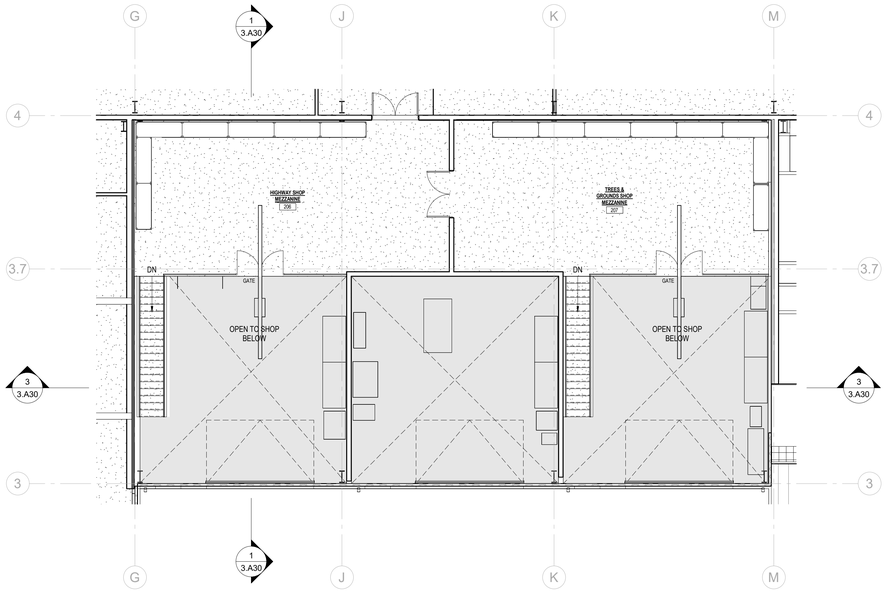
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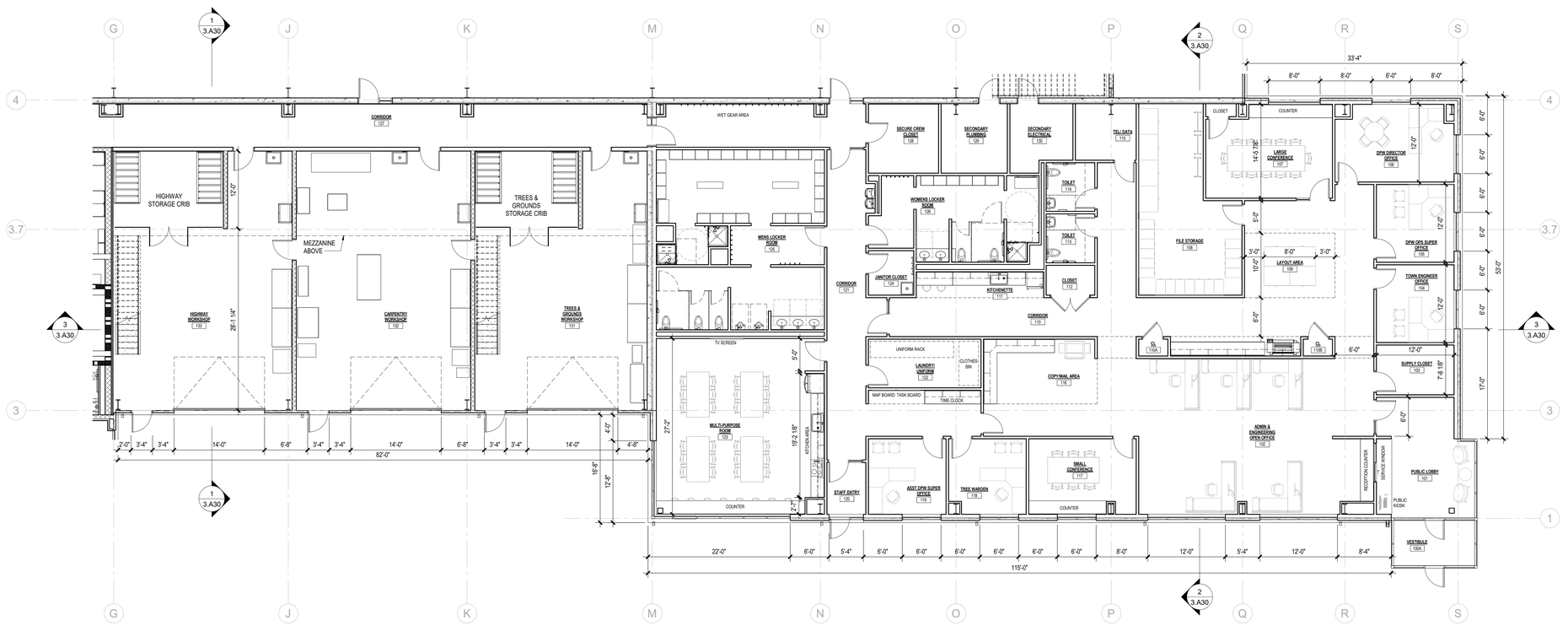
PH3 - OVERALL ROOF PLAN

Sheet Number:

3.A14



2 PH3 - LARGE SCALE WORKSHOPS MEZZANINE PLAN
1/8" = 1'-0" 1/ 3.A11



1 PH3 - LARGE SCALE ADMIN & WORKSHOPS FLOOR PLAN
1/8" = 1'-0" 1/ 3.A10

0' 4' 8' 16'
SCALE: 1/8" = 1'-0"

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Scale: 1/8" = 1'-0"

Key Plan:

NORTH

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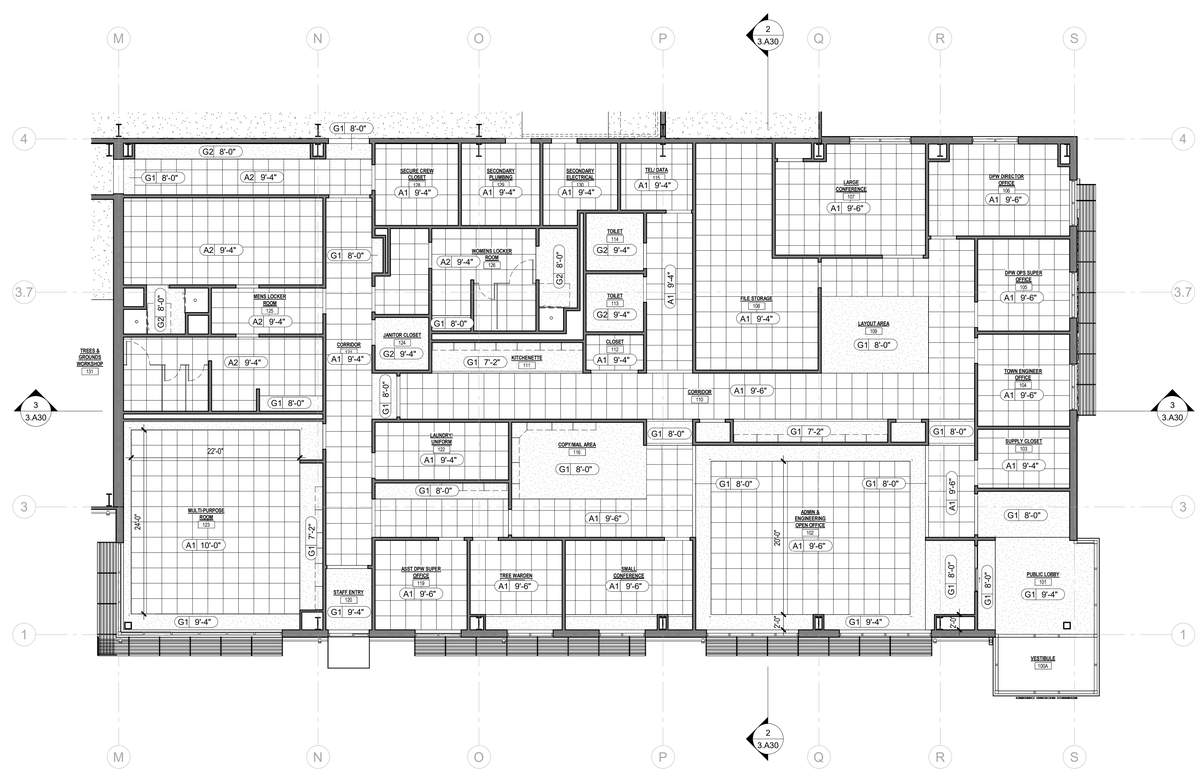
PH3 - LARGE SCALE ADMIN & WORKSHOPS FLOOR & MEZZANINE PLANS

Sheet Number:

3.A15

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1 PH3 - LARGE SCALE ADMIN REFLECTED CEILING PLAN
1/8" = 1'-0" 1/ 3.A12

0" 4' 8' 16'
SCALE: 1/8" = 1'-0"

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Scale: 1/8" = 1'-0"

Key Plan:

NORTH

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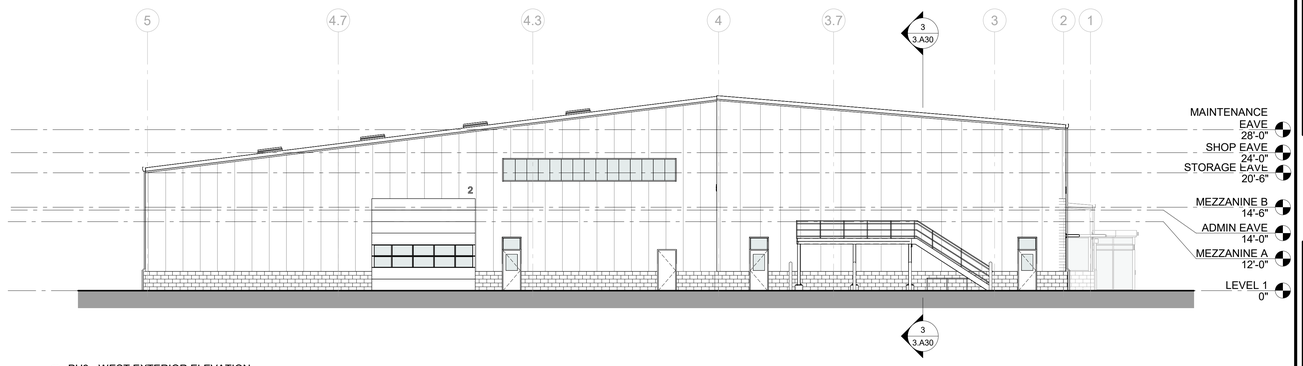
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PH3 - LARGE SCALE ADMIN REFLECTED CEILING PLAN

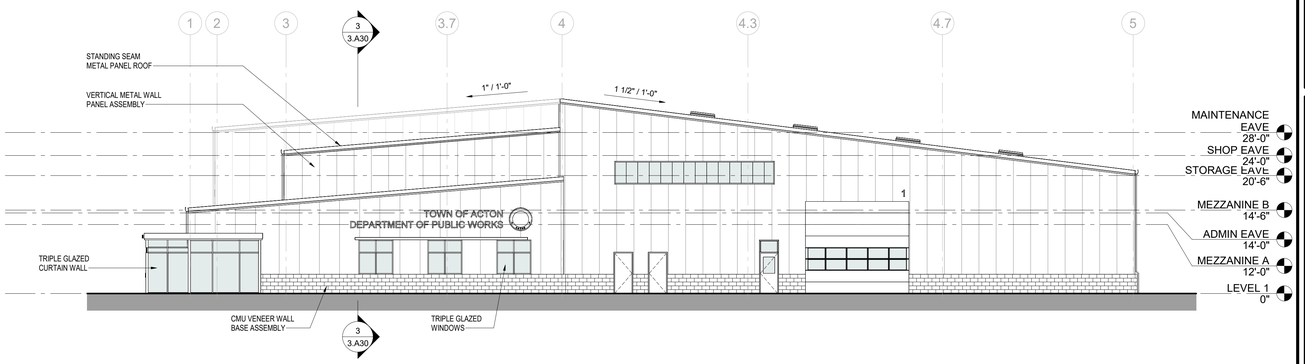
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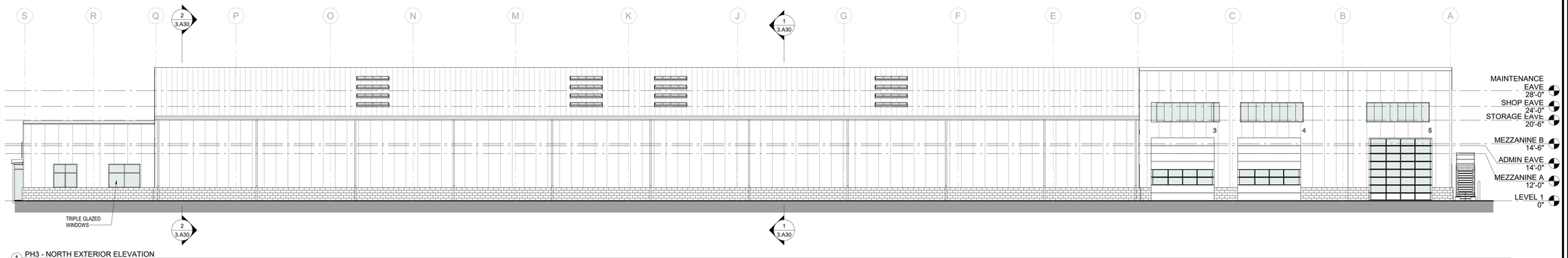
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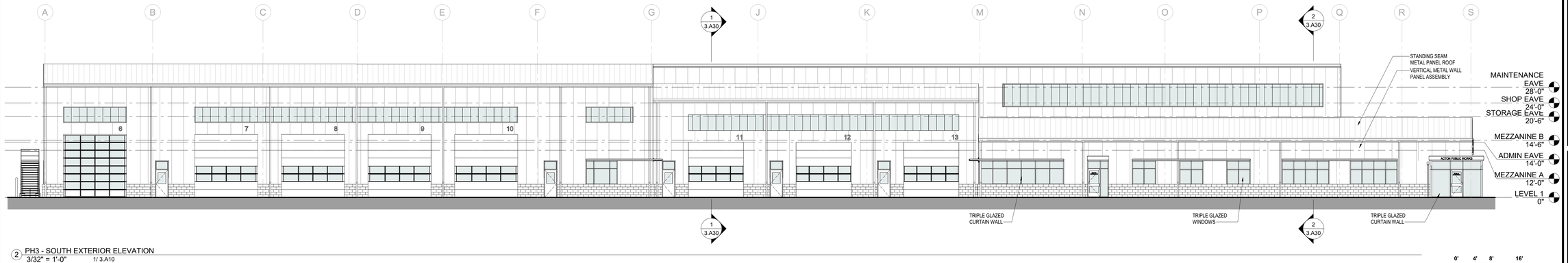
3 PH3 - WEST EXTERIOR ELEVATION
3/32" = 1'-0" 1/ 3.A10



4 PH3 - EAST EXTERIOR ELEVATION
3/32" = 1'-0" 1/ 3.A10



1 PH3 - NORTH EXTERIOR ELEVATION
3/32" = 1'-0" 1/ 3.A10



2 PH3 - SOUTH EXTERIOR ELEVATION
3/32" = 1'-0" 1/ 3.A10

0' 4' 8' 16'
SCALE: 3/32" = 1'-0"

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PH3 - OVERALL ELEVATIONS

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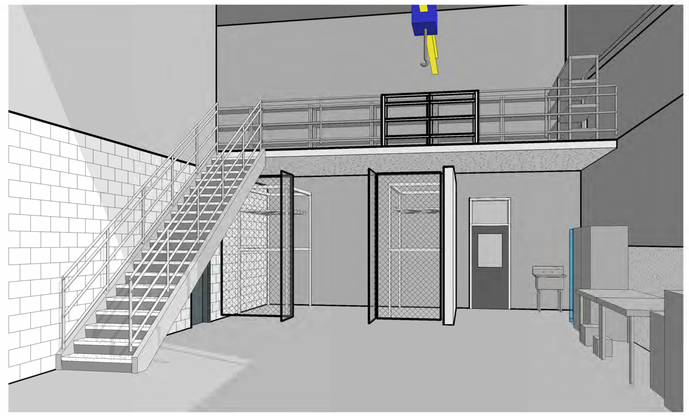
6 3D VIEW - LAYOUT AREA



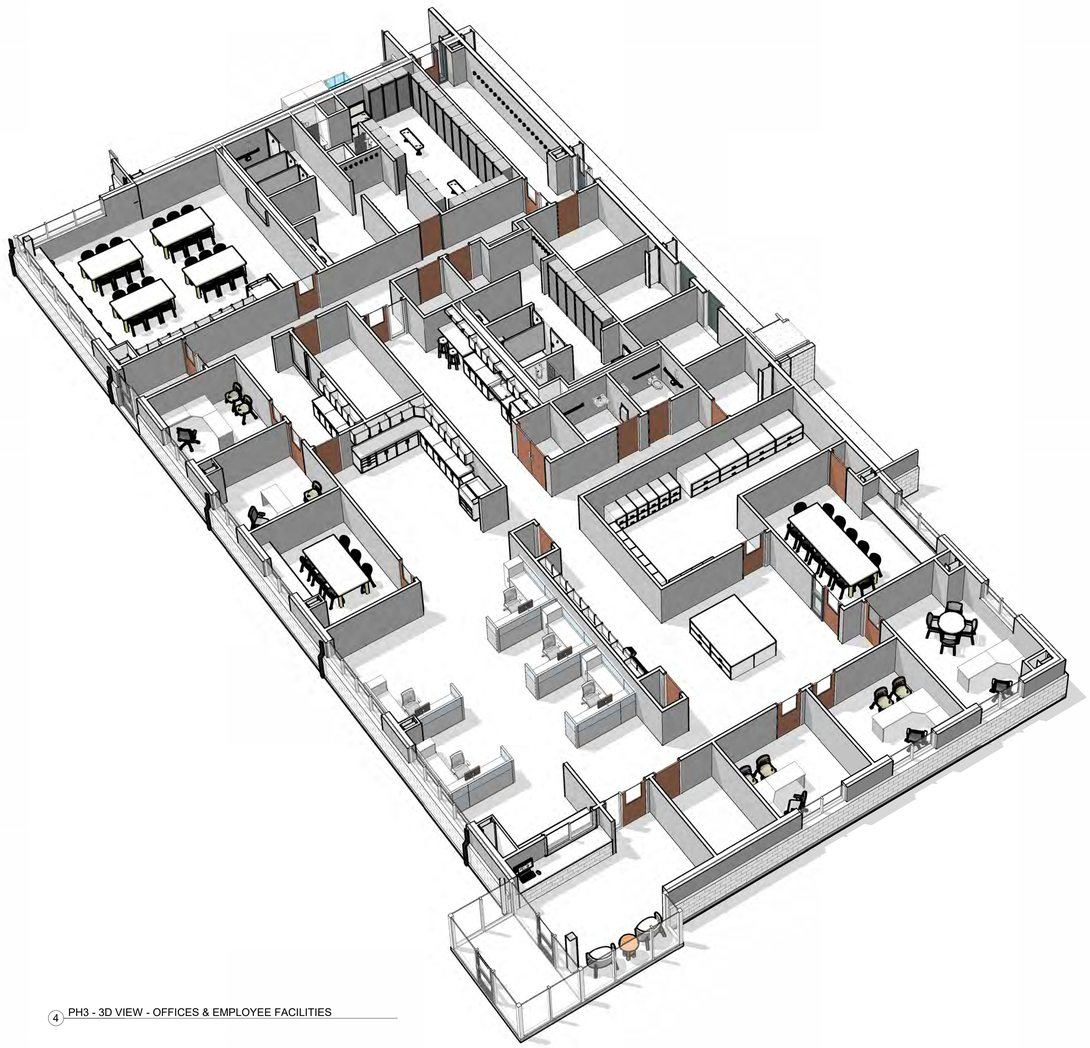
5 3D VIEW - MULTI-PURPOSE TRAINING ROOM



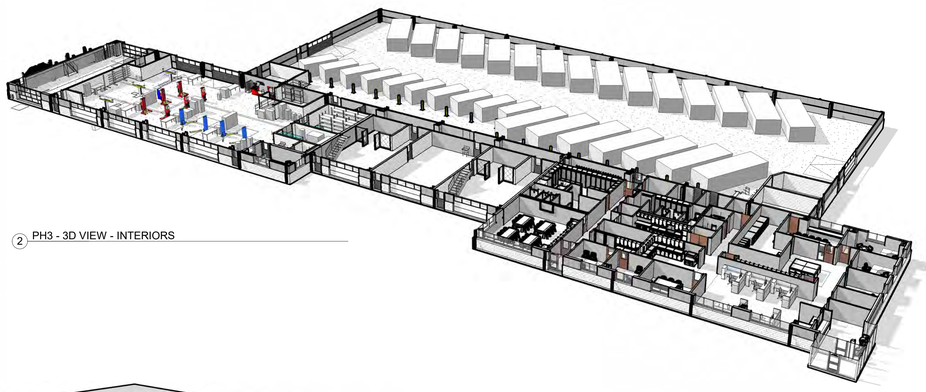
3 3D VIEW - PUBLIC LOBBY SERVICE WINDOW



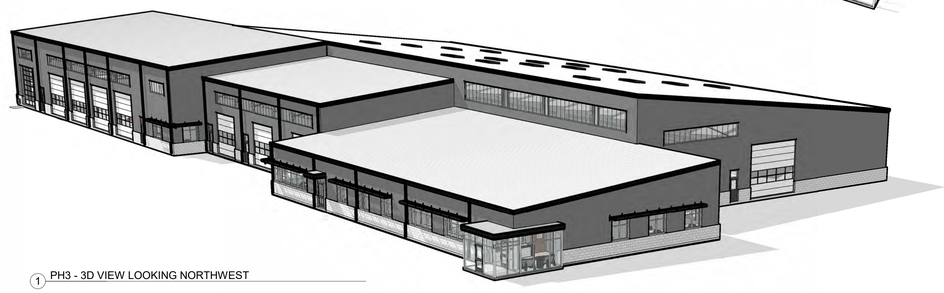
8 3D VIEW - WORKSHOP



4 PH3 - 3D VIEW - OFFICES & EMPLOYEE FACILITIES



2 PH3 - 3D VIEW - INTERIORS



1 PH3 - 3D VIEW LOOKING NORTHWEST

NOTE: 3D VIEWS ARE PROVIDED FOR REFERENCE ONLY. REFER TO PLANS, ELEVATIONS, SECTIONS, DETAILS AND SCHEDULES FOR BUILDING REQUIREMENTS.

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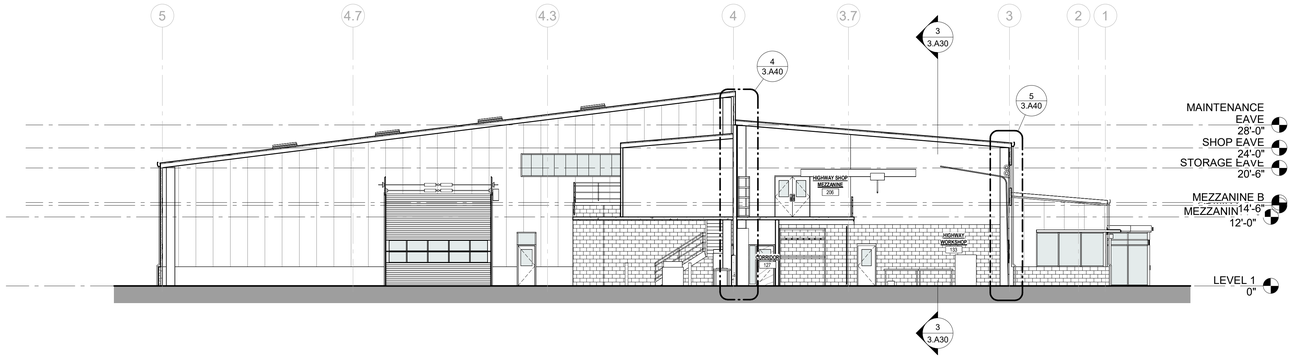
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PH3 - 3D VIEWS

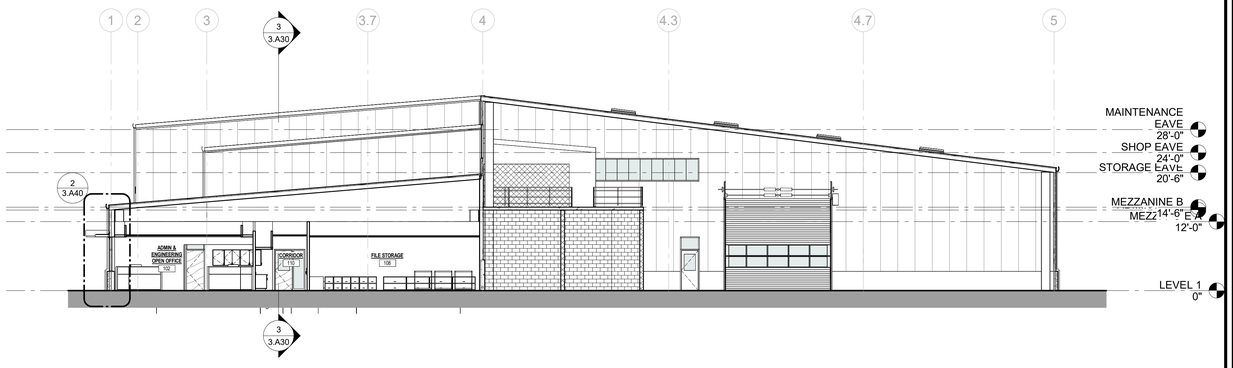
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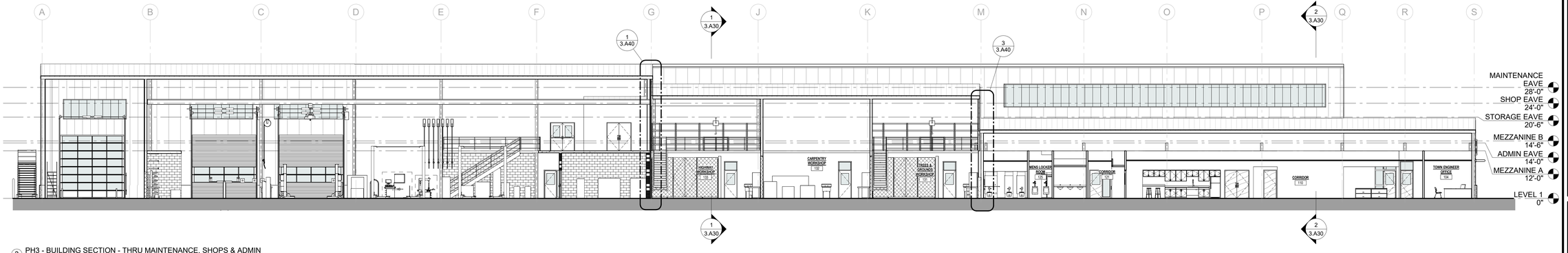
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1 PH3 - BUILDING SECTION - THRU SHOPS & STORAGE GARAGE
3/32" = 1'-0" 1/ 3.A10



2 PH3 - BUILDING SECTION - THRU ADMIN & STORAGE GARAGE
3/32" = 1'-0" 1/ 3.A10



3 PH3 - BUILDING SECTION - THRU MAINTENANCE, SHOPS & ADMIN
3/32" = 1'-0" 1/ 3.A10

0' 4' 8' 16'
SCALE: 1/8" = 1'-0"

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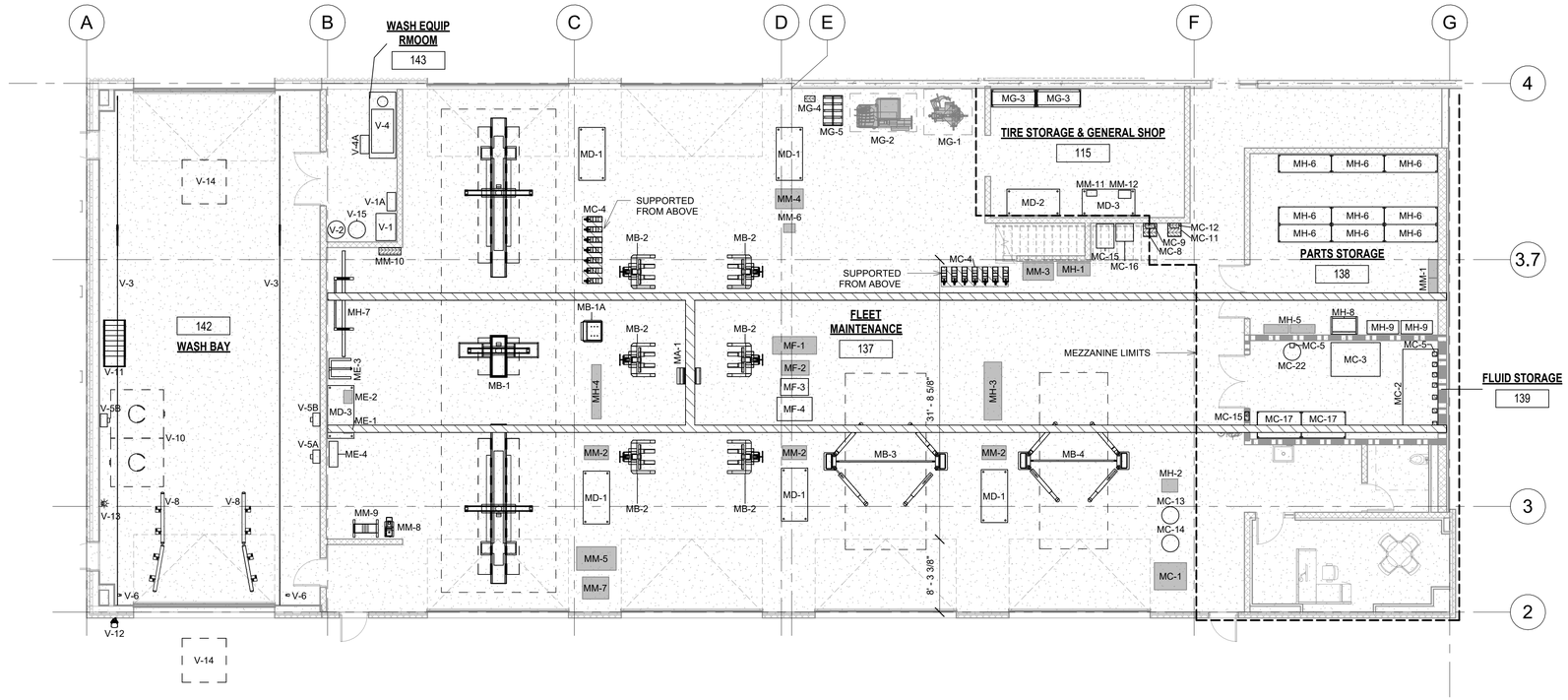
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1 PH1 - MAINTENANCE EQUIPMENT
1/8" = 1'-0"

PH1 - MAINTENANCE EQUIPMENT SCHEDULE

EQ Number	Description	Count	Equipment Type	Spec Number	Notes
HM-1	Bench Vice	1	N	12 40 00	
MA-1	5 Ton Bridge Crane	1	N	14 22 13	
MB-1	18" Frame Length - Traditional 3-Post	1	N	14 45 00	
MB-1A	PLC Power Unit	1	N	14 45 00	
MB-2	18k Mobile Column	6	N	14 45 00	
MB-3	20,000lb. Two Post Lift	1	N	14 45 00	
MB-4	12,000lb. Two Post Lift	1	N	14 45 00	
MC-1	DEF Tote with Pumpout	1	ERO	N/A	
MC-2	1,000-Gallon Compartment Tank (New Fluids)	1	N	11 11 29	
MC-3	600-Gallon Compartment Tank (Waste Fluids)	1	N	11 11 29	
MC-4	Fluid Reel Bank	2	N	11 11 29	
MC-5	Wall Mounted Lube Pumps	8	N	11 11 29	
MC-8	Waste Oil Pumpout System	1	N	11 11 29	
MC-9	Waste Oil High Level Alarm	1	N	11 11 29	
MC-11	Waste Antifreeze Pumpout System	1	N	11 11 29	
MC-12	Waste Antifreeze High Level Alarm	1	N	11 11 29	
MC-13	Lube Trolley (Grease)	1	N	11 11 29	
MC-14	Lube Trolley (Grease)	1	N	11 11 29	
MC-15	<varies>	2	N	11 11 29	
MC-16	Oil Filter Drain Box	1	N	11 11 29	
MC-17	5-Gallon Bucket Shelving	2	N	11 11 29	
MC-22	55-Gallon Fluid Drum (WWF)	1	N	11 11 29	
MD-1	Steel Workbench	5	N	12 40 00	
MD-2	Steel Work Bench w/ Elec. Shelf	1	N	12 40 00	
MD-3	Heavy Duty Steel Workbench	2	N	12 40 00	
ME-1	Hydraulic Hose Crimper	1	ERO	N/A	
ME-2	Hydraulic Hose Cut Off Machine	1	ERO	N/A	
ME-3	Hydraulic Hose Reel Rack	1	N	12 40 00	
ME-4	Cubby Storage	1	N	12 40 00	
MF-1	Welder & Wire Feeder	1	ERO	N/A	
MF-2	MIG Welder	1	ERO	N/A	
MF-3	Multipurpose Welder	1	N	12 40 00	
MF-4	Portable Weld Fume Extractor	1	N	12 40 00	
MG-1	Tire Changer	1	ERO	N/A	
MG-2	Tire Balancer	1	ERO	N/A	
MG-3	Tire Storage Rack	2	N	12 40 00	
MG-4	Digital Tire Inflator	1	N	12 40 00	
MG-5	Tire Inflation Cage	1	N	12 40 00	

PH1 - MAINTENANCE EQUIPMENT SCHEDULE

EQ Number	Description	Count	Equipment Type	Spec Number	Notes
MH-1	Toolbox Red	1	ERO	N/A	
MH-2	Toolbox Black (US General)	1	ERO	N/A	
MH-3	Toolbox Black (Snap-On)	1	ERO	N/A	
MH-4	Toolbox Black Tall (Snap-On)	1	ERO	N/A	
MH-5	Hose Cubby Storage	2	ERO	N/A	
MH-6	Parts Shelving (6'x2')	9	N	12 40 00	
MH-7	Cantilever Rack	1	N	12 40 00	
MH-8	Bin Storage Cabinet	1	N	12 40 00	
MH-9	Flammable Cabinet (45 Gallons)	2	N	12 40 00	
MM-1	Battery Rack	2	ERO	N/A	
MM-2	Tool Cart	3	ERO	N/A	
MM-3	Parts Washer	1	ERO	N/A	
MM-4	Torch Cart	1	ERO	N/A	
MM-5	Topside Creeper	1	ERO	N/A	
MM-6	Battery Charger	1	ERO	N/A	
MM-7	Power Washer	1	ERO	N/A	
MM-8	Drill Press	1	N	12 40 00	
MM-9	Hydraulic Shop Press (50 Ton)	1	N	12 40 00	
MM-10	Hand Tool Charging Station	1	N	N/A	
MM-11	Bench Vice	1	N	12 40 00	
MM-12	Bench Grinder	1	N	12 40 00	
V-1	Manual Wash Pump Skid	1	N	11 11 26	
V-1A	Manual Wash Control Panel	1	N	11 11 26	
V-2	Heat Exchanger	1	N	12 40 00	
V-3	Festoons	2	N	11 11 26	
V-4	Undercarriage Wash Pressure Plant	1	N	11 11 26	
V-4A	Undercarriage Wash Control Panel	1	N	11 11 26	
V-5A	Undercarriage Wash Toggle Switch	1	N	11 11 26	
V-5B	Manual Wash On/Off Switch	2	N	11 11 26	
V-8	Guide Rails	1	N	11 11 26	
V-10	Vehicle Wash Pre-Treatment Tank (1500gal)	1	N	11 11 26	
V-11	Mobile Platform	1	N	11 11 26	
V-12	Vehicle Wash Entry Traffic Light 2	1	N	11 11 26	
V-13	Undercarriage Wash Activation Light	1	N	11 11 26	
V-14	Loop Detector	2	N	11 11 26	
V-15	Vehicle Wash Soap Drum	1	N	11 11 26	

GENERAL NOTES:

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6. SEE SPECIFICATION SECTION 11 11 29 - FLUID DISTRIBUTION SYSTEM ALONG WITH DETAILS ON EQ___ FOR ADDITIONAL INFORMATION AND SCOPE DELINEATION FOR THE FLUID AND WASTE FLUID DISTRIBUTION SYSTEMS.

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LINE TYPES
- MEZZANINE LIMITS
- NIC/ERO EQUIPMENT
- NEW EQUIPMENT

HATCHES
- CEILING MOUNTED
- WALL MOUNTED

Project:
NEW PUBLIC WORKS FACILITY
14 FOREST ROAD, ACTON MA 01720

TOWN OF ACTON, MA

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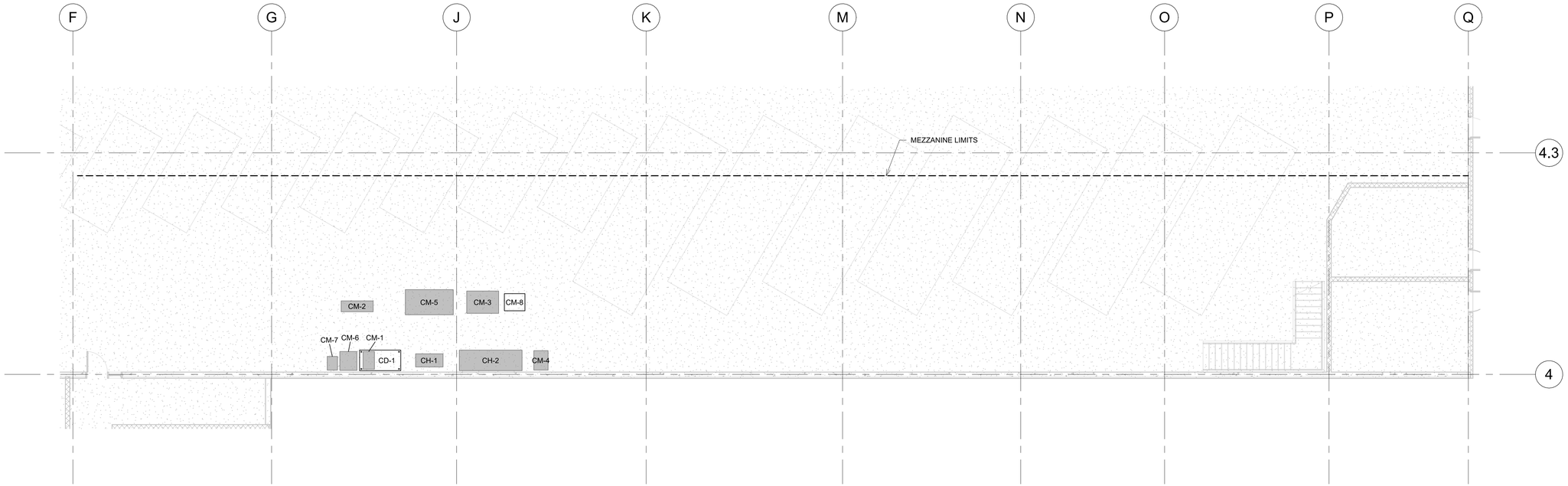
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Drawing Title:
MAINTENANCE EQUIPMENT LAYOUT PLAN

Sheet Number:
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1 PH2 - TEMPORARY SHOP FIT-OUT
1/8" = 1'-0"

PH2 - TEMPORARY SHOP FIT-OUT SCHEDULE					
EQ Number	Description	Count	Equipment Type	Spec Number	Notes
CD-1	Steel Workbench	1	N	12 40 00	
CH-1	Flammable Cabinet (30-Gallons)	1	ERO	N/A	
CH-2	Template Storage Rack	1	ERO	N/A	
CM-1	Chop Saw (Hitachi)	1	ERO	N/A	
CM-2	Edge Planar	1	ERO	N/A	
CM-3	Thickness Planar	1	ERO	N/A	
CM-4	Standing Band Saw	1	ERO	N/A	
CM-5	Table Saw (Powermatic)	1	ERO	N/A	
CM-6	Drill Press (Powermatic)	1	ERO	N/A	
CM-7	Drill Press (American Forge Foundry)	1	ERO	N/A	
CM-8	Portable Dust Collector	1	N	12 40 00	

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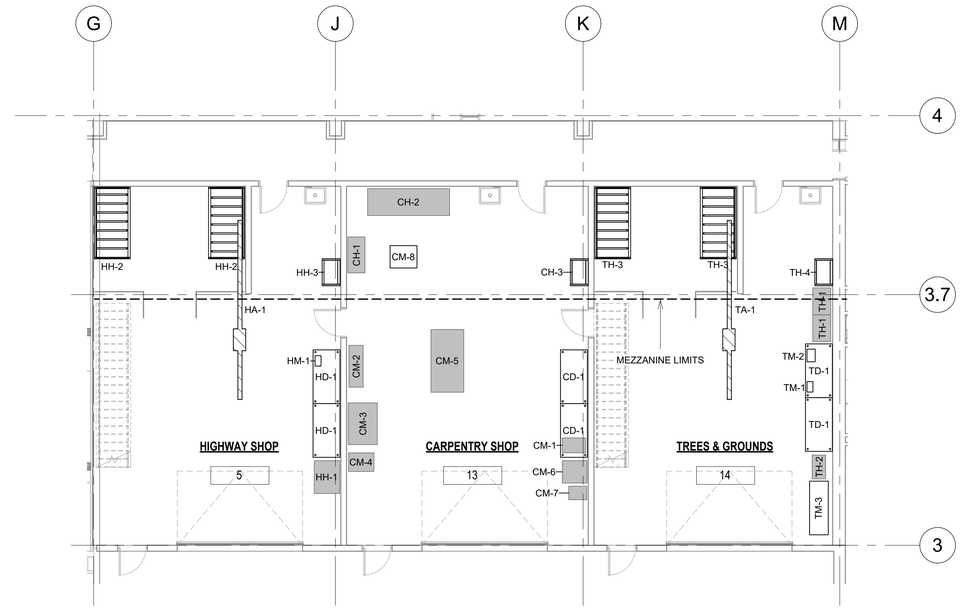
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Draw By:	NCH
Reviewed By:	TJC
Approved By:	JRF
W&S Project No.:	000000
W&S File No.:	XXX

Drawing Title:
TEMPORARY SHOP EQUIPMENT FIT-OUT

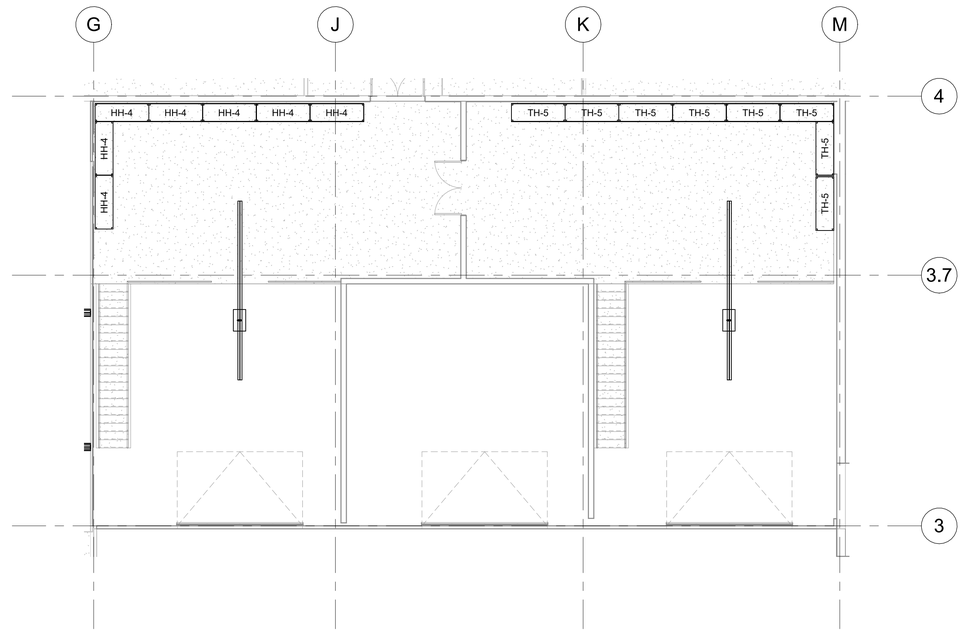
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1 PH3 - WORKSHOPS EQUIPMENT
1/8" = 1'-0"



2 PH3 - WORKSHOPS MEZZANINE EQUIPMENT
1/8" = 1'-0"

PH3 - HIGHWAY WORKSHOP EQUIPMENT SCHEDULE

EQ Number	Description	Count	Equipment Type	Spec Number	Notes
HA-1	2-Ton Monorail	1	N	14 22 13	
HD-1	Steel Workbench	2	N	12 40 00	
HH-1	Flammable Cabinet (60 Gallons)	1	ERO	N/A	
HH-2	Hanging Tool Storage Rack	2	N	12 40 00	
HH-3	Bin Storage Cabinet	1	N	12 40 00	
HH-4	Parts Shelving (6' x 2')	7	N	12 40 00	On Mezzanine

PH3 - CARPENTRY WORKSHOP EQUIPMENT SCHEDULE

EQ Number	Description	Count	Equipment Type	Spec Number	Notes
CD-1	Steel Workbench	2	N	12 40 00	
CH-1	Flammable Cabinet (30-Gallons)	1	ERO	N/A	
CH-2	Template Storage Rack	1	ERO	N/A	
CH-3	Bin Storage Cabinet	1	N	12 40 00	
CM-1	Chop Saw (Hitachi)	1	ERO	N/A	
CM-2	Edge Planar	1	ERO	N/A	
CM-3	Thickness Planar	1	ERO	N/A	
CM-4	Standing Band Saw	1	ERO	N/A	
CM-5	Table Saw (Powermatic)	1	ERO	N/A	
CM-6	Drill Press (Powermatic)	1	ERO	N/A	
CM-7	Drill Press (American Forge Foundry)	1	ERO	N/A	
CM-8	Portable Dust Collector	1	N	12 40 00	

PH3 - TREES & GROUNDS WORKSHOP EQUIPMENT SCHEDULE

EQ Number	Description	Count	Equipment Type	Spec Number	Notes
TA-1	2-Ton Monorail	1	N	14 22 13	
TD-1	Steel Workbench	2	N	12 40 00	
TH-1	Metal Locking Cabinet	2	ERO	N/A	
TH-2	Brown Tool Drawer	1	ERO	N/A	
TH-3	Hanging Tool Storage Rack	2	N	12 40 00	
TH-4	Bin Storage Cabinet	1	N	12 40 00	
TH-5	Parts Shelving (6' x 2')	8	N	12 40 00	On Mezzanine
TM-1	Bench Vice	1	N	12 40 00	
TM-2	Bench Grinder	1	N	12 40 00	
TM-3	Town Toolbox (New)	1	N	12 40 00	

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Key Plan:

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Reviewed By:	TJC
Approved By:	JRF
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W&S File No.:	XXX

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WORKSHOPS EQUIPMENT LAYOUT PLAN

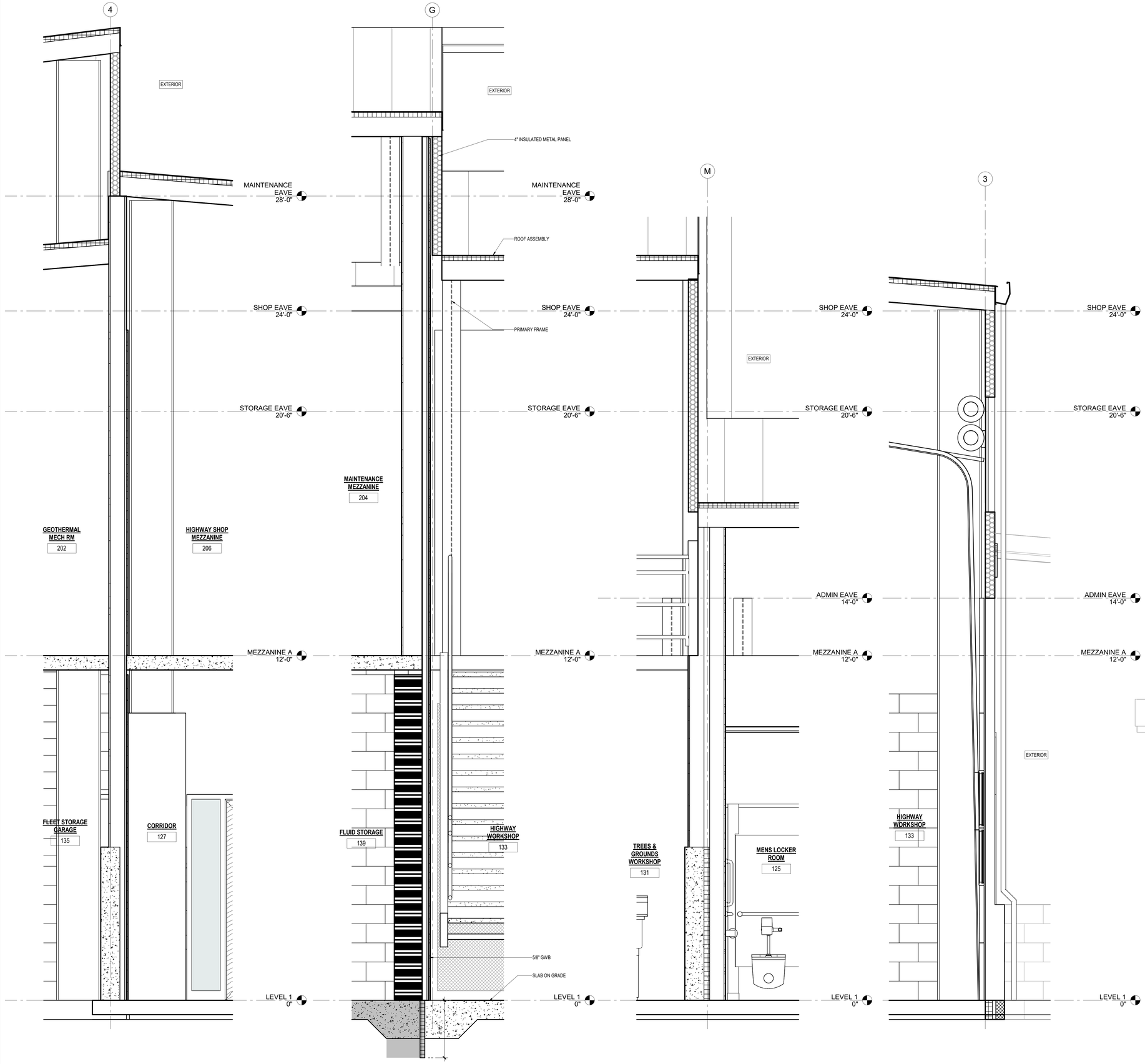
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TYPICAL WALL SECTION NOTES

- GIRT SPACING IS SHOWN DIAGRAMATICALLY ONLY, ACTUAL SPACING WILL BE BY MBM.
- AVB SHALL BE SEALED TO ALL ROOF FABRIC AND ANY STRUCTURE OR SYSTEMS WHICH PASSES THRU THE PLANE OF THE AVB TO FORM A CONTINUOUS AIR VAPOR BARRIER BETWEEN SPACES, TYP.
- SEE A031 FOR WALL AND ROOF ASSEMBLY TYPES



4 PH3 - WALL SECTION 5
3/4" = 1'-0" 1/ 3.A30

1 PH3 - WALL SECTION 4
3/4" = 1'-0" 3/ 3.A30

3 PH3 - WALL SECTION 3
3/4" = 1'-0" 3/ 3.A30

5 PH3 - WALL SECTION 2
3/4" = 1'-0" 1/ 3.A30

2 PH3 - WALL SECTION 1
3/4" = 1'-0" 2/ 3.A30

0' 1' 2' 3'
SCALE: 3/4" = 1'-0"

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Project:
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Reviewed By:	Checker
Approved By:	Approver
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W&S File No.:	XXX

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PH3 - WALL SECTIONS

Sheet Number:

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Town of Acton
New Public Works Facility
Schematic Design Package

3. Schematic Design Narratives

November 2024

Town of Acton
New Public Works Facility
Schematic Design Package

Schematic Design Narrative

Structural

November 2024

Weston & Sampson
100 Foxborough Blvd., Suite 250, Foxborough, MA 02035
Tel: 508.698.3034

Schematic Design Narrative Structural

TO:	John Comeau
FROM:	Kevin Connolly, P.E., Tim Murray E.I.T.
DATE:	09/27/2024
SUBJECT:	Schematic Structural Design Narrative for Acton Department of Public Works

1. Introduction:

The Town of Acton (Town) has retained to Weston & Sampson to create a feasibility study to design and construct a new Department of Public Works (DPW) building and demolish the Town's existing facility. The new facility is proposed to be constructed during a four-phase process, totaling approximately 48,000 square feet at completion, located at the site of their existing DPW Facility, 14 Forest Road, Acton, MA 01720. The proposed addition will consist of six different spaces including administration areas, which are approximately 8,200 square feet, workshops and material storage areas, which are approximately 3,500 square feet, vehicle maintenance and wash bay areas, which are approximately 9,100 square feet, and the vehicle and equipment storage bays, which are approximately 26,000 square feet. The building will contain two mezzanines, once in the workshops area and another in the vehicle maintenance bays.

The following is our understanding of the project phasing. Phase I of the project is proposed to include demolition of the existing equipment shed and erection of the new vehicle maintenance bays, vehicle wash bay, vehicle storage building, and external vehicle canopy building. Phase II includes the demolition of the existing DPW facility. Phase III includes the erection of the administrative office building and the shops building. Phase IV includes site work and completion of the project.

2. Structural System:

Given the building size, height, clear span requirements, and economic considerations, the most appropriate structural system selected is a pre-engineered metal building (PEMB) structure. The PEMB system shall be comprised of tapered wide flange bent frames spanning the full width of each space, approximately 100 feet in the vehicle storage, 60 feet in the wash bay and maintenance garage, 50 feet in the workshops and material storage area, and 65 feet in the administration space. The main support frames should typically be spaced at 25 feet or less on center. Cold formed channels and zee shaped will be erected spanning between the bent frames to support the exterior building envelope. A combination of portal frames and steel rod cross bracing will be designed to resist the lateral loading. We anticipate each of the specific structural systems shall be comprised of the following:

2.1. Roof System: The roof is assumed to be an insulated standing seam metal deck, with a varying slope depending on the space. Typical eave elevations include approximately 14 feet in the administration offices, 20 feet in the vehicle storage, and 28 feet in the vehicle maintenance, and 24 feet workshop areas. The metal decking will be supported by cold-formed steel zee-shaped purlins spanning between the main steel bent frames. Purlins are expected to be 8" depth with varying spacing.

2.2. Wall System: The exterior walls will generally consist of insulated metal panel siding, spanning vertically, and supported by 8" deep cold-formed horizontal girts, spaced as required, and spanning from frame to frame. At the base of the metal panels will be concrete knee walls extending above grade to an assumed elevation of 3 feet 4 inches and concrete foundation walls extending below grade a minimum of 4 feet. The exterior wall system of the administration office area shall be full height light gauge metal studs with metal panels spanning horizontally.

2.3. Foundation System: The external perimeter foundation will typically comprise a continuous strip footing below the foundation walls. Isolated footings will be used at column locations. The type and size of the foundations will be determined based on the recommendations provided by the geotechnical investigation. At grade level, a typical 6-inch reinforced cast-in-place slab on grade will be used, except in areas where vehicle traffic is anticipated such as the vehicle storage and vehicle maintenance. In vehicle trafficked areas, an 8-thick slab will be required. If the client chooses to utilize radiant floor heating in certain locations, a 10-inch slab will be considered.

2.4. Mezzanine Floor System: The mezzanine floor will be constructed from a slab on deck supported by wide flange beams and steel tube posts. The steel columns will be supported on concrete piers and isolated footings. The mezzanine floor will consist of a lightly reinforced concrete slab on composite metal decking.

2.5. Lateral System: The lateral forces from wind and seismic activities will be resisted using a combination of cross-bracing rods and wide flange portal frames. Portal frame and cross bracing locations will be coordinated with the architect team and metal building manufacturer.

3. Structural Design Applicable Building Codes and Standards:

The structural analysis and design of the proposed building will be based on the following building codes and standards:

- Massachusetts State Building Code, 10th Edition
- IBC 2021 "International Building Code"
- IEBC 2021 "International Existing Building Code"
- ASCE 7-16 "Minimum Design Loads and Criteria for Buildings and Other Structures"
- ANSI/AISC 360-16 "Specification for Structural Steel Buildings"
- ANSI/AISC 341-16 "Seismic Provisions for Structural Steel Buildings"
- ACI 318-19 "Building Code Requirements for Structural Concrete"
- TMS 402/602-16 "Building Code Requirements & Specification for Masonry Structures"
- MBMA 2018 "Metal Building Systems Manual"
- AISI 2020 "American Iron and Steel Institute"

3.1. Design Load Criteria

- Building Occupancy: Warehouse and Office Space
- Building Risk Category: IV

3.2. Dead Loads:

- Actual Weight of Building Components
- Floor Hung Ceiling/Mech./Misc/Finishes: 15 psf
- Roof Hung Ceiling/Mech./Misc./Finishes: 20 psf
- Future Photovoltaic (PV) Panel: 8 psf
- Perimeter Façade Load: 10 psf

3.3. Uniformly distributed Live Loads:

- Office Plus Partition: 65 psf
- Assembly Areas, First Floor Corridor, Stairs: 100 psf
- Second Floor Corridor: 80 psf
- Mechanical Areas, Storage: 250 psf
- Roof: 20 psf

3.4. Unbalanced Live Loading

Unbalanced live loading criteria will be applied in situations where such loading results in greater demands on members or connections compared to balanced load conditions.

3.5. Concentrated Live Loads

Floors will be designed to accommodate either the uniformly distributed live loads specified or the concentrated loads listed below, whichever results in higher stress levels. The concentrated load will be positioned to generate the maximum stress condition in the structural members.

- Stair treads: 300 lbs
- Office: 2000 lbs
- Guardrails, Handrails & Parapets: 200 lbs vertically or horizontally

For actual conditions generating concentrated loads exceeding those tabulated above, the structural components must be designed to withstand the higher loads.

3.6. Impact Load

Any mechanical equipment subject to vibration will have its load increased based on manufacturer guidelines for impact.

3.7. Snow Load:

- Ground Snow Load, Pg: 50 psf
- Min. Flat Roof Snow Load, Pf: 35 psf

- Snow drift resulting from building setbacks and changes in geometry will be calculated and incorporated into the design process.

3.8. Wind Load:

- Design Wind Speed: 134 mph
- Minimum downward Wind pressure: 16 psf
- Location is categorized under Hurricane- Prone Region

3.9. Seismic Load:

- Short Period Spectral Response Acceleration, Ss: 0.213
- 1.0 Sec. Spectral Response Acceleration, S1: 0.070
- Site Class: D (Assumed)
- Risk Category: IV
- Importance Factors: 1.5
- Sds: 0.214
- Sd1: 0.0928
- Long Period, T_L: 6
- Seismic Design Category: C
- Lateral Load Resisting System: Steel Not Specifically Detailed for Seismic Resistance
  - Response Modification Factor (R): 3.0
  - System Overstrength Factor (W0): 3.0
  - Deflection Amplification Factor (Cd): 3.0

3.10. Soil Loads

During the preparation of this report, a geotechnical investigation report was not available. Geotechnical parameters, including but not limited to lateral earth pressure coefficients, allowable soil bearing pressure, seismic soil site class, seismic site coefficient, sliding soil coefficient, groundwater level, and frost depth, will be obtained from a geotechnical investigation of the proposed building area.

4. Load combinations:

4.1. Load and Resistance Factor Design (LRFD): The strength design of the structures will adhere to the LRFD load combinations specified by either IBC 2021 or ASCE 7-16. The structural strength will be determined based on the appropriate critical combination of factored loads.

4.2. The serviceability requirements of the structural elements will be determined based on the critical ASD (Allowable Stress Design) load combination specified by either IBC 2021 or ASCE 7-16.

5. Deflection Requirements:

- The maximum deflection limit requirements of the structural elements will be determined in accordance with IBC 2021, Table 1604.3.
- The wind load deflection of the proposed building shall not exceed 1/400 of the total building height under service level wind loads for a 50-year return period event.
- Façade deflection criteria will be established in collaboration with facade consultants.

6. Material Specifications

6.1. Structural Steel

- Rolled wide flange shapes shall conform to ASTM A992, Grade 50.
- Hollow structural tubes shall conform to ASTM A500 GR. C, minimum yield strength 46 ksi.
- All connection materials and base plates shall conform to ASTM A572.
- Steel plates, angles and channels shall conform to ASTM A36.
- Anchor rods shall conform to ASTM F1554, Gr. 55, unless otherwise noted on drawings.
- Bolted connection shall conform to A325 or A490, type N bolts, except slip-critical bolts shall be used at lateral brace beam connections, and prestressed bolts shall be used at beams that support equipment vibrations.
- Headed shear stud shall conform to ASTM A108.
- All welded connections shall be made by approved certified welders and shall conform to AWS D1.1 E70XX.
- Structural steel shapes, plates and connections exposed to weather shall be hot-dipped galvanized.

6.2. Steel Metal Deck

- Roof deck shall be standing seam metal roof deck as designed by the metal building engineer, conforming to hot-dipped galvanized ASTM A653 SS Gr80 with G90 primer.
- Composite slab deck is assumed to be 3 ½'' NWC on top of 2" x 18-gauge deck conforming to ASTM A653 SS GR50 with G90 primer.

6.3. Concrete

All concrete shall have a minimum 28-day compressive strength as stated below:

- Concrete slab on metal deck: 4000 psi
- Footings, Foundation wall, Interior Slab-On-Grade: 4500 psi
- Exterior slabs, equipment pads, exterior curbs: 5000 psi
- Non-shrink nonmetallic grout: 7500 psi min.
- Portland Cement shall conform to ASTM C150, Type I or II

6.4. Concrete Reinforcing

- All reinforcing bars, ties and stirrups shall be ASTM A615 Grade 60 deformed bars.
- Welded wire fabric shall conform to ASTM A185, flat sheets.
- Reinforcing steel shall be uncoated and deformed.

6.5. Reinforced Masonry

The proposed building will have reinforced masonry in the shops, storage, and maintenance areas. The masonry material strength shall be as follows:

- Masonry blocks shall have a minimum of 1500 psi compressive strength.
- Concrete masonry units shall conform to ASTM C-90 or C-145 grade N-1.
- Mortar shall conform to ASTM C-270, type M OR S.
- Grout shall conform to ASTM C-476 fine or coarse with a minimum compressive strength of 3000 psi.
- Reinforcing bars shall conform to ASTM A 615 Grade 60 deformed bars. Typically, for non-bearing walls, (1) #5@32'' O.C. vertical and (2) #5@48'' O.C. horizontal will be used. All cells with reinforcement bars will be grouted.
- Knock out bond beams shall be located at 4'-0" on center minimum, and at the top of each level. Each bond beam shall be continuous and will likely contain (2) continuous #5 bars, fully grouted.
- CMU lintels shall be provided over masonry openings. Lintels shall be designed for length of opening.

CC: Nathan Seifert, PE

Town of Acton
New Public Works Facility
Schematic Design Package

Schematic Design Narrative

Architectural

November 2024

100 Foxborough Blvd., Suite 250, Foxborough, MA 02035
Tel: 508.698.3034

SCHEMATIC DESIGN NARRATIVE

Architectural

PROJECT: Acton, MA – Department of Public Works

FROM: Architectural Team

DATE: November 1, 2024

SUBJECT: Schematic Architectural Design Narrative

DESIGN CRITERIA:

Codes:

Massachusetts State Building Code, 780 CMR, 10th Edition:

State Amendments incorporated within the following base codes as listed below:

- 2021 International Building Code (IBC)
- 2021 International Mechanical Code (IMC)
- 248 CMR 10.00 Uniform State Plumbing Code (USPC)
- 2023 National Electric Code, NFPA 70 (NEC)
- Massachusetts Energy Code
  - 2021 International Energy Conservation Code (IECC)
  - Municipal Opt-in Specialized Energy Code provisions are applicable (appendix CC)
  - Refer to Energy Compliance & Sustainability narrative below
- 2022 Massachusetts Comprehensive Fire Code
  - 527 CMR, Board of Fire Prevention Regulations
  - NFPA 1 Fire Code, 2021 Edition
- 521 CMR, Architectural Access Board Regulations (MAAB)
- 271 CMR, Board of Examiners of Sheet Metal Workers

Americans with Disabilities Act (ADA) 2010 Standards for State and Local Government Facilities

Project Description:

The project involves the construction of a new Department of Public Works facility. The facility is intended to replace the existing DPW building constructed in 1970. The DPW performs important functions for the community, such as snow and ice removal, storm cleanup, road maintenance and repairs, emergency response and support for other town and state departments. The DPW is located on a large parcel of land that contains other town facilities, such as the waste transfer station, recycling center, fuel island and former landfill.

- Approximate building area: 46,910 SF +/-

- Anticipated Project Schedule:
  - Design: 2024 – April 2025
  - Bidding: Summer - Fall 2025
  - Construction: Start Fall 2025

- Specifics about the building:
  - Department of Public Works, fuel island, salt shed, transfer station, recycling center, and solar farm are to remain operational during duration of construction.
  - Phased construction is anticipated to allow for continuous DPW operations.
  - Building is designed to comply with the Acton Municipal Fossil Fuel Free Demonstration Program and the Municipal Opt-in Specialized Energy Code, and will also allow for future electrification of town vehicles and equipment.
  - Building to be a pre-engineered metal building assembly.

- Other items related to the project:
  - Salt Shed to have canopy addition provided.
  - The new fuel island system is not part of the project scope, but it is expected to be operational during construction of the DPW.

DESIGN NARRATIVE:

The proposed department of publics works facility consists of a non-separated "mixed-use" building program, including three (3) main operational components, as follows.

1. Use Group "B", Business: A one-story administration wing, consisting of employee support spaces (i.e. lunch/training room, men's & women's locker room etc.), directors' offices, shared administrative office, public service Counters and office support spaces.

2. Use Group "S-1" Moderate Hazard Use: single-story, double-height shop areas which have an associated open mezzanine space.

3. Use Group "S-2" Low Hazard Use: single-story, minimally heated vehicle & equipment storage garage area.

The building is steel framed with reinforced concrete slab-on-grade floors and steel deck and concrete slabs at the mezzanine levels. The building enclosure consists of a Pre-Engineered Metal Building (PEMB), with an insulated standing seam metal roof system, factory foamed in place industrial metal panel wall system, and CMU veneer on metal stud backup wall with an insulated CMU base wall. Aluminum-framed insulated

windows are provided at the administration wing, and translucent panel daylight systems are Incorporated into the wall panel system at the workshops and fleet maintenance and storage areas.

Specific code aspects of this building to note are as follows:

- A fluid storage room is provided with 1 hour rated fire barrier construction to store flammable / hazardous fluids used for the maintenance & repair of fleet vehicles. Quantities and types of fluids stored will not exceed the maximum allowable quantities per control area as noted in Table 307.1 (1).
- An exterior standby diesel generator, housed within a sound-attenuated enclosure, is sized to provide full operational power to the facility.
- The building is fully sprinkled per NFPA 13 requirements and will have an emergency voice/ alarm communication system.
- With exceptions of mezzanines, the building and facility are fully accessible and meet ADA/ CMR 521 Massachusetts Architectural Access Board (MAAB) Regulations.
- Exterior lighting to comply with Acton zoning review for “dark-skies” outdoor lighting.
- Refer to the Energy Compliance & Sustainability section below.

CONSTRUCTION PHASING

As a critical first-responder facility, the Department of Public Works is to remain operational 24/7 during duration of construction. A phased construction sequence is anticipated that will allow the DPW to maintain operations at the site at 14 Forest Road. Temporary disruptions to DPW operations must be carefully coordinated with the DPW Director.

Existing Conditions:

1. The DPW site consists of a large parcel that is shared with the town transfer station, recycling facility, solar farm, and fuel island, all of which are to remain operational during construction.
2. The DPW facility consists of a 19,000 SF building with offices, indoor vehicle storage, maintenance and workshop facilities, as well as a large salt shed, numerous bulk storage areas and Conex boxes, staff and visitor parking areas, and a fuel island.
3. The fuel island is currently being relocated to a new location on the property and is expected to be operational before the DPW project gets underway. The fuel island is used by other Town departments in addition to the DPW (fire, police, school). The existing fuel island location will be demolished upon completion of the new fueling station, including any mitigation for underground fuel tanks or contaminated soils.

Construction Phase 1:

1. The Town will remove any DPW components away from the proposed phase 1 Work Area, such as Conex boxes, bulk storage materials, storage sheds, vehicle parking. The existing DPW building will remain and stay operational, with the exception of a maintenance bay on the northeast corner.
2. DPW access to the salt barn and transfer station will be maintained, minor disruptions to be coordinated with the DPW Director.
3. With permission of the DPW Director, an area of the site adjacent to the transfer building or recycling facility may be designated as on-site parking for contractor’s vehicles, TBD.
4. Establish an enclosed Work Area to the northeast of the existing DPW building and to the north of the salt barn, with access gates for contractor’s personnel, equipment and

materials.

5. Existing utilities in Work Area 1 will be removed, and temporary trenching and utilities provided.
6. Construct utilities and related site components within Work Area 1.
7. Provide rough grading, related site work and noise reduction fencing in Work Area 1.
8. Construct the fleet maintenance area, fleet storage garage, wash bay and salt barn canopy.
9. Provide temporary protection for areas of the building that will be exposed to the weather until completion of Phase 3.
10. Provide paving to allow vehicle access to fleet maintenance and fleet storage garage.
11. Provide electrical outlets for temporary shops to be set up in fleet storage garage as part of Phase 2.
12. Obtain temporary occupancy permits for the fleet maintenance area, fleet storage garage, wash bay and salt barn canopy.

Construction Phase 2:

1. The Town will take occupancy of the vehicle maintenance area, fleet storage garage, wash bay and salt barn canopy constructed as part of Phase 1.
2. DPW access to the salt barn, transfer station and fuel island will be maintained, minor disruptions to be coordinated with the DPW Director.
3. The Town will vacate the existing DPW building.
4. The Town will remove the rooftop solar panels and related equipment.
5. Provide a 12' x 60' temporary trailer for DPW administration use, and a 12' x 60' temporary trailer for DPW employee use outside of Work Areas 2 and 3 to allow for DPW operations to continue.
6. Provide temporary fencing and gates to provide a Work Area for Phase 2.
7. Existing utilities in Work Area 2 will be removed or discontinued.
8. Set up temporary shops in fleet storage garage for use by DPW.
9. Demolish the existing DPW building, remove the debris from site, and regrade the area.

Construction Phase 3:

1. The Town will remove any DPW components away from Work Area 3, such as Conex boxes, bulk storage materials, storage sheds, vehicle parking.
2. DPW will maintain access to the vehicle maintenance area, fleet storage garage, wash bay and salt barn canopy constructed in Phase 1, as well as to the salt barn, transfer station and fuel island. Minor disruptions to access to be coordinated with the DPW Director.
3. Provide temporary fencing and gates to provide a Work Area for Phase 3.
4. Existing utilities in Work Area 3 will be removed, and temporary trenching and utilities provided, coordinate with utility work completed during phases 1 and 2.
5. Construct utilities and related site components within Work Area 3.
6. Provide rough grading and related site work in Work Area 3.
7. Construct the workshop areas, and office/staff areas.
8. Construct parking, sidewalk and pavement areas.
9. Provide new plantings and site features.
10. Remove temporary fencing and gates as necessary; remove temporary trailers provided as part of Phase 2.
11. Provide occupancy permit for entire DPW facility and turnover to Town.

ENERGY COMPLIANCE & SUSTAINABILITY

Code reference: MA 2023 Energy Code (IECC 2021) and Municipal Opt-in Specialized Energy Code will apply for Acton, MA.

Location of the project: Zone 5A - Middlesex County - Table C301.1,

MassSave Program:

1. The Town of Acton has signed a Memorandum of Understanding with MassSave to provide a Path 1 Zero Carbon & Low Energy Use Intensity building. The intent of the program is to encourage utility customers to pursue fully decarbonized building solutions with a sustained focus at the site on low Energy Use Intensity (EUI), from early design through post occupancy.
2. Path 1 is a performance-based participation pathway, final utility customer incentives are based on the building's post occupancy site EUI.
3. While the MassSave program is a zero-carbon incentive offer, utility customers are not required to install solar or purchase renewable energy offsets to participate. The Town may enter a third-party lease agreement for a rooftop or on-site photovoltaic panel array, or purchase solar panels if IRA incentives are available, upon completion of the construction.
4. The GC will need to coordinate with the Town, MassSave, the Designer and Energy Consultant, regarding Specialized Municipal Energy Code compliance and on-site Energy Use Intensity (EUI) calculations, especially post-occupancy, to insure compliance with the MassSave program.
5. Electric utility provider: Eversource.

LEED Silver Certification is an option the Town is considering.

The Town is also considering a Rainwater Collection System to use for vehicle wash operations.

Municipal Fossil Fuel Free Demonstration Program:
The Town of Acton has adopted the "Regulating Fossil Fuel Infrastructure in Buildings" bylaw to protect building occupants, residents, and the natural environment, and to reduce air pollution and greenhouse gas emissions. The bylaw is intended to require construction projects to participate in the Municipal Fossil Fuel Free Building Construction and Renovation Demonstration Project as defined in 225 CMR 24.00 (the "Demonstration Project").

The building will also be designed to accommodate the following features:

- Sub-metering of electric service for monitoring energy use.
- Conduit for future component electrification (future equipment and vehicles).
- Electric vehicle parking spaces (20% of on-site parking).
- Building roof to be designed to support future PV solar panel array.

Per the HVAC Narrative: The building is designed to comply with 225 CMR 23 CC101.3.2 All-Electric Pathway. 225 CMR 23 CC104.1.1 has been chosen as the optional compliance path.

Furthermore: Per 225 CMR 23 C401.2.4 Mixed Use Buildings, the building's energy code compliance path will C401.2.1 Prescriptive and Performance Compliance path with each use type evaluated separately. As such the following spaces will comply with the following code sections:

- 225 CMR 23 C.401.2.1.1 Prescriptive Compliance. The Administration Suite, Vehicle Maintenance, various Workshops, and the Fluids and Parts Storage rooms are each less than 20, 000 SF and will comply with 225 CMR 23 C.401.2.1.1 Prescriptive Compliance.
- 225 CMR 23 C401.2.1.3 Relative Performance Compliance. The Vehicle Storage Garage is over 20,000 SF and will comply with 225 CMR23 C401.2.1.3 Relative Performance Compliance.

The following are the proposed maximum U values for the building (per state energy code):

OPAQUE THERMAL ENVELOPE ASSEMBLY VALUES

Material	U-Value	Remarks
Mass Wall	0.090	
Metal building roof	0.035	Provided by PEMB
Metal building walls	0.050	Provided by PEMB
Attics	0.021	
Metal framed walls	0.055	
Unheated slabs	F-0.52	
Heated slabs	F-0.62	
Swinging doors	0.37	
Garage door <14% glazing	0.31	> 14% glazing use Fenestration Values

FENESTRATION VALUES

Material	Maximum Allowed – U-Value	Remarks
Skylights	0.5	
Vertical Fenestration	0.7	Triple pane low-E glazing

END

Town of Acton
New Public Works Facility
Schematic Design Package

Schematic Design Narrative

Fire Protection

November 2024

100 Foxborough Blvd., Suite 250, Foxborough, MA 02035
Tel: 508.698.3034

SCHEMATIC DESIGN NARRATIVE

Fire Protection

PROJECT: Acton, MA DPW – Acton Department of Public Works

FROM: Fire Protection Team

DATE: October 2024

SUBJECT: Schematic Fire Protection Design Narrative

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1. PROJECT INFORMATION:

The new Acton Department of Public Works (DPW) facility is located at 14 forest Road, Acton, MA 01720. This building comprises administration spaces, including employee support areas (locker rooms, lunch/training rooms, etc.), offices, fleet storage, fleet maintenance, and wash bays. All areas within the building will be equipped with fully code-compliant fire sprinkler systems, installed in accordance with the Massachusetts Building Code and Massachusetts General Law.

This schematic design narrative, prepared by Weston & Sampson Engineers, Inc., serves as the foundation for the project's design. It outlines the anticipated scope at the schematic design stage, addressing systems extending up to ten (10) feet outside the building; however, site utilities are not covered in this document. The sprinkler system will be installed following NFPA 13 requirements.

A dedicated fire protection room will be located in the southwest corner of the fleet storage area. The final room location will be determined in the next design stages, based on the project phases and sprinkler piping routing. This room will be heated and conditioned to comply with both the Massachusetts Building Code and NFPA 13 standards. A new fire service connection will be extended from the town's water main to the fire protection room. The room will be equipped with a backflow preventer (Double Check Valve), two wet alarm check valves, and one dry alarm check valve. One wet alarm check valve will serve the sprinkler coverage for the administration area, the second wet alarm check valve for the workshops and wash bays, and the dry alarm check valve for the vehicle storage area.

Based on the historical flow test data received, it is currently assumed that the existing water main provides sufficient flow and pressure to meet the sprinkler system's demands, eliminating the need for a fire pump. However, an updated flow test will be conducted in the next design stage to validate this assumption.

2. CODES:

- Massachusetts State Building Code, 780 CMR, 10th Edition
- Massachusetts 527 CMR 1.00, 2021 Edition (State of Massachusetts Fire Safety Code).
- NFPA 1 - Fire Code
- NFPA 13 - Standard for the Installation of Sprinkler Systems
- NFPA 24 - Standard for the Installation of Private Fire Service Mains and Their Appurtenances

3. DESIGN BASIS:

a. Hazard Classification:

- Light Hazard: Such as corridors, bathrooms, office space, and locker rooms.
- Ordinary Hazard Group 1: Storage (less than 8'), and wash bay.
- Ordinary Hazard Group 2: Storage (up to 12'). Vehicle storage, and vehicle maintenance area.
- Extra Hazard Group 1: Fluid Room.
- It must be ensured that no areas of storage exceed 12' and that no combustible material is stored in excessive quantities.

b. Minimum Density for Automatic-Sprinkler:

- Light Hazard: 0.15 gpm over 1500-sq. ft.
- Ordinary Hazard Group 2: 0.2 gpm over 1500-sq. ft.
- Extra Hazard Group 1: 0.3 gpm over 2500-sq. ft. (The room design method can be used during the design stage in accordance with NFPA13 requirements)
- Total Combined Hose-Stream Demand Requirement: According to NFPA 13 unless otherwise indicated.

c. Maximum Protection Area per Sprinkler:

- Light Hazard: 225 sq. ft.
- Ordinary Hazard: 130 sq. ft.
- Extra Hazard: 100 sq.ft.

4. WATER SERVICES:

The 6" proposed fire protection water service shall be independent of the domestic water service line and be extended from the water main and enter separately into the two fire protection rooms through the floor slab. The new water service shall be AWWA C151 class 52 double cement lined, piping shall be UL listed and FM approved for fire service. Mechanical joint ductile-iron fittings shall be AWWA C110, ductile-iron standard pattern or AWWA C153, ductile-iron compact pattern. All joints shall be furnished with ductile retainer glans, flanges shall meet ASME 16.1, cast-iron, class to match pipe class rating. A through wall post indicating valve shall be provided, with fire department connection (FDC) and backflow preventer test drain. Hydrant locations shall be reviewed, if a hydrant is not located between 50' and 150' from the facility a new hydrant shall be provided to comply with NFPA 24.

5. DOUBLE CHECK ASSEMBLY:

A UL listed, FM approved double check valves assemblies shall be provided with outside stem and yoke (OSY) resilient seated gate valves. The backflow preventer shall be in the fire protection rooms with code compliant clearance access to both the front and rear of the valve assembly.

6. FIRE DEPARTMENT CONNECTION:

A four-inch (4") grooved galvanized pipe header with galvanized fittings shall be installed in the fire protection rooms. It is assumed that one exterior Storz Fire Department Connection (FDC) will be used during the design stage; however, the final decision for the (FDC) type shall be made after coordinating with the local fire department. Signage shall be provided in accordance with NFPA signage requirements.

7. WET PIPE SPRINKLER SYSTEM:

A wet sprinkler pipe system shall be provided where the heating is sufficient to keep the temperature in the space above freezing temperature (32 F). The fire protection room will be provided with two wet alarm check valves. One check valve will serve the admin space and the other one for the vehicle maintenance bays. Wet pipe sprinklers shall be quick response type, UL listed, and FM approved for their proper application. Pipe size equal or less than NPS 2, shall be Schedule 40 with threaded fittings. Pipe size NPS 2.5 to NPS 6 shall be Schedule 10 with grooved fittings, piping components shall be listed for 175 psig minimum working pressure. Valves shall be UL listed and FM approved, zone valves shall be indicating type butterfly valves with electronic supervision, fittings shall be ductile-iron, cast-iron flanges or grooved joint, with a 175-psig minimum pressure rating. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213, rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts. The alarm valve shall meet UL 193 and include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure and gages. Inspectors test connections will be provided at each zone. Sprinklers shall meet UL's Fire

Protection Equipment Directory listing or Approval Guide published by FM Global listing. Water flow indicators shall meet UL 346, shall be electronically supervised, paddle operated, with 250 psig pressure rating, and shall be able to be installed in the horizontal and vertical positions.

8. DRY PIPE SPRINKLER SYSTEM:

The dry system will be utilized in the vehicle storage garage. A UL-260 approved dry sprinkler valve with a nitrogen generator, and appurtenances shall be provided in the fire protection room. The nitrogen generator shall come with an integrated or separate air compressor that can restore the system pressure in less than 30 minutes. Pipe size equal to or less than NPS 2, shall be Schedule 40 with threaded fittings; pipe size NPS 2.5 to NPS 6 shall be Schedule 40 with grooved fittings. Valves shall be UL listed and FM approved. Sprinklers shall meet UL's Fire Protection Equipment Directory listing or Approval Guide published by FM Global listing. Sprinklers shall be UL listed quick response type. Dry pipe valve shall have a low/high supervisory pressure switch that provides a supervisory signal when the air/nitrogen pressure within the system is out of the design ranges that is required by NFPA13 and manufacturer instructions.

9. STORAGE AREA SPRINKLER COVERAGE:

Storage sprinkler coverage shall comply with NFPA 13. Individual areas shall be reviewed during design development phase, review shall include but not be limited to hazard and commodity classifications, density of storage, shelving type, depth, height, and flue space in accordance with NFPA 13.

Town of Acton
New Public Works Facility
Schematic Design Package

Schematic Design Narrative

Electrical

November 2024

Weston & Sampson
100 Foxborough Blvd., Suite 250, Foxborough, MA 02035
Tel: 508.698.3034

Schematic Design Narrative Electrical

TO: John Comeau

FROM: Daniel Hill, E.I.T.

DATE: 09/27/2024

SUBJECT: Schematic Electrical Design Narrative for Acton Department of Public Works

Referenced Codes & Standards

- The Massachusetts State Building Code, Tenth Edition
  - 2021 International Building Code
  - 2021 International Mechanical Code
  - 2021 International Energy Conservation Code
    - 2023 225 CMR 23.00 Massachusetts Stretch Energy Code
- The 2023 National Electrical Code (NEC) with Massachusetts Amendments
- NFPA 101 - Life Safety Code

Energy Code Compliance

- The Town of Acton has adopted the Municipal Opt-In Specialized Code 2023. The building will be designed under 225 CMR 23 CC101.3.2 All-Electric Pathway with 225 CMR 23 CC104.1.1 chosen as the optional compliance path.

- New parking spaces shall provide EV Ready Spaces in accordance with 225 CMR 23 Table C405.13 EV-Ready Space Requirements. A minimum of 20% of new parking spaces shall be equipped with 40-amp or larger branch circuits.

- Electrical loads shall be parceled out between mechanical, lighting, and general loads for separate metering and monitoring in accordance with the 2021 International Energy Conservation Code.

Distribution

- The building will be served by an 800A, 480/277V 3phase, 4-wire switchboard which will house the breakers to serve the large mechanical and trade equipment, wash bay, and vehicle maintenance and storage areas as well as breakers to feed localized branch circuit panelboards.

Emergency Distribution

- A new exterior diesel fired standby generator will be provided to provide 100% backup power to the facility. This generator will be sized at 300kW and located in an exterior sound attenuated enclosure. The new generator will feed into the system via an automatic transfer switch located in the main electric room.

Site

- Power and communications are anticipated to be connected to services along the existing DPW driveway extending from Forest Road via an underground concrete encased ductbank system.
- Exterior illumination shall be provided utilizing building mounted light fixtures, supplemented with pole mounted LED lighting fixtures with full cut-off. Additional wall mounted lights shall be provided at all exterior doors to meet building code egress lighting requirements. Exterior emergency lighting shall be by LED emergency drivers within the fixtures to provide the required emergency illumination from the building to the public way. Exterior fixtures shall be controlled from the lighting control system. Fixtures shall be provided with bi-level switching allowing a reduction in light level at a pre-determined late hour.

Administration and Admin Support / Employee Facilities Areas

- Spaces shall include communication support infrastructure including back boxes and raceways (conduit) throughout the space to facilitate installation of voice/data wiring. Locations and quantities shall be as determined by the Town. Raceway shall extend from the back boxes through the wall cavity up to the ceiling space above. The raceway shall be turned toward the center of the room and shall be terminated with an insulating bushing. All wiring will be run in cable trays or J-hooks from a dedicated telephone / data room to each drop. Provisions for a wireless system shall be incorporated into the building accordingly.
- In general, lighting in business areas of the facility shall consist of LED recessed fixtures. Fixtures shall be placed parallel to the exterior wall. The row of fixtures closest to the window shall be provided with ambient light sensors and dimming ballasts allowing that row of fixtures to dim or brighten based upon the amount of day light entering the space. Occupancy sensors shall control the on-off function of the lights. Switching shall be provided to override the 'on' function of the fixtures allowing manual off setting of the lights and to allow for multiple light levels or in the event of a desire to have the fixtures off. Spaces shall be provided with emergency fixtures. Emergency fixtures shall be equipped with LED emergency drivers. Quantity of fixtures wired to emergency distribution system shall maintain 1 foot-candle (FC) average during emergency operation. Corridors shall be provided with wall mounted linear indirect fixtures. Required fixtures to provide emergency illumination shall be connected to the emergency distribution system. The corridor fixtures shall be controlled by area occupancy sensors with override control via the Building Management System (BMS). Toilet rooms shall be provided with recessed LED Fixtures. At least one fixture in toilet rooms shall be wired to the emergency distribution system. Toilet room lights shall be controlled by area occupancy sensors.

Trade Shops

- Shop areas shall be provided with high output LED pendant mounted light fixtures with protective wire guards. Light fixtures shall be controlled by a room control system with manual override switches. Emergency fixtures shall be equipped with LED emergency drivers.
- Shops shall include a carbon monoxide (CO) and Nitrogen Dioxide (NO2) detection system to monitor the space and provide exhaust system override/activation and alarm

locally and to the direct digital control (DDC) system operator workstation(s) if space CO and /or NO2 levels exceed OSHA and ASHRAE Standard 62.1-2004 acceptable levels.

Vehicle Storage Area

- Vehicle storage area shall provide storage for large vehicles (dump trucks, front end loaders, backhoes, etc.), small vehicles (pickup trucks, 1 ton, etc.), and equipment (trailers, compressors, attachments etc. The minimum clearance to the underside of the structure and any mechanical/electrical/plumbing/fire protection systems shall be 16'-0".
- Vehicle Storage Area shall be accessible via overhead sectional doors and personnel doors. Overhead doors shall be electrically operated and shall include the following components:
    - Motor Operator:
    - Remote-Control Station: Momentary-contact three button control station with pushbutton controls labeled "Open", "Close", and "Stop.
    - Obstruction Detection Device: Photoelectric sensor and automatic safety sensor edge.
    - Limit Switches: Adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- Vehicle storage area shall include a carbon monoxide (CO) and Nitrogen Dioxide (NO2) detection system to monitor the space and provide exhaust system override/activation and alarm locally and to the DDC system operator workstation(s) if space CO and /or NO2 levels exceed OSHA and ASHRAE Standard 62.1-2022 acceptable levels.
- Vehicle Storage areas shall be provided with high output LED pendant mounted light fixtures with protective wire guards. Light fixtures shall be controlled by a room control system with manual override switches. Emergency fixtures shall be equipped with LED emergency drivers.

Additional Lighting System Requirements

- Utility and mechanical spaces shall be provided with chain mounted industrial LED light fixtures. Emergency fixtures shall be equipped with LED emergency drivers.
- Lighting controls will consist of occupancy sensors with manual override switches, room controllers connected to a lighting control system for shops, vehicle maintenance, vehicle storage and shops. Manual only controls will be provided in process/mechanical/electrical type spaces.
- Exterior lighting will consist of LED wall packs mounted to the building. Luminaries will be full cutoff type with no light output above 90 degrees. Fixtures will be controlled by integral photocell for dusk to dawn operation and tied into the lighting control system to meet the current energy code.
- The maintained foot-candle illumination levels will follow the values listed in the Illumination Engineering Society of North America handbook. Average lighting foot candle levels will be as follows.
    - Offices: 30fc.

- Conference Rooms: 30fc.
- Electrical, Mechanical, Storage Rooms: 30fc.
- Corridors, Stairwells, Restrooms: 15fc.
- Electrical, Mechanical, Storage Rooms: 30fc.
- Shop Areas: 50fc.
- Vehicle Maintenance Areas: 50fc.
- Vehicle Storage Areas: 20fc.
- Wash Bay: 50fc.

Project Phasing

- Phase 1: The existing electrical system shall be utilized to provide temporary power to the vehicle storage area.
- Phase 2: The existing electrical system shall be utilized to provide temporary power to the Modular Office and Employee Facilities Trailers.
- Phase 3: The new electrical system shall be energized and temporary power shall be removed.

Additional Considerations

- All spaces shall have voice and data capabilities.
- Fire alarm shall be a voice activated addressable system. All spaces shall be equipped with fire alarm devices.
- The building shall contain exit signage as necessary to direct occupants to the available egress locations of the facility. Exit signs shall be LED with self-contained batteries and charger.
- All spaces shall be equipped with the appropriate power to support the operations. Receptacles shall be in workspace and office spaces to serve the equipment located in those spaces. Locations shall be based upon the intended furniture/equipment arrangement. Corridors shall be provided with receptacles at intermediate locations to support floor-cleaning equipment. Toilet rooms shall be provided with a GFI type receptacle adjacent to the vanities. All spaces other than small closets shall be provided with at least one duplex receptacle. Maintenance bays shall be equipped with a minimum of 6 receptacles per bay in addition to specialty power required to support the industrial equipment. Trade shop areas shall be equipped with a minimum of 4 outlets per bay in addition to specialty power required to support trade shop equipment. Kitchenette areas shall be provided with necessary power to support the equipment installed.
- Provisions for roof-mounted solar panels and battery backup for solar.

Town of Acton
New Public Works Facility
Schematic Design Package

Schematic Design Narrative

HVAC

November 2024

100 Foxborough Blvd., Suite 250, Foxborough, MA 02035
Tel: 508.698.3034

SCHEMATIC DESIGN NARRATIVE

HVAC

PROJECT: Acton, MA – Department of Public Works

FROM: HVAC Team

DATE: October 2024

SUBJECT: Schematic Design Narrative – HVAC

INTRODUCTION

This schematic design narrative is prepared by Weston & Sampson Engineers, Inc. and shall be used in conjunction with the Structural, Architectural, Fire Protection, Plumbing, and Electrical schematic design documents. This document includes anticipated scope for the project as understood at the schematic design level. This document addresses systems to ten (10) feet outside the building. It does not address site utilities, surface layout and finishes, grading, planting, and irrigation.

PROJECT PROGRAM:

The new Department of Public Works Building will be located at 14 Forest Road in the town of Acton, MA and consists of a non-separated "mixed use" building program. The primary "mixed use" operational components are an Administration Suite, Vehicle Storage Garage, various Workshops, Fluids and Parts Storage rooms, a Vehicle Maintenance area, and miscellaneous Utility rooms.

- The Administrative Office / Employee Facilities area consists of private and open offices, conference rooms, a multipurpose room, and employee support spaces such as male and female locker rooms, a laundry room, kitchenette, file storage, and a copy and mail room, public service counter.
- The Vehicle Storage Garage will provide for semi-heated indoor storage of the Town's various vehicle types
- The Workshops include a highway, carpentry and trees and grounds workshops.
- The Parts and Fluid Storage will provide storage areas for various lubrication and non-fluid vehicle parts.

- The Vehicle Maintenance Garage is a comprehensive vehicle maintenance workspace.
- Miscellaneous Utility rooms are included throughout different areas of the facility.

The facility will be built in multiple phases with the first phase consisting of the Vehicle Maintenance Garage and the Fleet Maintenance Garage and Wash Bay. The first phase will be fully operational and in use while the remainder of the facility, including the Administrative Offices, Employee Facilities, and Workshop areas are constructed.

APPLICABLE CODES:

The Massachusetts State Building Code, 780 CMR 10th Edition

- 2021 IMC International Mechanical Code
- 225 CMR 23 Massachusetts Commercial Stretch Energy Code and Municipal Opt-In Specialized Code 2023
    - 2021 IECC International Energy Conservation Code with Massachusetts 225 CMR 23 Amendments

- ASHRAE Standard 62.1-2022 – Ventilation for Acceptable Indoor Air Quality
- ASHRAE Standard 90.1-2019 – Energy Standard for Building Except Low-Rise Residential Buildings
- ASHRAE 2021 Fundamental Handbook
- 2020 National Electric Code (NFPA 70)

Energy Code Compliance Pathway

The Town of Acton has adopted the Municipal Opt-In Specialized Code 2023. The building will be designed under 225 CMR 23 CC101.3.2 All-Electric Pathway with 225 CMR 23 CC104.1.1 chosen as the optional compliance path.

Furthermore:

Per 225 CMR 23 C401.2.4 Mixed-Use Buildings, the building's energy code compliance path will C401.2.1 Prescriptive and Performance Compliance path with each use type evaluated separately. As such the following spaces will comply with the following code sections:

- 225 CMR 23 C.401.2.1.1 Prescriptive Compliance. The Administration Suite, Vehicle Maintenance, various Workshops, and the Fluids and Parts Storage rooms are each less than 20, 000 SF and will comply with 225 CMR 23 C.401.2.1.1 Prescriptive Compliance.
- 225 CMR 23 C401.2.1.3 Relative Performance Compliance. The Vehicle Storage Garage is over 20,000 SF and will comply with 225 CMR23 C401.2.1.3 Relative Performance Compliance.

DESIGN CRITERIA:

Outdoor Design Conditions:

Hanscom AFB, MA, USA

- Summer: 90.8°F DB / 73.2°F WB
- Winter: 2.3°F DB

Source: Based on ASHRAE 2021 Fundamentals Handbook Summer/Cooling 0.4% DB/WB and Winter/Heating 99.6% DB. Weather Station – Hanscom AFB, MA, USA.

Indoor Design Conditions:

- Administration Area (Office space, conference rooms, locker rooms)
  - Occupied Temperature/Humidity Set Points
    - Cooling Season: 75°F DB (+/- 3°F) and 40%-60% Relative Humidity.
    - Heating Season: 70°F DB (+/- 3°F) and no humidity control.
  - Unoccupied Temperature/Humidity Set Points
    - Cooling Season: 85°F DB (+/- 3°F) and 40%-60% Relative Humidity.
    - Heating Season: 55°F DB (+/- 3°F) and no humidity control.
- Vehicle Maintenance, Workshops, Parts Storage, and Fluid Storage
  - Occupied Temperature/Humidity Set Points
    - Cooling Season: 76°F DB (+/- 3°F) and 40%-60% Relative Humidity.
    - Heating Season: 70°F DB (+/- 3°F) and no humidity control.
  - Unoccupied Temperature/Humidity Set Points
    - Cooling Season: 85°F DB (+/- 3°F) and 40%-60% Relative Humidity.
    - Heating Season: 55°F DB (+/- 3°F) and no humidity control.
- Vehicle Wash Bay
  - Occupied Temperature/Humidity Set Points
    - Cooling Season: No temperature or humidity control.
    - Heating Season: 60°F DB (+/- 5°F) and no humidity control.
  - Unoccupied Temperature/Humidity Set Points
    - Cooling Season: No temperature or humidity control.
    - Heating Season: 55°F DB (+/- 5°F) and no humidity control.
- Vehicle Storage
  - Occupied Temperature/Humidity Set Points
    - Cooling Season: N/A – normally unoccupied
    - Heating Season: 59°F DB (+/- 5°F) and no humidity control.
  - Unoccupied Temperature/Humidity Set Points
    - Cooling Season: No temperature or humidity control.
    - Heating Season: 55°F DB (+/- 5°F) and no humidity control.

- Mechanical Room, Plumbing/FP Room, Electrical Room

    - Occupied Temperature/Humidity Set Points
        - Cooling Season: N/A – normally unoccupied
        - Heating Season: 65°F DB (+/- 5°F) and no humidity control.
    - Unoccupied Temperature/Humidity Set Points
        - Cooling Season: 85°F DB (+/- 5°F) and no humidity control.
        - Heating Season: 55°F DB (+/- 5°F) and no humidity control.
- Tel/Data Room
    - Occupied Temperature/Humidity Set Points
        - Cooling Season: 72°F DB (+/-3°F) and 40%-60% relative humidity.
        - Heating Season: 72°F DB (+/- 3°F) and no humidity control.
    - Unoccupied Temperature/Humidity Set Points
        - Cooling Season: 72°F DB (+/-3°F) and 40%-60% relative humidity.
        - Heating Season: 72°F DB (+/- 3°F) and no humidity control.

Outdoor Air Ventilation:

The minimum outside air will be introduced as required by the greater of ASHRAE Standard 62.1-2022, International Mechanical Code 2015, or the requirement to make up exhaust air.

- Administration Area
    - Office spaces, Conference rooms
        - 5 CFM/Person
        - 0.06 CFM/SF
    - Corridors, Storage
        - 0.06 CFM/SF
    - Training Rooms
        - 7.5 CFM/Person
        - 0.06 CFM/SF
    - Locker Room
        - 0.25 CFM/SF (Exhaust)
- Vehicle Maintenance
    - 1 CFM/SF (Exhaust)
- Shops
    - 0.5 CFM/SF (Exhaust)
    - 0.75 CFM/SF (Exhaust Purge Mode)
- Vehicle Wash Bay
    - 1 ACH (Exhaust)
    - 0.75 CFM/SF (Exhaust Purge Mode)
- Parts Storage, Fluid Storage
    - 1CFM/SF (Exhaust)
- Vehicle Storage
    - 0.05 CFM/SF (Exhaust)
    - 0.75 CFM/SF (Exhaust Purge Mode)

- Mechanical Room, Plumbing/FP Room, Electrical Room
    - 0.12 CFM/SF (note: this value exceeds the required ventilation)
- Tel/Data Room
    - 0.06 CFM/SF

HVAC SYSTEMS:

Central Systems

Closed Loop Geothermal

The primary source of heating and cooling will be provided by a closed-loop geothermal field located on site. The geothermal field will provide for the source of both heating and cooling in each of the respective seasons. We are assuming a total of 30 wells for the schematic design. This total will be adjusted after a test well is installed and the geothermal capacity of the ground is determined.

The closed-loop Geothermal system will consist of multiple wells headered to a common supply and return pipe that will be pumped to the building mechanical room. The geothermal fluid will be 30% propylene glycol. Pumping for the geothermal fluid will be 2 base mounted variable speed centrifugal pumps located in the mechanical room. Geothermal fluid will be supplied to water-to-water heat pumps also located in the mechanical room.

Water-to-Water Heat Pumps

The water-to-water heat pumps will be sized at 50% of the building heating or cooling loads whichever is greater. The heat pumps will have N+1 redundancy and as such there will be three (3) heat pumps to provide for the heating and cooling needs of the building in the form of hot water for heating and chilled water for cooling.

Hot Water Systems/Chilled Water Systems

The hydronic distribution system will be a 2-pipe, 30% propylene glycol system. It will provide all the heating and cooling needs of the entire building with the exception of the building's electric room and tel-data rooms. Each heat pump will have a dedicated variable speed pump. The hydronic plant will operate in a primary secondary variable pumping configuration with two (2) variable speed base-mounted end suction system pumps. Spaces that are heating only will have normally closed hydronic isolation valves to prevent chilled water from entering heating only equipment when the system is in heating mode. Additional hydronic specialties will include a low flow system bypass with modulating 3-way control valve, expansion tank, air separator, flow meter, coupon rack, glycol feeder, and chemical shot feeder.

The heating hot water loop will be designed with a supply water temperature of 130°F and a return water temperature of 100°F. The chilled water will be designed with a chilled water supply

temperature of 44F and a return temperature of 56F. Both chilled water and hot water plant control will reset supply water temperature based on the outside air temperature. In addition, the controller will optimize the operation of the heat pump plant by staging and rotating the operation of each heat pump.

Building Management Systems

The HVAC systems serving the building will be controlled by direct digital control (DDC) building management system (BMS). The BMS will provide monitoring and control of the system from a remote access web-based interface.

A gas monitoring system will be installed to monitor, alarm, and control purge ventilation equipment located in the necessary building locations. The gas monitoring system will include carbon monoxide (CO) and nitrogen dioxide (NO_2) sensors installed as required in each space to provide complete coverage of the area. Each sensor will include a visual and audible indication if gas is detected above the programmed high limit. The sensors will be tied to the main gas monitoring system control panel which will interface with the BMS to control the HVAC equipment setup with a purge mode sequence of operation. Manual wind down times will be provided to allow for a manual temporary purge by operators for all spaces that have a purge cycle.

Administrative Suite

The administration area will be served by 2-pipe ducted fan coils and an indoor, semi-custom, energy recovery unit (ERU) to provide heating, cooling, and ventilation to the spaces. The ERU will be comprised of the following main components: variable speed supply fan, variable speed exhaust fan, a 2-pipe hot water/ chilled water coil, and a rotary energy recovery wheel. The energy recovery exhaust fan will be provided with the ERU to relieve the minimum ventilation air introduced during normal operation and during economizer operation. The ERU will be capable of 100% economizer operation and will be controlled based on the outdoor air enthalpy.

The ERU exhaust fan will serve the locker rooms, janitor closet, breakrooms, etc.

Additional systems will include exhaust fans and an electric unit heater serving the electrical room. The tel/data room will be served by a dedicated ductless split-system with a wall mounted indoor unit and a remote outdoor condensing unit (CU).

Vehicle Maintenance:

The vehicle maintenance area will be served by an energy recovery unit (ERU) and a radiant floor heating system. The ERU will provide neutral supply air temperature (space temp setpoint -2F) in the heating mode and will provide for the cooling of the space during the cooling season.

The ERU will serve the maintenance area, fluid storage room, parts storage, and secured tool storage. The ERU will be comprised of the following main components: variable speed supply fan, variable speed exhaust fan, non-cross contaminating air-to-air heat exchanger, and a 2-pipe heating/cooling coil. The

ERU will be sized to maintain the ventilation requirements of the space and will only operate during occupied hours. Supply ductwork will be installed exposed to the space with duct mounted supply grilles. Exhaust ductwork will be installed exposed to the space with duct drops along the perimeter walls to 12" above the finished floor. The exhaust fan in the ERU will operate in purge mode when triggered by the gas monitoring system. In addition, the vehicle maintenance area will be installed with source capture vehicle exhaust and hose reels.

The vehicle maintenance area will be heated by an in-floor radiant heating system. The radiant floor system will utilize hot water from the water-to-water geothermal heat pumps. It will be installed in multiple circuits along with control valves and/or pump to control water supply temperatures to the floor loop and maintain the space temperature during occupied and unoccupied hours. The radiant heating system will be hydraulically isolated in the cooling months.

The fluid storage, tool storage, and parts storage rooms will be served by dedicated exhaust fans and utilize ventilation air from the ERU as the source of make-up air. Hot water unit heaters will provide heat to these spaces. The vehicle maintenance office will be heated and cooled by a 2-pipe ducted fan coil and ventilated by a dedicated energy recovery ventilator (ERV).

Vehicle Wash Bay:

The vehicle wash bay will be served by a roof mounted heating and ventilating unit (HV). This unit will provide heat and ventilation to the space. The HV unit will be comprised of a variable speed supply fan and a hot water heating coil. Supply ductwork from the HV unit will be aluminum construction and be installed exposed to the space. The return ductwork will be aluminum construction and installed with duct drops along the perimeter of the space to 12" above the finished floor.

The wash bay will also be served by 2 roof mounted exhaust fans. The first exhaust fan will operate during normal operation to relieve outdoor air introduced to the space by the HV unit. The second exhaust fan will be installed to operate in purge mode triggered from the gas monitoring system. Ductwork from both exhaust fans will be aluminum construction and duct drops along the perimeter of the space to 12" above the finished floor.

Vehicle Storage:

The vehicle storage area will be heated by ceiling or wall mounted hot water unit heaters.

The vehicle storage area will be served by two exhaust fans. The first exhaust fan will be installed for normal operation to provide ventilation air to the space. The second exhaust fan will be installed to operate during a purge mode initiated by the gas monitoring system.

High volume low speed fans will be installed above the vehicle storage area to provide thermal comfort in the summer and shoulder seasons.

Workshops:

Each shop area will be served by an Energy Recovery Unit (ERU) to provide heating, cooling, and ventilation to the spaces. The ERU will be comprised of the following main components: variable speed supply fan, variable speed exhaust fan, non-cross contaminating air-to-air heat exchanger, and a 2-pipe heating/cooling coil. Supply duct work will be installed exposed to the space with high-throw, duct mounted, supply grilles to deliver air. Exhaust ductwork will be installed exposed to the space with duct drops along the perimeter walls to 12" above the finished floor. The exhaust fan in the ERU will operate normally to relieve outdoor air introduced to the space. The exhaust fan will operate in purge mode when triggered by the gas monitoring system.

Mechanical Room and Plumbing/Fire Protection Room:

The building utility rooms will be installed with hot water unit heaters to provide heat to the space. Ventilation will be provided with exhaust fans and an outdoor air intake roof hood or wall louver.

Town of Acton
New Public Works Facility
Schematic Design Package

Schematic Design Narrative

Plumbing

November 2024

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SCHEMATIC DESIGN NARRATIVE

PLUMBING

PROJECT: Acton, MA – Department of Public Works

FROM: Plumbing Team

DATE: October 2024

SUBJECT: Schematic Design Narrative – Plumbing

INTRODUCTION

This schematic design narrative is prepared by Weston & Sampson Engineers, Inc. and shall be used in conjunction with the Structural, Architectural, Fire Protection, HVAC, and Electrical schematic design documents. This document includes anticipated scope for the project as understood at the schematic design level. This document addresses systems to ten (10) feet outside the building. It does not address site utilities, surface layout and finishes, grading, planting, and irrigation.

PROJECT PROGRAM:

The new Department of Public Works Building will be located at 14 Forest Road in the town of Acton, MA and consists of a non-separated "mixed use" building program. The primary "mixed use" operational components are an Administration Suite, Vehicle Storage Garage, various Workshops, Fluids and Parts Storage rooms, a Vehicle Maintenance area, and miscellaneous Utility rooms.

- The Administration Suite consists of private and open offices, conference rooms, a multipurpose room, and employee support spaces such as male and female locker rooms, a laundry room, kitchenette, file storage, and a copy and mail room, public service counter.
- The Vehicle Storage will provide for semi-heated indoor storage of the Town's various vehicle types.
- The Workshops include a highway, carpentry and trees a& grounds workshops.
- The Parts and Fluid Storage will provide storage areas for various lubrication and non-fluid vehicle parts.
- The Vehicle Maintenance area is a comprehensive vehicle maintenance workspace.
- Miscellaneous Utility rooms

APPLICABLE CODES:

- The Massachusetts State Building Code, 780 CMR, 10th Edition
  - 2021 International Energy Conservation Code (IECC)
  - 2021 International Mechanical Code
- 248 CMR 10.00 Uniform State Plumbing Code
- 522 CMR 7.00 Air Tanks

DESIGN CRITERIA:

The DPW will include complete code compliant plumbing systems. The plumbing systems will be designed to support the architectural layout including fixtures and equipment. The plumbing systems will be designed at the DPW to include domestic hot and cold water, non-potable cold water, tempered water, recirculated hot water, storm drainage, sanitary drainage and venting, oil waste drainage and venting, and compressed air systems.

DOMESTIC WATER SYSTEM DESCRIPTION:

The new domestic water service shall be extended from the water main on Forest Road and enter the facility in the FP/Plumbing room to a water meter, this work shall be done by the general contractor and the utility. Plumbing work shall start after the utility water meter where a new reduced pressure principal backflow preventer, pressure reducing valve (if required) shall be installed. Domestic cold water shall be distributed throughout the new DPW facility as required to support the plumbing fixtures as shown on the Architectural Drawings.

A heat pump style hot water heater system shall be provided and located in the mechanical room. Hot water distribution and recirculation loops shall be distributed throughout the new DPW facility as required to support the plumbing fixtures shown on the Architectural Drawings. Domestic water equipment, piping and supporting appurtenances shall in installed in accordance with 248 CMR 10.00 Uniform State Plumbing Code. Isolation valves and drain valves shall be provided at each riser.

Submeters can be supplied on the domestic water supply, hot water supply and industrial water supply to meter the water supply to the various systems.

PLUMBING FIXTURES:

Plumbing fixtures will be supplied in sufficient quantity to meet or exceed the requirements of the Plumbing Code.

High efficiency fixtures will be provided with the Water Sense label if available.

Water Closet: Dual flush 1.1/1.28 (gallons per flush) GPF water saver, wall hung siphon jet type. Water Sense labeled.

Urinal: Wall hung 0.125 GPF. Water Sense labeled.

Lavatories: To be furnished with 0.35 GPM restricted flow faucets receiving hot and cold water supplies. The faucet operation will have a maximum flow duration of 30 seconds. Water Sense labeled.

Showers: 1.5 GPM water saver. Drains, showerheads, and thermostatic balance pressure type mixing valves will be provided. Water Sense labeled.

Mop receptors: Stainless steel with hose-end type faucet, complete with vacuum breaker and 0.7 GPM restricted flow faucets.

Break room sinks: Single basin with 0.5 GPM faucet.

Water hammer arrestors will be provided to absorb hydrostatic shock pressure in the domestic cold and hot water piping system.

SANITARY DRAINAGE SYSTEM DESCRIPTION:

The new sanitary drainage system shall be connected to a new septic system.

A new oil water separator (OWS) shall be provided to service the floor drains located in the vehicle storage, shop areas, vehicle wash bay. The OWS shall be provided and sized in accordance with 248 CMR 10.00 Uniform State Plumbing Code. Discharge from the OWS will be plumbed to a tight tank and will not be plumbed to the new septic system.

STORM WATER DRAINAGE SYSTEM DESCRIPTION:

Storm water drainage is not required as all the roof drainage will be via gutters and downspouts piped to a drywell.

COMPRESSED AIR SYSTEM DESCRIPTION:

Compressed air shall be provided by a rotary scroll air compressor. Compressor shall feature a VFD, refrigerated air dryer, inline filtration down to 0.1 micron and oil water separator. A 120-gallon storage tank shall be provided. The compressed air intake shall be ducted to the outside for increased compression efficiency. Heat rejected by the air compressor shall be directed either into the space or outside controlled by a thermostat.

Compressed air drops shall be provided in vehicle maintenance, the workshops, and vehicle storage. Each drop shall include a filter, regulator, and lubricator with a drip leg.

DOMESTIC COLD WATER PIPING DISTRIBUTION:

Domestic cold-water connections shall be provided to all fixtures and equipment in accordance with applicable codes, as required based on the Architectural drawings. Domestic water piping shall be hard copper tube, Type L, ASTM B88 with pressure fittings. Cold water make-up will be provided to HVAC equipment as required with backflow preventers as outlined in 310 CMR 22: The Massachusetts Drinking Water Regulations.

DOMESTIC HOT WATER PIPING DISTRIBUTION:

Domestic hot-water connections shall be provided to all fixtures and equipment in accordance with applicable codes, as required based on the Architectural drawings. Domestic water piping shall be hard copper tube, Type L, ASTM B88 with pressure fittings. Hot water shall be generated via water-to-water heat pump water heaters. The hot water system shall be sized to accommodate the plumbing fixture load and safety shower eyewash stations.

The water shall be stored in the hot water storage tank at 140°F. Check valves, vacuum breakers, heat trap, circulator pumps and expansion tank shall be provided at the hot water heaters. Mixing valves serving handwash sinks shall be tempered to provide maximum 105°F water in accordance with CMR 248 10.00 Uniform State Plumbing Code.

SANITARY DRAINAGE PIPING DISTRIBUTION:

A single 6" sanitary main will collect all sanitary waste stacks, exit the facility at the lowest level and discharge into a septic system. Sanitary waste and vent branch connections will be provided for all plumbing fixtures including toilets, lavatories, urinals, showers, floor drains in mechanical rooms and toilet rooms and drinking fountains. All toilet room waste/vent stacks shall be coordinated to avoid exposed waste piping at the finished ceiling. Vent stacks shall start at the lowest level and exit the facility at the highest point of elevation.

Floor drains/trench drains located in the vehicle storage area, workshops, and wash bay shall drain to an outdoor oil water separator piped to a tight tank.

All floor drains shall be provided with automatic trap priming devices.

EMERGENCY STATIONS/EYEWASH:

Emergency stations/eyewash stations shall be provided in the workshops, fluids rooms, and vehicle maintenance. The water supply shall be 65°F tempered water with re-circulation. A local tepid water mixing valve shall be provided at each safety station, eyewash and handwash sink throughout the facility. Audio and visual alarms shall be provided at each station that will be tied into the building management system in case of activation.

FACTORS YET TO BE DETERMINED:

There are several factors that could affect the plumbing design that have not yet been determined. They are including but not limited to below:

- Locations of utility penetrations into and exiting the building.
- Location of floor drainage and septic system.

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Schematic Design Package

Schematic Design Narrative

Septic System

November 2024

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ACTON, MA – NEW DPW FACILITY SEPTIC SYSTEM

As part of the schematic design for the new Acton, MA Department of Public Works (DPW) facility, proposed wastewater flows will be conveyed to a new on-site sewage disposal system (septic system). Typically, the projected wastewater flow for new DPW facilities is calculated by using the Commercial-Office Building criteria for design flow from Title 5 (310 CMR 15.000, the MassDEP State Environmental Code for septic systems).

Per the Office Building criteria, the design flow is 75 gallons per day (gpd) per 1,000 square feet (s.f.) of office/building space (minimum 200 gpd design flow). The area used for the design flow calculation only includes the office/administrative area of the proposed building (not including the workshop, vehicle maintenance, wash bay, etc. areas of the building).

Based on the draft schematic floor plan layout that was forwarded, the Administration Office & Office Support (yellow) and Employee Facilities (orange) areas are approximately 120 feet by 68 feet, or 8,160 s.f. The proposed design flow is calculated as follows:

Projected Wastewater Flow from the new DPW Facility

- 8,160 s.f./1,000 s.f. = 8.16
- 8.16 x 75 gpd = 612 gpd

Preliminary Septic System Design

Based on the available soil data, test pit and boring findings show poorly graded sand. Official test pits with the approving authority will be required to confirm the Title 5 Soil Textural Class, but for the purposes of this analysis it is assumed that the soils fall into Class I (Sands, Loamy Sands). The official testing will also confirm the percolation rate of the soils, however for the purposes of this analysis it is also assumed that the percolation rate is less than 5 minutes per inch.

Based on a Class I sol and a percolation rate of less than 5 minutes per inch, the effluent loading rate is 0.74 gpd/s.f. Using this rate and the design flow of 612 gpd for the proposed Action DPW septic system, the effective leaching area required would be as follows:

- 612 gpd/0.74 gpd/s.f. = 828 s.f. (required)

Assuming a conventional leaching trench configuration, with the reserve area trenches located between the primary area trenches – there are many different configurations that can be considered, depending on number of trenches, length and width. Assuming four (4) trenches, a sample leaching trench design would be the following:

- 35’ L x 2’ W x 2’ D = 210 s.f. effective leaching area x 4 trenches = 840 s.f. total (provided)

Per Title 5, when designed to serve facilities other than a single family dwelling unit, a two compartment septic tank (or two tanks in series) are required, with a minimum liquid capacity of 1,500 gallons. For a two compartment tank, the first compartment shall be sized for a minimum hydraulic detention time of 48 hours, and the second compartment sized for 24 hours (based on design flow). The compartments shall be interconnected by a vented, inverted U-shaped pipe (minimum 4-inch) that extends below the bottom of the scum layer of the tank, and the outlet tee of each compartment shall be equipped with a corrosion resistant gas baffle or effluent tee filter.

- First tank compartment (48-hour detention time): 2 days x 612 gpd = 1,224 gallons
- Second tank compartment (24-hour detention time): 1 day x 612 gpd = 612 gallons
- Required Tank Volume = 1,836 gallons
    - Go with a 2,000 gallon 2-compartment septic tank

Town of Acton
New Public Works Facility
Schematic Design Package

Schematic Design Narrative

Sustainability

November 2024

SD Sustainability Narrative

Detailed within this narrative is the Acton Public Works Facility's approach to sustainable design, construction, and operations. The project will consider formally pursuing LEED for New Construction (LEED-NC) v4 Silver certification or better. At minimum, the project will follow the intents and requirements established in the LEED rating system as appropriate for the project.

The Public Works Facility is a critical component of the town's emergency preparedness and response. Public Works employees may occupy the facility for 24 hours a day through storms when necessary. The health and wellbeing of employees working during extraneous circumstances is critical to the town's ability to maintain operations and infrastructure for its residents. As such, the facility will incorporate spaces and design strategies catering to the health and wellbeing of the employees occupying the space.

Section 01 – All-Electric & Net Zero Energy Facility

The town of Acton has opted into the specialized opt-in energy code and has its own fossil-fuel free mandate for town buildings in support of an aggressive net zero carbon emission target by the year 2030. As such, the Project will be an all-electric facility. It will be net zero energy via on-site renewable energy production (roof-top solar PV) and off-site renewable energy supply for the facility's electricity consumption. Energy loads will be reduced with high-efficiency mechanical systems, building envelope, and geothermal wells tempering the facility's heating, cooling, and hot water demand.

Section 02 – LEED

The following describes the general approach to sustainable design and construction following the USGBC's Leadership in Energy and Environmental Desig (LEED) version 4 rating system. The team will adhere to the most current requirements (LEED v4.1) credits where/when appropriate and beneficial to the project.

Location and Transportation (LT)

LT Credit 2 Sensitive Land Protection — 1 point 'Yes'

The Project will meet requirements by being located on previously developed land.

LT Credit 3 High Priority Site — 2 points 'Yes'

The Project will conduct a Phase I Environmental Site Assessment to determine the need for further investigation of soil contamination on the site (Phase II ESA). Remediation will be performed as necessary.

LT Credit 6 Bicycle Facilities (LEED v4.1) — 1 point as 'No'

The Project will facilitate alternative transportation in the form of short-term bicycle storage and changing facilities for building occupants. However, due to the lack of a demarcated bicycle network to and from the Project, this credit point is not anticipated to be achieved.

LT Credit 7 Reduced Parking Footprint (LEED v4.1) — 1 point 'Yes'

The Project will demonstrate a 30% reduction in total parking quantity from what the Institute of Transportation Engineers Parking Generation Manual, 5th Edition, deems an appropriate quantity for the land use type.

LT Credit 8 Electric Vehicles (LEED v4.1) 1 point 'Yes'

The Project will provide electric vehicle charging infrastructure for a minimum of 5% of total parking spaces. EV parking spaces will be clearly identified with signage or demarking and Electric Vehicle Charging Equipment (EVSE) will:

- Provide a Level 2 charging capacity (208 – 240 volts) or greater for each space.
- Comply with standards for electrical connectors SAE Surface Vehicle Recommended Practice J1772.
- Meet the connected functionality criteria for ENERGY STAR certified EVSE and be capable of responding to time-of-use market signals (e.g. price).

Sustainable Sites (SS)

SS Prerequisite 1 Construction Activity Pollution Prevention Required

The Construction Management firm will satisfy this requirement by conforming to the requirements o the 2012 U.S. EPA Construction General Permit as it pertains to erosion and sedimentation control.

SS Credit 1 Site Assessment 1 point 'Yes'

Through the design process, the Project's Architect, Civil Engineer, and Landscape Engineers will assess the site's topography, hydrology, climate, vegetation, soils, human use, and human health effects to inform the Project's design. Information will be compiled into a USGBC worksheet.

SS Credit 3 Open Space 1 point 'Yes

The project will consider providing vegetated outdoor space for non-vehicular, pedestrian use that is at least 30% of the total site area and of the open space, 25% will be vegetated if feasible. Facility operations (vehicular paving, etc.) will take priority and conflicts with the intent of this credit and available site area. The project currently complies with 33.3% that could be considered open space, and of which 100% is vegetated.

SS Credit 4 Rainwater management 2 points 'Yes', *1 point 'Maybe*

The project will capture and manage all rainfall that lands on site. Calculations by the Civil Engineer will confirm the capacity of the proposed rainwater infiltration system regarding the ability of the system to manage respective volumes of water from local 80th, 85th, or 90th percentile rainfall events.

The town has expressed interest in the potential capturing of rainwater for reuse for fleet vehicle washing at the wash bay. The Project team will explore the cost implications and anticipated system's capacity to offset potable water use for the town's consideration.

SS Credit 6 Light Pollution Reduction 1 point 'Yes'

The project's site lighting design will specify fully shielded LED pole fixtures to comply with the town of Acton's outdoor lighting bylaws, in accordance with the town's Dark Skies initiative. The facility will be in operation during night-time hours and will require sufficient lighting for safety purposes. For LEED compliance purposes, the project should reference light pollution limits associated with Lighting Zone 3 and not exceed the following BUG ratings, with preference for lower thresholds:

- Backlight of 4 or 5 depending on distance to project boundary
- Uplight of 3
- Glare of 2 or 3 depending on distance to project boundary

Water Efficiency (WE)

WE Prerequisite 1 Outdoor Water Use Reduction — Required

The project will not install a permanent irrigation system, thereby complying with mandatory outdoor water use reduction requirements.

WE Prerequisite 2 Indoor Water Use Reduction — Required

Through the specification of low flush and flow and high efficiency plumbing fixtures, the Project will reduce potable water consumption by at least 20% over the baseline calculated for the building per Energy Policy Act of 1992 fixture performance requirements.

WE Prerequisite 3 Building-Level Water Metering — Required

The project will install a permanent whole-building-level water meter and share consumption data with the USGBC for 5 years post-certification if formal certification is pursued.

WE Credit 1 Outdoor Water Use Reduction — 2 points 'Yes'

The project's exclusion of permanent irrigation qualifies it for 2 credit points.

WE Credit 2 Indoor Water Use Reduction — 2 points 'Yes', *4 points 'Maybe'*

Through the specification of low flow and high efficiency plumbing fixtures, the Project will implement water use reduction strategies that at a minimum result in a 25% reduction in potable water use annually when compared to EPA baseline fixtures for the building after meeting Energy Policy Act of 1992 fixture performance requirements.

WE Credit 4 Water Metering — *1 point 'Maybe'*

The project will consider the inclusion of water system sub-metering – the measurement and monitoring of water consuming sub-systems in the building - such as indoor plumbing fixture and fittings and domestic hot water, in the Design Development phase of the project. The inclusion of these sub-meters will represent an additional cost to the project and should be included only if the relevant data is of use to the Town.

Energy and Atmosphere (EA)

EA Prerequisite 1 Fundamental Commissioning and Verification — Required

A commissioning agent (CxA) will be engaged by the Town for the purpose of providing fundamental commissioning services for the building energy-related systems prior to the end of Design Development. The CxA will perform the scope of work required to comply with the prerequisite in accordance with ASHRAE Guideline 0-2005 and ASHRAE Guideline 1.1-2007 for HVAC & R systems.

The CxA will be independent of the project's design and construction management teams and will report findings to the Owner. The Owner's Project Requirements and the Basis of Design documents will be provided to the CxA for review.

The following systems will be included in the Commissioning scope of work, as applicable:

- Heating, ventilating, air conditioning and refrigeration (HVAC&R) systems
- HVAC controls
- Lighting controls
- Electrical systems
- Domestic hot water systems

- Plumbing and pumps
- Building Management System
- Renewable Energy systems

EA Prerequisite 2 Minimum Energy Performance — Required

The project can comply with requirements by either following a prescriptive path or a performance path via an energy model. At this time, an energy model will not be performed for LEED purposes until formal pursuit of LEED certification. However, due to the net zero energy goal, building use type, all-electric facility, with on-site roof top solar PV and geothermal wells with ground source heat pumps, the project is anticipated to perform very well against the minimum and optimized energy performance requirements and thresholds.

Additionally, the Project will comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1–2010, with errata, reduce connected lighting power density by at least 5% below ASHRAE 90.1-2010, and install Energy Star appliances for at least 50% of the total Energy Star eligible products in the project.

EA Prerequisite 3 Building-level Energy Metering — Required

The project will install permanent whole-building-level energy meters and share consumption data with the USGBC for 5 years post-certification if formal certification is pursued.

EA Prerequisite 4 Fundamental Refrigerant Management — Required

CFC based refrigerants will not be used in the Project's HVAC & R systems.

EA Credit 1 Enhanced Commissioning — 5 points 'Yes', *1 point 'Maybe'*

The project team will engage a commissioning agent who will utilize a collaborative approach with the project team to ensure the Owner's Project Requirements (OPR), developed in the first phase of the project, are followed, and achieved throughout the process. Design reviews will start as early as the basis of design and design development stage to verify compliance with the OPR, energy-efficiency goals, code requirements, and good engineering practices. A project specific commissioning plan will be developed and followed throughout the commissioning process. Activities shall include design reviews, submittal reviews, site inspections, project-specific commissioning schedule, commissioning meetings, functional testing, seasonal testing, a 10-month warranty inspection, and all other LEED Fundamental and Enhanced commissioning activities. The Project is also evaluating the possibility of pursuing the monitoring-based commissioning option.

Per LEED guidance, the Commissioning team will meet the requirements for all commissioning services as a third party independent Cx agent.

EA Credit 2 Optimize Energy Performance — 16 points 'Yes', *2 points 'Maybe'*

Refer to EA Prerequisite 2.

EA Credit 3 Advanced Energy Metering — 1 point 'Yes'

The Project will install energy meters on subsystems representing 10% or more of the total energy consumption of the Project. Further, the town of Acton will commit to sharing energy consumption data with the USGBC for a 5-year period, post-certification, if the Project proceeds to formally pursue LEED certification. The subsystems representing 10% of total energy consumption will be confirmed in Design Development and by the Project's energy model simulation results. Typically, space heating, space

cooling, hot water heating, fan power, lighting, and plug loads should be anticipated to potentially exceed 10% of total consumption and require sub-metering per LEED requirements.
The town of Acton has signed a Memorandum of Understanding to participate in the utility provider's New Buildings & Major Renovations, Path 1: Zero Carbon & Low EUI Building energy efficiency inventive program through Mass Save. A requisite element of program participation is the energy metering per the requirements of ASHRAE 90.1-2016 paragraph 8.4.3 related metering and data storage, and to provide post-occupancy data to the Sponsors of Mass Save at the end of an agreed-upon one-year post occupancy period. Program participation also requires that electric vehicle charging stations, on-site generation, and non-ancillary unconditioned spaces (fleet storage) be separately sub-metered or see the associated energy use be captured separately by the Energy Management System.

EA Credit 4 Grid Harmonization (LEED v4.1) *2 points 'Maybe'*
The Project will explore participation in a utility peak load shedding program, which incentivizes program participants to reduce energy consumption during peak demand events. However, the Project is targeting Net Zero Energy and a low energy profile to begin with. Coupled with the fact that the facility facilitates emergency preparedness for the Town, shedding energy loads when called upon to do so will likely prove challenging. LEED requires the ability to reduce energy demand by at least 10%, however the project will be looking to operate as low as possible to begin with.

EA Credit 5 Renewable Energy (LEED v4.1) 5 points 'Yes'
On-site renewable energy systems are planned for the Project. Rooftop solar photovoltaics will be installed, either new or a reuse of existing panels on the existing public works facility. Geothermal wells are proposed for the Project to reduce peak heating and cooling demand. The town of Acton is engaged in a community electricity aggregation program which will supply renewable energy for the remainder of the Project's consumption after accounting for on-site renewables. Based on Schematic Design PV-ready roof area (~30,000 SF) and building orientation and placement, it is estimated that a roughly 460 kW capacity roof-top array could generate around 515,000 kWh/year.

EA Credit 6 Enhanced Refrigerant Management *1 point 'Maybe'*
The HVAC equipment installed will target low-impact refrigerants that have low global warming and ozone depletion potential. Calculations will be run to confirm compliance once final equipment selections have been made and charged with refrigerant.

Materials and Resources (MR)

MR Prerequisite 1 Storage & Collection of Recyclables Required
Storage of collected recyclables will be accommodated in a designated recycling area for the Project. Recyclable materials collected will include mixed paper, corrugated cardboard, glass, plastics, and metals, and the safe disposal of batteries and electronic waste. The Project is located next to the town's transfer station and therefore will not require substantial storage space for recyclables within the Project.

MR Prerequisite 2 Construction & Demo Waste Management Planning Required
The Project will meet the requirements of this prerequisite by including a Construction Waste Management section in Division 1 of the project manual. The specifications will include direction for the construction manager to submit and implement a compliant waste management plan for the duration of construction. Waste diversion goals for the Project will include at least five materials targeted for diversion from landfill.

MR Credit 3 BPDO: Environmental Product Declarations (LEEDv4.1) 2 points 'Yes'

The Project will achieve this credit via Options 1 and 2. The technical specifications will include direction for the construction manager and their sub-contractors to provide and submit materials and products Environmental Product Declarations that conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope. The team will work to provide documentation for 20 different permanently installed (weighted) products sourced from at least 5 different manufacturers. Additionally, Option 2: Embodied Carbon/LCA Optimization will be targeted by using at least 5 products from three manufacturers that have a compliant embodied carbon optimization report or action plan separate from the LCA or EPD.

MR Credit 4 BPDO: Sourcing of Raw Materials (LEEDv4.1) 1 point 'Yes', *1 point 'Maybe'*

The technical specifications will include information for applicable products and materials to meet one or more of the following extraction criteria (as applicable): Extended producer responsibility, Bio-Based materials, FSC wood, Materials reuse, Recycled Content, and/or regionally extracted and manufactured (within 100 miles of the project site).

MR Credit 5 BPDO: Material Ingredients (LEEDv4.1) 2 credit points 'Yes'

The Project will pursue Option 1 and Option 2 for product and material disclosure, and by selecting products and materials with third party confirmation of reduced hazardous substances. The project manuals will include the information and direction for the construction manager and their subcontractors to provide and submit materials and products documentation identifying the chemical make-up. The documentation may be Health Product Declarations, Cradle-to-Cradle or Declare certification. The team will provide documentation for 20 different permanently installed (weighted) products sourced from at least 5 different manufacturers. To comply with Option 2: Material Ingredient Optimization, the Project will target the use of at least 5 products from 3 manufacturers that have a compliant material ingredient optimization report or action plan.

MR Credit 6 Construction & Demo Waste Management (LEEDv4.1)

1 point 'Yes', *1 point 'Maybe'*

The Project will meet the requirements of this credit by including a Construction Waste Management section in Division 1 of the project manuals. The specifications will include direction for the construction manager to attempt to divert a minimum of 50% of the demolition and construction waste generated on site from area landfills with at least three separate waste streams. On-site separation of waste will be prioritized as part of the strategy to meet this credit. A 75% diversion rate with at least 4 separate waste streams will be targeted for an additional point.

Indoor Environmental Quality (IEQ)

IEQ Prerequisite 1 Minimum IAQ Performance Required

The Project's mechanical systems will be designed to exceed the requirements of ASHRAE Standard 62.1-2010 sections 4 through 7. The MEP Engineer will complete a ventilation rate procedure (VRP) calculator to verify compliance for the Project. Outdoor airflow monitors will be included for ventilation systems.

IEQ Prerequisite 2 Environmental Tobacco Smoke Control (LEEDv4.1) Required

Smoking will be prohibited in the Project and within 25' of the building. Signage will be posted within 10' of all building entrances to indicate the interior and exterior no-smoking policy.

IEQ Credit 1 Enhanced IAQ Strategies 2 points 'Yes'

The Project will be designed to incorporate permanent entryway systems, properly enclose and exhaust chemical use/storage areas, and provide particle filtration media (MERV 13+) for supply air. Additionally, the Project will incorporate CO2 monitoring in densely occupied spaces.

IEQ Credit 2 Low-Emitting Materials (LEEDv4.1) 3 points 'Yes'

The Project will achieve this credit through meeting the compliance criteria for the following categories: interior paints and coatings, adhesives and sealants, flooring, ceilings, insulation, wall panels and composite wood. The Project intends to achieve at least 4 of these categories for 3 points, by selecting low VOC content and low VOC emitting products and materials.

IEQ Credit 3 Construction Indoor Air Quality Management Plan 1 point 'Yes'

The project manual will include direction for the Construction Manager to develop and implement an Indoor Air Quality Management plan in compliance with applicable control measures as stated in the SMACNA IAQ Guidelines for Occupied Buildings under construction 2nd Edition, 2007 ANSI/SMACNA 008-2008 Chapter 3. Additional measures will be implemented to ensure absorptive materials will be protected from moisture damage.

IEQ Credit 5 Thermal Comfort 1 point 'Yes'

The Project will design to mechanical systems to comply with ASHRAE Standard 55-2010 for thermal comfort and provide thermal controllability for at least 50% of regularly occupied spaces.

IEQ Credit 6 Interior Lighting 1 point 'Yes', *1 point 'Maybe'*

The project will provide individual occupant spaces with individual lighting controls that enable occupants to adjust the lighting to suit their individual tasks and preferences, with at least three lighting levels or scenes (on, of, midlevel). Midlevel 30% to 70% of the maximum illumination level (not including daylight contributions. All shared multi-occupant spaces will have multizone control systems that enables occupants to adjust the lighting to meet group needs and preferences, with at least three lighting levels or scenes (on, of, midlevel), lighting for any presentation or projection wall will be separately controlled, and switches or manual controls will be located in the same space as the controlled luminaires. Additionally, there are many lighting quality pathways that the Project will explore in Design Development to earn an additional point around lighting quality, such as designing lighting in regularly occupied spaces with a color rendering index of 90+ or to limit glare.

IEQ Credit 7 Daylight (LEEDv4.1) *3 points 'Maybe'*

A daylight simulation will be explored for the Project in Design Development. Once completed, these points will be adjusted accordingly.

Innovation (IN)

IN Credits 1-5 3 points 'Yes', *2 points 'Maybe'*

In Design Development, the project team will explore appropriate strategies that qualify as Innovation credits whether it be strategies not reflected above or in the applicable LEED rating system for New Construction projects, Exemplary Performance in applicable credits, or by pursuing compliance with new Pilot Credits.

IN Credit 6 LEED Accredited Professional 1 point 'Yes'
Many members of the team are LEED Accredited Professionals (APs).

Regional Priority (RP)

Regional Priority Credits (RPCs) are established by the USGBC to have priority for a particular area of the country. When a project team achieves one of the designated RPCs, an additional credit is awarded to the project. LEEDv4 RPCs applicable to the Acton area include: LTc2 Surrounding Density and Diverse Uses (4 points), LTc3 Access to Quality Transit (3 points), SSc2 Site Development – Protect and Restore Habitat (1 point), MRc Building Life-Cycle Impact Reduction (2 points), EAc Renewable Energy (2 points), and EAc Optimize Energy Performance (8 points).

The Project is currently tracking the following RPCs:

EAc Optimize Energy Performance 1 point 'Yes'
EAc Renewable Energy 1 point 'Yes'

Town of Acton
New Public Works Facility
Schematic Design Package

4. Appendix

November 2024

Town of Acton
New Public Works Facility
Schematic Design Package

Appendix A

Geotechnical Engineering Report

November 2024

October 28, 2024

John Comeau, AIA, LEED AP®
Weston & Sampson Engineers, Inc.
100 Foxborough Blvd., Ste 250
Foxborough, MA 02035

55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

RE: **Geotechnical Engineering Report**
Acton DPW
Acton, Massachusetts

Dear Mr. Comeau:

Weston & Sampson Engineers, Inc. (Weston & Sampson) is pleased to present our geotechnical engineering report for the proposed Acton Department of Public Works (DPW) facility located at 14 Forest Road in Acton, Massachusetts. Our project understanding is based on an October 4, 2024 drawing prepared by Weston & Sampson. Our services were completed in general accordance with the scope of services and fee document, revised July 9, 2024, titled "Town of Acton, MA Design, Bidding and Construction Administration Services for a New Department of Public Works Facility."

Information on the use of this report is provided in the document titled "Important Information about this Geotechnical Engineering Report" by Geoprofessional Business Association (GBA), Inc., as described in the Limitations section of this report.

EXISTING CONDITIONS

The Acton DPW facility is bounded by the Acton Transfer Station and photovoltaic solar array field to the south; wooded areas to the east and west; and Forest Road to the north, as shown on *Figure 1 – Locus Map*. Wetland areas are also present about 200 and 300 feet to the west and east, respectively. The existing facility includes a main building located in the central portion of the site with a footprint area of approximately 19,400 square feet (SF), an equipment shed to the northeast of the main building, a salt shed structure and storage shed structure located in the western portion of the site, a fuel island with associated underground storage tanks (USTs) southwest of the existing building, and several paved access roads and paved parking areas throughout, as shown on *Figure 2 – Site Plan*.

Existing grades throughout the central portion of the site are relatively level at about El. 190 and increase to the north and west up to El. 197. Portions of the site within the project area sloped up to about 2 horizontal to 1 vertical (2H:1V). Elevations provided herein are in feet and reference the North American Vertical Datum of 1988 (NAVD 88).

PROJECT UNDERSTANDING

The project includes construction of a new DPW main building covering a total footprint area of about 47,000 SF, as shown on *Figure 2*. Based on the October, 2024 drawing set, the new main building will include several administration offices, employee facility rooms, workshops, vehicle storage and maintenance areas, and a wash bay. The project also includes a new canopy structure, with a footprint area of about 2,700 SF along the northeastern side of the existing salt shed. We understand the new building will be constructed in phases and the existing main building and equipment shed will be demolished during the second phase. As part of a separate

project, a new fuel island will be constructed in the southeastern portion of the Site and the existing fuel island will be demolished.

Additional proposed features include new parking areas, sidewalks, landscaping, stormwater drainage and infiltration systems, septic tanks with leaching trenches, and the installation of geothermal wells to provide heating/cooling to the facility. Based on the October 2024 drawing set, the geothermal wells will be installed to the south of the proposed building and consist of GSHP vertical closed-loop well fields for a total of 28 wells.

We understand the finished floor elevation (FFE) of the new main building will at about El. 191, requiring cuts of up to 6 feet in the northern portion of the building and minor cuts and fills in the southern portion. The new canopy structure connecting to the existing salt shed will match the existing salt shed FFE at about El. 191, requiring cuts of up to 4 feet, including cuts of up to 4 feet against the existing wall of the salt shed structure.

Structural loading and design details were not available at the time of this report

SUBSURFACE CONDITIONS

Geologic Setting

Information from the Massachusetts Office of Geographic Information (MassGIS) and the United States Geological Survey (USG) "Surficial Materials Map of the Maynard Quadrangle" (2018) compiled by Janet R. Stone and Byron D. Stone, the site is located in an area of coarse deposits, composed predominantly of gravel and sand.

According to the 1983 "Bedrock Geologic Map of Massachusetts" by E-an Zen, bedrock at the site consists of Nashoba Formation and is composed of sillimanite schist and gneiss. Bedrock outcrops are not mapped near the site and were not observed during our site reconnaissance.

Previous Subsurface Explorations

Weston & Sampson previously performed explorations at the Acton DPW facility, consisting of borings and test pits, in August 2023. The explorations were performed as part of a new fuel island project located about 200 feet southeast of the project site. The borings were advanced to depths of 27 feet and the test pits were advanced to depths ranging from 7.5 to 10 feet. Subsurface conditions generally consisted of topsoil over native sand and silt to the depths explored. Groundwater was encountered in one of the borings at El 170.5.

Excerpts (e.g., exploration location plan, boring logs, and test pit logs) from the geotechnical engineering report are included in *Attachment A*.

Recent Subsurface Exploration Program

Subsurface conditions within the proposed DPW main building were recently explored on September 4 and 5, 2024 by advancing six borings (B-1 through B-6) up to depths ranging from 17 to 42 feet. The borings were completed by Geosearch, Inc. of Sterling, MA using a CME 55 all-terrain-vehicle (ATV) drill rig. Standard penetration tests (SPTs) were conducted in each boring by driving a split spoon sampler with an automatic hammer in general accordance with ASTM D1586. Following completion of drilling, the borings were backfilled with cuttings and, where borings were performed in paved areas, the surface was patched with asphalt cold patch.

Subsurface conditions were also explored on September 4 and 5, 2024 by advancing eight test pits (TP-1 through

TP-8) up to depths ranging from 7 to 10 feet. The test pits were completed by the Town of Acton DPW personnel using a medium-sized hydraulic excavator. Following completion, the test pits were backfilled with the excavated materials.

Weston & Sampson geotechnical engineering staff monitored exploration activities, measured exploration locations relative to existing site features, and prepared boring and test pit logs for each exploration. Approximate locations of the borings and test pits are shown on *Figure 2*. Copies of the boring logs along with the Guide to Subsurface Exploration Logs are included in *Attachment B* and copies of the test pit logs are included in *Attachment C*.

Encountered Subsurface Conditions

Subsurface conditions encountered in the recent explorations generally consisted of fill and subsoil over native sands. The subsurface conditions encountered in the borings were generally consistent with mapped surficial geology.

Subsurface soil and groundwater conditions described below have been interpreted based on a limited number of explorations that were observed by Weston & Sampson. Variations may occur and should be expected between locations. The strata boundaries shown in our boring and test pit logs are based on our interpretations and the actual transitions may be gradual. Refer to the boring logs included in *Attachment B* and test pit logs included in *Attachment C* for detailed descriptions of the soil samples collected. The general Unified Soil Classification System (USCS) designation(s) for each stratum is included in the descriptions below in parentheses. Depths provided below are relative to the existing ground surface at the time of drilling.

Surficial Materials – Surficial materials encountered in the borings and test pits generally consisted of asphalt concrete (AC) pavement or topsoil. Borings and test pits performed in paved areas encountered approximately 2 to 6 inches of AC pavement. Borings and test pits not performed in paved areas encountered approximately 1 to 9 inches of topsoil.

Fill – Medium dense to very dense fill was encountered below the surficial materials in each of the borings and test pits, except B-2, B-4, TP-1 and TP-3. Fill was encountered up to depths ranging from approximately 0.8 to 4.5 feet. The fill was generally comprised of sand or gravel with varying amounts of non-plastic fines (SM, SP, SP-SM).

Subsoil and Buried Topsoil – Buried subsoil and/or topsoil was encountered below the fill in four of the borings and test pits (B-3, T-4, TP-5, and TP-6) and extended up to depths ranging from approximately 2 to 3.5 feet. Subsoil was also encountered below the surficial topsoil in TP-1 and TP-3 and extended to a depth of approximately 1.8 feet. The subsoil generally consisted of sand with varying amounts of non-plastic fines and roots (SM, SP-SM)

Native Sand – Medium dense to very dense native sand was encountered below the fill, subsoil, or buried topsoil / subsoil in each of the borings and test pits. The sand was generally comprised of a SAND with varying amounts of gravel and non-plastic fines (SP-SP-SM, SM, and GP). Each of the explorations were terminated in the native sand layer.

Groundwater – Based on observations in sample moisture and water level readings taken after drilling, groundwater was estimated to be at depths ranging from 21 to 27 feet (El. 163 to El. 169).

We anticipate that groundwater levels will fluctuate with season, variations in precipitation, construction in the area, and other factors. Perched groundwater conditions could exist close to the ground surface, especially during and after extended periods of wet weather.

Laboratory Testing

Selected soil samples were submitted to Thielsch Engineering of Cranston, RI for laboratory grain size (ASTM D6913) testing to confirm field classifications and estimate engineering properties. Laboratory test results are included in the boring logs in *Attachment B* and the laboratory test results are included in *Attachment D.*

GEOTECHNICAL RECOMMENDATIONS

General

Based on the subsurface conditions encountered, shallow foundations are feasible for the proposed main building and canopy structure. A primary geotechnical consideration for construction of the proposed building and related site improvements is the presence of undocumented (i.e. non-engineered) fill , buried topsoil, and buried subsoil overlying the native sand. The native sand was encountered between El. 187.5 and El. 196.5 within the proposed main building and between El. 190.5 and 191.7 below the proposed canopy. The existing fill, subsoil, and buried topsoil are not suitable for support of structure foundations and other rigid site features due to risk of differential settlement from variations in thickness, consistency, compaction, and variable rates of compression of these materials. Additionally, the Massachusetts Building Code does not allow support of foundations on non-engineered fill.

We recommend supporting the proposed main building and canopy on spread footings with a slab-on-grade bearing on the native sand or on Structural Fill following removal of the topsoil, fill, subsoil, and other unsuitable soils, as determined by the engineer, from within the zone-of-influence (ZOI) beneath proposed structures and slabs down to the intersection with native, undisturbed soils. The ZOI is defined by a plane extending horizontally away from the bottom edges of footings and slabs a distance of 2 feet in all directions and then down and away at 1Horizontal:1Vertical (1H:1V) slopes. It is anticipated that excavations extending about 3.5 feet below proposed finish floor slab (El. 191) will be required.

Additionally, cobbles, boulders, and auger grinding were observed in several of the test pits and borings; therefore, difficult excavations should be anticipated during construction.

As undocumented fill has been identified during this geotechnical evaluation, environmental review should be considered to evaluate potential premiums, liabilities, or regulatory requirements which may result from soil management during construction.

Considerations and specific geotechnical recommendations for excavation, backfill materials, and temporary excavation support are provided below.

Shallow Foundations

Based on the subsurface conditions encountered in our explorations, the proposed structures can be supported by shallow spread footings bearing on undisturbed native sand or on Structural Fill directly overlying suitable native materials following removal of the existing fill, subsoil, and buried topsoil as described herein. Foundation subgrade preparation recommendations are provided below.

Footings founded as recommended herein can be designed using an allowable bearing pressure of 5,000 psf. The allowable bearing pressure can be increased by one-third to resist transient wind and seismic loads provided the vertical component of the resultant of all forces due to load eccentricities remains within the middle third of the footing.

Resistance to lateral loads can be obtained by a passive equivalent fluid pressure of 260 pounds per cubic foot (pcf), ignoring the top 12 inches of embedment, and by a footing base friction coefficient of 0.45. Passive pressure may be relied upon to resist lateral loads only if measures are in place to prevent future removal or disturbance of the soil in front of the footing. We recommend a minimum factor of safety of 1.5 when using sliding friction alone. A larger magnitude of movement is required to engage passive resistance than sliding friction. Therefore, a minimum factor of safety of 2.0 is recommended when using passive pressure in addition to friction to resist lateral loads. The resistance values discussed above are only applicable where the concrete for footings are either cast directly against undisturbed native soils or Structural Fill and that the trenches created for foundation construction are backfilled with properly compacted soil.

Foundations for proposed structures should be designed in accordance with the provisions of the current edition of the Massachusetts State Building Code (MSBC). Footings should be embedded at least 4 feet below the nearest proposed adjacent ground surface exposed to freezing. Interior foundation bearing surfaces not exposed to freezing can be embedded at least 18 inches below the lowest overlying floor slab elevation; however, these footings will likely require special frost protection measures if constructed during freezing conditions.

Shallow foundations constructed as recommended herein are anticipated to undergo total and differential settlements of less than 1-inch and ½-inch, respectively. The majority of foundation settlement is expected to occur during construction. We recommend that construction of settlement sensitive building elements such as dry wall and tiling be delayed as long as practicable to reduce the potential for damage due to post-construction settlements.

Seismic Design

Seismic site class is determined in accordance with the International Building Code (IBC) as adapted by the MSBC using a weighted average of SPT blow counts in the upper 100 feet of soil at a site. As our deepest exploration extended to a depth of 42.0 feet (B-3), our site class evaluation considered mapped surficial geologic conditions in the site vicinity (coarse deposits) and assumed SPT blow counts below a depth of 42 feet. Based on the results of explorations and analyses and depths of proposed structures, we recommend that the subject project be evaluated using parameters associated with Site Class D. The structural engineer shall determine the seismic site parameters (S_1 and S_s) based on the site location and site coefficients (F_a and F_v) based on the seismic site parameters and Site Class.

Liquefaction is the sudden drop in shear strength between soil particles that can occur in saturated, cohesionless soils as a result of ground acceleration during a seismic event. Liquefaction typically results in soil densification and subsequent settlement of overlying features and structures. Conditions most likely to contribute to liquefaction include a soil matrix containing loose, uniform medium to fine sand (poorly graded sand) below the groundwater table. Based on the soil and groundwater conditions encountered in our explorations, the risk of liquefaction induced structurally damaging ground deformations is low.

Slabs

Interior and exterior building and equipment slabs should bear on recompacted subgrades of native undisturbed sand or properly constructed Structural Fill overlying suitable native soils. Based on the subgrade preparation procedures recommended herein and the existing soil conditions, a modulus of subgrade reaction (k_{s1}) of 160 psi/in is recommended for slab design. The value for k_{s1} is for a 1 x 1 square foot area. This value should be adjusted for larger areas using the following expression:

$$Modulus\ of\ Subgrade\ Reacion\ (k_s) = k_{s1} * \left(\frac{B+1}{2B}\right)^2$$

Where:

k_s = Coefficient of vertical subgrade reaction for loaded area,
k_{s1} = Coefficient of vertical subgrade reaction for a 1 x 1 square foot area, and
B = width of loaded area in feet.

Concrete slabs on-grade should be supported on a minimum of 6 inches of clean, well graded, angular crushed stone with no more than 10 percent passing a #200 sieve placed between the prepared subgrade and concrete. If the underslab stone is saturated or trapping water, the water should be removed prior to slab placement.

Some flooring manufacturers require specific slab moisture levels and/or vapor barriers to validate the warranties on their products. A properly installed and protected vapor flow retardant can reduce slab moistures. If a vapor flow retardant is used, care should be taken not to trap moisture within the overlying crushed stone and floor slab concrete.

Drainage

Exterior ground surfaces should be sloped to drain away from all structures including walkways, pavements, and landscaping. Surfaces should also be sloped to drain away from slopes. Drainage elements such as catch basins or strip drains should provide drainage if sloping is not possible. Stormwater should not be discharged on or above slopes.

Gutters and drains should be tight-lined to a suitable erosion protected discharge and maintained as free-flowing. Cleanouts and redundant drain pipes are recommended.

EARTHWORK AND CONSTRUCTION CONSIDERATIONS

Site Preparation

Site preparation for earthwork and foundation construction should include removal of existing pavement, debris, and surficial organic and unsuitable (e.g. soft or disturbed) soils from within a 5-foot perimeter around all proposed structure, pavement, and fill areas. Explorations completed in existing pavement areas encountered up to 6 inches of AC pavement. Explorations within grassy areas encountered up to about 9 inches of surficial topsoil. Deeper stripping depths and removal of loose surficial organic soil should be anticipated in areas of landscaping, shrubs, and trees, such as in the northern portion of the proposed main building. Root balls from trees and brush may extend several feet and grubbing operations can cause considerable subgrade disturbance. In general, roots greater than 1-inch in diameter should be removed as well as areas of concentrated smaller roots. All disturbed material should be removed to undisturbed subgrade.

Excavations resulting from site preparation should be backfilled as recommended herein. Any existing utilities should be removed or properly abandoned using Structural Fill, controlled density fill (CDF), or grouting in such a manner to prevent voids.

Subgrade Preparation and Protection

Based on the subsurface conditions encountered in our explorations, stripping and subgrade preparation will likely expose fill and native sandy soils with variable amounts of cobbles, boulders, gravel and silt. Undocumented fill, organics, and loose or disturbed soils should be removed from within the zone-of-influence of all foundations and slab areas. Cobbles and boulders should be removed to a minimum depth of 1 foot below footing and slab subgrades.

Footing and slab subgrades in granular materials should be proof compacted with at least 5 passes by a minimum 12-ton smooth drum vibratory roller. All subgrades should be observed by Weston & Sampson prior to placement of fill, forms and rebar.

If subgrade preparation exposes existing fill in areas outside the zone-of-influence of proposed structures, slabs, and other rigid site improvements, it may be possible to leave the fill in place provided the thickness, composition, and stability of the fill is evaluated by the Geotechnical Engineer. If the fill can be left in place, the surface of the fill should be prepared by scarifying (ripping) the surface of the fill to a minimum depth of 12 inches and recompacting until dense and stable with several passes of a minimum 12-ton vibratory roller.

Soft and/or disturbed areas will require over-excavation and backfilling with compacted angular crushed stone or compacted structural fill. A geosynthetic separation layer between the excavation subgrade and crushed stone backfill may also be required. We recommend that a geosynthetic used for stabilization consist of a woven geosynthetic with an AOS of #70 to # 100 sieve, and a minimum puncture resistance of at least 120 pounds (such as Mirafi FW700 or equivalent).

Soils containing more than trace amounts of silt are highly susceptible to softening and disturbance by construction activity during wet or freezing weather. Subgrade protection should be the responsibility of the contractor and special precautions and protective measures appropriate for the weather and traffic conditions during construction should be used during earthwork and foundation construction to preserve the integrity of subgrades.

Construction traffic should not operate directly on subgrades. If the construction schedule allows, existing pavement areas can be used as staging areas but the existing asphalt concrete pavement section should not be expected to protect subgrades from concentrated heavy construction traffic.

A few inches of angular crushed stone can be placed and compacted at the base of footing excavations to protect subgrades from disturbance during construction and wet weather conditions. If foundation construction occurs during freezing conditions, insulating blankets, heaters, or other suitable measures should be employed to prevent foundation subgrades from freezing until the foundations are backfilled sufficiently to prevent frost from reaching the footing subgrades and penetrating beneath foundation elements.

Excavation Considerations

Excavation will be required for site preparation, foundation construction, utility construction, site grading, etc.

Groundwater is estimated to be from about El. 163 to El. 169; therefore, we do not anticipate the need for managing groundwater during construction. Surface water should be controlled during construction and prevented from eroding slopes and disturbing excavation and subgrade materials. Moderate to severe caving conditions should be expected where seepage is present.

Temporary excavation support will be required for excavation depths greater than 4 feet where sloping is not feasible. Temporary excavation support should be anticipated if excavations approach the zone-of-influence beneath existing footings, structures, site features, or property lines. Foundations and utilities should be designed and constructed so that excavations into zones of influences below footings are not required.

We recommend that the type and design of shoring systems be the responsibility of the contractor, who is in the best position to choose a system that fits the overall plan of operation. All excavations should be made in accordance with applicable OSHA safety regulations.

Trenches

Utility trench excavations should be completed as recommended above. Pipe bedding should be installed in accordance with the pipe manufacturers' recommendations. If standing water is present in the base of utility trench excavations, we recommend over-excavating the trench by 12 to 18 inches and placing trench stabilization material in the base. Trench stabilization material should consist of well-graded, crushed stone or crushed gravel with a maximum particle size of 4 inches and be free of deleterious materials. The percent passing the U.S. Standard No. 200 Sieve should be less than 5 percent by weight when tested in accordance with ASTM C 117. It may be necessary to include a filter fabric separation layer between the stabilization material and the bottom and sides of excavations.

Trench backfill above the pipe zone should consist of well graded, angular crushed stone or sand fill with no more than 6 percent passing a #200 sieve. Trench backfill should be compacted to 92 percent relative to ASTM D1557 and to 95 percent of maximum dry density as determined by ASTM D1557 within 2 feet of finished grades. Construction of hard surfaces, such as sidewalks or pavement, should not occur within two weeks of backfilling.

Fill Materials and Placement

We recommend the following fill materials be used for this project:

Structural Fill – Well graded sand and gravel with a maximum particle size of 4 inches and less than approximately 10 percent fines (such as MassDOT M1.03.0-type B Gravel Borrow or M2.01.7 Dense-graded Crushed Stone) are recommended for use as Structural Fill beneath proposed structures, within the zone-of-influence beneath foundations and behind below grade structures, and within two feet below pavements and sidewalks. Structural Fill should be placed in maximum 12-inch-thick lifts (measured prior to compaction) with each lift compacted to at least 95 percent of maximum dry density as determined by ASTM D1557 (modified Proctor) for the specific fill material.

Ordinary Fill – Well graded sand and gravel with a maximum particle size of 6 inches and less than approximately 20 percent fines (such as MassDOT M1.01 Ordinary Borrow) is recommended for use as Ordinary Fill beyond the zone-of-influence beneath foundations and below grade structures, and more than two feet below pavements and sidewalks. Ordinary Fill should be placed in maximum 12-inch-thick lifts (measured prior to compaction) with each lift compacted to at least 92 percent of maximum dry density as determined by ASTM D1557 (modified Proctor) for the specific fill material.

Crushed Stone - Crushed stone shall consist of durable crushed rock or durable crushed gravel stone, free from ice and snow, sand, clay, loam, or other deleterious or organic material. The crushed stone shall be uniformly blended and shall conform to the requirements provided in MassDOT Standard Specifications section M2.01.4. Crushed stone should be placed and compacted to a firm and unyielding condition with at least 4 passes of a vibratory compactor.

Reuse of On-Site Soils - Fill and natural soils excavated from the site meeting free of organics, contamination (including metals, VOCs, SVOCs, etc.), and other deleterious materials may be suitable for reuse as Structural or Ordinary Fill provided the grain size distribution meets the requirements provided above. Use of on-site materials as Structural or Ordinary Fill should be evaluated on a case by case basis during construction by the Geotechnical Engineer.

The moisture content of fill materials should be within 3 percent of the optimum moisture content. Moisture conditioning, if required, could consist of drying by scarification and frequent mixing in thin lifts during warm, dry conditions.

Density testing should be completed on each lift of fill during construction to confirm adequate compaction. In addition to density testing, we recommend that the fill lifts pass a proof roll using a fully loaded 10-wheel dump truck or equipment of similar size and weight and observed by the Geotechnical Engineer. In confined areas and where only hand-guided compaction equipment can be used, the lift thickness should be reduced to not more than six inches and the maximum particle size reduced to three inches.

Slopes

Soil slopes should be excavated with a smooth excavator bucket with the surface repaired if disturbed. Surface runoff should be routed so that it does not run down the face of the slopes. Erosion control is critical to maintaining all slopes and should be in place immediately after construction of all slopes. No outfalls or stormwater discharge points should be located on or above slopes. All slopes and excavations should be constructed in accordance with applicable OSHA and local safety standards.

Temporary slopes up to 10 feet high can be inclined up to 1.5H:1V provided no seepage or sloughing is present. Equipment should not be allowed to induce vibration or infiltrate water above the slopes and no surcharges should be located within 20 feet of slope crests. Temporary slopes should be expected to ravel somewhat, depending on weather conditions, soil conditions, seepage, and duration of exposure. Soft or loose fill soils and the presence of seepage may require flatter slopes, erosion control measures, drainage elements, and/or temporary excavation support.

Permanent cut and fill slopes up to 10 feet high should be formed at 2H:1V or flatter, however shallower (3H:1V) slopes are recommended for ease of maintenance and mowing. The faces of fill slopes should be overbuilt and cut back into compacted materials with a smooth excavator bucket. If steeper fill slopes are desired, we should be consulted to evaluate use of grid reinforcement, rock blankets, or rock fill buttresses.

LIMITATIONS

Observation of Construction

Satisfactory earthwork and foundation performance depends to a large degree on the quality of construction. Subsurface conditions observed during construction should be compared with those encountered during the subsurface explorations. Recognition of changed conditions often requires experience; therefore, qualified personnel should visit the site with sufficient frequency to evaluate whether actual subsurface conditions differ from those anticipated. In addition, full-time construction observation of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications.

The recommendations in this report are preliminary as actual subsurface conditions may differ from those interpreted based on our subsurface explorations. In order for our recommendations to be considered final, we must be retained to observe the actual subsurface conditions encountered during construction. Our observations will allow us to interpret the actual conditions present during construction and adapt our recommendations if needed.

Variations of Subsurface Conditions and Use of Report

We have prepared this report for use by the owner, members of the design and construction team for the subject project and site, only. The data and report can be used for estimating purposes, but our report, conclusions, and interpretations should not be construed as a warranty of the subsurface conditions and are not applicable to other sites.

Explorations indicate soil conditions only at specific locations and only to the depths penetrated. They do not necessarily reflect subsurface conditions that may exist outside or between exploration locations. If subsurface conditions differing from those described are noted during the course of excavation and construction, reevaluation will be necessary, and we should be consulted.

Site development plans and design details were considered preliminary at the time this report was prepared. If changes are made in site grades, configuration, design loads, or type of construction for the structure, the conclusions and recommendations may not be applicable. We should be consulted to review final design drawings and specifications to see that our recommendations are suitably followed. If design changes are made, we should be retained to review our conclusions and recommendations and provide a written evaluation or modification. Additional geotechnical engineering analyses and explorations may be necessary.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted practices in this area at the time this report was prepared. No warranty or other conditions, expressed or implied, is given. For additional information on the use of this report, please refer to the document titled "Important Information about This Geotechnical-Engineering Report" included in *Attachment E.*

It has been a pleasure assisting you with this project and we look forward to our continued involvement. Please call if you have any questions.

Sincerely,

WESTON & SAMPSON ENGINEERS, INC.

Carolyn Conlee, Ph.D., PE
Senior Project Engineer

Jennifer MacGregor, PE
Technical Leader

Attachments:
Figure 1 – Locus Plan
Figure 2 –Site Plan
Attachment A – Previous Explorations
Attachment B – Boring Logs
Attachment C – Test Pit Logs
Attachment D – Laboratory Test Results
Attachment E – Important Information about This Geotechnical-Engineering Report

CC:JACM

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FIGURES

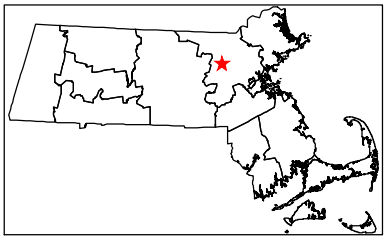


Weston & Sampson

SCALE IN FEET

0 1000 2000

FIGURE 1
LOCUS MAP
ACTON DEPARTMENT OF PUBLIC WORKS FACILITY
14 FOREST ROAD
ACTON, MA
MIDDLESEX COUNTY



\\wse03.local\WSE\Projects\MA\Acton\Acton DPW and TS Facility\Geotech\06_Geo CAD\Acton Locus Map.dwg

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

NOTES

1. THIS PLAN IS A CONCEPTUAL SITE LAYOUT PLAN BASED ON SITE SURVEY DATA DATED SEPTEMBER 9, 2024.
2. BORINGS WERE COMPLETED BY GEOSEARCH INC. OF STERLING, MA ON SEPTEMBER 4 AND 5, 2024 AND WERE OBSERVED BY A WESTON & SAMPSON ENGINEER.
3. TEST PITS WERE EXCAVATED BY THE TOWN OF ACTON DPW ON AUGUST 2, 2023 AND WERE OBSERVED BY A WESTON & SAMPSON ENGINEER.
4. BORING AND TEST PIT LOCATIONS SHOWN ARE APPROXIMATE.

LEGEND

B-X — DESIGNATION AND APPROXIMATE LOCATION OF BORING

TP-X — DESIGNATION AND APPROXIMATE LOCATION OF TEST PIT

GRAPHIC SCALE

30 25 0 50 100

SCALE: 1"=50'

ORIENTATION	TITLE
	SITE PLAN
	PROJECT: ACTON DEPARTMENT OF PUBLIC WORKS, 14 FOREST ROAD, ACTON, MA 01720

DATE	09/24
DRWN BY	KEL
CHKD BY	CTC
PRJ. NO.	ENG24-1080
REV. NO.	-

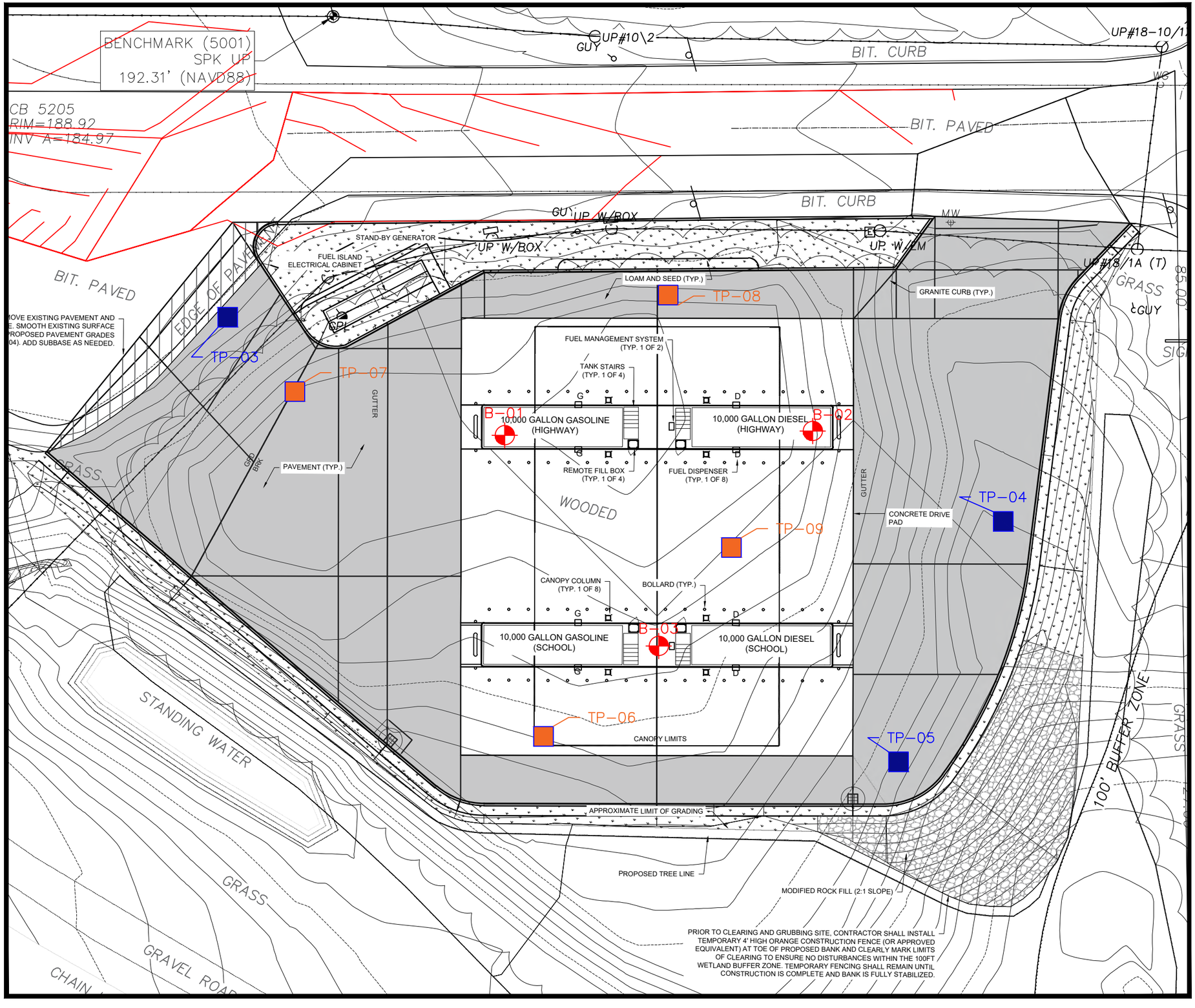
FIGURE

FIGURE 2

P:\MA\Acton\Acton DPW and TS Facility\Geotech\06_Geo CAD\Acton Figure 2 – Site Plan.dwg

Attachment A

Previous Explorations



\\wse03.local\WSE\Projects\MA\Acton\ENG23-0187 - Acton DPW Fuel System\Geotech\3.1 CADD\Figure 2 - Site Plan.dwg

Weston & Sampson Engineers, Inc.
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Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

NOTES

1. THIS PLAN IS BASED ON PROPOSED SITE PLAN PREPARED BY WESTON & SAMPSON ENGINEERS INC. DATED JUNE 15, 2023.
2. BORINGS WERE COMPLETED BY GEOSEARCH, INC. OF STERLING, MA BETWEEN JULY 5 & 7, 2023.
3. ALL BORINGS WERE OBSERVED BY A WESTON & SAMPSON ENGINEER.
4. BORING LOCATIONS SHOWN ARE APPROXIMATE AND WERE LOCATED USING A HANDHELD GPS UNIT.

LEGEND

- B-X — DESIGNATION AND APPROXIMATE LOCATION OF BORING
- GEOTECH/STORMWATER TEST PIT
- GEOTECH TEST PIT

GRAPHIC SCALE

20 10 0 20 40

SCALE: 1"=20'

ORIENTATION

TITLE

SITE PLAN

PROJECT

FUEL DEPOT DESIGN

14 FOREST ROAD
ACTON, MA 01720

DATE	08/2023
DRWN BY	KEL
CHKD BY	JACM
PRJ. NO.	ENG23-0187
REV. NO.	-

FIGURE

FIGURE 2

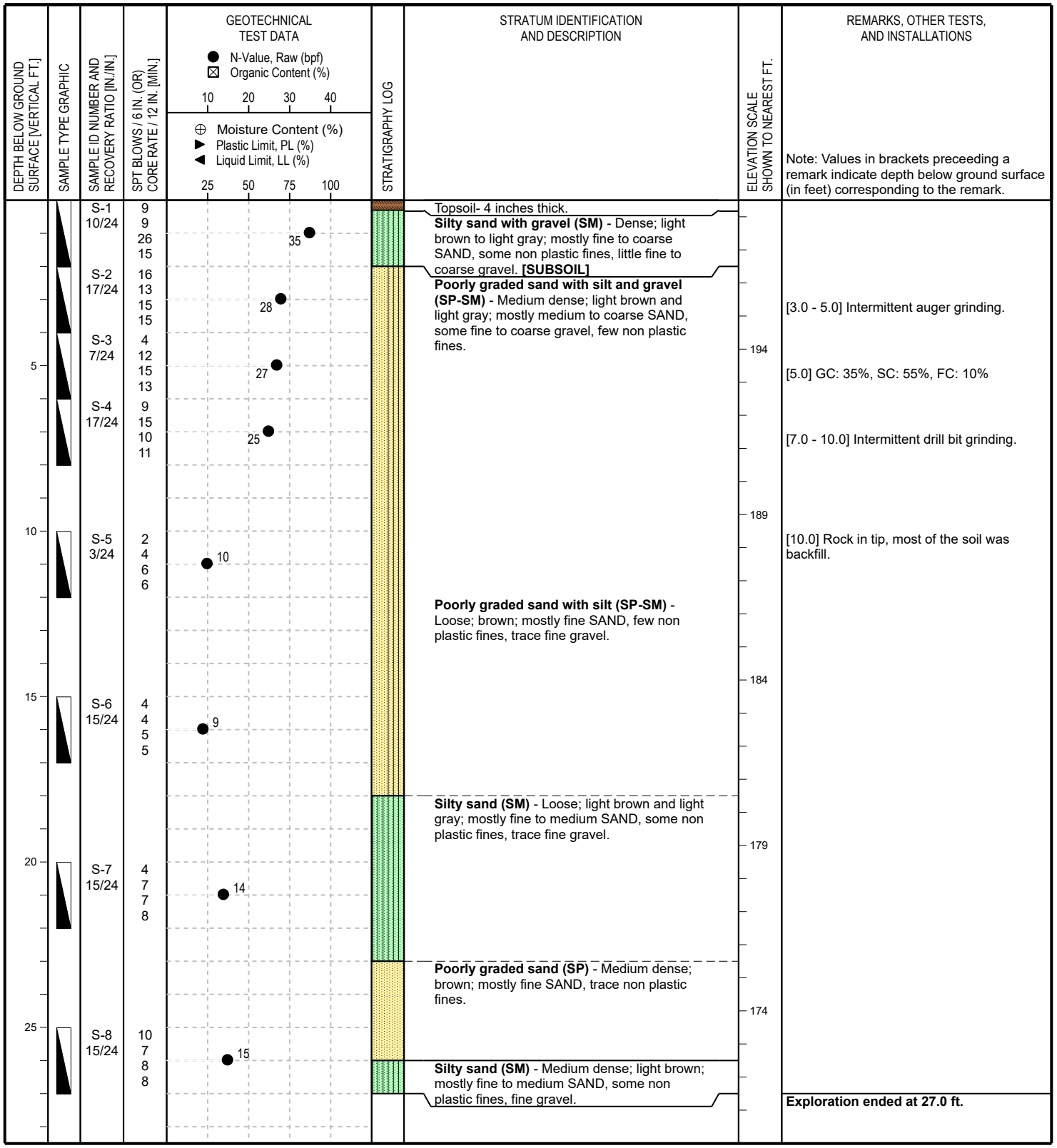
Weston & Sampson

Department of Public Works Fuel Island
14 Forest Road, Acton, MA

BORING ID: B-01

WSE Project: ENG23-0187

CONTRACTOR:	**Drilex**	BORING LOCATION:	**See Attached Figure**	DATE START:	**August 4, 2023**
FOREMAN:	**Chris Hogan**	ADVANCE METHOD:	**Hollow-Stem Auger Drilling**	DATE FINISH:	**August 4, 2023**
LOGGED BY:	**K. Lennon**	AUGER DIAMETER:	**N/A**	GROUND EL:	**198.5 ± (NAVD88)**
CHECKED BY:	**J. MacGregor, PE**	SUPPORT CASING:	**N/A**	FINAL DEPTH:	**27.0 ft.**
EQUIPMENT:	**Mobile B-57, ATV Mounted**	CORING METHOD:	**N/A**	GRID COORDS:	**N:2997846.2911 / E:675112.4873**
SPT HAMMER:	**N/A**	BACKFILL MATERIAL:		GRID SYSTEM:	**NAD83 State Plane (MA)**



Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

Department of Public Works Fuel Island
14 Forest Road, Acton, MA

BORING ID: B-02

WSE Project: ENG23-0187

CONTRACTOR:	Drilex	BORING LOCATION:	See Attached Figure	DATE START:	August 4, 2023
FOREMAN:	Chris Hogan	ADVANCE METHOD:	Hollow-Stem Auger Drilling	DATE FINISH:	August 4, 2023
LOGGED BY:	K. Lennon	AUGER DIAMETER:	N/A	GROUND EL:	197.0 ± (NAVD88)
CHECKED BY:	J. MacGregor, PE	SUPPORT CASING:	N/A	FINAL DEPTH:	27.0 ft.
EQUIPMENT:	Mobile B-57, ATV Mounted	CORING METHOD:	N/A	GRID COORDS:	N:2997875.6794 / E:675130.5657
SPT HAMMER:	N/A	BACKFILL MATERIAL:		GRID SYSTEM:	NAD83 State Plane (MA)

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	SAMPLE ID NUMBER AND RECOVERY RATIO [IN./IN.]	SPT BLOWS / 6 IN. (OR) CORE RATE / 12 IN. [MIN.]	GEOTECHNICAL TEST DATA	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
		S-1 8/21	2 9 13 50/3	22		Topsoil- 6 inches thick.		[0.0] Has to auger down, spoon kicked forward.
						Silty sand (SM) - Medium dense; light brown; dry; mostly fine to coarse SAND, some non plastic fines, few fine to coarse gravel.		
		S-2 8/24	4 8 9 10	17		**[SUBSOIL]** **Poorly graded sand with silt and gravel (SP-SM)** - Medium dense; light brown and gray; dry; mostly fine to coarse SAND, some fine to coarse gravel, few non plastic fines.		
		S-3 8/24	5 16 18 15	34				
5							192	[5.0] GC: 30%, SC: 60%, FC: 10%
		S-4 21/24	18 15 15 12	30				
								[8.0 - 10.0] Intermittent auger grinding.
						Silty sand with gravel (SM) - Medium dense; brown and gray; dry; mostly fine to coarse SAND, little non plastic fines, little fine to coarse gravel.		
10		S-5 4/24	3 7 10 10	17			187	
						Silty sand (SM) - Medium dense; light brown and gray; dry; mostly fine to coarse SAND, little non plastic fines, trace fine to coarse gravel.		
15		S-6 12/24	3 5 5 6	10			182	[16.0] GC: 2%, SC: 84%, FC: 14%
						Silty sand (SM) - Medium dense; light gray and light brown; dry to moist; mostly fine to medium SAND, little non plastic fines, fine to coarse gravel.		
20			4 5 7 6	12			177	
25		S-8 17/24	4 6 6 5	12			172	
								Exploration ended at 27.0 ft.

GEOTECHNICAL TEST DATA: ● N-Value, Raw (bpf); ☒ Organic Content (%); 10 20 30 40; ⊕ Moisture Content (%); ▶ Plastic Limit, PL (%); ◀ Liquid Limit, LL (%); 25 50 75 100

Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

Department of Public Works Fuel Island
14 Forest Road, Acton, MA

BORING ID: B-03

WSE Project: ENG23-0187

CONTRACTOR:	**Drilex**	BORING LOCATION:	**See Attached Figure**	DATE START:	**August 4, 2023**
FOREMAN:	**Chris Hogan**	ADVANCE METHOD:	**Hollow-Stem Auger Drilling**	DATE FINISH:	**August 4, 2023**
LOGGED BY:	**K. Lennon**	AUGER DIAMETER:	**N/A**	GROUND EL:	**196.5 ± (NAVD88)**
CHECKED BY:	**J. MacGregor, PE**	SUPPORT CASING:	**N/A**	FINAL DEPTH:	**27.0 ft.**
EQUIPMENT:	**Mobile B-57, ATV Mounted**	CORING METHOD:	**N/A**	GRID COORDS:	**N:2997847.4128 / E:675191.0210**
SPT HAMMER:	**N/A**	BACKFILL MATERIAL:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	SAMPLE ID NUMBER AND RECOVERY RATIO [IN./IN.]	SPT BLOWS / 6 IN. (OR) CORE RATE / 12 IN. [MIN.]	GEOTECHNICAL TEST DATA	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
				N-Value, Raw (bpf); Organic Content (%); 10 20 30 40; Moisture Content (%); Plastic Limit, PL (%); Liquid Limit, LL (%); 25 50 75 100				Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
		S-1 8/24	2 7 9 10	16		Topsoil- 4 inches thick. **Silty sand (SM)** - Medium dense; light brown; dry; mostly fine to coarse SAND, little non plastic fines, few fine to coarse gravel; Rock in cone tip. **[SUBSOIL]**		
		S-2 17/24	17 22 16 23	38		**Silty sand with gravel (SM)** - Dense; light brown and light gray; dry; mostly fine to coarse SAND, little fine to coarse gravel, little non plastic fines.		
		S-3 8/24	15 11 15 15	26		**Poorly graded sand with silt and gravel (SP-SM)** - Dense; light brown and light gray; dry; mostly fine to coarse SAND, little fine to coarse gravel, few non plastic fines.	192	[4.0 - 6.0] Intermittent auger grinding.
5		S-4 12/24	18 18 12 7	30				[5.0] GC: 13%, SC: 76%, FC: 11%
								[8.0 - 10.0] Intermittent auger grinding.
		S-5 9/24	3 3 6 5	9		**Silty sand (SM)** - Loose; light brown and light gray; dry; mostly fine to medium SAND, little non plastic fines, few fine to coarse gravel.	187	
10								
							182	
15		S-6 0/24	10 9 9 10	18				[15.0] Piece of rock in spoon with topsoil.
								[17.0 - 18.0] Intermittent auger grinding.
						Sandy silt (ML) - Stiff; light gray and light brown; dry; mostly non plastic FINES, some fine to medium sand.	177	
20		S-7 18/24	4 4 5 6	9				
						Sandy silt (ML) - Stiff; light gray and light brown; moist to wet; mostly non plastic FINES, some fine to medium sand; Assuming GWT @ 26'. Sand in cone tip.	172	
25		S-8 18/24	4 6 6 8	12				**Exploration ended at 27.0 ft.**

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

Department of Public Works Fuel Island

TEST PIT ID: TP-03

WSE Project: ENG23-0187

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**August 2, 2023**
OPERATOR:	**Bill Murphy**	PLAN DIMENSIONS:	**Length: 14.0 ft. , Width: 6.0 ft.**	DATE FINISH:	**August 2, 2023**
LOGGED BY:	**K. Lennon**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**191.0 ± (NAVD88)**
CHECKED BY:	**J. MacGregor, PE**	CAVING REMARKS:	**No Caving Observed**	FINAL DEPTH:	**10.0 ft.**
EQUIPMENT:	**John Deere 710k Backhoe**	BACKFILL MATERIAL:		GRID COORDS:	**N:2997842 ± / E:675046 ±**
BUCKET TYPE:	**N/A**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	PID MEASUREMENT, PPM BY VOLUME (HEADSPACE)	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
		0.7		Topsoil- 10 inches thick.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
		0.7		**Poorly graded sand with gravel (SP)** - Light brown; dry; mostly fine to coarse SAND, little fine to coarse gravel, trace non plastic fines; occasional cobbles and trace boulders.		[2.1] GC: 28%, SC: 69%, FC: 3%
		0.9		**Poorly graded sand with silt and gravel (SP-SM)** - Light brown; dry; mostly fine to medium SAND, little fine to coarse gravel, few non plastic fines; common cobbles & trace boulders.		
5		1.2		**Silty sand (SM)** - Light brown; dry; mostly fine to medium SAND, little non plastic fines, few fine to coarse gravel.	186	
		0.8		**Well graded sand (SW)** - Brown; dry; mostly fine to coarse SAND, few fine to coarse gravel, trace non plastic fines.		
10					181	**Exploration ended at 10.0 ft.**

TEST PIT PHOTOGRAPHS



1. Excavation Soil Pile



2. Bottom of Test Pit

Weston & Sampson

Department of Public Works Fuel Island

TEST PIT ID: TP-04

WSE Project: ENG23-0187

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**August 2, 2023**
OPERATOR:	**Bill Murphy**	PLAN DIMENSIONS:	**Length: 15.0 ft. , Width: 6.0 ft.**	DATE FINISH:	**August 2, 2023**
LOGGED BY:	**K. Lennon**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**187.0 ± (NAVD88)**
CHECKED BY:	**J. MacGregor, PE**	CAVING REMARKS:	**No Caving Observed**	FINAL DEPTH:	**7.5 ft.**
EQUIPMENT:	**John Deere 710k Backhoe**	BACKFILL MATERIAL:		GRID COORDS:	**N:2997846 ± / E:675183 ±**
BUCKET TYPE:	**N/A**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	PID MEASUREMENT, PPM BY VOLUME (HEADSPACE)	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
				Topsoil- 12 inches thick.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
		2.4		**Silty sand (SM)** - Light brown; dry; some fine to medium SAND, some non plastic fines, few fine to coarse gravel. **[SUBSOIL]**		
		1.8		**Silty sand with gravel (SM)** - Light brown; dry; mostly fine to medium SAND, little non plastic fines, little fine to coarse gravel; common cobbles & occasional boulders.		
		1.1				
5					182	
						Exploration ended at 7.5 ft.
10					177	

TEST PIT PHOTOGRAPHS



1. Excavation Soil Pile



2. Bottom of Test Pit

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

Department of Public Works Fuel Island

TEST PIT ID: TP-05

WSE Project: ENG23-0187

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**August 2, 2023**
OPERATOR:	**Bill Murphy**	PLAN DIMENSIONS:	**Length: 13.0 ft. , Width: 6.0 ft.**	DATE FINISH:	**August 2, 2023**
LOGGED BY:	**K. Lennon**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**189.0 ± (NAVD88)**
CHECKED BY:	**J. MacGregor, PE**	CAVING REMARKS:	**No Caving Observed**	FINAL DEPTH:	**8.5 ft.**
EQUIPMENT:	**John Deere 710k Backhoe**	BACKFILL MATERIAL:		GRID COORDS:	**N:2997812 ± / E:675196 ±**
BUCKET TYPE:	**N/A**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	PID MEASUREMENT, PPM BY VOLUME (HEADSPACE)	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
				Topsoil- 7 inches thick.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
		0.3		**Silty sand with gravel (SM)** - Light brown; dry; mostly fine to medium SAND, little non plastic fines, little fine to coarse gravel. **[SUBSOIL]**		
		0.8		**Silty sand with gravel (SM)** - Light brown; dry; mostly fine to medium SAND, little non plastic fines, little fine to coarse gravel; ommon cobbles & trace boulders.		
5		3.3		**Poorly graded sand with silt (SP-SM)** - Brown; dry; mostly fine to medium SAND, few fine gravel, few non plastic fines.	184	
		0.5				**Exploration ended at 8.5 ft.**
10					179	

TEST PIT PHOTOGRAPHS



1. Excavation Soil Pile



2. Bottom of Test Pit

Weston & Sampson

Department of Public Works Fuel Island

TEST PIT ID: TP-06

WSE Project: ENG23-0187

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**August 2, 2023**
OPERATOR:	**Bill Murphy**	PLAN DIMENSIONS:	**Length: 13.0 ft. , Width: 5.0 ft.**	DATE FINISH:	**August 2, 2023**
LOGGED BY:	**K. Lennon**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**194.0 ± (NAVD88)**
CHECKED BY:	**J. MacGregor, PE**	CAVING REMARKS:	**No Caving Observed**	FINAL DEPTH:	**10.0 ft.**
EQUIPMENT:	**John Deere 710k Backhoe**	BACKFILL MATERIAL:		GRID COORDS:	**N:2997783 ± / E:675138 ±**
BUCKET TYPE:	**N/A**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	PID MEASUREMENT, PPM BY VOLUME (HEADSPACE)	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
				Topsoil- 9 inches thick.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
		0.7		**Silty sand with gravel (SM)** - Orangeish brown; dry; mostly fine to medium SAND, some non plastic fines, little fine to coarse gravel; ommon cobbles & trace boulders. **[SUBSOIL]**		
		0.4		**Well graded sand with gravel (SW)** - Brown; dry; mostly fine to coarse SAND, some fine to coarse gravel, trace non plastic fines; ommon cobbles & trace boulders.		[3.5] GC: 38%, SC: 61%, FC: 1%
5		1.4		**Poorly graded sand (SP)** - Gray; dry; mostly fine to coarse SAND, few fine to coarse gravel, trace non plastic fines; trace cobbles.	189	
10					184	**Exploration ended at 10.0 ft.**

TEST PIT PHOTOGRAPHS



1. Excavation Soil Pile



2. Bottom of Test Pit

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

Department of Public Works Fuel Island

TEST PIT ID: TP-07

WSE Project: ENG23-0187

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**August 2, 2023**
OPERATOR:	**Bill Murphy**	PLAN DIMENSIONS:	**Length: 14.0 ft. , Width: 7.0 ft.**	DATE FINISH:	**August 2, 2023**
LOGGED BY:	**K. Lennon**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**198.0 ± (NAVD88)**
CHECKED BY:	**J. MacGregor, PE**	CAVING REMARKS:	**No Caving Observed**	FINAL DEPTH:	**9.0 ft.**
EQUIPMENT:	**John Deere 710k Backhoe**	BACKFILL MATERIAL:		GRID COORDS:	**N:2997801 ± / E:675135 ±**
BUCKET TYPE:	**N/A**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	PID MEASUREMENT, PPM BY VOLUME (HEADSPACE)	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
				Topsoil- 7 inches thick.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
		0.3		**Silty sand with gravel (SM)** - Dry; fine to medium SAND, some fine to coarse gravel, some non plastic fines; common cobbles & occasional boulders. **[SUBSOIL]**		
		0.9		**Well graded sand with silt and gravel (SW-SM)** - Dry; mostly fine to coarse SAND, little fine to coarse gravel, few non plastic fines; common cobbles & occasional boulders.		
5					193	
		0.3		**Poorly graded sand (SP)** - Dry; mostly fine to medium SAND, few fine to coarse gravel, trace non plastic fines.		
		0.2				**Exploration ended at 9.0 ft.**
10					188	

TEST PIT PHOTOGRAPHS



1. Excavation Soil Pile



2. Bottom of Test Pit

Weston & Sampson

Department of Public Works Fuel Island

TEST PIT ID: TP-08

WSE Project: ENG23-0187

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**August 2, 2023**
OPERATOR:	**Bill Murphy**	PLAN DIMENSIONS:	**Length: 11.0 ft. , Width: 5.0 ft.**	DATE FINISH:	**August 2, 2023**
LOGGED BY:	**K. Lennon**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**197.5 ± (NAVD88)**
CHECKED BY:	**J. MacGregor, PE**	CAVING REMARKS:	**No Caving Observed**	FINAL DEPTH:	**8.0 ft.**
EQUIPMENT:	**John Deere 710k Backhoe**	BACKFILL MATERIAL:		GRID COORDS:	**N:2997941 ± / E:675119 ±**
BUCKET TYPE:	**N/A**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	PID MEASUREMENT, PPM BY VOLUME (HEADSPACE)	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
				Topsoil- 12 inches thick.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
		2.4		**Well graded sand with gravel (SW)** - Dry; mostly fine to coarse SAND, little fine to coarse gravel, trace non plastic fines; common cobbles & occasional boulders.		
		0.6			193	
5						
						Exploration ended at 8.0 ft.
					188	
10						

TEST PIT PHOTOGRAPHS



1. Excavation Soil Pile



2. Bottom of Test Pit

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

Department of Public Works Fuel Island

TEST PIT ID: TP-09

WSE Project: ENG23-0187

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**August 2, 2023**
OPERATOR:	**Bill Murphy**	PLAN DIMENSIONS:	**Length: 15.0 ft. , Width: 6.0 ft.**	DATE FINISH:	**August 2, 2023**
LOGGED BY:	**K. Lennon**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**197.5 ± (NAVD88)**
CHECKED BY:	**J. MacGregor, PE**	CAVING REMARKS:	**No Caving Observed**	FINAL DEPTH:	**10.0 ft.**
EQUIPMENT:	**John Deere 710k Backhoe**	BACKFILL MATERIAL:		GRID COORDS:	**N:2997847 ± / E:675152 ±**
BUCKET TYPE:	**N/A**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	PID MEASUREMENT, PPM BY VOLUME (HEADSPACE)	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
				Topsoil- 5 inches thick.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
		1.0		**Silty sand with gravel (SM)** - Light brown; dry; fine to coarse SAND, some fine to coarse gravel, some non plastic fines; common cobbles & occasional boulders. **[SUBSOIL]**		
		0.3		**Poorly graded gravel with sand (GP)** - Brown and orange; dry; mostly fine to coarse GRAVEL, some fine to coarse sand, trace non plastic fines; common cobbles & occasional boulders.		[3.5] GC: 64%, SC: 35%, FC: 1%
5		1.1		**Poorly graded sand (SP)** - Brown; dry; mostly fine to coarse SAND, trace fine to coarse gravel, trace non plastic fines; trace cobbles.	193	
					188	
10		0.3				**Exploration ended at 10.0 ft.**

TEST PIT PHOTOGRAPHS



1. Excavation Soil Pile



2. Bottom of Test Pit

Attachment B

Boring Logs

Weston & Sampson

WSE Project: ENG24-1080

Acton DPW and TS Facility
14 Forest Road, Acton, MA

BORING ID: B-1

CONTRACTOR:	**Geosearch, Inc.**	BORING LOCATION:	**See Attached Figure**	DATE START:	**September 5, 2024**
FOREMAN:	**Kenny Bylund**	ADVANCE METHOD:	**Hollow-Stem Auger Drilling**	DATE FINISH:	**September 5, 2024**
LOGGED BY:	**Kathryn Lennon**	AUGER DIAMETER:	**4-1/4" ID (Stem), 7-5/8" OD (Flights)**	GROUND EL:	**191.5 ± (NAVD88)**
CHECKED BY:	**Carolyn Conlee, PE**	SUPPORT CASING:	**N/A**	FINAL DEPTH:	**22.0 ft.**
EQUIPMENT:	**CME 55 LC, ATV Mounted**	CORING METHOD:	**N/A**	GRID COORDS:	**N:2998162.4 ± / E:674737.6 ±**
SPT HAMMER:	**Automatic (140-lb.)**	BACKFILL MATERIAL:	**Drill Cuttings**	GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	SAMPLE ID NUMBER AND RECOVERY RATIO [IN./IN.]	SPT BLOWS / 6 IN. (OR) CORE RATE / 12 IN. [MIN.]	GEOTECHNICAL TEST DATA (N-Value, Raw (bpf); Organic Content (%); Moisture Content (%); Plastic Limit, PL (%); Liquid Limit, LL (%))	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
						Surface: Asphalt concrete pavement.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
		S-1 14/18	4 4 7	11		Asphalt- 2 inches thick. **Poorly graded sand with silt and gravel (SP-SM)** - Medium dense; dark gray; moist; mostly fine to coarse SAND, little fine to coarse gravel, few non plastic fines. **[FILL]**		[0.0 - 9.0] Auger grinding.
		S-2 8/24	19 29 24 26	>> 53		**Poorly graded sand (SP)** - Medium dense to very dense; light brown; moist; mostly fine to coarse SAND, trace non plastic fines. **Poorly graded sand with silt and gravel (SP-SM)** - Medium dense to very dense; tan; moist; mostly fine and coarse SAND, some fine to coarse gravel, few non plastic fines.		[4.0] GC: 41%, SC: 48%, FC: 11%
5		S-3 2/24	13 16 18 15	34			187	
10		S-4 3/24	8 10 11 10	21		**Poorly graded sand (SP)** - Medium dense; gray; moist; mostly medium SAND, trace fine gravel, trace non plastic fines.	182	
15		S-5 12/24	3 4 7 9	11			177	
20		S-6 15/24	0 6 7 10	13		*Change color to light grey and to fine sand*	172	**Exploration ended at 22.0 ft.**
							167	

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

WSE Project: ENG24-1080

Acton DPW and TS Facility
14 Forest Road, Acton, MA

BORING ID: B-2

CONTRACTOR:	Geosearch, Inc.	BORING LOCATION:	See Attached Figure	DATE START:	September 4, 2024
FOREMAN:	Kenny Bylund	ADVANCE METHOD:	Hollow-Stem Auger Drilling	DATE FINISH:	September 4, 2024
LOGGED BY:	Kathryn Lennon	AUGER DIAMETER:	4-1/4" ID (Stem), 7-5/8" OD (Flights)	GROUND EL:	197.0 ± (NAVD88)
CHECKED BY:	Carolyn Conlee, PE	SUPPORT CASING:	N/A	FINAL DEPTH:	22.0 ft.
EQUIPMENT:	CME 55 LC, ATV Mounted	CORING METHOD:	N/A	GRID COORDS:	N:2998258.8 ± / E:674866.1 ±
SPT HAMMER:	Automatic (140-lb.)	BACKFILL MATERIAL:	Drill Cuttings	GRID SYSTEM:	NAD83 State Plane (MA)

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	SAMPLE ID NUMBER AND RECOVERY RATIO [IN./IN.]	SPT BLOWS / 6 IN. (OR) CORE RATE / 12 IN. [MIN.]	GEOTECHNICAL TEST DATA (N-Value, Raw (bpf); Organic Content (%); Moisture Content (%); Plastic Limit, PL (%); Liquid Limit, LL (%))	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
						Surface: Forest debris.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
		S-1 15/24	3 8 12 24	20		Topsoil- 6 inches thick.		
						Poorly graded sand with gravel (SP) - Dense to very dense; tan; moist; mostly fine and coarse SAND, some fine to coarse gravel, few non plastic fines.		[0.5 - 18.0] Auger grinding.
		S-2 8/24	26 32 46 35	>> 78				
5		S-3 12/24	12 20 19 26	39			192	
								[7.0] GC: 39%, SC: 50%, FC: 10%
10		S-4 10/24	13 30 41 41	>> 71			187	
15		S-5 14/24	18 30 60 29	>> 90			182	
						Poorly graded sand (SP) - Medium dense; light brown; moist; mostly fine to medium SAND, trace non plastic fines.		
20		S-6 14/24	7 11 11 18	22			177	
						1 inch gray sandy silt seam *Change to fine to coarse sand and few fine gravel*		**Exploration ended at 22.0 ft.**

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

WSE Project: ENG24-1080

Acton DPW and TS Facility
14 Forest Road, Acton, MA

BORING ID: B-3

CONTRACTOR:	**Geosearch, Inc.**	BORING LOCATION:	**See Attached Figure**	DATE START:	**September 5, 2024**
FOREMAN:	**Kenny Bylund**	ADVANCE METHOD:	**Hollow-Stem Auger Drilling**	DATE FINISH:	**September 5, 2024**
LOGGED BY:	**Kathryn Lennon**	AUGER DIAMETER:	**4-1/4" ID (Stem), 7-5/8" OD (Flights)**	GROUND EL:	**190.0 ± (NAVD88)**
CHECKED BY:	**Carolyn Conlee, PE**	SUPPORT CASING:	**N/A**	FINAL DEPTH:	**42.0 ft.**
EQUIPMENT:	**CME 55 LC, ATV Mounted**	CORING METHOD:	**N/A**	GRID COORDS:	**N:2998145.9 ± / E:674927.6 ±**
SPT HAMMER:	**Automatic (140-lb.)**	BACKFILL MATERIAL:	**Drill Cuttings**	GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE ID NUMBER AND RECOVERY RATIO [IN./IN.]	SPT BLOWS / 6 IN. (OR) CORE RATE / 12 IN. [MIN.]	GEOTECHNICAL TEST DATA (N-Value, Raw (bpf); Organic Content (%); Moisture Content (%); Plastic Limit, PL (%); Liquid Limit, LL (%))	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
					Surface: Forest debris.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
	S-1 12/24	7 4 6 13	10		**Poorly graded gravel with sand (GP)** - Medium dense; dark gray with brown; moist; mostly fine to coarse GRAVEL, some fine sand, trace non plastic fines. **[FILL]**		[0.5] GC: 47%, SC: 46%, FC: 7%
	S-2 5/24	34 21 23 18	44		**Silty sand (SM)** - Medium dense; orange with light brown; moist; mostly fine SAND, little non plastic fines, few fine to coarse gravel; trace roots. **[SUBSOIL]**		
5	S-3 9/24	17 25 20 19	45		**Poorly graded sand with gravel (SP)** - Dense; tan with light brown; moist; mostly fine to medium SAND, little fine to coarse gravel, trace non plastic fines. *Change to some gravel*	185	[4.0 - 7.0] Auger grinding.
10	S-4 15/24	12 21 23 18	44			180	[12.0] GC: 44%, SC: 50%, FC: 6%
15	S-5 11/24	4 7 11 12	18		**Poorly graded sand (SP)** - Medium dense to dense; gray; moist; mostly fine to coarse SAND, trace fine to coarse gravel, trace non plastic fines. *Change color to gray and trace fine gravel*	175	
20	S-6 17/24	4 7 9 12	16			170	

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

WSE Project: ENG24-1080

Acton DPW and TS Facility
14 Forest Road, Acton, MA

BORING ID: B-3

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	SAMPLE ID NUMBER AND RECOVERY RATIO [IN./IN.]	SPT BLOWS / 6 IN. (OR) CORE RATE / 12 IN. [MIN.]	GEOTECHNICAL TEST DATA	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
		S-7 17/24	10 21 26 21	47		**Poorly graded sand (SP)** - Medium dense to dense; gray; moist; mostly fine to coarse SAND, trace fine to coarse gravel, trace non plastic fines.		[26.0] Estimated water level at time of drilling based on changes in sample moisture. [27.0] Water level measured on 09/05/24 (during drilling).
						Poorly graded sand with silt and gravel (SP-SM) - Dense; gray and brown; moist to wet; mostly fine to medium SAND, some fine to coarse gravel, few non plastic fines; iron oxide.		
30		S-8 24/24	4 8 17 20	25		**Poorly graded sand with silt (SP-SM)** - Medium dense; gray; wet; mostly fine SAND, few non plastic fines.	160	
35		S-9 17/24	5 3 7 16	10		**Poorly graded sand (SP)** - Medium dense to dense; brown; wet; mostly fine to medium SAND, trace non plastic fines; iron oxide. *2 inch light brown sandy silt seam* *Change color to tan* *Change color to light brown* *Change color to black* *Change color to orange*	155	[37.0] GC: 0%, SC: 95%, FC: 5%
40		S-10 19/24	11 15 20 21	35		*Change color to gray*	150	**Exploration ended at 42.0 ft.**
45							145	
50							140	

GEOTECHNICAL TEST DATA
● N-Value, Raw (bpf)
⊠ Organic Content (%)
10 20 30 40
⊕ Moisture Content (%)
▶ Plastic Limit, PL (%)
◀ Liquid Limit, LL (%)
25 50 75 100

Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

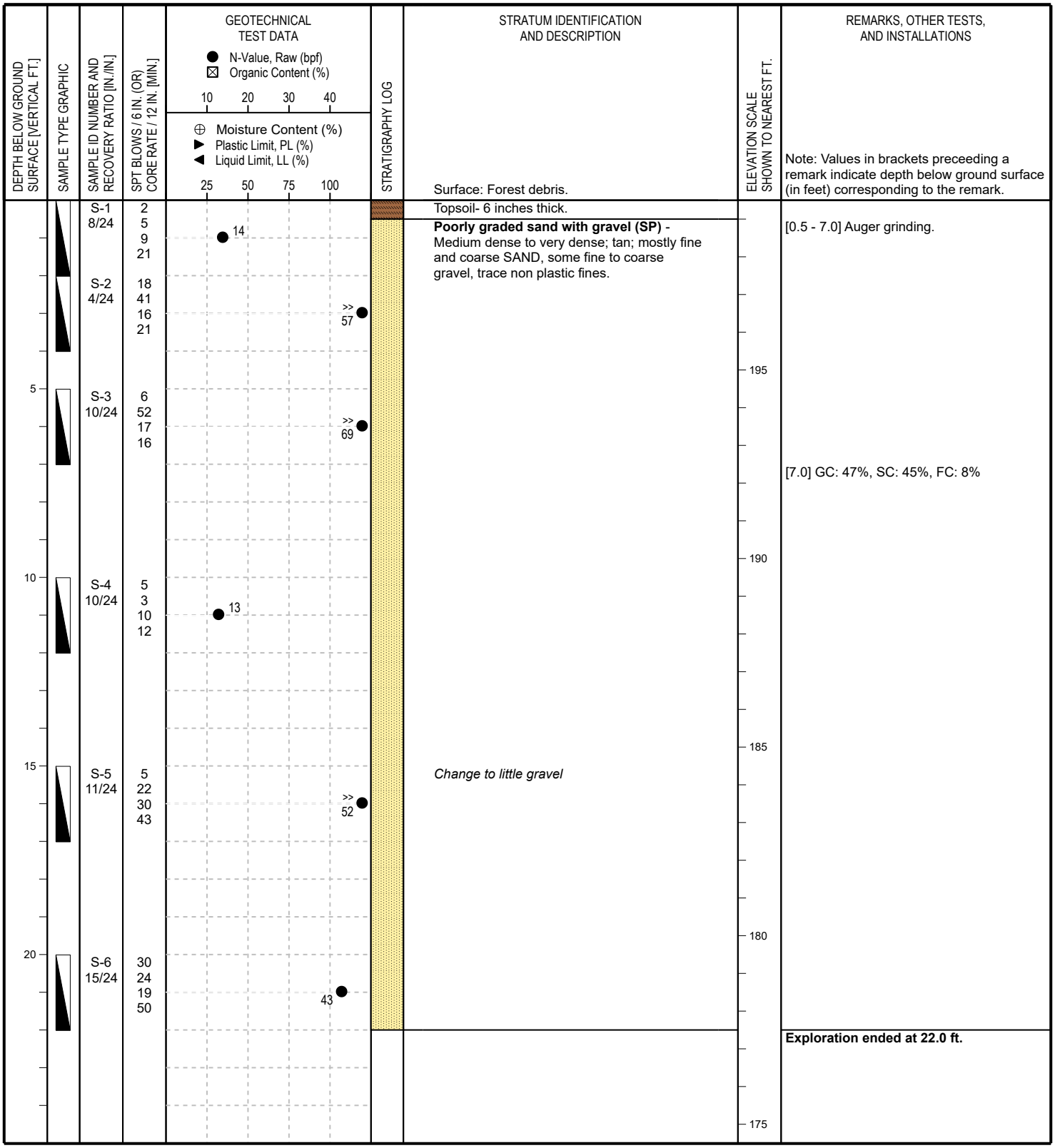
Weston & Sampson

WSE Project: ENG24-1080

Acton DPW and TS Facility
14 Forest Road, Acton, MA

BORING ID: B-4

CONTRACTOR:	Geosearch, Inc.	BORING LOCATION:	See Attached Figure	DATE START:	September 4, 2024
FOREMAN:	Kenny Bylund	ADVANCE METHOD:	Hollow-Stem Auger Drilling	DATE FINISH:	September 4, 2024
LOGGED BY:	Kathryn Lennon	AUGER DIAMETER:	4-1/4" ID (Stem), 7-5/8" OD (Flights)	GROUND EL:	199.5 ± (NAVD88)
CHECKED BY:	Carolyn Conlee, PE	SUPPORT CASING:	N/A	FINAL DEPTH:	22.0 ft.
EQUIPMENT:	CME 55 LC, ATV Mounted	CORING METHOD:	N/A	GRID COORDS:	N:2998113.5 ± / E:675074.0 ±
SPT HAMMER:	Automatic (140-lb.)	BACKFILL MATERIAL:	Drill Cuttings	GRID SYSTEM:	NAD83 State Plane (MA)



Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

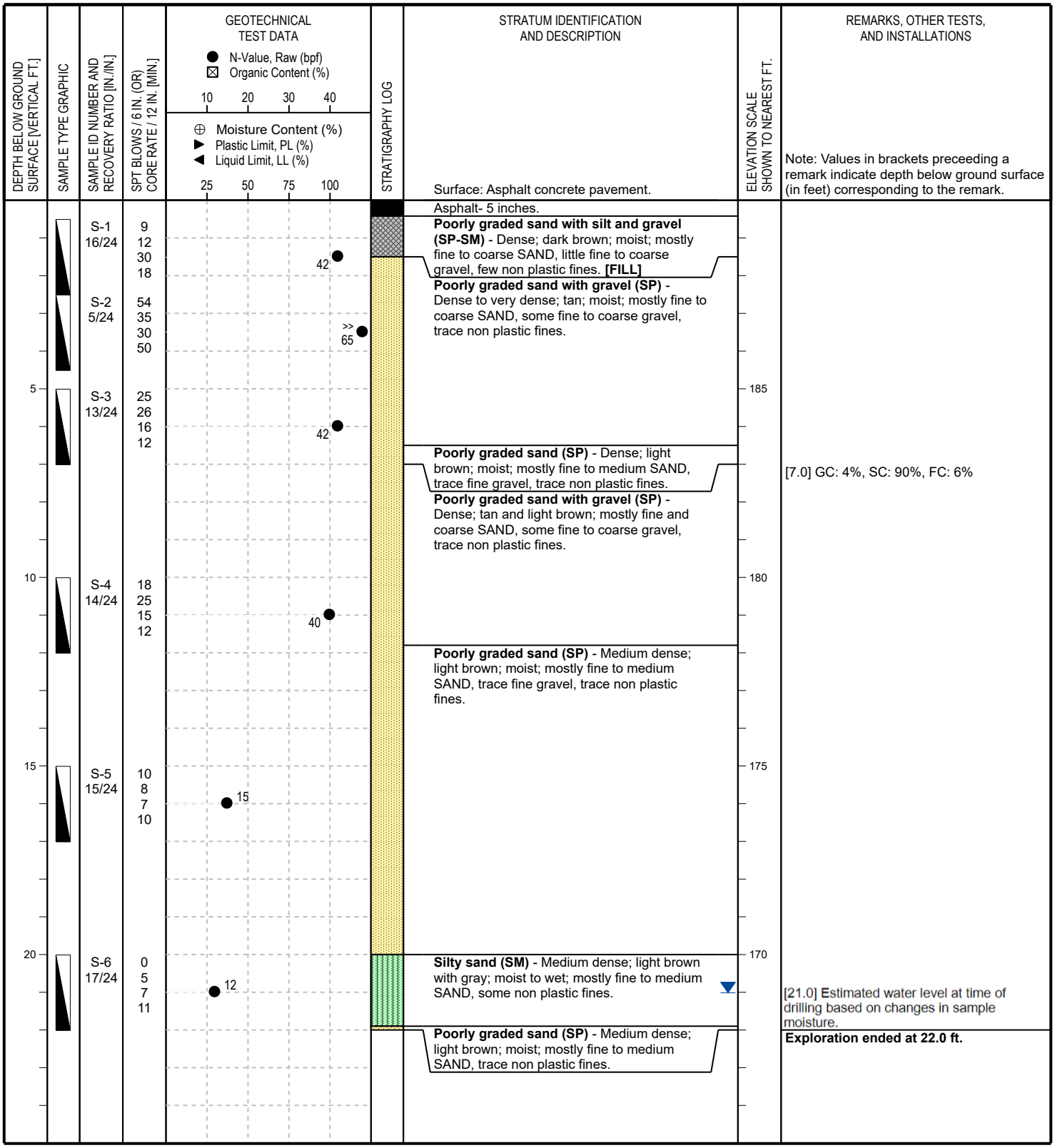
Weston & Sampson

Acton DPW and TS Facility
14 Forest Road, Acton, MA

BORING ID: B-5

WSE Project: ENG24-1080

CONTRACTOR:	**Geosearch, Inc.**	BORING LOCATION:	**See Attached Figure**	DATE START:	**September 4, 2024**
FOREMAN:	**Kenny Bylund**	ADVANCE METHOD:	**Hollow-Stem Auger Drilling**	DATE FINISH:	**September 4, 2024**
LOGGED BY:	**Kathryn Lennon**	AUGER DIAMETER:	**4-1/4" ID (Stem), 7-5/8" OD (Flights)**	GROUND EL:	**190.0 ± (NAVD88)**
CHECKED BY:	**Carolyn Conlee, PE**	SUPPORT CASING:	**N/A**	FINAL DEPTH:	**22.0 ft.**
EQUIPMENT:	**CME 55 LC, ATV Mounted**	CORING METHOD:	**N/A**	GRID COORDS:	**N:2998023.7 ± / E:675036.9 ±**
SPT HAMMER:	**Automatic (140-lb.)**	BACKFILL MATERIAL:	**Drill Cuttings**	GRID SYSTEM:	**NAD83 State Plane (MA)**



Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

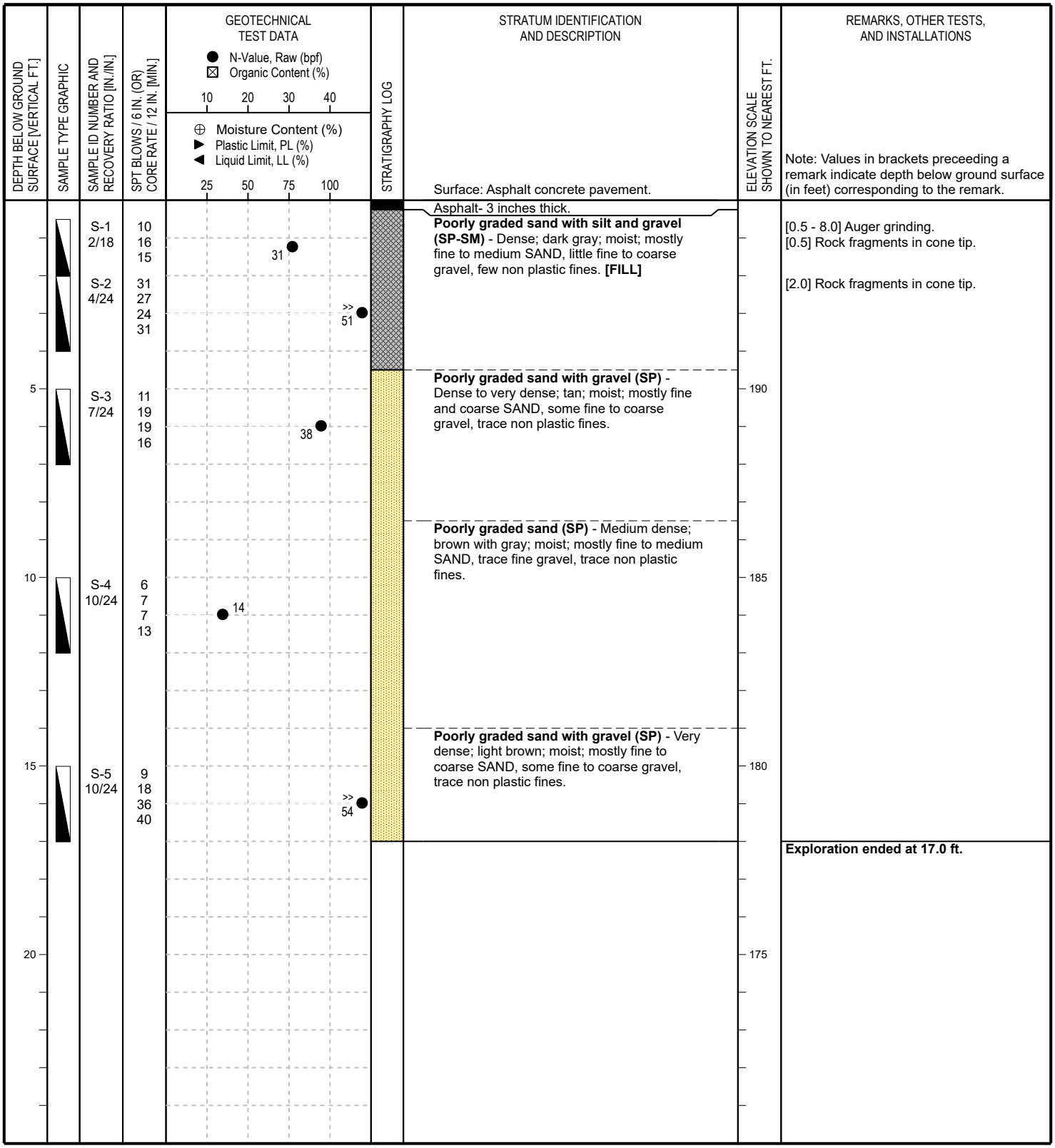
Weston & Sampson

Acton DPW and TS Facility
14 Forest Road, Acton, MA

BORING ID: B-6

WSE Project: ENG24-1080

CONTRACTOR:	**Geosearch, Inc.**	BORING LOCATION:	**See Attached Figure**	DATE START:	**September 5, 2024**
FOREMAN:	**Kenny Bylund**	ADVANCE METHOD:	**Hollow-Stem Auger Drilling**	DATE FINISH:	**September 5, 2024**
LOGGED BY:	**Kathryn Lennon**	AUGER DIAMETER:	**4-1/4" ID (Stem), 7-5/8" OD (Flights)**	GROUND EL:	**195.0 ± (NAVD88)**
CHECKED BY:	**Carolyn Conlee, PE**	SUPPORT CASING:	**N/A**	FINAL DEPTH:	**17.0 ft.**
EQUIPMENT:	**CME 55 LC, ATV Mounted**	CORING METHOD:	**N/A**	GRID COORDS:	**N:2998127.9 ± / E:674639.8 ±**
SPT HAMMER:	**Automatic (140-lb.)**	BACKFILL MATERIAL:	**Drill Cuttings**	GRID SYSTEM:	**NAD83 State Plane (MA)**



Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

GUIDE TO SUBSURFACE EXPLORATION LOGS

Weston & Sampson℠

INDEX SHEET 1 GENERAL INFORMATION

GENERAL NOTES AND USE OF LOGS

1.) Explorations were made by ordinary and conventional methods and with care adequate for Weston & Sampson's study and/or design purposes. The exploration logs are part of a specific report prepared by Weston & Sampson for the referenced project and client, and are an integral part of that report. Information and interpretations are subject to the explanations and limitations stated in the report. Weston & Sampson is not responsible for any interpretations, assumptions, projections, or interpolations made by others.

2.) Exploration logs represent general conditions observed at the point of exploration on the date(s) stated. Boundary lines separating soil and rock layers (strata) represent approximate boundaries only and are shown as solid lines where observed and dashed lines where inferred based on drilling action. Actual transitions may be gradual and changes may occur over time.

3.) Soil and rock descriptions are based on visual-manual examination of recovered samples, direct observation in test pits (when permissible), and laboratory testing (when conducted).

4.) Water level observations were made at the times and under the conditions stated. Fluctuations should be be expected to vary with seasons and other factors. Use of fluids during drilling may affect water level observations. The absence of water level observations does not necessarily mean the exploration was dry or that subsurface water will not be encountered during construction.

5.) Standard split spoon samplers may not recover particles with any dimension larger than 1-3/8 inches. Reported gravel conditions or poor sample recovery may not reflect actual in-situ conditions.

6.) Sections of this guide provide a general overview of Weston & Sampson's practices and procedures for *identifying* and *describing* soil and rock. These procedures are predominantly based on ASTM D2488, *Standard Practice for Description and Identification of Soils (Visual-Manual Procedures*), the International Society of Rock Mechanics (ISRM) standards, and the *Engineering Geology Field Manual* published by the Bureau of Reclamation. Not all aspects of this guide relating to description and identification procedures of soil and rock may be applicable in all circumstances.

SAMPLER GRAPHICS

- Split Spoon (Standard) 2" OD, 1-3/8" ID
- Split Spoon (Oversize) 3" OD, 2-3/8" ID
- Shelby or Piston Tube 3" OD, 2-7/8" ID
- Double-Tube Rock Core Barrel 2" Core Diameter
- Direct Push with Acetate Liner Various Liner Sizes
- A — Auger Sample *(from cuttings or hand auger)*
- G — Grab Sample *(manual, from discrete point)*
- C — Composite Sample *(multiple grab samples)*

WELL GRAPHICS

- Cement concrete seal around casing or riser pipe
- Bentonite seal around casing or riser pipe
- Cement grout seal around casing or riser pipe
- Soil backfill around riser pipe or beneath screen
- Gravel backfill around screen or riser pipe
- Sand backfill around screen or riser pipe (filter sand)
- Solid-wall riser; Sch. 40 PVC, 1" ID unless noted otherwise
- Slotted screen; Sch. 40 PVC, 1" ID with machined slots

CAVING / SEEPAGE TERMS

The following caving and/or seepage terms may appear on a test pit log.

Caving Term	Criteria
Minor	less than 1 cubic ft.
Moderate	1 to 3 cubic ft.
Severe	greater than 3 cubic ft.

Seepage Term	Criteria
Slow	less than 1 gpm
Moderate	1 to 3 gpm
Fast	greater than 3 gpm

KEY TO WATER LEVELS

- Observed in exploration during advancement.
- Measured in exploration at completion, prior to backfilling or well installation.
- Measured in exploration after the stated stabilization period, prior to backfilling, or in well installation if noted.

DEFINITIONS OF COMMON TERMS

Sample Recovery Ratio - The length of material recovered in a drive or push type sampler over the length of sampler penetration, in inches (e.g. 18/24).

Standard Penetration Test (*SPT*) - An in-situ test where a standard split-spoon sampler is driven a distance of 12 or 18 inches (after an initial 6-inch seating interval) using a 140-lb. hammer falling 30 inches for each blow.

SPT Blows - The number of hammer blows required to drive a split-spoon sampler each consecutive 6-inch interval during a *Standard Penetration Test*. If no discernable advancement of a split spoon sampler is made after 50 consecutive hammer blows, 50/X indicates *sampler refusal* and is the number of blows required to drive the sampler X inches.

SPT N-Value (*N*) - The uncorrected blow count representation of a soil's penetration resistance over a 12-inch interval after an initial 6-in. seating interval, reported in blows per foot (bpf). The N-value is correlated to soil engineering properties.

Auger Refusal - No discernable advancement of the auger over a period of 5 minutes with full rig down pressure applied.

Casing Refusal (Driven) - Casing penetration of less than 6 inches after a minimum 50 blows of a drop hammer weighing 300 lbs. or a minimum 100 blows of a drop hammer weighing 140 lbs.

PID Measurement - A measurement (electronic reading) taken in the field using a photoionization detector (PID) to detect the presence of volatile organic compounds in a soil sample. Values are reported as benzene equivalent units in parts per million (ppm) unless noted otherwise.

Rock Quality Designation (RQD) - A qualitative index measure of the degree of jointing and fracture of a rock core taken from a borehole. The RQD is defined as the sum length of solid core pieces 4 inches or longer divided by the run (cored) length, expressed as a percentage. Higher RQD values may indicate fewer joints and fractures in the rock mass.

Fill (Made Ground) - A deposit of soil and/or artificial waste materials that has been placed or altered by human processes.

LABORATORY TESTS AND FIELD MEASUREMENTS

MC	Moisture Content
OC	Organic Content
PL	Plastic Limit
LL	Liquid Limit
GC	Gravel Content
SC	Sand Content
FC	Fines Content
DS	Direct Shear
IC	1D Incremental Consolidation
VS	Laboratory Vane Shear
US	Unconfined Compression
TC	Triaxial Compression
PP	Pocket (Hand) Penetrometer
TV	Torvane (Hand Vane)
PID	Photoionization Detector
FID	Flame Ionization Detector

BORING ADVANCEMENT METHODS

Hollow-Stem Auger Drilling - Utilizes continuous flight auger sections with hollow stems to advance the borehole. Drill rods and a plug are inserted into the auger stem to prevent the entrance of soil cuttings into the augers.

Rotary Wash Drilling - Utilizes downward pressure and rotary action applied to a non-coring bit while washing the cuttings to the surface using a circulating fluid injected down the drill rods. The borehole is supported with either steel casing or the drilling fluid. Where a casing is used, the borehole is advanced sequentially by driving the casing to the desired depth and then cleaning out the casing. The process of driving and cleaning the casing is commonly referred to as the 'drive-and-wash' technique.

Continuous Sampling - Includes a variety of methods and procedures during which the borehole is advanced via continuous recovery of soil samples. *Direct Push* sampling is a common method that uses static downward pressure combined with percussive energy to drive a steel mandrel into the ground at continuous intervals while recovering soil samples in disposable acetate liners.

Rock Coring - Utilizes downward pressure and rotary action applied to a core barrel equipped with a diamond-set or tungsten carbide coring bit. During conventional coring, the entire barrel is retrieved from the hole upon completion of a core run. Wireline coring allows for removal of the inner barrel assembly containing the actual core while the the drill rods and outer barrel remain in the hole. Various types and sizes of core barrels and bits are used.

GUIDE TO SUBSURFACE EXPLORATION LOGS

Weston & Sampson℠

INDEX SHEET 2
SOIL DESCRIPTION

SOIL CONSTITUENTS

Naturally occurring soils consist of one or more of the following matrix constituents defined in terms of particle size.

Constituent		U.S. Sieve Size			Observed Size (in.)		
Gravel	(Coarse)	3/4 in.	-	3 in.	3/4	-	3
Gravel	(Fine)	No. 4	-	3/4 in.	1/5	-	3/4
Sand	(Coarse)	No. 10	-	No. 40	1/16	-	1/5
Sand	(Medium)	No. 40	-	No. 10	1/64	-	1/16
Sand	(Fine)	No. 200	-	No. 40	1/300	-	1/64
Fines	(Silt or Clay)	Smaller than		No. 200	Less than		1/300

SOIL IDENTIFICATION

Soil identification refers to the grouping of soils with similar physical characteristics into a category defined by a **group name** and corresponding **group symbol** based on estimation of the matrix soil constituents to the nearest 5% and simple manual tests. Proportions of cobbles, boulders, and other non-matrix soil materials are not considered during this procedure but are included in the overall soil description if observed or thought to be present. Refer to the following descriptions and tables adapted from ASTM D2488.

Coarse-Grained Soil - Coarse-grained soils contain fewer than 50% fines and are identified based on the following table.

Primary Constituent	Fines Percent	Type of Fines and Gradation		Group Symbol	Group Name [1]
GRAVEL *% gravel > % sand*	≤ 5%	well graded		GW	Well graded gravel
		poorly graded		GP	Poorly graded gravel
	10%	clayey fines	well graded	GW-GC	Well graded gravel with clay
			poorly graded	GP-GC	Poorly graded gravel with clay
		silty fines	well graded	GW-GM	Well graded gravel wth silt
			poorly graded	GP-GM	Poorly graded gravel with silt
	15% to 45%	clay fines		GC	Clayey gravel
		silt fines		GM	Silty gravel
SAND *% sand ≥ % gravel*	≤ 5%	well graded		SW	Well graded sand
		poorly graded		SP	Poorly graded sand
	10%	clayey fines	well graded	SW-SC	Well graded sand with clay
			poorly graded	SP-SC	Poorly graded sand with clay
		silty fines	well graded	SW-SM	Well graded sand with silt
			poorly graded	SP-SM	Poorly graded sand with silt
	15% to 45%	clay fines		SC	Clayey sand
		silt fines		SM	Silty sand

[1] If soil is a gravel and contains 15% or more sand, add "with sand" to the group name. If soil is a sand and contains 15% of more gravel, add "with gravel" to the group name.

Inorganic Fine-Grained Soil - Fine-grained soils contain 50% or more fines and are identified based on the following table.

Plasticity Criteria	Dry Strength	Coarse Fraction S = Sand, G = Gravel		Group Symbol	Group Name [1]
Medium	Medium to high	< 15% S + G		CL	Lean clay
		≥ 30%	% S ≥ % G	CL	Sandy lean clay
		S + G	% S < % G	CL	Gravelly lean clay
Non-plastic	None to low	< 15% S + G		ML	Silt
		≥ 30%	% S ≥ % G	ML	Sandy silt
		S + G	% S < % G	ML	Gravelly silt
High	High to very high	< 15% S + G		CH	Fat clay
		≥ 30%	% S ≥ % G	CH	Sandy fat clay
		S + G	% S < % G	CH	Gravelly fat clay
Low to Medium	Low to medium	< 15% S + G		MH	Elastic silt
		≥ 30%	% S ≥ % G	MH	Sandy elastic silt
		S + G	% S < % G	MH	Gravelly elastic silt

[1] If soil contains 15% to 25% sand or gravel, add "with sand" or "with gravel" to the group name.

Organic Fine-Grained Soil - Fine-grained soils that contain enough organic particles to influence the soil properties are identified as Organic Soil and assigned the group symbol **OL** or **OH**.

Highly Organic Soil (Peat) - Soils composed primarily of plant remains in various stages of decomposition are identified as Peat and given the group symbol **PT**. Peat usually has an organic odor, a dark brown to black color, and a texture ranging from fibrous (original plant structure intact or mostly intact) to amorphous (plant structure decomposed to fine particles).

SOIL DESCRIPTION

Soils are *described* in the following general sequence. Deviations may occur in some instances.

Identification Components

(1) Group Name and Group Symbol

Description Components

(2) Consistency (Fine-Grained) or Apparent Density (Coarse-Grained)
(3) Color (*note, the term "to" may be used to indicate a gradational change*)
(4) Soil Moisture
(5) Matrix Soil Constituents (Gravel, Sand, Fines)
  └► Proportion (*by weight*), particle size, plasticity of fines, angularity, etc.
(6) Non-Matrix Soil Materials and Proportions (*by volume*)
(7) Other Descriptive Information (Unusual Odor, Structure, Texture, etc.)
(8) [Geologic Formation Name or Soil Survey Unit]

SPT N-VALUE CORRELATIONS

Consistency	SPT N-Value	Apparent Density	SPT N-Value
Very soft	0 - 2	Very loose	0 - 5
Soft	2 - 4	Loose	5 - 10
Medium stiff	4 - 8	Medium dense	10 - 30
Stiff	8 - 15	Dense	30 - 50
Very stiff	15 - 30	Very dense	> 50
Hard	> 30		

SOIL MOISTURE

Dry..... Apparent absence of moisture; dry to the touch.
Moist..... Damp but no visible water.
Wet..... Visible free water; saturated.

PROPORTIONS / PERCENTAGES

Proportions of gravel, sand, and fines (excluding cobbles, boulders, and other constituents) are stated in the following terms indicating a range of percentages by weight (to nearest 5%) of the minus 3-in. soil fraction and add up to 100%.

Mostly ..... 50% - 100%
Some ..... 30% - 45%
Little ..... 15% - 25%
Few ..... 5% - 10%
Trace..... Less than 5%

Proportions of cobbles, boulders, and other non-matrix soil materials including artificial debris, roots, plant fibers, etc. are stated in the following terms indicating a range of percentages by volume (to the nearest 5%) of the total soil.

Numerous ..... 40% - 50%
Common ..... 25% - 35%
Occasional ..... 10% - 20%
Trace..... Less than 5%

PLASTICITY (FINES ONLY)

Non-plastic.....Dry specimen ball falls apart easily. Cannot be rolled into thread at any moisture content.
Low.....Dry specimen ball easily crushed with fingers. Can be rolled into 1/8-in. thread with some difficulty.
Medium.....Difficult to crush dry specimen ball with fingers. Easily rolled into 1/8-in. thread.
High.....Cannot crush dry specimen ball with fingers. Easily rolled and re-rolled into 1/8-in. thread.

COBBLES AND BOULDERS

Cobbles - Particles of rock that will pass a 12-in. square opening and be retained on a 3-in. sieve.

Boulders - Particles of rock that will not pass a 12-in. square opening.

Note: Where the percentage (by volume) of cobbles and/or boulders cannot be accurately or reliably estimated, the terms "with cobbles", "with boulders", or "with cobbles and boulders" may be used to indicate observed or inferred presence.

GUIDE TO SUBSURFACE EXPLORATION LOGS

Weston & Sampson℠

INDEX SHEET 3
ROCK DESCRIPTION

ROCK DEFINITION

Where reported on an exploration log, *rock* is defined as any naturally formed aggregate of mineral matter occurring in larges masses or fragments. This definition of rock should not be taken as a replacement for any definitions relating to rock and/or rock excavation defined in construction documents. Intensely weathered or decomposed rock that is friable and can be reduced to gravel size particles or smaller by normal hand pressure is identified and described as soil. Poorly indurated formational materials which display both rock-like and soil-like properties are identified and described as rock followed by the soil description. In such cases, the term "poorly indurated" or "weakly cemented" is added to the rock name (e.g. weakly cemented sandstone).

ROCK IDENTIFICATION

Rock is identified by a combination of *rock type* (igneous, metamorphic, or sedimentary) followed by the the *rock name* (e.g. granite, schist, sandstone).

ROCK DESCRIPTION

Rock descriptions are presented in the following general sequence. The detail of description is dictated by the complexity and objectives of the project.

Identification Components

(1) Rock Type and Name

Description Components

(2) Rock Grain Size (*for clastic sedimentary rock*)
(3) Crystal Size (*for igneous and metamorphic rock*)
(4) Bedding Spacing (*for sedimentary rock*)
(5) Color
(6) Hardness and Weathering Descriptors
(7) Fracture Density
(8) [Geologic Formation Name]

ROCK QUALITY DESIGNATION

$$\text{RQD (\%)} = \frac{\Sigma \text{ Length of intact core pieces} \geq 4 \text{ inches}}{\text{Total length of core run (inches)}} \times 100$$

The RQD should correlate with the fracture density in most cases. Higher RDQ values generally indicate fewer joints and fractures.

GRAIN / CRYSTAL SIZE

Grain Size for Clastic Sedimentary Rock

The names of clastic sedimentary rocks are generally based on their predominant clast or grain size (e.g. fine sandstone, medium sandstone, coarse gravel conglomerate, cobble conglomerate, siltstone, claystone).

Crystal Size for Igneous and Metamorphic Rock

Grain Size Description	Average Crystal Size (in.)
Very coarse grained (pegmatitic)	Greater than or equal to 3/8
Coarse-grained	Between 3/16 and 3/8
Medium-grained	Between 1/32 and 3/16
Fine-grained	Between 1/250 and 1/32
Aphanitic	Less than or equal to 1/250

BEDDING SPACING

Bedding Description	Thickness / Spacing
Massive	Less than 10 ft.
Very thickly bedded	3 ft. to 10 ft.
Thickly bedded	1 ft. to 3 ft.
Moderately bedded	4 in. to 1 ft.
Thinly bedded	1 in. to 4 in.
Very thinly bedded	1/4 in. to 1 in.
Laminated	Less than 1/4 in.

Note: Bedding is generally only applicable to sedimentary or bedded volcanic rocks.

HARDNESS

Hardness	Criteria
Extremely hard	Cannot be scratched with a pocketknife or sharp pick. Can only be chipped with repeated heavy hammer blows.
Very hard	Cannot be scratched with a pocketknife or sharp pick with difficulty. Breaks with repeated heavy hammer blows.
Hard	Can be scratched with with a pocketknife or sharp pick with difficulty. Breaks with heavy hammer blows.
Moderately hard	Can be scratched with a pocketknife or sharp pick with light or moderate pressure. Breaks with moderate hammer blows.
Moderately soft	Can be grooved 1/16 in. deep with a pocketknife or sharp pick with moderate or heavy pressure. Breaks with light hammer blow or heavy manual pressure.
Soft	Can be grooved or gouged easily with a pocketknife or sharp pick. Breaks with light to moderate manual pressure.
Very soft	Can be readily indented, grooved, or gouged with fingernail, or carved with a pocketknife. Breaks with light manual pressure.

WEATHERING (INTACT ROCK)

Weathering Description	Discoloration and/or Oxidation	General Characteristics
Fresh	Body of rock and fracture surfaces are not discolored or oxidized.	Rock texture unchanged. Hammer rings when crystalline rocks are struck.
Slightly weathered	Discoloration or oxidation limited to surface of, or short distance from, fractures. Most surfaces exhibit minor to complete discoloration.	Rock texture preserved. Hammer rings when crystalline rocks are struck. Body of rock not weakened.
Moderately weathered	Discoloration or oxidation extends usually throughout. Fe-Mg minerals appear rusty. All fracture surfaces are discolored or oxidized.	Rock texture generally preserved. Hammer does not ring when rock is struck. Body of rock slightly weakened.
Intensely weathered	Discoloration or oxidation throughout. Feldspar and Fe-Mg minerals altered to clay to some extent. All fracture surfaces are discolored or oxidized and friable.	Rock texture altered by chemical disintegration. Can usually be broken with moderate to heavy manual pressure or by light hammer blow . Body of rock is significantly weakened.
Decomposed	Discoloration or oxidation throughout but resistant minerals such as quartz may be unaltered. All feldspar and Fe-Mg minerals are completely altered to clay.	Resembles a soil; partial or complete remnant rock structure may be preserved. Can be granulated by hand. Resistant minerals may present as stringers or dikes.

FRACTURE DENSITY

Description	Observed Fracture Density
Unfractured	No fractures
Very slightly fractured	Core lengths greater than 3 ft.
Slightly fractured	Core lengths mostly from 1 ft. to 3 ft.
Moderately fractured	Core lengths mostly from 4 in. to 1 ft.
Intensely fractured	Core lengths mostly from 1 in. to 4 in.
Very intensely fractured	Mostly chips and fragments

Note: Fracture density is based on the fracture spacing in recovered core, measured along the core axis (excluding mechanical breaks).

Attachment C

Test Pit Logs

Weston & Sampson

Acton DPW and TS Facility

TEST PIT ID: TP-1

WSE Project: ENG24-1080

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**September 4, 2024**
OPERATOR:	**Mike Racard**	PLAN DIMENSIONS:	**Length: 12.0 ft. , Width: 7.0 ft.**	DATE FINISH:	**September 4, 2024**
LOGGED BY:	**Joseph Payson**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**196.5 ± (NAVD88)**
CHECKED BY:	**Carolyn Conlee, PE**	CAVING REMARKS:	**Moderate Caving Below 7.5 ft.**	FINAL DEPTH:	**7.5 ft.**
EQUIPMENT:	**Hydraulic Excavator, Medium**	BACKFILL MATERIAL:	**Excavated Soil**	GRID COORDS:	**N:2998208 ± / E:674762 ±**
BUCKET TYPE:	**Toothed, 30-in. (8.5 cubic-ft.)**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
			Surface: Forest debris.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
			Topsoil- 8" thick topsoil, common roots.		
	G		**Silty sand with gravel (SM)** - Brown; moist; some fine SAND, some fine and coarse gravel, little non plastic fines; trace roots. **[SUBSOIL]**		
	G		**Poorly graded sand with gravel (SP)** - Tan; mostly fine to coarse SAND, some fine and coarse gravel, trace non plastic fines; numerous cobbles and occasional boulders. *Iron oxide staining*		
5	G		**Poorly graded sand (SP)** - Tan with orange; moist; mostly fine to coarse SAND; iron oxide, occasional cobbles. *Iron oxide staining*	192	
	G		**Poorly graded sand with gravel (SP)** - Tan; mostly fine to coarse SAND, some fine and coarse gravel, trace non plastic fines.		
					Exploration ended at 7.5 ft.
10				187	
15				182	



Excavated Soil


Overview


Sidewall Profile

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

Acton DPW and TS Facility

TEST PIT ID: TP-2

WSE Project: ENG24-1080

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**September 4, 2024**
OPERATOR:	**Mike Racard**	PLAN DIMENSIONS:	**Length: 13.0 ft. , Width: 9.0 ft.**	DATE FINISH:	**September 4, 2024**
LOGGED BY:	**Joseph Payson**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**191.5 ± (NAVD88)**
CHECKED BY:	**Carolyn Conlee, PE**	CAVING REMARKS:	**No Caving Observed**	FINAL DEPTH:	**8.0 ft.**
EQUIPMENT:	**Hydraulic Excavator, Medium**	BACKFILL MATERIAL:	**Excavated Soil**	GRID COORDS:	**N:2998201 ± / E:674853 ±**
BUCKET TYPE:	**Toothed, 30-in. (8.5 cubic-ft.)**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
			Surface: Asphalt concrete pavement.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
	G		Asphalt- 4" thick asphalt concrete.		
	G		**Silty sand with gravel (SM)** - Black; moist; some fine to coarse SAND, some fine and coarse gravel, little non plastic fines. **[FILL]**		
			Poorly graded sand with gravel (SP) - Tan; moist; mostly fine to coarse SAND, some fine and coarse gravel, trace non plastic fines.		
	G		*Common cobbles and occasional boulders*		
			Poorly graded sand with gravel (SP) - Brown; mostly fine to coarse SAND, little fine to coarse gravel, trace non plastic fines.		
	G				
5				187	
	G		**Poorly graded sand with gravel (SP)** - Tan with brown; moist; mostly fine to coarse SAND, little fine and coarse gravel, trace non plastic fines.		
					Exploration ended at 8.0 ft.
10				182	
15				177	



Excavated Soil



Overview



Sidewall Profile

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

Acton DPW and TS Facility

TEST PIT ID: TP-3

WSE Project: ENG24-1080

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**September 4, 2024**
OPERATOR:	**Mike Racard**	PLAN DIMENSIONS:	**Length: 12.0 ft. , Width: 5.0 ft.**	DATE FINISH:	**September 4, 2024**
LOGGED BY:	**Joseph Payson**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**193.5 ± (NAVD88)**
CHECKED BY:	**Carolyn Conlee, PE**	CAVING REMARKS:	**Moderate Caving Below 7.0 ft.**	FINAL DEPTH:	**7.0 ft.**
EQUIPMENT:	**Hydraulic Excavator, Medium**	BACKFILL MATERIAL:	**Excavated Soil**	GRID COORDS:	**N:2998174 ± / E:674941 ±**
BUCKET TYPE:	**Toothed, 30-in. (8.5 cubic-ft.)**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
			Surface: Forest debris.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
			Topsoil- 9" thick topsoil, common roots.		
	G		**Silty sand with gravel (SM)** - Tan; moist; mostly fine to coarse SAND, some non plastic fines, little fine and coarse gravel; trace roots, common cobbles. **[SUBSOIL]**		
	G		**Poorly graded sand with gravel (SP)** - Tan; mostly fine to coarse SAND, little fine gravel, trace non plastic fines.		
	G		**Poorly graded sand with gravel (SP)** - Gray; mostly fine to coarse SAND, little fine gravel, trace non plastic fines.		
5	G		**Poorly graded sand (SP)** - Tan and orange; moist; mostly fine SAND, trace non plastic fines; iron oxide. *Iron oxide staining*	189	
					Exploration ended at 7.0 ft.
10				184	
15				179	



Excavated Soil



Overview

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

Acton DPW and TS Facility

TEST PIT ID: TP-4

WSE Project: ENG24-1080

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**September 4, 2024**
OPERATOR:	**Mike Racard**	PLAN DIMENSIONS:	**Length: 10.0 ft. , Width: 10.0 ft.**	DATE FINISH:	**September 4, 2024**
LOGGED BY:	**Joseph Payson**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**190.0 ± (NAVD88)**
CHECKED BY:	**Carolyn Conlee, PE**	CAVING REMARKS:	**Moderate Caving Below 7.0 ft.**	FINAL DEPTH:	**7.0 ft.**
EQUIPMENT:	**Hydraulic Excavator, Medium**	BACKFILL MATERIAL:	**Excavated Soil**	GRID COORDS:	**N:2998099 ± / E:674987 ±**
BUCKET TYPE:	**Toothed, 30-in. (8.5 cubic-ft.)**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
			Surface: Forest debris.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
	G		Topsoil- 1" thick topsoil, common roots. **Silty sand with gravel (SM)** - Gray; moist; mostly fine to coarse SAND, little non plastic fines, little fine gravel; common cobbles and boulders, trace roots. **[FILL]**		
	G		Topsoil- 6" thick, trace roots.		
	G		**Poorly graded sand with gravel (SP)** - Brown; moist; mostly fine to coarse SAND, little fine and coarse gravel, trace non plastic fines; occasional cobbles.		
5	G		**Poorly graded sand (SP)** - Brown; moist; mostly fine to coarse SAND, few fine gravel, trace non plastic fines.	185	
					Caving at 7.0 ft. (exploration ended).
10				180	
15				175	



Overview



Sidewall Profile

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

Acton DPW and TS Facility

TEST PIT ID: TP-5

WSE Project: ENG24-1080

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**September 5, 2024**
OPERATOR:	**Mike Racard**	PLAN DIMENSIONS:	**Length: 11.0 ft. , Width: 7.0 ft.**	DATE FINISH:	**September 5, 2024**
LOGGED BY:	**Joseph Payson**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**191.0 ± (NAVD88)**
CHECKED BY:	**Carolyn Conlee, PE**	CAVING REMARKS:	**No Caving Observed**	FINAL DEPTH:	**9.0 ft.**
EQUIPMENT:	**Hydraulic Excavator, Medium**	BACKFILL MATERIAL:	**Excavated Soil**	GRID COORDS:	**N:2998057 ± / E:674965 ±**
BUCKET TYPE:	**Toothed, 30-in. (8.5 cubic-ft.)**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
			Surface: Asphalt concrete pavement.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
	G		Asphalt- 4" thick asphalt concrete.		
	G		**Poorly graded sand with silt and gravel (SP-SM)** - Black; moist; mostly fine to coarse SAND, some fine and coarse gravel, few non plastic fines. **[FILL]**		
	G		Topsoil- 3" thick.		
	G		**Poorly graded sand with silt and gravel (SP-SM)** - Brown with orange; moist; some fine to coarse SAND, some fine and coarse gravel, few non plastic fines; common cobbles, occasional boulders, and trace roots. **[SUBSOIL]**		
	G		**Silty sand (SM)** - Tan; moist; mostly fine SAND, some non plastic fines, few fine gravel; occasional cobbles. *Iron oxide staining*		
5	G		**Poorly graded sand with gravel (SP)** - Gray; mostly medium to coarse SAND, little fine and coarse gravel, trace non plastic fines; trace cobbles.	186	
	G		**Poorly graded sand (SP)** - Tan with orange; moist; mostly fine to coarse SAND, trace non plastic fines. *Iron oxide staining*		
10				181	**Exploration ended at 9.0 ft.**
15				176	



Overview



Sidewall Profile

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

Acton DPW and TS Facility

TEST PIT ID: TP-6

WSE Project: ENG24-1080

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**September 5, 2024**
OPERATOR:	**Mike Racard**	PLAN DIMENSIONS:	**Length: 12.0 ft. , Width: 6.0 ft.**	DATE FINISH:	**September 5, 2024**
LOGGED BY:	**Joseph Payson**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**191.0 ± (NAVD88)**
CHECKED BY:	**Carolyn Conlee, PE**	CAVING REMARKS:	**No Caving Observed**	FINAL DEPTH:	**10.0 ft.**
EQUIPMENT:	**Hydraulic Excavator, Medium**	BACKFILL MATERIAL:	**Excavated Soil**	GRID COORDS:	**N:2998105 ± / E:674901 ±**
BUCKET TYPE:	**Toothed, 30-in. (8.5 cubic-ft.)**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
			Surface: Asphalt concrete pavement.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
	G		Asphalt- 3" asphalt concrete.		
	G		**Poorly graded sand with gravel (SP)** - Tan; moist; mostly fine to medium SAND, little fine and coarse gravel, trace non plastic fines; common cobbles and occasional boulders. **[FILL]**		
			Poorly graded sand with silt and gravel (SP-SM) - Mostly fine to coarse SAND, little fine and coarse gravel, few non plastic fines; common cobbles, occasional boulders, trace wood. **[FILL]**		
			Topsoil- 3" thick.		
	G		**Silty sand with gravel (SM)** - Mostly fine to coarse SAND, little fine and coarse gravel, little non plastic fines; common cobbles and trace boulders.		
5				186	
	G		**Poorly graded sand with silt (SP-SM)** - Tan; moist; mostly fine SAND, few non plastic fines.		
	G		**Poorly graded sand with gravel (SP)** - Light brown; moist; mostly medium to coarse SAND, some fine and coarse gravel, trace non plastic fines; occasional cobbles.		
10				181	**Exploration ended at 10.0 ft.**
15				176	



Excavated Soil



Overview



Sidewall Profile

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

Acton DPW and TS Facility

TEST PIT ID: TP-7

WSE Project: ENG24-1080

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**September 4, 2024**
OPERATOR:	**Mike Racard**	PLAN DIMENSIONS:	**Length: 12.0 ft. , Width: 7.0 ft.**	DATE FINISH:	**September 4, 2024**
LOGGED BY:	**Joseph Payson**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**191.0 ± (NAVD88)**
CHECKED BY:	**Carolyn Conlee, PE**	CAVING REMARKS:	**No Caving Observed**	FINAL DEPTH:	**9.5 ft.**
EQUIPMENT:	**Hydraulic Excavator, Medium**	BACKFILL MATERIAL:	**Excavated Soil**	GRID COORDS:	**N:2998134 ± / E:674835 ±**
BUCKET TYPE:	**Toothed, 30-in. (8.5 cubic-ft.)**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
			Surface: Asphalt concrete pavement.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
			Asphalt- 6 inches thick.		
	G		**Poorly graded sand with gravel (SP)** - Tan; moist; mostly fine to coarse SAND, some fine and coarse gravel, trace non plastic fines. **[FILL]**		
	G		**Poorly graded sand with silt and gravel (SP-SM)** - Brown; moist; mostly fine to coarse SAND, little fine and coarse gravel, few non plastic fines. **[FILL]**		
	G		Topsoil- 6" thick.		
	G		**Poorly graded sand with gravel (SP)** - Brown; moist; mostly fine to coarse SAND, some fine and coarse gravel, trace non plastic fines.		
5	G			186	
	G		**Poorly graded sand (SP)** - Light tan; moist; mostly fine to medium SAND.		
	G		**Poorly graded sand with gravel (SP)** - Brown with orange; moist; mostly fine to coarse SAND, little fine to coarse gravel, trace non plastic fines; iron oxide. *Change color to dark gray* *Change color to gray with brown*		
10				181	**Exploration ended at 9.5 ft.**
15				176	



Excavated Soil



Overview



Sidewall Profile

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

Acton DPW and TS Facility

TEST PIT ID: TP-8

WSE Project: ENG24-1080

14 Forest Road, Acton, MA

CONTRACTOR:	**Excavated by Town DPW**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**September 5, 2024**
OPERATOR:	**Mike Racard**	PLAN DIMENSIONS:	**Length: 12.0 ft. , Width: 11.5 ft.**	DATE FINISH:	**September 5, 2024**
LOGGED BY:	**Joseph Payson**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**195.0 ± (NAVD88)**
CHECKED BY:	**Carolyn Conlee, PE**	CAVING REMARKS:	**No Caving Observed**	FINAL DEPTH:	**10.0 ft.**
EQUIPMENT:	**Hydraulic Excavator, Medium**	BACKFILL MATERIAL:	**Excavated Soil**	GRID COORDS:	**N:2998116 ± / E:674596 ±**
BUCKET TYPE:	**Toothed, 30-in. (8.5 cubic-ft.)**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (MA)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
			Surface: Asphalt concrete pavement.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
	G		Asphalt- 4" asphalt concrete.		
	G		**Poorly graded sand with silt (SP-SM)** - Brown; moist; mostly fine to medium SAND, few fine and coarse gravel, few non plastic fines; common cobbles. **[FILL]**		
	G		**Silty sand with gravel (SM)** - Dark brown; moist; mostly fine to medium SAND, some fine and coarse gravel, little non plastic fines; occasional cobbles. **[FILL]**		
	G		Topsoil- 2" thick.		
			Silty sand with gravel (SM) - Brown; moist; mostly fine to medium SAND, some fine and coarse gravel, little non plastic fines; common cobbles. **[SUBSOIL]**		
5	G		**Poorly graded gravel with sand (GP)** - Brown; moist; mostly fine and coarse GRAVEL, some medium to coarse sand, trace non plastic fines; occasional cobbles.	190	
	G		**Poorly graded sand (SP)** - Tan; moist; mostly fine to medium SAND, trace non plastic fines.		
10				185	**Exploration ended at 10.0 ft.**
15				180	



Overview



Sidewall Profile

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Attachment D

Laboratory Test Results

Thielsch
DIVISION OF THE RISE GROUP

195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
thielsch.com
Let's Build a Solid Foundation

Client Information:		Project Information:	
Weston & Sampson		**Acton DPW**	
Reading, MA		**Acton, MA**	
Project Manager:	Carolyn Conlee	Project Number:	ENG23-0187
Assigned By:	Carolyn Conlee	Summary Page:	1 of 1
Collected By:	Client	Report Date:	10/11/2024

LABORATORY TESTING DATA SHEET, Report No.: 7424-K-B007

Boring ID	Sample No.	Depth (ft)	Laboratory No.	Identification Tests								Proctor / CBR / Permeability Tests								Laboratory Log and Soil Description
				As Rcvd Moisture Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	pH	g_d MAX (pcf) W_{opt} (%)	g_d MAX (pcf) W_{opt} (%) (Corr.)	Dry unit wt. (pcf)	Test Moisture Content %	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318		D6913			D2974	D4792	D1557								
B-1	S-2	2-4	24-S-B1461				40.9	47.7	11.4											Brown f-c SAND and f-c GRAVEL, little Silt
B-2	S-3	5-7	24-S-B1462				39.4	50.3	10.3											Light Brown f-c SAND and f-c GRAVEL, little Silt
B-3	S-1A	0-2	24-S-B1463				47.4	45.6	7.0											Brown f-c GRAVEL and f-c SAND, trace Silt
B-3	S-4	10-12	24-S-B1464				43.6	50.1	6.3											Brown f-c GRAVEL and f-c SAND, trace Silt
B-3	S-9	35-37	24-S-B1465				0.0	95.1	4.9											Brown-Orange f-m SAND, trace Silt
B-4	S-3	5-7	24-S-B1466				46.6	45.2	8.2											Light Brown f-c GRAVEL and f-c SAND, trace Silt
B-5	S-3	5-7	24-S-B1467				3.9	90.1	6.0											Brown f-m SAND, trace Silt, trace fine Gravel
B-6	S-4	10-12	24-S-B1468				3.1	94.1	2.8											Brown f-m SAND, trace Silt, trace fine Gravel

Date Received: **10/4/2024** Reviewed By: Ronelle LeBlanc Date Reviewed: **10/11/2024**

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This report shall not be reproduced, except in full, without prior written approval from the Agency, as defined in ASTM E329.

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspect and/or tested. No warranty, expressed or implied, is made.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	17.1	23.8	7.6	21.8	18.3	11.4	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	82.9		
3/4"	82.9		
1/2"	73.7		
3/8"	66.5		
#4	59.1		
#10	51.5		
#20	39.8		
#40	29.7		
#60	23.0		
#100	17.3		
#200	11.4		

* (no specification provided)

Source of Sample: B-1 Depth: 2-4'
Sample Number: S-2

Soil Description

Brown f-c SAND and f-c GRAVEL, little Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 31.5022 D_{85}= 28.2743 D_{60}= 5.2536
D_{50}= 1.7553 D_{30}= 0.4338 D_{15}= 0.1168
D_{10}= C_u= C_c=

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Date: 10/10/2024

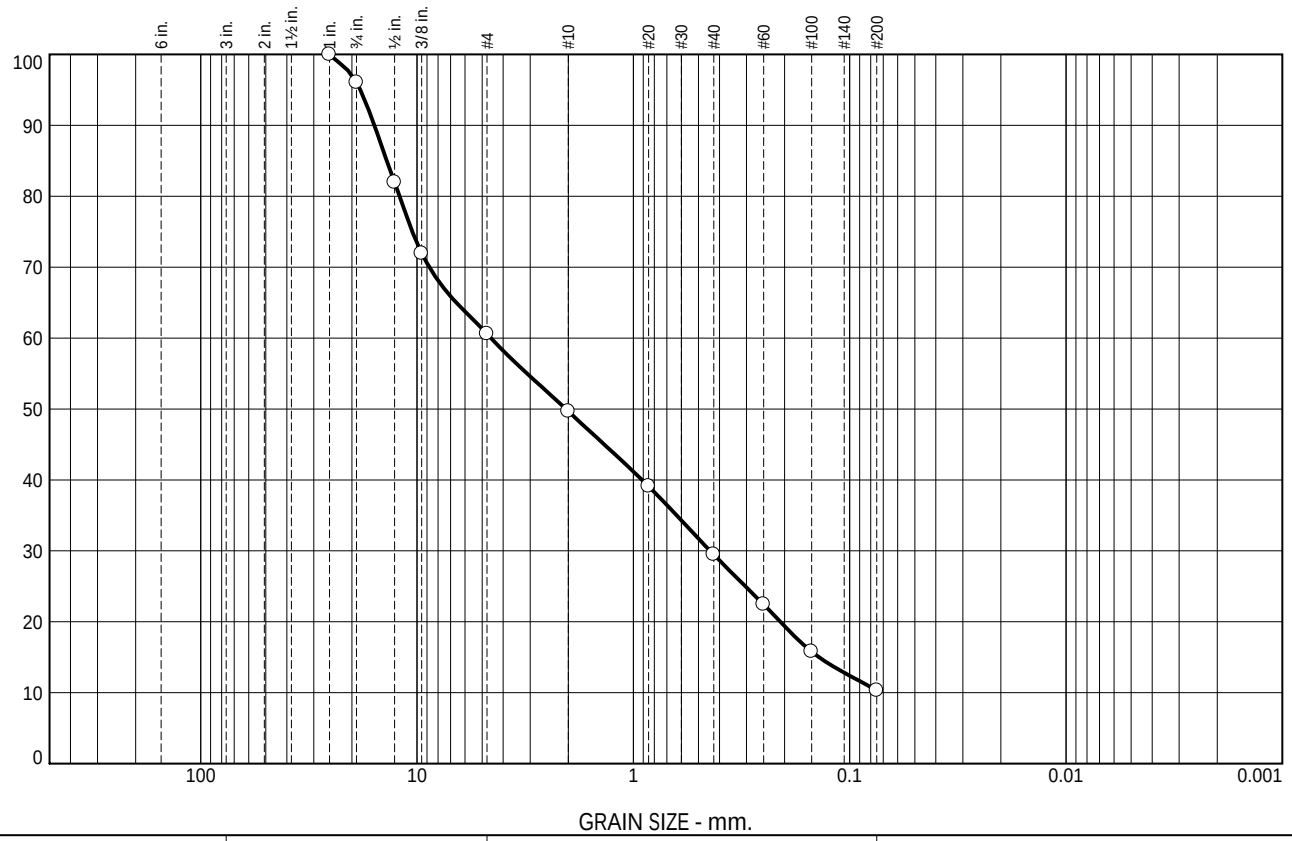
Thielsch Engineering Inc.
Cranston, RI

Client: Weston & Sampson
Project: Acton DPW
Acton, MA
Project No: ENG23-0187 Figure 24-S-B1461

Tested By: SF / MA Checked By: Ronelle LeBlanc

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Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.9	35.5	10.9	20.2	19.2	10.3	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	96.1		
1/2"	82.0		
3/8"	72.0		
#4	60.6		
#10	49.7		
#20	39.1		
#40	29.5		
#60	22.4		
#100	15.8		
#200	10.3		

* (no specification provided)

Soil Description

Light Brown f-c SAND and f-c GRAVEL, little Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 15.7481 D_{85}= 13.8037 D_{60}= 4.5550
D_{50}= 2.0509 D_{30}= 0.4419 D_{15}= 0.1386
D_{10}= C_u= C_c=

Classification

USCS= SP-SM AASHTO= A-1-a

Remarks

Source of Sample: B-2 Depth: 5-7'
Sample Number: S-3

Date: 10/10/2024

Thielsch Engineering Inc.

Cranston, RI

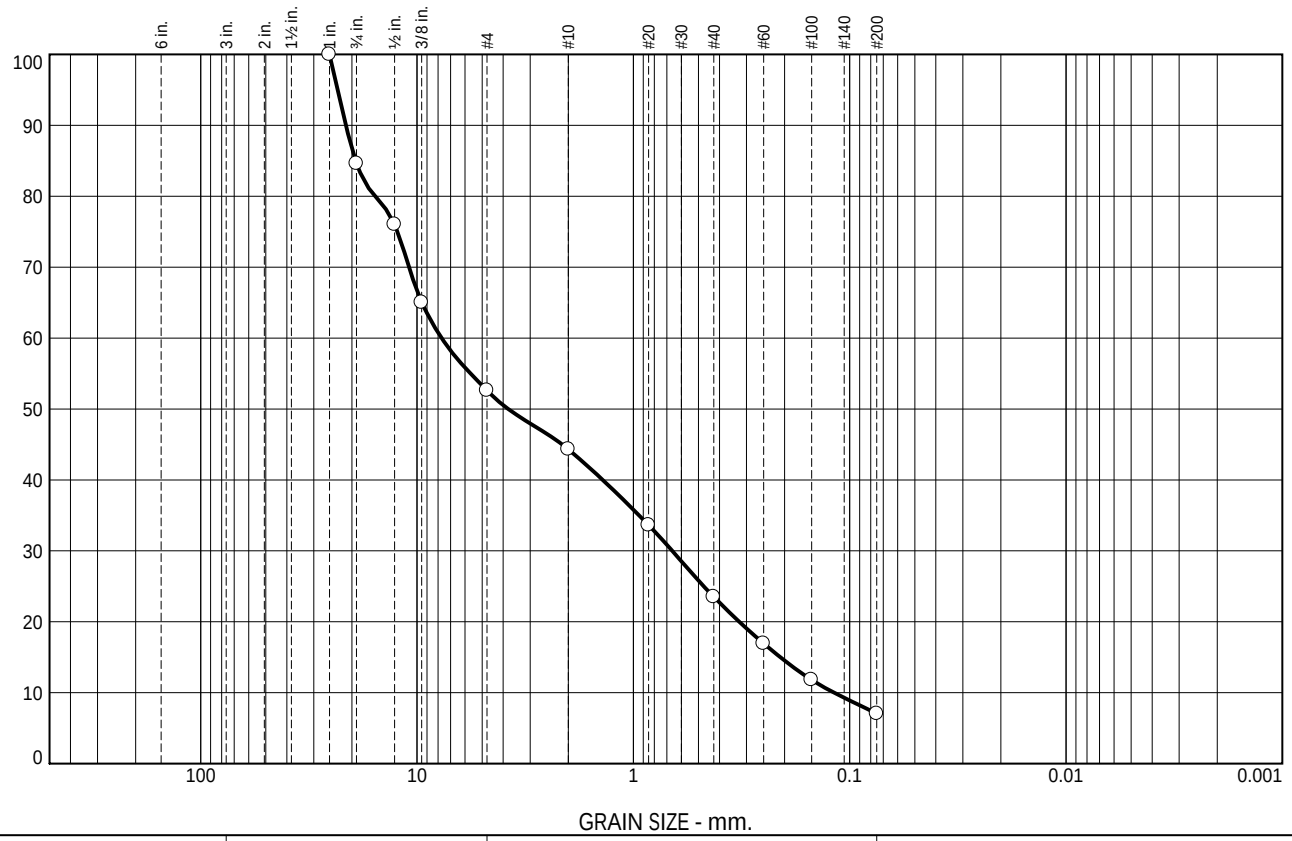
Client: Weston & Sampson
Project: Acton DPW
Acton, MA
Project No: ENG23-0187

Figure 24-S-B1462

Tested By: SF / MA Checked By: Ronelle LeBlanc

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Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	15.4	32.0	8.3	20.8	16.5	7.0	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	84.6		
1/2"	76.0		
3/8"	65.0		
#4	52.6		
#10	44.3		
#20	33.6		
#40	23.5		
#60	16.9		
#100	11.8		
#200	7.0		

* (no specification provided)

Soil Description

Brown f-c GRAVEL and f-c SAND, trace Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 21.3322 D_{85}= 19.2379 D_{60}= 7.6997
D_{50}= 3.7858 D_{30}= 0.6612 D_{15}= 0.2093
D_{10}= 0.1181 C_u= 65.19 C_c= 0.48

Classification

USCS= GP-GM AASHTO= A-1-a

Remarks

Source of Sample: B-3 Depth: 0-2'
Sample Number: S-1A

Date: 10/10/2024

Thielsch Engineering Inc.
Cranston, RI

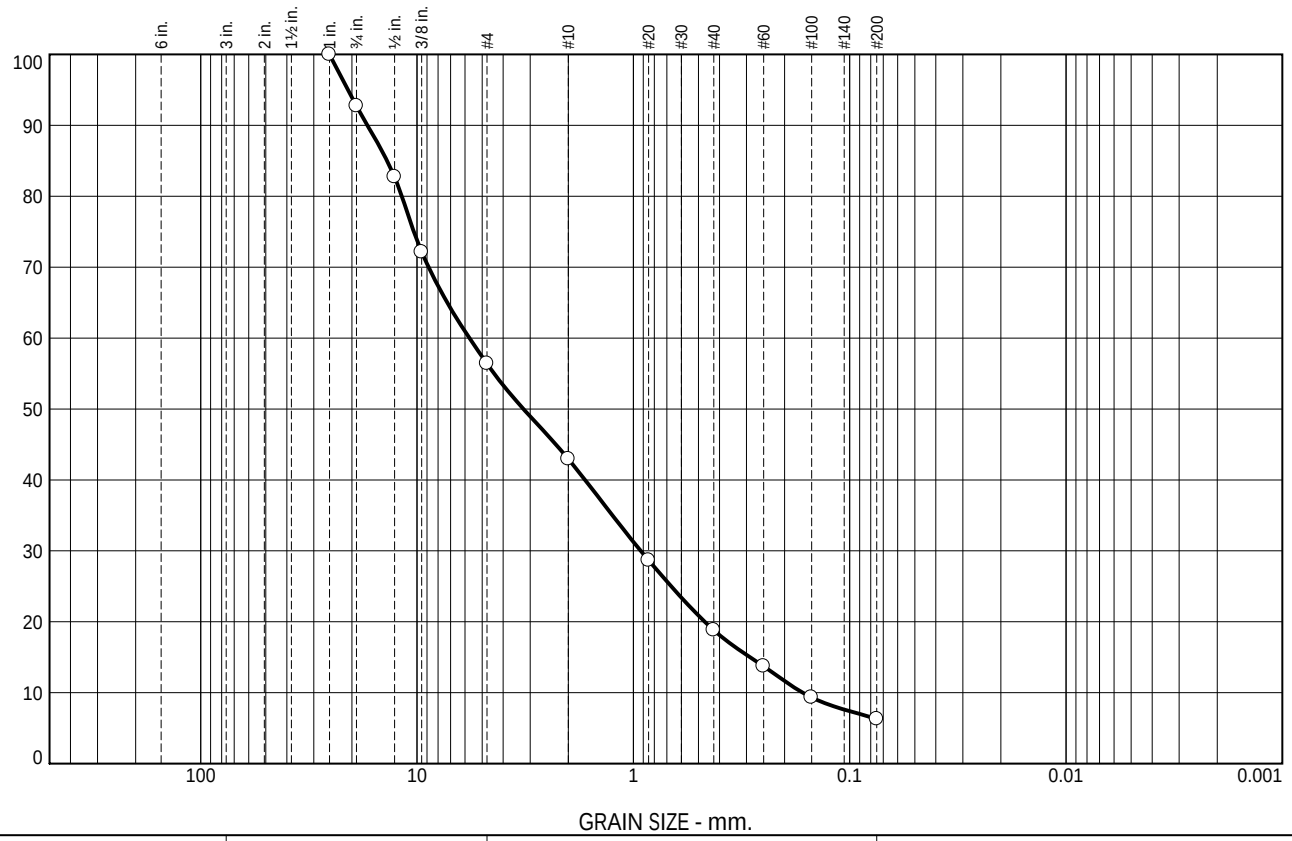
Client: Weston & Sampson
Project: Acton DPW
Acton, MA
Project No: ENG23-0187

Figure 24-S-B1463

Tested By: SF / MA Checked By: Ronelle LeBlanc

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspect and/or tested. No warranty, expressed or implied, is made.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.3	36.3	13.4	24.2	12.5	6.3	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	92.7		
1/2"	82.7		
3/8"	72.1		
#4	56.4		
#10	43.0		
#20	28.7		
#40	18.8		
#60	13.7		
#100	9.3		
#200	6.3		

* (no specification provided)

Soil Description

Brown f-c GRAVEL and f-c SAND, trace Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 16.9671 D_{85}= 13.7448 D_{60}= 5.7242
D_{50}= 3.2212 D_{30}= 0.9251 D_{15}= 0.2887
D_{10}= 0.1649 C_u= 34.72 C_c= 0.91

Classification

USCS= SP-SM AASHTO= A-1-a

Remarks

Source of Sample: B-3 Depth: 10-12'
Sample Number: S-4

Date: 10/10/2024

Thielsch Engineering Inc.
Cranston, RI

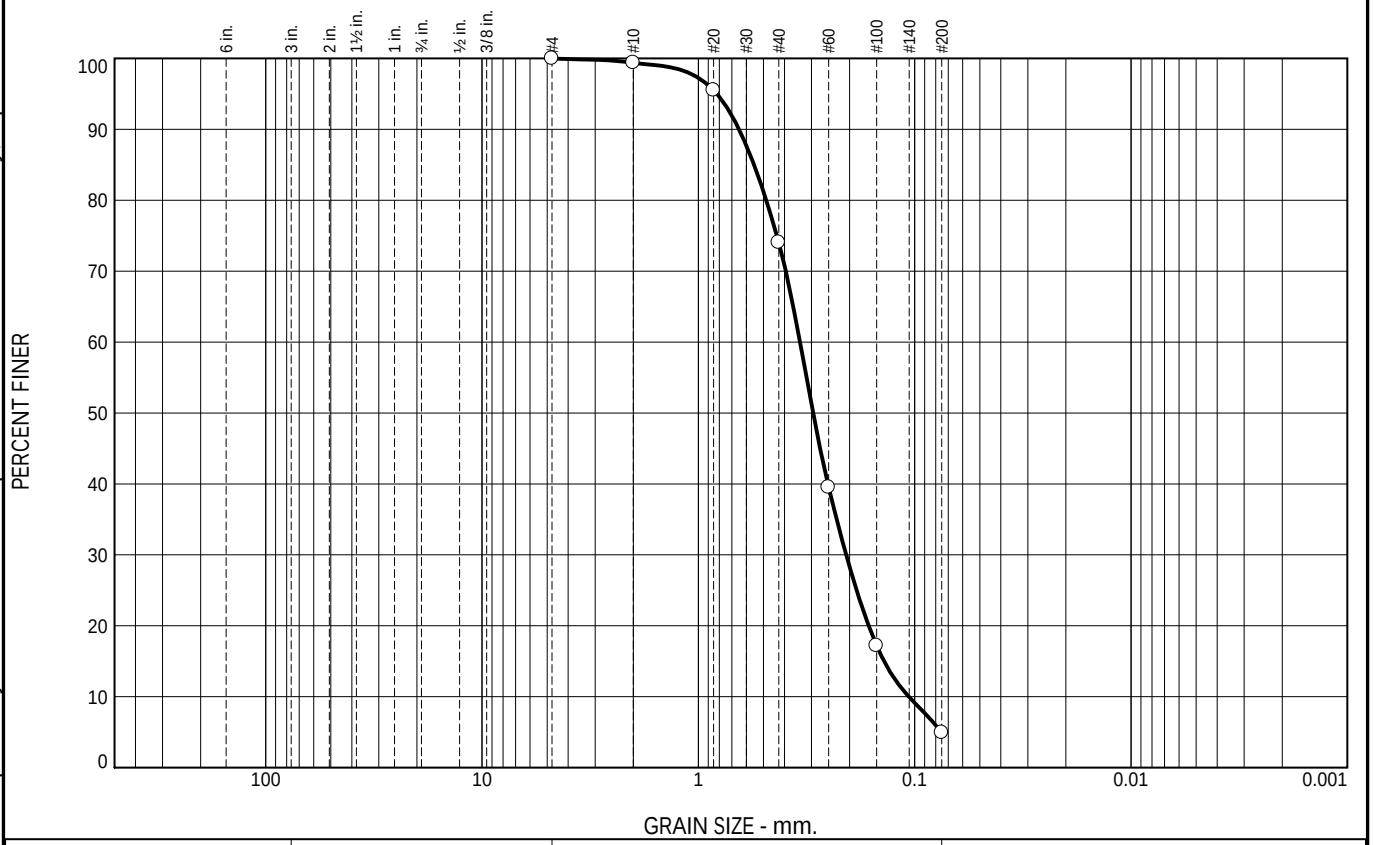
Client: Weston & Sampson
Project: Acton DPW
Acton, MA
Project No: ENG23-0187

Figure 24-S-B1464

Tested By: SF / MA Checked By: Ronelle LeBlanc

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspect and/or tested. No warranty, expressed or implied, is made.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.6	25.4	69.1	4.9	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.4		
#20	95.5		
#40	74.0		
#60	39.5		
#100	17.2		
#200	4.9		

* (no specification provided)

Soil Description

Brown-Orange f-m SAND, trace Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.6487 D_{85}= 0.5529 D_{60}= 0.3390
D_{50}= 0.2948 D_{30}= 0.2074 D_{15}= 0.1387
D_{10}= 0.1065 C_u= 3.18 C_c= 1.19

Classification

USCS= SP AASHTO= A-3

Remarks

Source of Sample: B-3 Depth: 35-37'
Sample Number: S-9

Date: 10/10/2024

Thielsch Engineering Inc.
Cranston, RI

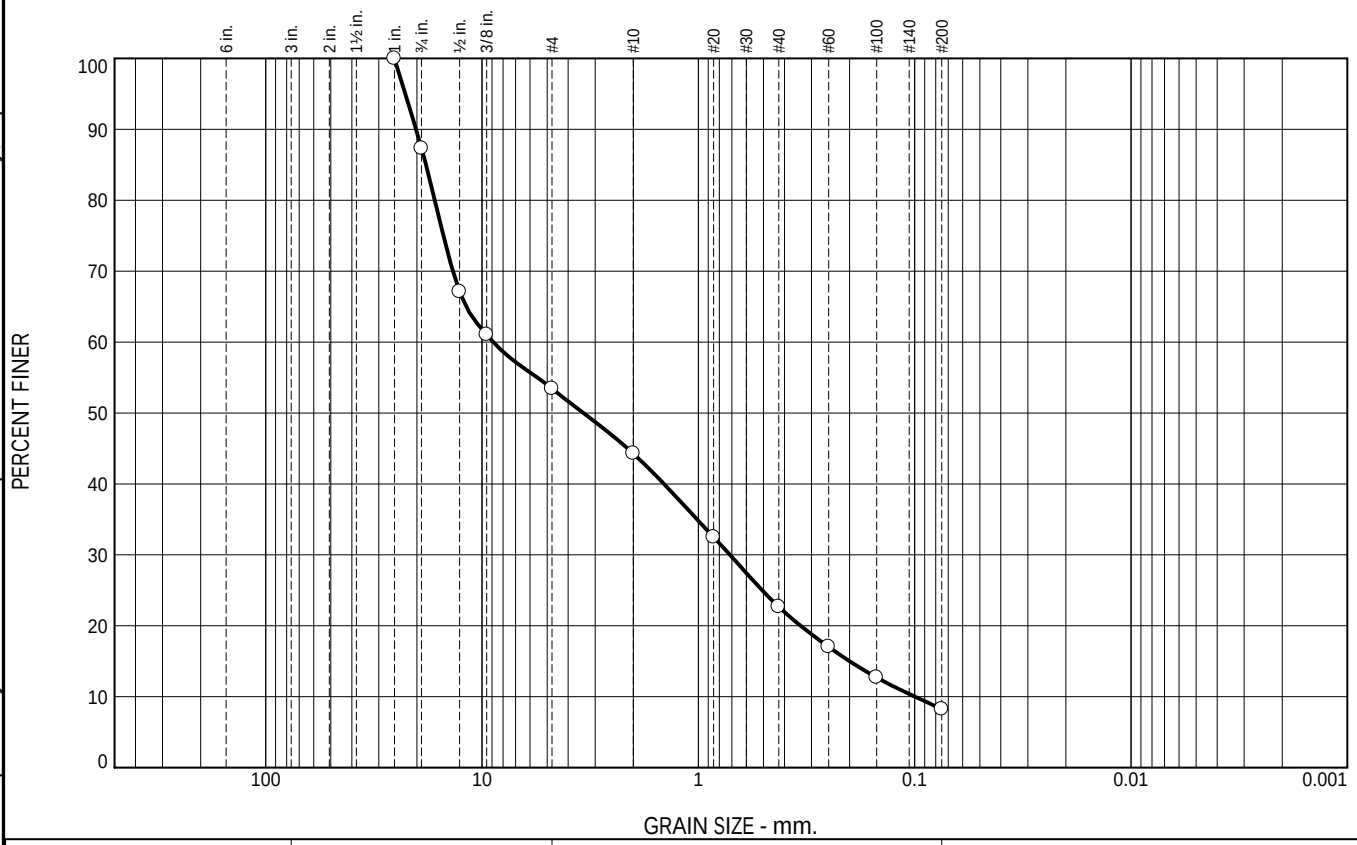
Client: Weston & Sampson
Project: Acton DPW
Acton, MA
Project No: ENG23-0187

Figure 24-S-B1465

Tested By: SF / MA Checked By: Ronelle LeBlanc

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspect and/or tested. No warranty, expressed or implied, is made.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.7	33.9	9.1	21.6	14.5	8.2	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	87.3		
1/2"	67.1		
3/8"	61.1		
#4	53.4		
#10	44.3		
#20	32.5		
#40	22.7		
#60	17.0		
#100	12.7		
#200	8.2		

* (no specification provided)

Source of Sample: B-4 Depth: 5-7'
Sample Number: S-3

Soil Description

Light Brown f-c GRAVEL and f-c SAND, trace Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 20.1919 D_{85}= 18.1678 D_{60}= 8.8818
D_{50}= 3.3968 D_{30}= 0.7145 D_{15}= 0.1999
D_{10}= 0.0996 C_u= 89.17 C_c= 0.58

Classification

USCS= GP-GM AASHTO= A-1-a

Remarks

Date: 10/11/2024

Thielsch Engineering Inc.
Cranston, RI

Client: Weston & Sampson
Project: Acton DPW
Acton, MA
Project No: ENG23-0187 Figure 24-S-B1466

Tested By: SF / MA Checked By: Ronelle LeBlanc

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspect and/or tested. No warranty, expressed or implied, is made.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.9	2.2	40.2	47.7	6.0	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	97.9		
#4	96.1		
#10	93.9		
#20	84.5		
#40	53.7		
#60	26.0		
#100	12.1		
#200	6.0		

* (no specification provided)

Soil Description

Brown f-m SAND, trace Silt, trace fine Gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 1.1317 D_{85}= 0.8669 D_{60}= 0.4829
D_{50}= 0.3952 D_{30}= 0.2737 D_{15}= 0.1733
D_{10}= 0.1296 C_u= 3.73 C_c= 1.20

Classification

USCS= SP-SM AASHTO= A-3

Remarks

Source of Sample: B-5 Depth: 5-7'
Sample Number: S-3

Date: 10/11/2024

Thielsch Engineering Inc.

Cranston, RI

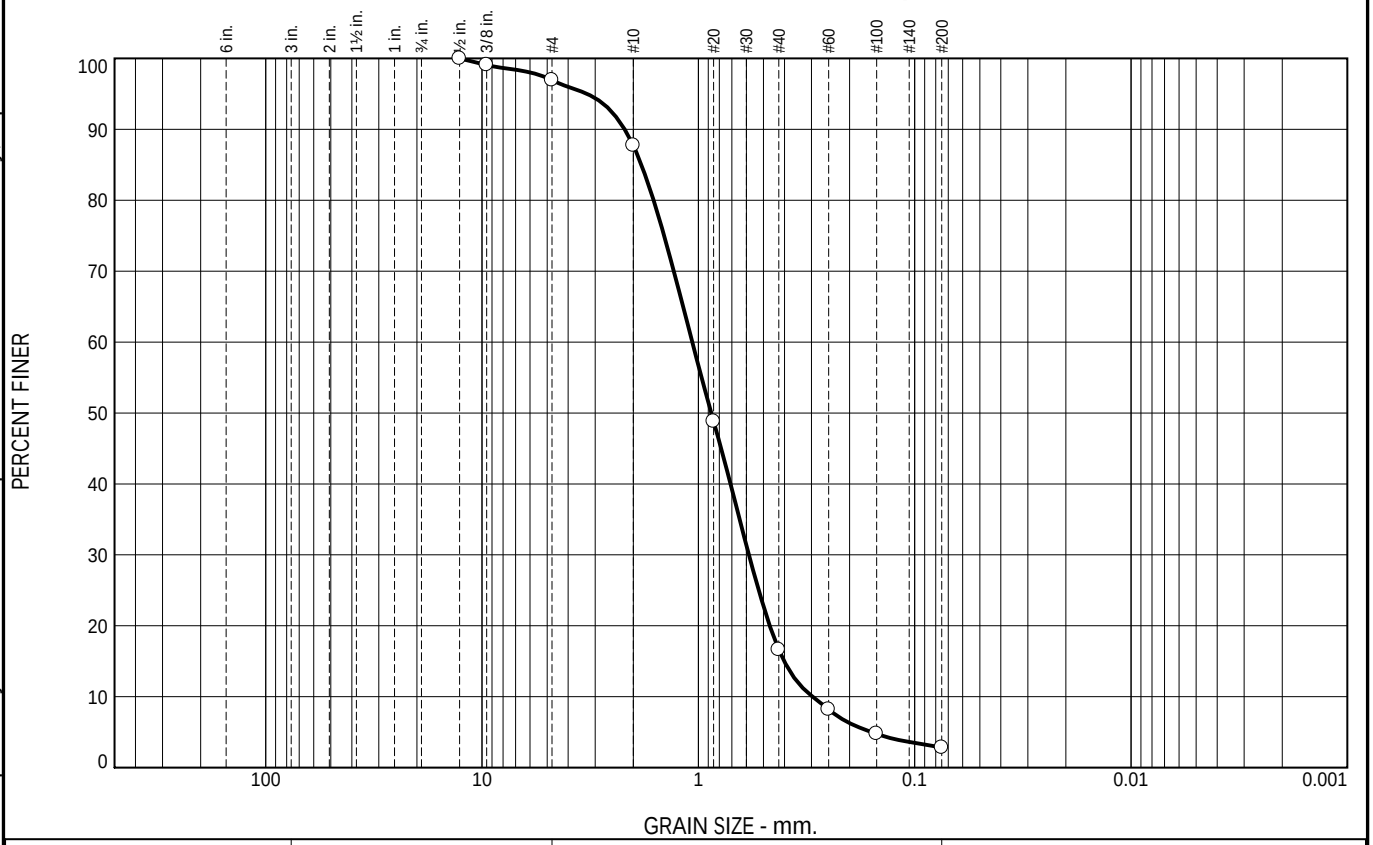
Client: Weston & Sampson
Project: Acton DPW
Acton, MA
Project No: ENG23-0187

Figure 24-S-B1467

Tested By: SF / MA Checked By: Ronelle LeBlanc

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspect and/or tested. No warranty, expressed or implied, is made.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.1	9.2	71.1	13.8	2.8	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	99.1		
#4	96.9		
#10	87.7		
#20	48.8		
#40	16.6		
#60	8.2		
#100	4.8		
#200	2.8		

* (no specification provided)

Soil Description

Brown f-m SAND, trace Silt, trace fine Gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 2.1913 D_{85}= 1.8337 D_{60}= 1.0671
D_{50}= 0.8718 D_{30}= 0.5840 D_{15}= 0.4014
D_{10}= 0.2969 C_u= 3.59 C_c= 1.08

Classification

USCS= SP AASHTO= A-1-b

Remarks

Source of Sample: B-6 Depth: 10-12'
Sample Number: S-4

Date: 10/10/2024

Thielsch Engineering Inc.

Cranston, RI

Client: Weston & Sampson
Project: Acton DPW
Acton, MA
Project No: ENG23-0187

Figure 24-S-B1468

Tested By: SF / MA Checked By: Ronelle LeBlanc

Attachment E

Important Information about This Geotechnical-Engineering Report

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

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Town of Acton
New Public Works Facility
Schematic Design Package

Appendix B

Zoning & Permitting Memorandum

November 2024

100 Foxborough Blvd., Suite 250, Foxborough, MA 02035
Tel: 508.698.3034

MEMORANDUM

TO: Town of Acton

FROM: Megan Fitzmaurice; Russel Rucker

DATE: October 2020; Updated October 2024

SUBJECT: Town of Acton MA Department of Public Works Zoning and Permitting Analysis

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Weston & Sampson has prepared this memorandum to summarize the findings of our analysis of the Town of Acton, MA zoning regulations as it pertains to the proposed Department of Public Works facility to be located at 14 Forest Road.

General Information:

Site Address:	14 Forest Road
Parcel Map/Lot:	76, 140
Acreage:	19.88, 4.40
Zoning District/Owner:	R-2/Town-Owned
FEMA Flood Zone:	X, Area of Minimal Flood Hazard
Groundwater Protection District:	Zone 3

Overlay District	Applicability	Notes
Flood Plain District	No	
Open Space Development	No	
Groundwater Protection District	Yes	Located in Zone 3.
Affordable Housing Incentives and Overlay District	No	

Applicable Reference Documents:

- Town of Acton Zoning Bylaw, April 2019
- Zoning Map Town of Acton Massachusetts
- Groundwater Protection District Map of the Town of Acton Map Number 3 April 2011
- Rules and Regulations for Special Permits_Zoning Board of Appeals_Town of Acton
- FEMA Flood Map 25017C0356F_07/07/2014
- General Bylaws of the Town of Acton

Permitting Pathway:

Municipal projects are "permitted by right" in accordance with section 3, Table of Principal Uses, ¶3.4.1. A site plan special permit is not required in accordance to paragraph 3.1. This is to be verified.
Improvements at the transfer station will also require permitting through MassDEP for modifications to the transfer station, as well as for work above a landfill closure. This is expected to include a BWP SW 07 Large Handling Facility Modification permit application.

Only construction activities on the capped landfill and its associated appurtenances (including stormwater) require a Post-Closure Use Permit (PCUP). No permit records online were found for the salt shed – only the 2019 solar array. There are interconnected detention areas around the former landfill and transfer station shown in the original 1985 landfill closure plans that are still in use. The existing stormwater system will have minor modifications made to them but those will only serve to improve its function. Since the existing detention areas/stormwater system appear to be appurtenant to the landfill closure and current transfer station but no negative impacts are expected, the proposed DPW project may receive presumptive approval, but a pre-application meeting should be scheduled early in Design Development to verify (https://www.mass.gov/how-to/sw-36-37-landfill-post-closure-use-permit). ***Recommend discussing with our solid waste group further before discussing with DEP.*** Presumptive approval requires notifying MassDEP and the Board of Health within 45 days of commencing activities and providing as-builts within 45 days of completing activities.

A land disturbance permit is required from the DPW's Engineering Division in accordance with Chapter X of the Town's General Bylaws. Permit does not require public hearings. There is a brief public hearing period of a week after submission of an online application. The application may require peer review – this is at the discretion of the Town Engineer.

The site requires a septic system which must be designed in accordance with Title 5. A Disposal Works Construction permit is required from the Town's Board of Health in accordance with Article 11 of the Board of Health Rules and Regulations. Additionally, an Aquifer Protection Zone special permit is required by the Board of Health for building the septic system within a Zone 3 district in accordance with Article 16. Recommend coordinating permit requirements for each with the Board of Health early in Design Development to verify.

Applicable Zoning Bylaws:

Note: The following is an abbreviated list of key bylaws that may be applicable and may influence design considerations. Additional bylaws may apply. Refer to the bylaws.

TABLE OF STANDARD DIMENSIONAL REGULATIONS

Description	Required	Proposed	Notes
Minimum Lot Dimensions			
Area square feet	20,000		No anticipated changes
Frontage in feet	150		No anticipated changes
Lot Width in feet	50		No anticipated changes
Minimum Required Yard Dimensions/Setbacks			
Front Yard	30		
Side Yard	10		
Rear Yard	10		
Max. Bldg. Height			
Feet	36		
Minimum OPEN SPACE			
% of the LOT	NR		
Maximum floor area ratio			
	NR		

NR indicates no specific minimum or maximum regulation.

REGULATIONS	Notes
4.3 GROUNDWATER Protection District	
4.3.7.1 Permitted uses all zones – All uses allowed in the underlying zoning district except those which are prohibited or regulated in Section 4.3.7.2 are permitted.	Use appears permitted however, refer to table 4.3.7.2 USE Regulations within the groundwater Protection District for restrictions
SECTION 5. DIMENSIONAL REGULATIONS	
5.3.5 Height of BUILDINGS	
5.3.5.1 In all districts appurtenant structures located upon the roof of a building may extend above the height limit but in no case shall they exceed 45 feet in height when combined with the height of the building nor in the aggregate occupy more than 20% of the roof plan area unless in compliance with Section 5.3.5.2 of this Bylaw.	
SECTION 6. PARKING STANDARDS	
6.2.2 Undetermined USES – Where the use of a building or buildings has not been determined at the time of application for a building permit or special permit, the parking requirements applicable to the most intensive use allowed in the district where such undetermined use is to be located shall apply provided, however, that the number of parking spaces actually built need not exceed the number required by the actual use or uses of the building.	
6.2.3 Relief from Parking Regulations by Special Permit from the Board of Selectmen – Relief from the parking regulations may be granted by special permit from the Board of Selectmen where the Board finds that it is not practicable to provide the number of parking spaces required, and either 1) in the case of a change from a nonconforming use to a conforming use, that the benefits of a change to a conforming use outweigh the lack of parking spaces, or 2) in the case of a change from one conforming use to another conforming use, that the lack of parking spaces will not create undue congestion or traffic hazards on or off the site; provided that in either case the Board of Selectmen shall require the maximum practicable number of parking spaces. This Section shall not be construed to provide relief from the requirements of Section 5.4.6.2.	
6.3 Minimum Parking Space Requirements by use	Refer to 6.3.1 Schedule. Listed uses do not appear to apply
6.3.3 Comparable USES – Where a USE is not specifically included in Section 6.3.1, it is intended that the requirements for the most nearly comparable USE specified shall apply.	
6.3.7.5 Bicycle parking spaces shall be provided for all uses, except single- to four-family Dwellings, at a rate of not less than one (1) bicycle parking space for each twenty (20) motor vehicle parking spaces in the parking facility, but never less than two (2) bicycle parking spaces; and no parking facility shall be required to have more than thirty (30) bicycle parking spaces overall.	Design requirement.
6.5 Standard Parking Dimensional Regulations – Off-street parking facilities shall be laid out and striped in compliance with the following minimum provisions:	Refer to associated table.
6.7 Parking Lot Design Requirements – All parking lots shall be designed in compliance with the following design standards, except as provided in Section 6.9. In addition, the following standards shall not apply to parking lots serving a single to four-family residential use, an Assisted Living	Design requirements

Residence with 10 or less residents, a religious use, a Conservation use, and a Municipal outdoor recreation use. Required parking spaces, loading areas and driveways shall be provided and maintained with suitable grading, paved surfaces and adequate drainage. Any parking lot containing five (5) or more parking spaces shall include landscaping as required below which is, in the opinion of the Special Permit Granting Authority (if the parking area is related to a permitted USE for which a site plan or other special permit is required) or the Zoning Enforcement Officer (for other parking areas), located and designed to enhance the visual appearance of the parking or loading facility, to ensure traffic safety, and to minimize the adverse effects of the parking or loading facility on the natural environment.	
6.7.2 Set-Backs – Except as may be required elsewhere in this Bylaw, no parking space or other paved surface, other than access driveways, common driveways, walkways, sidewalks or bikeways, shall be located within 30 feet of the front lot line and within 10 feet of the side and rear lot lines, and notwithstanding the foregoing, no parking space or other paved surface, other than access driveways, common driveways, walkways, sidewalks or bikeways, shall be located within the limits of a landscaped buffer area required under Section 10.4.3.5 and Section 10.4.3.6.	Design requirements. Refer to additional requirements in section 6.7.
SECTION 7. SIGNS AND ADVERTISING DEVICES	Refer to Section 7 regarding requirements and restrictions.
SECTION 10. ADMINISTRATION	Refer to section 10 for design requirements. Verify that most of requirements listed apply only to special permit conditions.
10.2.1 Application – Any application for a building permit shall be accompanied by: 1) a description of the existing and the proposed use of land or structures on the development site; 2) a plan drawn to scale and prepared by a Registered Professional Engineer or a Registered Land Surveyor, as appropriate to the data, showing the dimensions of the development site, the location and dimensions of all existing and proposed structures and the dimensions of all setbacks; and 3) such further information as the Zoning Enforcement Officer may require to ensure enforcement of this Bylaw. The Zoning Enforcement Officer may waive the requirements of the preceding sentence, if the Zoning Enforcement Officer determines that the proposed work is of a minor nature.	
10.4.3.4 Sidewalks – A sidewalk shall be required along the entire frontage of a lot. The Board of Selectmen may also require other walkways and paths as it deems necessary to accommodate the safe movement of pedestrians and bicyclists.	Requirement for a site plan special permit. Should be verified that this is not required. Important - This should be reviewed and taken under consideration. See waiver exceptions allowed by Board of Selectmen
The Board of Selectmen may waive the sidewalk requirement provided it finds that such a sidewalk is not necessary for the safe movement of pedestrians and bicyclists.	

Town of Acton
New Public Works Facility
Schematic Design Package

Appendix C

Schematic Design Independent Cost Estimates

November 2024

PMA Consultants

Updated: 11/1/2024		Updated for SD RECON Estimate 11/1/2024
DIRECT CONSTRUCTION ESTIMATE		
Cost of New Construction (Tci Estimate)	$	37,946,168
TOTAL DIRECT CONSTRUCTION COSTS	**$**	**37,946,168**
A/E DESIGN COSTS		
Weston & Sampson	$	3,295,000
OWNERS PROJECT MANAGER		
PMA Consultants LLC.	$	1,429,288
TOTAL A/E & OPM COSTS	**$**	**4,724,288**
CONSTRUCTION RELATED SOFT COSTS		
Commissioning Agent	$	100,000
Testing Services (Construction)	$	125,000
Printing	$	15,000
FF&E	$	200,000
Communications/Low Voltage	$	400,000
Temporary Trailers/Related Expenses	$	350,000
Legal Costs	$	50,000
Utility Backcharges	$	150,000
Town Fiber	$	75,000
Moving Costs	$	75,000
Owner's Construction Contingency	$	2,250,000
Owner's Soft Cost Contingency	$	500,000
Total Probable Owner's Indirect Costs	**$**	**4,290,000**
TOTAL PROJECT COSTS	**$**	**46,960,456**

RECONCILED CONSTRUCTION COST ESTIMATE

District: Acton
Project: Acton Department of Public Works
OPM: PMA Consultants LLC
Designer: Weston & Sampson
Project Type: New
Phase: SD - RECONCILED
Proposed SF: 46,884 SF (Tci); 46,860 SF (PM&C)

CSI DIVISION	DESCRIPTION	TCi COST ESTIMATE	PM&C Cost Estimate	Differential
n/a	GC OH & Profit	$ 1,110,999	$ 1,285,972	$ (174,973)
n/a	Bonds & Insurance	$ 916,460	$ 964,479	$ (48,019)
n/a	Design Contingency	$ 3,285,383	$ 2,832,537	$ 452,846
n/a	Escalation	$ 1,806,961	$ 991,388	$ 815,573
n/a	Phase 3 Escalation - 6 month escalation add	$ -	$ -	$ -
1000	General Conditions/Requirements	$ 3,054,865	$ 3,214,929	$ (160,064)
2000	Existing Conditions	$ 388,900	$ 494,000	$ (105,100)
3000	Concrete	$ 1,989,770	$ 1,994,027	$ (4,257)
4000	Masonry	$ 395,196	$ 363,256	$ 31,940
5000	Metals	$ 585,734	$ 1,084,365	$ (498,631)
6000	Woods, Plastics, Composites	$ 249,865	$ 283,235	$ (33,370)
7000	Thermal and Moisture Protection	$ 629,977	$ 542,948	$ 87,029
8000	Openings	$ 1,109,550	$ 1,151,960	$ (42,410)
9000	Finishes	$ 1,568,664	$ 1,454,345	$ 114,319
10000	Specialties	$ 141,540	$ 91,300	$ 50,240
11000	Equipment	$ 1,076,250	$ 950,800	$ 125,450
12000	Furnishings	$ 32,250	$ 93,750	$ (61,500)
13000	Special Construction	$ 5,539,125	$ 5,154,600	$ 384,525
14000	Conveying Equipment	$ -	$ -	$ -
21000	Fire Suppression	$ 590,370	$ 562,160	$ 28,210
22000	Plumbing	$ 1,334,600	$ 1,166,408	$ 168,192
23000	Heating Ventilating and Air Conditioning	$ 5,063,239	$ 5,161,093	$ (97,854)
26000	Electrical	$ 2,369,340	$ 2,493,874	$ (124,534)
31000	Earthwork	$ 1,713,600	$ 2,418,186	$ (704,586)
32000	Exterior Improvements	$ 1,810,930	$ 1,741,376	$ 69,554
33000	Utilities	$ 1,182,600	$ 1,123,685	$ 58,915
	Subtotal Base Contract Amount	**$ 37,946,168**	**$ 37,614,673**	**$ 331,495**
	Bid Alternates			
	Add 10,000 Gallon Rainwater Catchment System for Wash Bay	**$ 130,487**	**$ 156,940**	$ (26,453)

Schematic Design Cost Estimate

New Public Works Facility

14 Forest Road

Town of Acton, Ma

Prepared by:

TCi Construction Cost Estimating

Post Office Box 1988

North Falmouth, Ma 02556

www.tortoraconsulting.com

p 781-275-5511

Prepared for:

Weston and Sampson

November 1, 2024

New Public Works Facility
Town of Acton, Ma

Schematic Design Cost Estimate

01-Nov-24

MAIN CONSTRUCTION COST SUMMARY

Phase	Scope	Bid Date	Building GSF	$/sf	Estimated Construction Cost
PHASE 1	Fleet storage garage, Maintenance, Wash Bay, Salt Shed addition and Sitework		34,605	$688.32	$23,819,474
PHASE 2	Temporary Shop, Admin trailer utilities, Demolition of existing building and Site prep for phase 3				$1,056,752
PHASE 3	Admin/Support, Shops and Sitework		12,279	$1,064.41	$13,069,942
TOTAL BASE CONSTRUCTION COSTS		**4TH QTR 2025**	**46,884**	**$809.36**	**$37,946,168**

Alternate

1. Add 10,000 gallon rainwater catchment system for wash bay	add	**$130,487**

QUALIFICATIONS

This Schematic Design cost estimate was produced from drawings prepared by Weston and Sampson and their design team dated October 4, 2024.

This estimate includes all direct construction costs, general contractor's overhead and profit and design contingency. Cost escalation assumes bid date in 12 months.

Bidding conditions are expected to be public bidding to pre-qualified general contractors, and pre-qualified sub-contractors, open specifications for materials and manufactures. The project is expected to be bid and construction start there after with one continuous phase.

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

All professional fees and insurance
All Furnishings, Fixtures and Equipment not identified
Items identified in the design as Not In Contract (NIC)
Items identified in the design as by others
Special foundations (unless indicated by design engineers)
Utility company back charges, including work required off-site
Work to City streets and sidewalks, (except as noted in this estimate)
Construction or occupancy phasing or off hours' work, (except as noted in this estimate)
Off hours
Ledge & contaminated soils
Building Permit
Temporary trailer rentals
Renovation to existing buildings to remain

New Public Works Facility
Town of Acton, Ma

Schematic Design Cost Estimate

TCi Construction Cost Estimating

01-Nov-24

CONSTRUCTION COST SUMMARY IN CSI FORMAT	PHASE 1	34,605 $/SF	PHASE 2	PHASE 3	12,279 $/SF	TOTAL	46,884 $/SF
DIV. 2 DEMOLITION							
020500 Demolition	$0	*$0.00*	$288,900	$0	*$0.00*	$288,900	*$6.16*
024500 Hazardous Material Abatement	$0	*$0.00*	$100,000	$0	*$0.00*	$100,000	*$2.13*
DIV. 3 CONCRETE							
033000 Cast-in-Place Concrete	$1,479,670	*$42.76*	$0	$510,100	*$41.54*	$1,989,770	*$42.44*
DIV. 4 MASONRY							
042000 Unit Masonry (part of 040001 FSB)	$262,244	*$7.58*	$0	$132,952	*$10.83*	$395,196	*$8.43*
DIV. 5 METALS							
055000 Metal Fabrications (part of 050001 FSB)	$426,385	*$12.32*	$0	$159,349	*$12.98*	$585,734	*$12.49*
DIV. 6 WOODS & PLASTICS							
061000 Rough Carpentry	$131,490	*$3.80*	$0	$14,320	*$1.17*	$145,810	*$3.11*
064020 Interior Architectural Woodwork	$770	*$0.02*	$0	$103,285	*$8.41*	$104,055	*$2.22*
DIV. 7 THERMAL & MOISTURE PROTECTION							
072100 Thermal Insulation	$160,050	*$4.63*	$0	$31,420	*$2.56*	$191,470	*$4.08*
072700 Air Barriers & Waterproofing (part of 070001 FSB)	$51,140	*$1.48*	$0	$30,160	*$2.46*	$81,300	*$1.73*
074600 Cement Board Siding and Trim	$0	*$0.00*	$0	$0	*$0.00*	$0	*$0.00*
075400 Membrane Roofing (part of 070002 FSB)	$0	*$0.00*	$0	$5,000	*$0.41*	$5,000	*$0.11*
075450 Metal Roofing System (part of 070002 FSB)	$87,400	*$2.53*	$0	$0	*$0.00*	$87,400	*$1.86*
077200 Roof Accessories	$8,400	*$0.24*	$0	$8,400	*$0.68*	$16,800	*$0.36*
078410 Penetration Firestopping	$16,766	*$0.48*	$0	$14,175	*$1.15*	$30,941	*$0.66*
079200 Joint Sealants (part of 070001 FSB)	$154,090	*$4.45*	$0	$62,976	*$5.13*	$217,066	*$4.63*
DIV. 8 DOORS & WINDOWS							
081110 Doors and Frames	$63,600	*$1.84*	$0	$61,200	*$4.98*	$124,800	*$2.66*
083110 Access Doors and Frames	$0	*$0.00*	$0	$0	*$0.00*	$0	*$0.00*
083310 Overhead Coiling Doors	$296,320	*$8.56*	$0	$64,680	*$5.27*	$361,000	*$7.70*
084500 Aluminum Windows and Storefronts	$16,000	*$0.46*	$0	$228,000	*$18.57*	$244,000	*$5.20*
084550 Skylights	$61,600	*$1.78*	$0	$0	*$0.00*	$61,600	*$1.31*
084555 Sunshades	$14,300	*$0.41*	$0	$68,750	*$5.60*	$83,050	*$1.77*
084600 Translucent Windows	$170,000	*$4.91*	$0	$0	*$0.00*	$170,000	*$3.63*
087100 Door Hardware	$18,700	*$0.54*	$0	$27,650	*$2.25*	$46,350	*$0.99*
088000 Glazing	$1,750	*$0.05*	$0	$7,000	*$0.57*	$8,750	*$0.19*
089000 Louvers and Vents	$5,000	*$0.14*	$0	$5,000	*$0.41*	$10,000	*$0.21*
DIV. 9 FINISHES							
092110 Gypsum Board Assemblies	$366,388	*$10.59*	$0	$623,556	*$50.78*	$989,944	*$21.11*
093000 Tiling	$4,340	*$0.13*	$0	$58,275	*$4.75*	$62,615	*$1.34*
095100 Acoustical Ceilings	$2,640	*$0.08*	$0	$74,400	*$6.06*	$77,040	*$1.64*
096510 Resilient Flooring and Accessories	$3,680	*$0.11*	$0	$46,368	*$3.78*	$50,048	*$1.07*
096550 Carpet	$0	*$0.00*	$0	$23,200	*$1.89*	$23,200	*$0.49*
097300 Resinous flooring and base	$0	*$0.00*	$0	$18,700	*$1.52*	$18,700	*$0.40*
099000 Painting and Coating (part of 090007 FSB)	$234,651	*$6.78*	$0	$112,466	*$9.16*	$347,117	*$7.40*
DIV 10 SPECIALTIES							
101400 Signage	$8,250	*$0.24*	$0	$15,325	*$1.25*	$23,575	*$0.50*
102800 Toilet Accessories	$1,025	*$0.03*	$0	$11,190	*$0.91*	$12,215	*$0.26*
104400 Fire Protection Specialties	$1,800	*$0.05*	$0	$1,200	*$0.10*	$3,000	*$0.06*
106500 Toilet Partitions	$0	*$0.00*	$0	$7,550	*$0.61*	$7,550	*$0.16*
108500 Lockers	$0	*$0.00*	$0	$31,000	*$2.52*	$31,000	*$0.66*
109400 Screen Partitions	$18,700	*$0.54*	$0	$0	*$0.00*	$18,700	*$0.40*
109500 Fall Arrest	$32,500	*$0.94*	$0	$13,000	*$1.06*	$45,500	*$0.97*
DIV. 11 EQUIPMENT							
113100 Appliances	$0	*$0.00*	$0	$19,000	*$1.55*	$19,000	*$0.41*
118100 Industrial Equipment	$897,300	*$25.93*	$25,700	$134,250	*$10.93*	$1,057,250	*$22.55*

New Public Works Facility
Town of Acton, Ma

Schematic Design Cost Estimate

TCi Construction Cost Estimating

01-Nov-24

CONSTRUCTION COST SUMMARY IN CSI FORMAT		*PHASE 1*	*34,605 $/SF*	*PHASE 2*	*PHASE 3*	*12,279 $/SF*	*TOTAL*	*46,884 $/SF*
DIV. 12 FURNISHINGS								
122110 Horizontal Louver Blinds		$1,200	*$0.03*	$0	$31,050	*$2.53*	$32,250	*$0.69*
DIV. 13 SPECIAL CONSTRUCTION								
13100 Pre-fabricated Metal Building, Mezzanine Steel and Decking		$4,102,975	*$118.57*	$0	$1,436,150	*$116.96*	$5,539,125	*$118.15*
13200 Pre-fabricated Building (salt shed)		$0	*$0.00*	$0	$0	*$0.00*	$0	*$0.00*
13300 Fuel Island Equipment and Canopy		$0	*$0.00*	$0	$0	*$0.00*	$0	*$0.00*
DIV. 21 FIRE SUPPRESSION								
210000 Fire Suppression - FSB		$435,970	*$12.60*	$0	$154,400	*$12.57*	$590,370	*$12.59*
DIV. 22 PLUMBING								
220000 Plumbing - FSB		$911,550	*$26.34*	$17,500	$405,550	*$33.03*	$1,334,600	*$28.47*
DIV. 23 HVAC								
220000 HVAC - FSB		$2,677,710	*$77.38*	$22,500	$2,363,029	*$192.44*	$5,063,239	*$108.00*
DIV. 26 ELECTRICAL								
260000 Electrical - FSB		$1,730,794	*$50.02*	$42,500	$596,046	*$48.54*	$2,369,340	*$50.54*
DIV. 31 EARTHWORK								
311000 Site Clearing		$414,000	*$11.96*	$135,800	$22,500	*$1.83*	$572,300	*$12.21*
312000 Earthwork		$889,320	*$25.70*	$57,500	$128,480	*$10.46*	$1,075,300	*$22.94*
312500 Erosion and Sedimentation Controls		$30,000	*$0.87*	$18,000	$18,000	*$1.47*	$66,000	*$1.41*
315000 Ground Improvements		$0	*$0.00*	$0	$0	*$0.00*	$0	*$0.00*
DIV. 32 EXTERIOR IMPROVEMENTS								
321216 Asphalt Paving		$202,000	*$5.84*	$0	$560,780	*$45.67*	$762,780	*$16.27*
321213 Portland Cement Concrete Paving		$25,740	*$0.74*	$0	$20,300	*$1.65*	$46,040	*$0.98*
321613 Curbs and Gutters		$7,000	*$0.20*	$0	$69,410	*$5.65*	$76,410	*$1.63*
323100 Site Improvements		$612,000	*$17.69*	$15,000	$119,200	*$9.71*	$746,200	*$15.92*
329000 Landscaping		$104,500	*$3.02*	$0	$75,000	*$6.11*	$179,500	*$3.83*
DIV. 33 UTILITIES								
331000 Site Water Distribution		$68,350	*$1.98*	$15,000	$0	*$0.00*	$83,350	*$1.78*
333000 Sanitary Sewerage Utilities		$96,600	*$2.79*	$15,000	$160,300	*$13.05*	$271,900	*$5.80*
334000 Storm Drainage		$126,000	*$3.64*	$10,000	$681,350	*$55.49*	$817,350	*$17.43*
335000 Gas		$0	*$0.00*	$10,000	$0	*$0.00*	$10,000	*$0.21*
SUBTOTAL DIRECT (TRADE) COST		*$17,432,658*	*$503.76*	*$773,400*	*$9,565,442*	*$779.01*	***$27,771,500***	*$592.34*
GENERAL CONDITIONS & REQUIREMENTS	11%	$1,917,592		$85,074	$1,052,199		$3,054,865	
GL INSURANCE	1.5%	$261,490		$11,601	$143,482		$416,573	
BONDS	1.8%	$313,788		$13,921	$172,178		$499,887	
GC - OVERHEAD & PROFIT	3.5%	$697,393		$30,940	$382,666		$1,110,999	
DESIGN AND PRICING CONTINGENCY	10%	$2,062,292		$91,494	$1,131,597		$3,285,383	
1 YEAR ESCALATION TO 4TH QUARTER 2025 BID OPENING	5%	$1,134,261		$50,322	$622,378		$1,806,961	
TOTAL BASE CONSTRUCTION COSTS		$23,819,474	*$688.32*	$1,056,752	$13,069,942	*$1,064.41*	**$37,946,168**	***$809.36***

New Public Works Facility
Town of Acton, Ma

TCi Construction Cost Estimating

01-Nov-24

Schematic Design Cost Estimate

GSF 34,605

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
PHASE 1	Fleet storage garage, Maintenance, Wash Bay, Salt Shed addition and Sitework						
	GROSS FLOOR AREA CALCULATION						
	Fleet Storage Garage			**25,100**			
	Maintenance			**7,705**			
	Wash Bay			**1,800**			
	Mezzanines			**8,860**			
	TOTAL GROSS FLOOR AREA (does not include mezzanines)				**34,605** ***gsf***		
	A10 FOUNDATIONS						
	A1010 STANDARD FOUNDATIONS						
	Strip footings to walls						
03300	Formwork	**2,106**	sf	18.00	37,908		
03300	Re-bar	**7,380**	lbs	3.00	22,140		
03300	Concrete material	**123**	cy	190.00	23,370		
03300	Placing concrete	**123**	cy	65.00	7,995		
	Foundation walls						
03300	Formwork	**12,636**	sf	18.00	227,448		
03300	Re-bar	**23,985**	lbs	3.00	71,955		
03300	Concrete material	**369**	cy	190.00	70,110		
03300	Placing concrete	**369**	cy	65.00	23,985		
07210	2.5” Polyisocyanurate	**4,212**	sf	10.00	42,120		
	Back up knee walls						
03300	Formwork	**4,720**	sf	18.00	84,960		
03300	Re-bar	**4,160**	lbs	3.00	12,480		
03300	Concrete material	**64**	cy	195.00	12,480		
03300	Placing concrete	**64**	cy	65.00	4,160		
	Column footings						
03300	Formwork	**3,200**	sf	18.00	57,600		
03300	Re-bar	**18,675**	lbs	3.00	56,025		
03300	Concrete material	**249**	cy	190.00	47,310		
03300	Placing concrete	**249**	cy	65.00	16,185		
	Piers						
03300	Formwork	**960**	sf	18.00	17,280		
03300	Re-bar	**1,425**	lbs	3.00	4,275		
03300	Concrete material	**19**	cy	190.00	3,610		
03300	Placing concrete	**19**	cy	65.00	1,235		
	SUBTOTAL					844,631	
	A1030 LOWEST FLOOR CONSTRUCTION						
	8" Slab on grade						
03300	Vapor barrier	**34,605**	sf	2.50	86,513		
03300	Reinforcing	**38,066**	sf	2.00	76,132		
03300	Concrete - 8" thick	**915**	cy	190.00	173,850		
03300	Placing concrete	**915**	cy	45.00	41,175		
03300	Finishing and curing concrete	**34,605**	sf	1.65	57,098		
03300	Control joints - saw cut	**34,605**	sf	0.50	17,303		
	Miscellaneous						
07210	1” Polyisocyanurate below slabs	**7,705**	sf	6.00	46,230		
03300	4' haunch under CM walls	**500**	lf	45.00	22,500		
03300	Pits, curbs, pads and misc equipment supports	**1**	ls	20,000.00	20,000		
	SUBTOTAL					540,801	
	TOTAL - FOUNDATIONS						***$1,385,432***

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 1 Fleet storage garage, Maintenance, Wash Bay, Salt Shed addition and Sitework						
	B10 SUPERSTRUCTURE						
	B1010 FLOOR CONSTRUCTION						
	Mezzanine Floor Structure - Steel:						
13100	W columns, beam, bracing, HSS tubes, L angles and Channels	**62**	tons	6,500.00	403,000		
	Mezzanine Floor Structure						
13100	Floor deck - 1 1/2'' deck	**8,860**	sf	7.50	66,450		
03300	WWF reinforcement	**10,189**	sf	2.00	20,378		
03300	Concrete to metal deck	**117**	cy	190.00	22,230		
03300	Place and finish concrete	**8,860**	sf	2.50	22,150		
	Miscellaneous						
05500	Misc metals - overall added cost for FSB pricing	**34,605**	sf	6.00	207,630		
07841	Firestopping	**34,605**	sf	0.34	11,766		
	SUBTOTAL					753,604	
	B1020 ROOF CONSTRUCTION						
	Pre-fabricated Structure (includes steel, insulated metal panels walls and roof) :						
13100	Main Building - Prefabricated metal building package (galv steel, insulated metal panels, metal roof with fabric liner insulation/VR, gutters, downspouts and snow guards)	**34,605**	sf	105.00	3,633,525		
	Miscellaneous						
05500	Overhead door openings	**10**	ea	2,000.00	20,000		
05500	Skylight openings	**512**	sf	15.00	7,680		
05500	Window openings	**80**	sf	15.00	1,200		
05500	Translucent window openings	**1,360**	sf	15.00	20,400		
	SUBTOTAL					3,682,805	
	TOTAL - SUPERSTRUCTURE						***$4,436,409***
	B20 EXTERIOR CLOSURE						
	B2010 EXTERIOR WALLS						
	CMU veneer						
04200	CMU veneer	**2,250**	sf	60.00	135,000		
07270	Air barrier	**2,250**	sf	10.00	22,500		
07210	Rigid insulation	**2,250**	sf	8.00	18,000		
	SUBTOTAL					175,500	
	B2020 WINDOWS						
84600	Translucent windows	**1,360**	sf	125.00	170,000		
84500	Triple glazed windows	**80**	sf	200.00	16,000		
08900	Louvers	**1**	ls	5,000.00	5,000		
84555	Sunshades	**26**	lf	550.00	14,300		
07920	Backer rod & double sealant	**720**	lf	15.00	10,800		
07270	Flashings	**720**	lf	16.00	11,520		
06100	Wood blocking at openings	**720**	lf	12.00	8,640		
07920	Waterproofing - overall added cost for FSB pricing	**34,605**	sf	4.00	138,420		
	SUBTOTAL					374,680	

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 1 Fleet storage garage, Maintenance, Wash Bay, Salt Shed addition and Sitework						
	B2030 EXTERIOR DOORS						
	Overhead doors						
08331	18x16 OHD	**2**	ea	31,680.00	63,360		
08331	16x16 OHD	**6**	ea	28,160.00	168,960		
08331	16x16 OHD poly washbay	**2**	ea	32,000.00	64,000		
	Man Doors						
08111	Ext 3x7 doors flush	**3**	lvs	1,650.00	4,950		
08111	Ext 3x7 doors with half lite and transom	**6**	ea	4,800.00	28,800		
08710	Hardware	**9**	lvs	850.00	7,650		
	Misc						
07270	Flashings	**200**	lf	16.00	3,200		
07920	Backer rod & double sealant	**200**	lf	15.00	3,000		
06100	Wood blocking at openings	**200**	lf	12.00	2,400		
	SUBTOTAL					346,320	
	TOTAL - EXTERIOR CLOSURE						***$896,500***
	B30 ROOFING						
	B3010 ROOF COVERINGS						
	All roofing, gutters, downspouts and snow guards included with Prefabricated metal building						
	SUBTOTAL					-	
	B3020 ROOF OPENINGS						
84550	4'x8' skylights	**16**	ea	3,850.00	61,600		
07720	Roof hatch and ladder	**1**	ea	6,750.00	6,750		
07720	Roof ladder	**1**	ea	1,650.00	1,650		
10950	Fall arrest system	**50**	ea	650.00	32,500		
	SUBTOTAL					102,500	
	TOTAL - ROOFING						**$102,500**
	C10 INTERIOR CONSTRUCTION						
	C1010 PARTITIONS						
09211	Fur-out GWB partition	**1,080**	sf	15.00	16,200		
09211	GWB partitions at mezz	**1,648**	sf	22.00	36,256		
09211	GWB rated partition	**700**	sf	25.00	17,500		
09211	Plumbing wall	**140**	sf	26.00	3,640		
04200	8" CMU walls	**3,028**	sf	38.00	115,064		
10940	Screen partition and door	**44**	lf	425.00	18,700		
	<u>Separation walls - F lower</u>						
03300	Cast in place 8" concrete knee wall	**30**	cy	800.00	24,000		
07210	2" rigid insulation	**600**	sf	7.00	4,200		
09211	6" metal stud	**600**	sf	16.00	9,600		
09211	5/8" GWB	**600**	sf	7.00	4,200		
	<u>Separation walls - F upper</u>						
03300	5/8" GWB	**3,300**	sf	7.00	23,100		
09211	2 rows 6" metal stud	**6,600**	sf	16.00	105,600		
07210	3" closed cell spray foam	**3,300**	sf	15.00	49,500		
09211	5/8" GWB	**3,300**	sf	7.00	23,100		

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	PHASE 1 Fleet storage garage, Maintenance, Wash Bay, Salt Shed addition and Sitework						
	Wash bay separation wall						
03300	Concrete curb	**58**	lf	60.00	3,480		
04200	CMU wall to 6'	**348**	sf	35.00	12,180		
09211	Gyp sheathing	**1,392**	sf	8.00	11,136		
07270	Vapor permeable barrier	**1,392**	sf	10.00	13,920		
09211	6" metal stud	**1,392**	sf	16.00	22,272		
09211	5/8" GWB	**1,392**	sf	7.00	9,744		
	Misc						
09211	Rough blocking	**500**	lf	8.00	4,000		
07841	Safing/firestopping	**1**	ls	5,000.00	5,000		
	SUBTOTAL					532,392	
C1020	**INTERIOR DOORS**						
	Doors & Frames						
08111	Interior doors - single	**6**	ea	1,100.00	6,600		
08111	Interior doors - double	**9**	ea	1,950.00	17,550		
08111	Single door with sidelight	**1**	ea	2,200.00	2,200		
08111	Interior windows	**1**	ea	3,500.00	3,500		
	Hardware						
08710	Hardware	**17**	lvs	650.00	11,050		
	Glazing						
08800	Glazing to doors	**20**	sf	50.00	1,000		
08800	Glazing to frames	**15**	sf	50.00	750		
09900	Paint HM frames	**17**	ea	165.00	2,805		
07920	Sealants & caulking	**17**	ea	110.00	1,870		
	SUBTOTAL					47,325	
C1030	**SPECIALTIES / MILLWORK**						
06402	Window sills	**14**	lf	55.00	770		
10280	Soap disp	**1**	ea	30.00	30		
10280	Mirror	**1**	ea	275.00	275		
10280	Robe hook	**2**	ea	25.00	50		
10280	Grab bar	**2**	ea	125.00	250		
10280	TTD	**1**	ea	65.00	65		
10280	PTD	**1**	ea	285.00	285		
10280	Hooks	**2**	ea	35.00	70		
10440	Fire extinguisher cabinets	**6**	ea	300.00	1,800		
10140	Cast alum letters - main sign	**1**	ls	2,500.00	2,500		
10140	Cast alum letters - OHDs	**10**	ea	175.00	1,750		
10140	Interior signage	**1**	ls	2,500.00	2,500		
10140	Code signage	**1**	ls	1,500.00	1,500		
	SUBTOTAL					11,845	
	TOTAL - INTERIOR CONSTRUCTION						***$591,562***
	C20 STAIRCASES						
C2010	**STAIR CONSTRUCTION**						
05500	Mezzanine Stairs	**3**	ea	18,000.00	54,000		
05500	3 step Stairs	**1**	ea	5,000.00	5,000		
05500	Mezzanine railings	**345**	lf	175.00	60,375		
05500	Gates	**3**	ea	1,500.00	4,500		
03300	Concrete material in pan infill	**2**	ea	950.00	1,900		
	SUBTOTAL					125,775	
C2020	**STAIR FINISHES**						
09900	Paint to mezzanine stairs	**2**	ea	3,200.00	6,400		
09900	Paint to mezzanine rails/gates	**345**	lf	30.00	10,350		
	SUBTOTAL					16,750	
	TOTAL - STAIRCASES						***$142,525***

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 1 Fleet storage garage, Maintenance, Wash Bay, Salt Shed addition and Sitework						
	C30 INTERIOR FINISHES						
	C3010 WALL FINISHES						
09900	Paint to interior walls	**24,500**	sf	2.00	49,000		
09300	Wall tile at toilet wet wall	**64**	sf	35.00	2,240		
09211	Wash bay PVC panels on furring	**3,500**	sf	25.00	87,500		
	SUBTOTAL					138,740	
	C3020 FLOOR FINISHES						
09651	Linoleum	**220**	sf	14.00	3,080		
09900	SC - Sealed Concrete	**43,185**	sf	1.75	75,574		
09300	Tile	**60**	sf	35.00	2,100		
09651	Rubber base	**100**	lf	6.00	600		
09900	Line stripping	**800**	sf	4.00	3,200		
	SUBTOTAL					84,554	
	C3030 CEILING FINISHES						
09510	A1 - ACT ceilings; 2' x 2'	**220**	sf	12.00	2,640		
09211	GWB ceilings	**60**	sf	18.00	1,080		
09211	Mech platform framing and plywood	**416**	sf	35.00	14,560		
09900	Paint to GWB ceilings and soffits	**476**	sf	2.00	952		
09900	Exposed prefab/mezz metal columns and beams	**43,185**	sf	2.00	86,370		
	SUBTOTAL					105,602	
	TOTAL - INTERIOR FINISHES						***328,896***
	D20 PLUMBING						
	D20 PLUMBING						
	Equipment						
220000	Water Meter	**1**	ea	2,600.00	2,600		
220000	Backflow Preventor Assembly	**1**	ea	4,500.00	4,500		
220000	Water Pressure Regulator	**1**	ea	1,500.00	1,500		
220000	Gas Fired Water Heaters	**2**	ea	12,000.00	24,000		
220000	Recirc Pumps	**1**	ea	1,500.00	1,500		
220000	Expansion Tanks	**1**	ea	600.00	600		
220000	Thermostatic Mixing Valve	**1**	ea	1,350.00	1,350		
220000	Oil/Water Seperator	**1**	ea	12,500.00	12,500		
220000	Air Compressor w/ Dryer	**1**	ea	25,000.00	25,000		
220000	Trap Primers	**8**	ea	500.00	4,000		
220000	Make Up Water Station	**1**	ea	1,500.00	1,500		
220000	Plumbing Specialties	**1**	ls	7,500.00	7,500		
220000	Equipment Connections	**20**	ea	550.00	11,000		
	Fixtures						
220000	Water Closets	**1**	ea	2,350.00	2,350		
220000	Lavatory - wall hung	**1**	ea	2,250.00	2,250		
220000	Shop sink	**1**	ea	1,650.00	1,650		
220000	Emergency Shower	**1**	ea	4,500.00	4,500		
220000	Floor Drains	**18**	ea	850.00	15,300		
220000	Trench Drains	**280**	lf	150.00	42,000		
220000	Trench Drain Catch Basin	**1**	ea	2,500.00	2,500		
220000	Clean Outs	**12**	ea	250.00	3,000		
220000	Air Stations	**6**	ea	425.00	2,550		
220000	Hose Reel - Air	**4**	ea	850.00	3,400		
220000	Fixture Connections	**4**	ea	650.00	2,600		
	Piping						
220000	All piping and insulation	**10,500**	lf	65.00	682,500		
	Trade Requirements						
220000	Project Supervision	**200**	hrs	130.00	26,000		
220000	Coordination	**180**	hrs	130.00	23,400		
	SUBTOTAL					911,550	
	TOTAL - PLUMBING						***$911,550***

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 1 Fleet storage garage, Maintenance, Wash Bay, Salt Shed addition and Sitework						
	D30 HVAC						
	D30 HVAC						
230000	Equipment	**34,605**	sf	15.00	519,075		
230000	Geothermal equipment, wells, vault and piping (12 wells)	**12**	ea	55,000.00	660,000		
230000	Ductwork, venting	**34,605**	sf	10.00	346,050		
230000	Piping	**34,605**	sf	8.00	276,840		
230000	Insulation	**34,605**	sf	8.00	276,840		
230000	Radiant	**7,000**	sf	25.00	175,000		
230000	Mezzanine work	**8,860**	sf	8.00	70,880		
230000	Controls	**34,605**	sf	5.00	173,025		
230000	Start Up	**200**	hrs	135.00	27,000		
230000	Testing, Adjusting, & Balancing	**200**	hrs	135.00	27,000		
230000	Coordination	**400**	hrs	135.00	54,000		
230000	BIM	**200**	hrs	150.00	30,000		
230000	Crane	**1**	ls	15,000.00	15,000		
230000	Rigging	**200**	hrs	135.00	27,000		
	SUBTOTAL					2,677,710	
	TOTAL - HVAC						***$2,677,710***
	D40 FIRE PROTECTION						
	D40 FIRE PROTECTION						
210000	FP service equipment, valves, compressors and misc	**1**	ls	18,500.00	18,500		
210000	Wet and dry sprinkler heads	**458**	ea	265.00	121,370		
210000	Branch sprinkler piping with fittings & hangers	**6,870**	lf	30.00	206,100		
210000	Main sprinkler piping with fittings & hangers	**1,500**	lf	50.00	75,000		
210000	Hydraulic calculations, permits and testing	**1**	ls	15,000.00	15,000		
	SUBTOTAL					435,970	
	TOTAL - FIRE PROTECTION						***$435,970***
	D50 ELECTRICAL						
	D5010 LIGHTING, SERVICE AND DISTRIBUTION						
260000	Power Equipment	**34,605**	sf	8.00	276,840		
260000	Power Circuitry	**34,605**	sf	3.00	103,815		
260000	Lighting	**34,605**	sf	10.00	346,050		
260000	Power devices	**34,605**	sf	6.00	207,630		
260000	Mezzanine power & lighting	**8,860**	sf	10.00	88,600		
	SUBTOTAL					1,022,935	
	D5030 COMMUNICATION & SECURITY SYSTEMS						
260000	Telecommunications System - rough-in	**34,605**	sf	2.25	77,861		
260000	BDA Emergency Responder Radio System	**1**	ls	50,000.00	50,000		
260000	Security System allowance	**34,605**	sf	1.00	34,605		
260000	PV system rough-in	**1**	ls	25,000.00	25,000		
260000	Fire Alarm	**34,605**	sf	4.50	155,723		
260000	Mezzanine FA	**8,860**	sf	4.50	39,870		
	SUBTOTAL					383,059	

CSI CODE		DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 1	Fleet storage garage, Maintenance, Wash Bay, Salt Shed addition and Sitework						
	D5035	**SITE LIGHTING AND POWER**						
		Site Lighting						
260000		Assume lighting provide from building wall packs						
		Utilities, Service, Generator Fdrs:						
260000		Utility Pole and connection	**1**	ls	25,000.00	25,000		
260000		Generator	**1**	ls	200,000.00	200,000		
260000		Primary ductbank	**200**	lf	125.00	25,000		
260000		Secondary ductbanks	**130**	lf	160.00	20,800		
260000		Communications conduits	**300**	lf	35.00	10,500		
260000		Pull box	**1**	ea	3,500.00	3,500		
		Misc						
260000		Utility poles and wiring modifications				by utility co		
260000		Misc Site Demo, Removals, make-safe and temp services	**1**	ls	15,000.00	15,000		
		SUBTOTAL					299,800	
	D5040	**OTHER ELECTRICAL SYSTEMS**						
260000		Temp Power and Lighting	**1**	ls	25,000.00	25,000		
		SUBTOTAL					25,000	
		TOTAL - ELECTRICAL						***$1,730,794***
	E20	***FURNISHINGS***						
	E2010	**FIXED FURNISHINGS**						
12211		Horizontal Louver Blinds/Blackout	**80**	sf	15.00	1,200		
		SUBTOTAL					$1,200	
		TOTAL - FURNISHINGS						***$1,200***
	F10	***INDUSTRIAL EQUIPMENT***						
11810		HM-1 Bench Vice	**1**	ea	950.00	950		
11810		MA-1 5 Ton Bridge Crane	**1**	ea	185,000.00	185,000		
11810		MB-1 60,000lb. Inground Lift (Two Post)	**1**	ea	150,000.00	150,000		
11810		MB-2 20,000lb. Two Post Lift	**2**	ea	38,000.00	76,000		
11810		MB-3 12,000lb. Two Post Lift	**2**	ea	25,000.00	50,000		
11810		Fluid distribution system	**1**	ls	125,000.00	125,000		
11810		MC-1 DEF Tote with Pumpout				*ERO*		
11810		MC-2 1,000-Gallon Compartment Tank (New Fluids)	**1**	ea		*inc above*		
11810		MC-3 600-Gallon Compartment Tank (Waste Fluids)	**1**	ea		*inc above*		
11810		MC-4 Fluid Reel Bank	**2**	ea		*inc above*		
11810		MC-5 Wall Mounted Lube Pumps	**8**	ea		*inc above*		
11810		MC-8 Waste Oil Pumpout System	**1**	ea		*inc above*		
11810		MC-9 Waste Oil High Level Alarm	**1**	ea		*inc above*		
11810		MC-11 Waste Antifreeze Pumpout System	**1**	ea		*inc above*		
11810		MC-12 Waste Antifreeze High Level Alarm	**1**	ea		*inc above*		
11810		MC-13 Lube Trolley (Grease)	**1**	ea		*inc above*		
11810		MC-14 Lube Trolley (Grease)	**1**	ea		*inc above*		
11810		MC-15 <varies>	**2**	ea		*inc above*		
11810		MC-16 Oil Filter Drain Box	**1**	ea		*inc above*		
11810		MC-17 5-Gallon Bucket Shelving	**2**	ea		*inc above*		
11810		MC-22 55-Gallon Fluid Drum (WWF)	**1**	ea		*inc above*		
11810		MD-1 Steel Workbench	**5**	ea	1,200.00	6,000		
11810		MD-2 Steel Work Bench w/ Elec. Shelf	**1**	ea	1,500.00	1,500		
11810		MD-3 Heavy Duty Steel Workbench	**2**	ea	1,600.00	3,200		
11810		ME-1 Hydraulic Hose Crimper				*ERO*		
11810		ME-2 Hydraulic Hose Cut Off Machine				*ERO*		
11810		ME-3 Hydraulic Hose Reel Rack	**1**	ea	3,500.00	3,500		

New Public Works Facility
Town of Acton, Ma

TCi Construction Cost Estimating

01-Nov-24

Schematic Design Cost Estimate

GSF 34,605

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 1 Fleet storage garage, Maintenance, Wash Bay, Salt Shed addition and Sitework						
11810	ME-4 Cubby Storage	**1**	ea	1,500.00	1,500		
11810	MF-1 Welder & Wire Feeder				*ERO*		
11810	MF-2 MIG Welder				*ERO*		
11810	MF-3 Multipurpose Welder	**1**	ea	4,500.00	4,500		
11810	MF-4 Portable Weld Fume Extractor	**1**	ea	7,500.00	7,500		
11810	MG-1 Tire Changer				*ERO*		
11810	MG-2 Tire Balancer				*ERO*		
11810	MG-3 Tire Storage Rack	**2**	ea	1,950.00	3,900		
11810	MG-4 Digital Tire Inflator	**1**	ea	1,450.00	1,450		
11810	MG-5 Tire Inflation Cage	**1**	ea	1,750.00	1,750		
11810	MH-1 Toolbox Red				*ERO*		
11810	MH-2 Toolbox Black (US General)				*ERO*		
11810	MH-3 Toolbox Black (Snap-On)				*ERO*		
11810	MH-4 Toolbox Black Tall (Snap-On)				*ERO*		
11810	MH-5 Hose Cubby Storage				*ERO*		
11810	MH-6 Parts Shelving (6'x2')	**9**	ea	650.00	5,850		
11810	MH-7 Cantilever Rack	**1**	ea	2,500.00	2,500		
11810	MH-8 Bin Storage Cabinet	**1**	ea	1,950.00	1,950		
11810	MH-9 Flammable Cabinet (45 Gallons)	**2**	ea	3,200.00	6,400		
11810	MM-1 Battery Rack				*ERO*		
11810	MM-2 Tool Cart				*ERO*		
11810	MM-3 Parts Washer				*ERO*		
11810	MM-4 Torch Cart				*ERO*		
11810	MM-5 Topside Creeper				*ERO*		
11810	MM-6 Battery Charger				*ERO*		
11810	MM-7 Power Washer				*ERO*		
11810	MM-8 Drill Press	**1**	ea	2,500.00	2,500		
11810	MM-9 Hydraulic Shop Press (50 Ton)	**1**	ea	18,500.00	18,500		
11810	MM-10 Hand Tool Charging Station	**1**	ea	950.00	950		
11810	MM-11 Bench Vice	**1**	ea	950.00	950		
11810	MM-12 Bench Grinder	**1**	ea	1,500.00	1,500		
11810	TM-1 Bench Vice	**1**	ea	950.00	950		
11810	TM-2 Bench Grinder	**1**	ea	1,500.00	1,500		
11810	Manual high pressure wash and undercarriage wash	**1**	ls	220,000.00	220,000		
11810	V-1 Manual Wash Pump Skid	**1**	ea		*inc above*		
11810	V-1A Manual Wash Control Panel	**1**	ea		*inc above*		
11810	V-2 Heat Exchanger	**1**	ea		*inc above*		
11810	V-3 Festoons	**2**	ea		*inc above*		
11810	V-4 Undercarriage Wash Pressure Plant	**1**	ea		*inc above*		
11810	V-4A Undercarriage Wash Control Panel	**1**	ea		*inc above*		
11810	V-5A Undercarriage Wash Toggle Switch	**1**	ea		*inc above*		
11810	V-5B Manual Wash On/Off Switch	**2**	ea		*inc above*		
11810	V-8 Guide Rails	**1**	ea		*inc above*		
11810	V-10 Vehicle Wash Pre-Treatment Tank (1500gal)	**1**	ea		*inc above*		
11810	V-11 Mobile Platform	**1**	ea		*inc above*		
11810	V-12 Vehicle Wash Entry Traffic Light 2	**1**	ea		*inc above*		
11810	V-13 Undercarriage Wash Activation Light 1	**1**	ea		*inc above*		
11810	V-14 Loop Detector	**2**	ea		*inc above*		
11810	V-15 Vehicle Wash Soap Drum	**1**	ea		*inc above*		
11810	Connect and or install ERO equipment	**80**	hrs	150.00	12,000		
	SUBTOTAL					897,300	
	TOTAL - INDUSTRIAL EQUIPMENT						***$897,300***

New Public Works Facility
Town of Acton, Ma

TCi Construction Cost Estimating

01-Nov-24

Schematic Design Cost Estimate

GSF 34,605

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 1 Fleet storage garage, Maintenance, Wash Bay, Salt Shed addition and Sitework						
	B SITEWORK						
	Site Demolition						
02050	Shed and containers removals				by owner		
	Site Contractor general conditions						
312000	Field Engineering	**15**	dy	1,500.00	22,500		
312000	Trench Plates Trench Safety	**1**	ls	5,000.00	5,000		
312000	Mobilization	**1**	ea	7,500.00	7,500		
311000	Site fencing, protection, barricades, GRs phasing	**1**	ls	250,000.00	250,000		
	Site prep						
311000	Stabilized Construction Entrance	**1**	ea	7,500.00	7,500		
312500	Compost filter tubes and silt fence	**2,000**	lf	15.00	30,000		
311000	Tree/stump removals	**1.8**	acre	15,000.00	27,000		
311000	Clear and grub	**79,500**	sf	1.00	79,500		
311000	Strip and stockpile topsoil	**2,500**	cy	8.00	20,000		
311000	Misc paving and site improvement removals	**1**	ls	30,000.00	30,000		
	SUBTOTAL					479,000	
	Earthwork						
312000	Site cuts	**12,500**	cy	8.00	100,000		
312000	Site fills	**950**	cy	10.00	9,500		
312000	Export excess - assume clean	**11,550**	cy	35.00	404,250		
312000	Rough and finisg grading	**8**	days	5,000.00	40,000		
	Structural excavation and backfill						
312000	Over excavate foundation footprint	**5,127**	cy	10.00	51,270		
312000	Import structural fill	**1,500**	cy	60.00	90,000		
312000	Import 12" subbase for under slabs	**1,282**	cy	60.00	76,920		
312000	Backfill foundation footing and walls	**1,019**	cy	20.00	20,380		
312000	Backfill foundation column footings	**400**	cy	20.00	8,000		
312000	E&B retaining wall	**600**	cy	50.00	30,000		
	Paving and walks prep						
321216	12" Dense Grade at paving and walks	**1,200**	cy	60.00	72,000		
	SUBTOTAL					902,320	
	Paving and curbing						
321216	5" Asphalt pavement	**21,000**	sf	5.50	115,500		
321216	Temp ramps	**2**	ea	3,500.00	7,000		
321216	Patch at Forest rd	**1**	ea	7,500.00	7,500		
321613	Bitum berm	**280**	lf	25.00	7,000		
	SUBTOTAL					137,000	
	Storm						
334000	CB	**2**	ea	6,500.00	13,000		
334000	DMH	**4**	ea	7,500.00	30,000		
334000	OCS	**1**	ea	9,500.00	9,500		
334000	12" HDPE piping	**300**	lf	110.00	33,000		
334000	18" HDPE piping	**180**	lf	125.00	22,500		
334000	Perimeter building roof drainage piping/boots	**450**	lf	40.00	18,000		
	SUBTOTAL					126,000	

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 1 Fleet storage garage, Maintenance, Wash Bay, Salt Shed addition and Sitework						
	Water						
331000	FP DI water main	**200**	lf	125.00	25,000		
331000	Dom DI water	**210**	lf	85.00	17,850		
331000	Gates & valves	**6**	ea	1,500.00	9,000		
331000	Hydrants	**1**	ea	6,500.00	6,500		
331000	Water CTE	**2**	ea	5,000.00	10,000		
	SUBTOTAL					68,350	
	Sanitary						
333000	Waste water piping and venting	**60**	lf	110.00	6,600		
333000	Oil water sep	**1**	ea	15,000.00	15,000		
333000	10,000 gal Holding tank	**1**	ea	75,000.00	75,000		
	SUBTOTAL					96,600	
	Site Improvements						
05500	Exterior wash bay catwalk/stair	**1**	ea	20,000.00	20,000		
03300	Footings for exterior wash bay catwalk/stair	**6**	ea	1,500.00	9,000		
323100	Sound wall	**20,400**	sf	30.00	612,000		
321213	Knock down pad	**1,430**	sf	18.00	25,740		
05500	Site bollards	**32**	ea	800.00	25,600		
03300	Transformer Pad	**1**	ea	5,000.00	5,000		
03300	Generator Pad	**1**	ea	8,500.00	8,500		
312000	E&B Elec/communication duct banks	**330**	lf	55.00	18,150		
03300	Encase duct banks in concrete	**98**	cy	350.00	34,300		
	SUBTOTAL					758,290	
	Landscaping						
329000	Mixed evergreen/deciduous trees	**26**	ea	1,500.00	39,000		
329000	Mixed evergreen trees	**20**	ea	1,500.00	30,000		
329000	Screen and spread loam	**700**	cy	15.00	10,500		
329000	Seed	**25,000**	sf	1.00	25,000		
	SUBTOTAL					104,500	
	TOTAL - SITEWORK						***2,672,060***
	C SALT SHED						
	Site Structure						
312000	E&B footings	**9**	ea	650.00	5,850		
03300	Sonotube footings	**9**	ea	950.00	8,550		
06100	Wood columns to match existing	**18**	ea	850.00	15,300		
06100	Wood beams to match	**350**	lf	35.00	12,250		
06100	Wood trusses - 2' o.c.	**56**	ea	1,150.00	64,400		
06100	3/4" plywood	**3,800**	sf	7.50	28,500		
07545	Standing seam metal roofing on ice and water shield	**3,800**	sf	23.00	87,400		
	SUBTOTAL					222,250	
	TOTAL - SALT SHED						***222,250***

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 2 Temporary Shop, Admin trailer utilities, Demolition of existing building and Site prep for phase 3						
	F10 INDUSTRIAL EQUIPMENT						
	Temporary Shop - Equipment						
11810	CD-1 Steel Workbench	**1**	ea	1,200.00	1,200		
11810	CH-1 Flammable Cabinet (30-Gallons)				*ERO*		
11810	CH-2 Template Storage Rack				*ERO*		
11810	CM-1 Chop Saw (Hitachi)				*ERO*		
11810	CM-2 Edge Planar				*ERO*		
11810	CM-3 Thickness Planar				*ERO*		
11810	CM-4 Standing Band Saw				*ERO*		
11810	CM-5 Table Saw (Powermatic)				*ERO*		
11810	CM-6 Drill Press (Powermatic)				*ERO*		
11810	CM-7 Drill Press (American Forge Foundry)				*ERO*		
11810	CM-8 Portable Dust Collector	**1**	ea	6,500.00	6,500		
11810	Connect and or install ERO equipment	**120**	hrs	150.00	18,000		
	Temporary Shop - Fit-out (Allowance)						
260000	Electrical	**1**	ls	20,000.00	20,000		
230000	HVAC	**1**	ls	15,000.00	15,000		
220000	Plumbing	**1**	ls	10,000.00	10,000		
	SUBTOTAL					70,700	
	TOTAL - INDUSTRIAL EQUIPMENT						***$70,700***
	B SITEWORK						
	Building Demolition						
02050	Demolish existing building	**19,260**	sf	15.00	288,900		
02450	Haz-mat allowance	**1**	ls	100,000.00	100,000		
220000	Demo, cut and cap plumbing	**1**	ls	7,500.00	7,500		
230000	Demo, cut,cap and decommision HVAC	**1**	ls	7,500.00	7,500		
260000	Demo/makesafe electrical	**1**	ls	7,500.00	7,500		
	SUBTOTAL					411,400	
	Site Demo & Prep						
312000	Mobilization	**1**	ea	7,500.00	7,500		
311000	Site fencing, protection, barricades	**1**	ls	15,000.00	15,000		
311000	Stabilized Construction Entrance	**1**	ea	7,500.00	7,500		
312500	Compost filter tubes and silt fence	**1,200**	lf	15.00	18,000		
311000	Sawcut and remove paving & curbing	**80,000**	sf	1.00	80,000		
311000	Remove concrete walks, pads and misc items at building perimeter	**2,500**	sf	5.00	12,500		
311000	Remove drainage structures	**4**	ea	1,500.00	6,000		
311000	Remove drainage piping	**240**	lf	20.00	4,800		
311000	Protect water service through site	**1**	ls	10,000.00	10,000		
	SUBTOTAL					161,300	
	Earthwork						
312000	Excavate, back fill and prep for removed utilities piping and structures	**800**	cy	25.00	20,000		
312000	Allow for rough grade befopre phase 3	**2,000**	cy	15.00	30,000		
	SUBTOTAL					50,000	

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 2 Temporary Shop, Admin trailer utilities, Demolition of existing building and Site prep for phase 3						
	Storm						
334000	Drainage piping and structures modifications before phase 3	**1**	ls	10,000.00	10,000		
	SUBTOTAL					10,000	
	Gas						
335000	Remove piping, cut and cap	**200**	lf	50.00	10,000		
	SUBTOTAL					10,000	
	Temp Facilities						
323100	Temporary office trailers and connection				with FF&E		
331000	Allow for water pipping and connections	**1**	ea	15,000.00	15,000		
333000	Allow for sewer piping and connections	**1**	ls	15,000.00	15,000		
260000	Allow for electrical service and connections	**1**	ls	15,000.00	15,000		
323100	Removal at end of project	**1**	ls	15,000.00	15,000		
	SUBTOTAL					60,000	
	TOTAL - SITEWORK						***702,700***

New Public Works Facility
Town of Acton, Ma

TCi Construction Cost Estimating

01-Nov-24

Schematic Design Cost Estimate

GSF 12,279

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 3 Admin/Support, Shops and Sitework						
	GROSS FLOOR AREA CALCULATION						
	Admin/Support areas			**8,200**			
	Shops			**4,079**			
	Mezzanines			**2,100**			
	TOTAL GROSS FLOOR AREA (does not include mezzanines)				**12,279**	***gsf***	
	A10 FOUNDATIONS						
	A1010 STANDARD FOUNDATIONS						
	Strip footings to walls						
03300	Formwork	**1,040**	sf	18.00	18,720		
03300	Re-bar	**3,660**	lbs	3.00	10,980		
03300	Concrete material	**61**	cy	190.00	11,590		
03300	Placing concrete	**61**	cy	65.00	3,965		
	Foundation walls						
03300	Formwork	**6,240**	sf	18.00	112,320		
03300	Re-bar	**11,830**	lbs	3.00	35,490		
03300	Concrete material	**182**	cy	190.00	34,580		
03300	Placing concrete	**182**	cy	65.00	11,830		
07210	3.5” Polyisocyanurate	**900**	sf	12.00	10,800		
07270	2.5” Polyisocyanurate	**950**	sf	10.00	9,500		
	Back up knee walls						
03300	Formwork	**320**	sf	18.00	5,760		
03300	Re-bar	**260**	lbs	3.00	780		
03300	Concrete material	**4**	cy	195.00	780		
03300	Placing concrete	**4**	cy	65.00	260		
	Column footings						
03300	Formwork	**1,152**	sf	18.00	20,736		
03300	Re-bar	**6,750**	lbs	3.00	20,250		
03300	Concrete material	**90**	cy	190.00	17,100		
03300	Placing concrete	**90**	cy	65.00	5,850		
	Piers						
03300	Formwork	**384**	sf	18.00	6,912		
03300	Re-bar	**525**	lbs	3.00	1,575		
03300	Concrete material	**7**	cy	190.00	1,330		
03300	Placing concrete	**7**	cy	65.00	455		
	SUBTOTAL					341,563	
	A1030 LOWEST FLOOR CONSTRUCTION						
	8" Slab on grade						
03300	Vapor barrier	**4,079**	sf	2.50	10,198		
03300	Reinforcing	**4,487**	sf	2.00	8,974		
03300	Concrete - 8" thick	**108**	cy	190.00	20,520		
03300	Placing concrete	**108**	cy	45.00	4,860		
03300	Finishing and curing concrete	**4,079**	sf	1.65	6,730		
03300	Control joints - saw cut	**4,079**	sf	0.50	2,040		
	6" Slab on grade						
03300	Vapor barrier	**8,200**	sf	2.50	20,500		
03300	Reinforcing	**9,430**	sf	2.00	18,860		
03300	Concrete - 6" thick	**159**	cy	190.00	30,210		
03300	Placing concrete	**159**	cy	45.00	7,155		
03300	Finishing and curing concrete	**8,200**	sf	1.65	13,530		
03300	Control joints - saw cut	**8,200**	sf	0.50	4,100		
	Miscellaneous						
03300	4' haunch under CM walls	**100**	lf	45.00	4,500		
03300	Pits, curbs, pads and misc equipment supports	**1**	ls	7,500.00	7,500		
	SUBTOTAL					159,677	
	TOTAL - FOUNDATIONS						***$501,240***

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 3 Admin/Support, Shops and Sitework						
	B10 SUPERSTRUCTURE						
	B1010 FLOOR CONSTRUCTION						
	Mezzanine Floor Structure - Steel:						
13100	W columns, beam, bracing, HSS tubes, L angles and Channels	**15**	tons	6,500.00	97,500		
	Mezzanine Floor Structure						
13100	Floor deck - 1 1/2'' deck	**2,100**	sf	7.50	15,750		
03300	WWF reinforcement	**2,415**	sf	2.00	4,830		
03300	Concrete to metal deck	**28**	cy	190.00	5,320		
03300	Place and finish concrete	**2,100**	sf	2.50	5,250		
	Miscellaneous						
05500	Misc metals - overall added cost for FSB pricing	**12,279**	sf	6.00	73,674		
07841	Firestopping	**12,279**	sf	0.34	4,175		
	SUBTOTAL					206,499	
	B1020 ROOF CONSTRUCTION						
	Pre-fabricated Structure (includes steel, insulated metal panels walls and roof) :						
13100	Main Building - Prefabricated metal building package (galv steel, insulated metal panels, metal roof with fabric liner insulation/VR, gutters, downspouts and snow guards)	**12,279**	sf	100.00	1,227,900		
	Miscellaneous						
05500	Overhead door openings	**3**	ea	2,000.00	6,000		
05500	Window openings	**1,000**	sf	15.00	15,000		
	SUBTOTAL					1,248,900	
	TOTAL - SUPERSTRUCTURE						***$1,455,399***
	B20 EXTERIOR CLOSURE						
	B2010 EXTERIOR WALLS						
	Admin exterior wall back-up						
09211	6" LGMF, gyp sheathing	**3,640**	sf	20.00	72,800		
09211	5/8" int gwb	**3,640**	sf	8.00	29,120		
09900	Paint	**3,276**	sf	2.00	6,552		
	CMU veneer and siding						
04200	CMU veneer	**1,010**	sf	60.00	60,600		
07270	Air barrier	**1,010**	sf	10.00	10,100		
07210	Rigid insulation	**1,010**	sf	8.00	8,080		
	SUBTOTAL					187,252	
	B2020 WINDOWS						
	Storefront and windows						
84500	Triple glazed windows	**550**	sf	200.00	110,000		
84500	Triple glazed storefront	**450**	sf	200.00	90,000		
08900	Louvers	**1**	ls	5,000.00	5,000		
84555	Sunshades	**125**	lf	550.00	68,750		
07920	Backer rod & double sealant	**500**	lf	15.00	7,500		
07270	Flashings	**500**	lf	16.00	8,000		
06100	Wood blocking at openings	**500**	lf	12.00	6,000		
07920	Waterproofing - overall added cost for FSB pricing	**12,279**	sf	4.00	49,116		
	SUBTOTAL					344,366	

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 3 Admin/Support, Shops and Sitework						
	B2030 EXTERIOR DOORS						
	Overhead doors						
08331	14x14 OHD	**3**	ea	21,560.00	64,680		
	Man Doors						
08111	Ext 3x7 doors with half lite and transom	**3**	ea	4,800.00	14,400		
84500	Alum entry door with sidelite and transom - triple glazed	**1**	ea	7,500.00	7,500		
84500	Alum entry door at vestibules - triple glazed	**1**	ea	6,500.00	6,500		
08710	Hardware	**5**	lvs	850.00	4,250		
	Misc						
07270	Flashings	**160**	lf	16.00	2,560		
07920	Backer rod & double sealant	**160**	lf	15.00	2,400		
06100	Wood blocking at openings	**160**	lf	12.00	1,920		
	SUBTOTAL					104,210	
	TOTAL - EXTERIOR CLOSURE						***$635,828***
	B30 ROOFING						
	B3010 ROOF COVERINGS						
	All roofing, gutters, downspouts and snow guards included with Prefabricated metal building						
05500	Secondary entry canopy - structure (framing, decking and turnbuckle)	**1**	ea	5,000.00	5,000		
07540	Secondary entry canopy - membrane roof	**1**	ea	2,500.00	2,500		
07540	Secondary entry canopy - metal panel ceiling, fascia and soffit	**1**	ea	2,500.00	2,500		
	SUBTOTAL					10,000	
	B3020 ROOF OPENINGS						
07720	Roof hatch and ladder	**1**	ea	6,750.00	6,750		
07720	Roof ladder	**1**	ea	1,650.00	1,650		
10950	Fall arrest system	**20**	ea	650.00	13,000		
	SUBTOTAL					21,400	
	TOTAL - ROOFING						**$31,400**
	C10 INTERIOR CONSTRUCTION						
	C1010 PARTITIONS						
09211	Fur-out GWB partition	**2,400**	sf	15.00	36,000		
09211	GWB partitions at mezz	**1,648**	sf	22.00	36,256		
09211	GWB partitions	**12,180**	sf	25.00	304,500		
09211	Plumbing wall	**980**	sf	26.00	25,480		
04200	8" CMU walls	**1,904**	sf	38.00	72,352		
12211	Screen partition and door	**36**	lf	425.00	15,300		
09211	Column wrapps	**13**	ea	500.00	6,500		
	<u>Separation walls - F lower</u>						
03300	Cast in place 8" concrete knee wall	**8**	cy	800.00	6,400		
07210	2" rigid insulation	**120**	sf	7.00	840		
09211	6" metal stud	**120**	sf	22.00	2,640		
09211	5/8" GWB	**120**	sf	7.00	840		
	<u>Separation walls - F upper</u>						
03300	5/8" GWB	**780**	sf	7.00	5,460		
09211	2 rows 6" metal stud	**1,560**	sf	26.00	40,560		
07210	3" closed cell spray foam	**780**	sf	15.00	11,700		
09211	5/8" GWB	**780**	sf	7.00	5,460		
	<u>Misc</u>						
09211	Rough blocking	**1,000**	lf	8.00	8,000		
07841	Safing/firestopping	**1**	ls	10,000.00	10,000		
	SUBTOTAL					588,288	

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	PHASE 3 Admin/Support, Shops and Sitework						
	C1020 INTERIOR DOORS						
	Doors & Frames						
08111	Interior doors - single	**29**	ea	1,100.00	31,900		
08111	Interior doors - double	**2**	ea	1,950.00	3,900		
08111	Single door with sidelight	**5**	ea	2,200.00	11,000		
84500	Interior sliding service window	**1**	ea	6,500.00	6,500		
84500	Interior vestibule door and storefront	**1**	ls	7,500.00	7,500		
	Hardware						
08710	Hardware	**36**	lvs	650.00	23,400		
	Glazing						
08800	Glazing to doors	**65**	sf	50.00	3,250		
08800	Glazing to frames	**75**	sf	50.00	3,750		
09900	Paint HM frames	**36**	ea	165.00	5,940		
07920	Sealants & caulking	**36**	ea	110.00	3,960		
	SUBTOTAL					101,100	
	C1030 SPECIALTIES / MILLWORK						
06402	Restroom vanities	**14**	lf	450.00	6,300		
06402	Window sills	**107**	lf	55.00	5,885		
06402	Multipurpose base/wall cabinets, counter and shelving	**20**	lf	600.00	12,000		
06402	Window counters	**32**	lf	300.00	9,600		
06402	Admin alcove base/wall cabinets, counter and shelving	**20**	lf	600.00	12,000		
06402	Workforce alcove base/wall cabinets, counter and shelving	**17**	lf	600.00	10,200		
06402	Admin alcove base/wall cabinets, counter and shelving	**20**	lf	600.00	12,000		
06402	Kitchenette base/wall cabinets, counter and shelving	**19**	lf	600.00	11,400		
06402	Copy/file base/wall, counter and shelving	**18**	lf	550.00	9,900		
06402	Closet poles and shelves	**16**	lf	150.00	2,400		
06402	Reception and service counters	**22**	lf	300.00	6,600		
06402	Wood trim, chair rails and base	**200**	lf	25.00	5,000		
	Lockers						
10850	Lockers	**31**	ea	850.00	26,350		
10850	Lockers benches	**2**	ea	650.00	1,300		
10850	ADA benches	**2**	ea	1,675.00	3,350		
	Restrooms						
10280	Shower curtain and rods	**6**	ea	235.00	1,410		
10650	Toilet partitions HC	**2**	ea	1,500.00	3,000		
10650	Toilet partitions Reg	**3**	ea	1,300.00	3,900		
10650	Toilet partitions urinal screen	**1**	ea	650.00	650		
10280	Soap disp	**7**	ea	30.00	210		
10280	Mirror	**7**	ea	275.00	1,925		
10280	Robe hook	**16**	ea	25.00	400		
10280	Grab bar	**10**	ea	125.00	1,250		
10280	Shower seat and bars	**3**	ea	275.00	825		
10280	Wet gear hooks	**30**	lf	65.00	1,950		
10280	SRWR	**2**	ea	250.00	500		
10280	TTD	**7**	ea	65.00	455		
10280	SND	**2**	ea	150.00	300		
10280	PTD	**4**	ea	285.00	1,140		
10280	Hooks	**12**	ea	50.00	600		
10280	Jan closet MB	**1**	ea	225.00	225		
	Miscellaneous						
06100	Plywood backers, locker bases and misc	**800**	sf	5.00	4,000		
10440	Fire extinguisher cabinets	**4**	ea	300.00	1,200		
10140	Town seal	**1**	ea	1,500.00	1,500		
10140	Cast alum letters - main sign	**1**	ls	2,500.00	2,500		
10140	Cast alum letters - OHDs	**3**	ea	175.00	525		
10140	Cast alum letters - secondary entry	**2**	ea	150.00	300		
10140	Cast alum letters - address	**1**	ls	1,500.00	1,500		
10140	Interior signage	**1**	ls	7,500.00	7,500		
10140	Code signage	**1**	ls	1,500.00	1,500		
	SUBTOTAL					173,550	
	TOTAL - INTERIOR CONSTRUCTION						***$862,938***

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 3 Admin/Support, Shops and Sitework						
	C20 STAIRCASES						
	C2010 STAIR CONSTRUCTION						
05500	Mezzanine Stairs	**2**	ea	18,000.00	36,000		
05500	Mezzanine railings	**45**	lf	175.00	7,875		
05500	Gates	**2**	ea	1,500.00	3,000		
03300	Concrete material in pan infill	**2**	ea	950.00	1,900		
	SUBTOTAL					48,775	
	C2020 STAIR FINISHES						
09900	Paint to mezzanine stairs	**2**	ea	3,200.00	6,400		
09900	Paint to mezzanine rails/gates	**45**	lf	30.00	1,350		
	SUBTOTAL					7,750	
	TOTAL - STAIRCASES						***$56,525***
	C30 INTERIOR FINISHES						
	C3010 WALL FINISHES						
09900	Paint to GWB	**28,440**	sf	1.75	49,770		
09900	Paint to interior CMU	**3,928**	sf	2.50	9,820		
09300	Wall tile at backsplashes and Locker room wet walls	**1,200**	sf	35.00	42,000		
06100	FRP to janitor closet	**200**	sf	12.00	2,400		
	SUBTOTAL					103,990	
	C3020 FLOOR FINISHES						
09651	Linoleum at corridors, muster, operations and misc storage rooms	**3,000**	sf	12.00	36,000		
09665	Carpet tile at offices & conf rooms	**2,800**	sf	6.50	18,200		
09730	RF - Resinous Flooring at locker rooms	**1,100**	sf	17.00	18,700		
09900	SC - Sealed Concrete	**7,369**	sf	1.75	12,896		
09665	Walk off mats	**2**	ea	2,500.00	5,000		
09300	Tile at vestibule/lobby	**355**	sf	35.00	12,425		
09300	Tile at single use restrooms	**110**	sf	35.00	3,850		
09651	Rubber base	**1,728**	lf	6.00	10,368		
	SUBTOTAL					117,439	
	C3030 CEILING FINISHES						
09510	A1 - ACT ceilings; 2' x 2'	**4,800**	sf	12.00	57,600		
09510	A2 - ACT ceilings; 2' x 2'	**1,200**	sf	14.00	16,800		
09211	G-1 GWB ceilings	**800**	sf	18.00	14,400		
09211	G-2 GWB ceilings	**300**	sf	20.00	6,000		
09211	GWB L, U and drop soffits	**350**	lf	100.00	35,000		
09900	Paint to GWB ceilings and soffits	**2,500**	sf	2.00	5,000		
09900	Exposed prefab metal columns and beams	**7,369**	sf	2.00	14,738		
	SUBTOTAL					149,538	
	TOTAL - INTERIOR FINISHES						***370,967***

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 3 Admin/Support, Shops and Sitework						
	D20 PLUMBING						
	D20 PLUMBING						
	Equipment						
220000	Recirc Pumps	**1**	ea	1,500.00	1,500		
220000	Expansion Tanks	**1**	ea	600.00	600		
220000	Thermostatic Mixing Valve	**1**	ea	1,350.00	1,350		
220000	Trap Primers	**6**	ea	500.00	3,000		
220000	Plumbing Specialties	**1**	ls	5,000.00	5,000		
220000	Equipment Connections	**10**	ea	550.00	5,500		
	Fixtures						
220000	Water Closets	**7**	ea	2,350.00	16,450		
220000	Lavatory - drop in	**5**	ea	1,450.00	7,250		
220000	Lavatory - wall hung	**2**	ea	2,250.00	4,500		
220000	Urinals	**2**	ea	1,950.00	3,900		
220000	Showers	**3**	ea	2,500.00	7,500		
220000	Shop sink	**3**	ea	1,650.00	4,950		
220000	Sink - Mop	**1**	ea	1,400.00	1,400		
220000	Kitchen sink	**2**	ea	1,500.00	3,000		
220000	Emergency Shower	**1**	ea	4,500.00	4,500		
220000	Drinking Fountain	**1**	ea	4,200.00	4,200		
220000	Bottle filler	**1**	ea	3,250.00	3,250		
220000	Wall Hydrant	**4**	ea	500.00	2,000		
220000	Hose Bibbs	**2**	ea	375.00	750		
220000	Floor Drains	**8**	ea	850.00	6,800		
220000	Trench Drains	**80**	lf	150.00	12,000		
220000	Clean Outs	**12**	ea	250.00	3,000		
220000	Air Stations	**2**	ea	425.00	850		
220000	Hose Reel - Air	**2**	ea	850.00	1,700		
220000	Fixture Connections	**34**	ea	650.00	22,100		
	Piping						
220000	Water	**800**	lf	45.00	36,000		
220000	Waste	**600**	lf	115.00	69,000		
220000	Vent	**600**	lf	95.00	57,000		
220000	Garage Waste	**200**	lf	125.00	25,000		
220000	Garage Vent	**200**	lf	95.00	19,000		
220000	Compressed Air	**300**	lf	45.00	13,500		
220000	Insulation	**800**	lf	12.00	9,600		
	Trade Requirements						
220000	Project Supervision	**200**	hrs	130.00	26,000		
220000	Coordination	**180**	hrs	130.00	23,400		
	SUBTOTAL					405,550	
	TOTAL - PLUMBING						***$405,550***
	D30 HVAC						
	D30 HVAC						
230000	Equipment	**12,279**	sf	15.00	184,185		
230000	Geothermal equipment, wells, vault and piping (28 wells)	**28**	ea	55,000.00	1,540,000		
230000	Ductwork, venting	**12,279**	sf	10.00	122,790		
230000	Piping	**12,279**	sf	8.00	98,232		
230000	Insulation	**12,279**	sf	8.00	98,232		
230000	Controls	**12,279**	sf	10.00	122,790		
230000	Mezzanine work	**2,100**	sf	8.00	16,800		
230000	Start Up	**200**	hrs	135.00	27,000		
230000	Testing, Adjusting, & Balancing	**200**	hrs	135.00	27,000		
230000	Coordination	**400**	hrs	135.00	54,000		
230000	BIM	**200**	hrs	150.00	30,000		
230000	Crane	**1**	ls	15,000.00	15,000		
230000	Rigging	**200**	hrs	135.00	27,000		
	SUBTOTAL					2,363,029	
	TOTAL - HVAC						***$2,363,029***

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	PHASE 3 Admin/Support, Shops and Sitework						
	D40 FIRE PROTECTION						
	D40 FIRE PROTECTION						
210000	Wet and dry sprinkler heads	**160**	ea	265.00	42,400		
210000	Branch sprinkler piping with fittings & hangers	**2,400**	lf	30.00	72,000		
210000	Main sprinkler piping with fittings & hangers	**800**	lf	50.00	40,000		
	SUBTOTAL					154,400	
	TOTAL - FIRE PROTECTION						***$154,400***
	D50 ELECTRICAL						
	D5010 LIGHTING, SERVICE AND DISTRIBUTION						
260000	Power Equipment	**12,279**	sf	8.00	98,232		
260000	Power Circuitry	**12,279**	sf	3.00	36,837		
260000	Lighting	**12,279**	sf	10.00	122,790		
260000	Power devices	**12,279**	sf	6.00	73,674		
260000	Mezzanine power & lighting	**2,100**	sf	10.00	21,000		
	SUBTOTAL					352,533	
	D5030 COMMUNICATION & SECURITY SYSTEMS						
260000	Telecommunications System - rough-in	**12,279**	sf	2.25	27,628		
260000	Security System - rough-in	**12,279**	sf	1.00	12,279		
260000	PV system rough-in	**1**	ls	15,000.00	15,000		
260000	Fire Alarm	**12,279**	sf	4.50	55,256		
260000	Mezzanines and open canopy lighting and FA	**2,100**	sf	4.50	9,450		
	SUBTOTAL					119,613	
	D5035 SITE LIGHTING AND POWER						
	Site Light Fixtures						
260000	Light poles	**6**	ea	4,000.00	24,000		
260000	Site Lighting Controls	**1**	ls	5,000.00	5,000		
260000	1" PVC, 4#10 UG	**1,200**	lf	8.25	9,900		
	Utilities, Service, Generator Fdrs:						
260000	Completed in phase 1						
260000	Charging stations, counduits, wiring and pads	**8**	ea	7,500.00	60,000		
	Telecommunications System						
260000	Completed in phase 1						
	Misc						
260000	Misc Site Demo, Removals, make-safe and temp services	**1**	ls	10,000.00	10,000		
	SUBTOTAL					108,900	
	D5040 OTHER ELECTRICAL SYSTEMS						
260000	Temp Power and Lighting	**1**	ls	15,000.00	15,000		
	SUBTOTAL					15,000	
	TOTAL - ELECTRICAL						***$596,046***
	E20 FURNISHINGS						
	E2010 FIXED FURNISHINGS						
12211	Horizontal Louver Blinds/Blackout	**550**	sf	15.00	8,250		
12211	Interior window and door blinds	**1**	ls	7,500.00	7,500		
11310	Kitchen appliances	**2**	ea	9,500.00	19,000		
	SUBTOTAL					34,750	
	TOTAL - FURNISHINGS						***$34,750***

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	PHASE 3 Admin/Support, Shops and Sitework						
	F10 INDUSTRIAL EQUIPMENT						
	PH3 - HIGHWAY WORKSHOP						
11810	HA-1 2-Ton Monorail	**1**	ea	28,500.00	28,500		
11810	HD-1 Steel Workbench	**2**	ea	1,200.00	2,400		
11810	HH-1 Flammable Cabinet (60 Gallons)				*ERO*		
11810	HH-2 Hanging Tool Storage Rack	**2**	ea	2,500.00	5,000		
11810	HH-3 Bin Storage Cabinet	**1**	ea	1,950.00	1,950		
11810	HH-4 Parts Shelving (6' x 2')	**7**	ea	650.00	4,550		
11810	Connect and or install ERO equipment	**4**	hrs	150.00	600		
	PH3 - CARPENTRY WORKSHOP						
11810	CA-1 2-Ton Monorail	**1**	ea	28,500.00	28,500		
11810	CD-1 Steel Workbench	**2**	ea	1,200.00	2,400		
11810	CH-1 Flammable Cabinet (30-Gallons)				*ERO*		
11810	CH-2 Template Storage Rack				*ERO*		
11810	CH-3 Bin Storage Cabinet	**1**	ea	1,950.00	1,950		
11810	CM-1 Chop Saw (Hitachi)				*ERO*		
11810	CM-2 Edge Planar				*ERO*		
11810	CM-3 Thickness Planar				*ERO*		
11810	CM-4 Standing Band Saw				*ERO*		
11810	CM-5 Table Saw (Powermatic)				*ERO*		
11810	CM-6 Drill Press (Powermatic)				*ERO*		
11810	CM-7 Drill Press (American Forge Foundry)				*ERO*		
11810	CM-8 Portable Dust Collector	**1**	ea	5,000.00	5,000		
11810	Connect and or install ERO equipment	**20**	hrs	150.00	3,000		
	PH3 - TREES & GROUNDS WORKSHOP						
11810	TA-1 2-Ton Monorail	**1**	ea	28,500.00	28,500		
11810	TD-1 Steel Workbench	**2**	ea	1,200.00	2,400		
11810	TH-1 Metal Locking Cabinet				*ERO*		
11810	TH-2 Brown Tool Drawer				*ERO*		
11810	TH-3 Hanging Tool Storage Rack	**2**	ea	2,500.00	5,000		
11810	TH-4 Bin Storage Cabinet	**1**	ea	1,950.00	1,950		
11810	TH-5 Parts Shelving (6' x 2')	**8**	ea	650.00	5,200		
11810	TM-1 Bench Vice	**1**	ea	950.00	950		
11810	TM-2 Bench Grinder	**1**	ea	1,500.00	1,500		
11810	TM-3 Town Toolbox (New)	**1**	ea	2,500.00	2,500		
11810	Connect and or install ERO equipment	**16**	hrs	150.00	2,400		
	SUBTOTAL					134,250	
	TOTAL - INDUSTRIAL EQUIPMENT						***$134,250***
	B SITEWORK						
	Site Contractor general conditions						
312000	Field Engineering	**6**	dy	1,500.00	9,000		
312000	Trench Plates Trench Safety	**1**	ls	5,000.00	5,000		
312000	Mobilization	**2**	ea	7,500.00	15,000		
311000	Site fencing, protection, barricades	**1**	ls	15,000.00	15,000		
	Site prep						
311000	Stabilized Construction Entrance	**1**	ea	7,500.00	7,500		
312500	Compost filter tubes and silt fence	**1,200**	lf	15.00	18,000		
	SUBTOTAL					69,500	

New Public Works Facility
Town of Acton, Ma

TCi Construction Cost Estimating

01-Nov-24

Schematic Design Cost Estimate

GSF 12,279

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	PHASE 3 Admin/Support, Shops and Sitework						
	Earthwork						
312000	E&B to support Geo-thermal and utility work	**2,500**	cy	12.00	30,000		
312000	Over excavate foundation footprint	**1,500**	cy	10.00	15,000		
312000	Import structural fill for under perimeter and column footings	**160**	cy	60.00	9,600		
312000	Import 12" subbase for under slabs	**448**	cy	60.00	26,880		
312000	Backfill foundation footing and walls	**600**	cy	20.00	12,000		
312000	Backfill foundation column footings	**300**	cy	20.00	6,000		
	Paving and walks prep						
321216	12" Dense Grade at paving and walks	**2,728**	cy	60.00	163,680		
	SUBTOTAL					263,160	
	Paving and curbing						
321216	5" Asphalt pavement	**72,200**	sf	5.50	397,100		
321613	Bitum berm	**530**	lf	25.00	13,250		
321613	Granite curbs	**864**	lf	65.00	56,160		
	SUBTOTAL					466,510	
	Storm						
334000	CB	**11**	ea	6,500.00	71,500		
334000	DMH	**4**	ea	7,500.00	30,000		
334000	OCS	**1**	ea	9,500.00	9,500		
334000	WQS	**2**	ea	15,000.00	30,000		
334000	12" HDPE piping	**550**	lf	110.00	60,500		
334000	18" HDPE piping	**120**	lf	125.00	15,000		
334000	24" HDPE piping	**210**	lf	145.00	30,450		
334000	Perimeter building roof drainage piping/boots	**300**	lf	40.00	12,000		
334000	Stormtech MC-4500 Storm water infiltration system (E,B, prep and manifolds)	**192**	ch	2,200.00	422,400		
	SUBTOTAL					681,350	
	Sanitary						
333000	4,000 gal tank	**1**	ea	25,000.00	25,000		
333000	Piping	**160**	lf	80.00	12,800		
333000	D box	**1**	ea	2,500.00	2,500		
333000	Leaching trenches	**6**	ea	20,000.00	120,000		
	SUBTOTAL					160,300	
	Site Improvements						
13100	42' x 12' - Covered material storage bins (DPW) - Galv framing and metal roofing	**2**	ea	35,000.00	70,000		
13100	28' x 12' - Covered material storage bins (Public) - Galv framing and metal roofing	**1**	ea	25,000.00	25,000		
323100	Storage bin block walls 5' ht (DPW & Public)	**1,520**	sf	60.00	91,200		
323100	Security arm gate and access key pad	**1**	ea	15,000.00	15,000		
323100	Parking signs	**12**	ea	250.00	3,000		
05500	Site bollards	**16**	ea	800.00	12,800		
321213	Concrete walks	**1,450**	sf	14.00	20,300		
323100	Parking space lines, symbols and hatching	**40**	ea	250.00	10,000		
	SUBTOTAL					247,300	
	Landscaping						
329000	Landscaping allowance	**1**	ls	75,000.00	75,000		
	SUBTOTAL					75,000	
	TOTAL - SITEWORK						***1,963,120***

New Public Works Facility
Town of Acton, Ma

Schematic Design Cost Estimate 01-Nov-24

DESCRIPTION	*QTY*	*UNIT*	*UNIT COST*	*EST'D COST*	*SUB TOTAL*	*TOTAL COST*
ALTERNATE 1						
1. Add 10,000 gallon rainwater catchment system for wash bay						
Tank support on mezzanine	**1**	ls	25,000.00	25,000		
10,000 gal tank	**1**	ea	50,000.00	50,000		
Piping and equipment	**1**	ls	20,000.00	20,000		
SUBTOTAL					95,000	
TOTAL						***$95,000***
SUBTOTAL						***$95,000***
GENERAL CONDITIONS & REQUIREMENTS				11%		$10,450
GL INSURANCE				1.5%		$1,425
BONDS				1.8%		$1,710
GC - OVERHEAD & PROFIT				3.5%		$3,325
DESIGN AND PRICING CONTINGENCY				10%		$11,191
1 YEAR ESCALATION TO 4TH QUARTER 2025 BID OPENING				6%		$7,386
TOTAL - ALTERNATE 1						***$130,487***

Schematic Design Estimate

Acton DPW
New Construction
Acton, MA

PM&C LLC
20 Downer Ave, Suite 5
Hingham, MA 02043

(T) 781-740-8007
(F) 781-740-1012

Prepared for:

PMA

November 1, 2024

PM&C

Acton DPW
New Construction
Acton, MA

01-Nov-24

Schematic Design

MAIN CONSTRUCTION COST SUMMARY

	Construction Start	Gross Floor Area	$/sf	Estimated Construction Cost
TRADE COSTS				
Phase 1 - Fleet storage garage, Maintenance, Wash Bay	Jan-26	34,605	$461.74	$15,978,670
Phase 1 - Salt shed canopy addition				$374,055
Phase 1 - Sitework				$2,607,343
Phase 2 - Temporary Shop, Admin trailers				$81,186
Phase 2 - Demolition of existing DPW building		19,000	$10.00	$190,000
Phase 2 - Demolition of existing DPW building, hazmat allowance				$304,000
Phase 2 - Sitework				$514,983
Phase 3 - Admin/Support and Shops		12,255	$484.73	$5,940,418
Phase 3 - Sitework				$2,334,713
SUBTOTAL TRADE COSTS		46,860	$604.47	$28,325,368
Design and Estimating Contingency	10.0%			$2,832,537
Escalation to Construction Start (Jan 2026)	3.5%			$991,388
SUBTOTAL INCLUDING CONTINGENCIES				**$32,149,293**
Subcontractor Bonds				In rates
General Conditions	8.0%			$2,571,943
General Requirements	2.0%			$642,986
Winter Conditions				excl
Insurances - GLI/Builders Risk	2.00%			$642,986
Bond	1.00%			$321,493
Building Permit				Waived
Overhead & Profit	4.0%			$1,285,972
TOTAL ESTIMATED CONSTRUCTION COST		**46,860**	**$803**	**$37,614,673**
ALTERNATES - *includes mark-ups*				
Rainwater Harvesting System			ADD	$156,940

Acton DPW
New Construction
Acton, MA

01-Nov-24

Schematic Design

BASIS OF ESTIMATE

This Schematic Design cost estimate was produced from drawings and specifications prepared by Weston & Sampson and their design team dated October 04, 2024. 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 and profit and design contingency. Cost escalation assumes start dates indicated.

Bidding conditions are expected to be under:
Chapter 149 of the Massachusetts General Laws to pre-qualified general contractors, and pre-qualified sub-contractors, open specifications for materials and manufacturers.

If a CM at risk CH149a procurement is used costs will increase from the costs presented in this report.

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:

- All professional fees and insurance
- Building Permit costs
- 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 (e.g. draperies, furniture and equipment)
- Construction or occupancy phasing or off hours' work, (except as noted in this estimate)

PM&C

Acton DPW
New Construction
Acton, MA

Schematic Design

CONSTRUCTION COST SUMMARY IN CSI FORMAT

		Phase 1 Detail		*Phase 1 Salt Shed Addition*		*Site Detail Phase 1*		*Phase 2 Temp Shops Detail*		*Site Detail Phase 2*		*Phase 3 Admin + Shop Detail*		*Site Detail Phase 3*		*Total Project*	
		Subtotal	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*
TOTAL PROJECT CSI SUMMARY																	
DIV. 2	**EXISTING CONDITIONS**																
024116	Structure Demolition																
028213	Abatement																
DIV. 3	**CONCRETE**		**$1,507,126**		**$11,700**		**$34,350**						**$440,851**				**$1,994,027**
033000	Cast-in-Place Concrete	$1,507,126		$11,700		$34,350						$440,851				$1,994,027	
033510	Polished Concrete Finishing																
DIV. 4	**MASONRY**		**$282,306**										**$80,950**				**$363,256**
040001	**Unit Masonry - FSB**	$282,306										$80,950				$363,256	
DIV. 5	**METALS**		**$884,367**										**$199,998**				**$1,084,365**
050001	**Metal Fabrications - FSB**	$464,339										$119,688				$584,027	
051200	Structural Steel Framing	$420,028										$80,310				$500,338	
DIV. 6	**WOODS & PLASTICS**		**$32,298**		**$188,230**								**$62,707**				**$283,235**
061000	Rough Carpentry	$32,298		$188,230								$27,057				$247,585	
061850	Glue Laminated Timber Beams																
064100	Architectural Woodwork											$35,650				$35,650	
068200	Glass-Fiber-Reinforced Plastic																
DIV. 7	**THERMAL & MOISTURE PROTECTION**		**$274,335**		**$150,605**								**$118,008**				**$542,948**
070001	**Waterproofing, Dampproofing and Caulking - FSB**	$122,506										$74,694				$197,200	
070002	**Roofing and Flashing - FSB**			$150,605								$11,441				$162,046	
072100	Thermal Insulation	$149,329										$28,873				$178,202	
074213	Wall Panels											$500				$500	
078400	Fireproofing	$2,500										$2,500				$5,000	
079500	Expansion Control																
DIV. 8	**DOORS & WINDOWS**		**$669,340**										**$482,620**				**$1,151,960**
080001	**Windows**	$204,700										$283,760				$488,460	
080002	**Glass and Glazing - FSB**	$4,000										$7,900				$11,900	
081113	Doors and Frames	$52,080										$48,645				$100,725	
083100	Access Doors and Frames	$500										$2,000				$2,500	
083323	Overhead Coiling Doors	$280,960										$61,740				$342,700	
085113	Translucent Glazing	$105,600										$36,875				$142,475	
087100	Door Hardware	$16,500										$40,700				$57,200	
089000	Louvers	$5,000										$1,000				$6,000	
089200	Louvered Equipment Enclosure																
DIV. 9	**FINISHES**		**$681,668**										**$772,677**				**$1,454,345**
090002	**Tiling - FSB**	$7,924										$71,536				$79,460	
090003	**Acoustical Ceilings - FSB**	$1,760										$46,384				$48,144	
090005	**Resilient Flooring - FSB**	$22,305										$23,080				$45,385	
090007	**Painting - FSB**	$170,996										$89,615				$260,611	
092900	Gypsum Board Assemblies	$478,683										$487,982				$966,665	
095700	Special Function Ceiling																
096450	Wood Sprung Flooring																
096766	Fluid-Applied Athletic Flooring											$25,080				$25,080	
096810	Carpet											$29,000				$29,000	
098400	Acoustic Room Components																
DIV 10	**SPECIALTIES**		**$22,700**										**$68,600**				**$91,300**
101100	Visual Display Surfaces											$3,700				$3,700	
101200	Display Cases																
101400	Signage	$7,500										$12,850				$20,350	
102100	Toilet Compartments and Cubicles											$14,600				$14,600	
102200	Operable Partitions																
102226	Operable Glass Partitions																
102600	Wall Protection	$10,000										$10,000				$20,000	
102800	Toilet Accessories	$1,000										$10,700				$11,700	
104300	Fire Protection Specialties	$4,200										$1,400				$5,600	
105000	Lockers											$15,350				$15,350	

PM&C

Acton DPW
New Construction
Acton, MA

Schematic Design

CONSTRUCTION COST SUMMARY IN CSI FORMAT

						$312,000		*$260,000*				*$33,000*				*Total Project*	
		Subtotal	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*
TOTAL PROJECT CSI SUMMARY																	
DIV. 11	**EQUIPMENT**		**$804,870**						**$2,300**				**$143,630**				**$950,800**
113100	Appliances																
114000	Food Service Equipment																
115213	Projection Screens																
115300	Laboratory Equipment																
116200	Theatre Equipment																
116600	Athletic Equipment																
117900	Miscellaneous Equipment	$804,870						$2,300				$143,630				$950,800	
DIV. 12	**FURNISHINGS**												**$93,750**				**$93,750**
122113	Window Treatments											$12,300				$12,300	
123200	Fixed Casework and Equipment											$79,200				$79,200	
124813	Entrance Mats and Frames											$2,250				$2,250	
126100	Fixed Audience Seating																
DIV. 13	**SPECIAL CONSTRUCTION**		**$3,806,550**										**$1,348,050**				**$5,154,600**
130000	Special Construction	$3,806,550										$1,348,050				$5,154,600	
DIV. 14	**CONVEYING SYSTEMS**																
142000	**Passenger Elevators - FSB**																
DIV. 21	**FIRE SUPPRESSION**		**$408,290**				**$25,300**		**$9,100**				**$119,470**				**$562,160**
210000	**Fire Protection - FSB**	$408,290				$25,300		$9,100				$119,470				$562,160	
DIV. 22	**PLUMBING**		**$808,753**						**$13,500**				**$344,155**				**$1,166,408**
220000	**Plumbing - FSB**	$808,753						$13,500				$344,155				$1,166,408	
DIV. 23	**HVAC**		**$4,135,317**						**$30,700**				**$995,076**				**$5,161,093**
230000	**HVAC - FSB**	$4,135,317						$30,700				$995,076				$5,161,093	
DIV. 26	**ELECTRICAL**		**$1,486,308**		**$23,520**		**$350,360**		**$25,586**				**$608,100**				**$2,493,874**
260000	**Electrical - FSB**	$1,486,308		$23,520		$350,360		$25,586				$608,100				$2,493,874	
DIV. 31	**EARTHWORK**		**$174,442**				**$2,197,333**				**$514,983**		**$61,776**		**$2,334,713**		**$4,536,712**
311000	Site Preparation					$287,514				$346,733				$82,600		$716,847	
312000	Earthwork	$174,442				$717,654				$97,000		$61,776		$650,467		$1,701,339	
312500	Erosion and Sedimentation Control																
DIV. 32	**EXTERIOR IMPROVEMENTS**																
320000	Site Paving					$812,130								$765,226		$1,577,356	
323000	Site Improvements																
329900	Landscaping					$117,635								$46,385		$164,020	
DIV. 33	**UTILITIES**																
331000	Water Utilities					$31,200				$60,000						$91,200	
333000	Sanitary Utilities					$158,500				$10,000				$117,450		$285,950	
334000	Storm Utilities					$72,700				$1,250				$672,585			
SUBTOTAL DIRECT (TRADE) COST			**$15,978,670**		**$374,055**		**$2,607,343**		**$81,186**		**$514,983**		**$5,940,418**		**$2,334,713**		**$27,084,833**

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST

Phase 1 Detail

GROSS FLOOR AREA CALCULATION

001		Fleet maintenance, wash bay, parts and fluid storage, mechanics office	**9,374**	sf			
002		Fleet storage garage, utilities, FP room, elec room	**25,231**	sf			
003		Maintenance mezzanine (not included in GFA)	**2,522**	sf			
004		Fleet storage garage mezzanine (not included in GFA)	**6,992**	sf			
005							
006		***TOTAL GROSS FLOOR AREA (GFA)***				**34,605**	***sf***
007							
008							
009	***A10***	***FOUNDATIONS***					
010							
011	**A1010**	**STANDARD FOUNDATIONS**					
012							
013	*033000*	*CONCRETE*				-	
014		Concrete Summary					
015	*FW*	Foundation Walls	***376***				
016	*WF*	Wall Footings	***129***				
017	*CF*	Spread Footings	***249***				
018	*P*	Piers	***5***				
019	*RW*	Retaining Wall & Footing					
020	*SOG*	Slab on Grade	***871***				
021		Total Concrete	**1,630**	cy			
022							
023		Perimeter wall footing, allow 3'-0"W x 1'-0"H, final sizing TBD	***1,059***	*lf*			
024		Formwork	**2,118**	sf	18.00	38,124	
025		Re-bar	**11,649**	lbs	2.00	23,298	
026	WF	Concrete material; 4,500 psi	**129**	cy	171.00	22,059	
027		Placing concrete	**129**	cy	120.00	15,480	
028							
029		Foundation walls, 7'-4" total height including knee wall	***2,118***	*lf*			
030		Formwork	**15,525**	sf	20.00	310,500	
031		Re-bar	**27,534**	lbs	2.00	55,068	
032	FW	Concrete material; 4,500 psi	**316**	cy	171.00	54,036	
033		Placing concrete	**316**	cy	120.00	37,920	
034							
035		Interior kneewalls at type F separation walls (per reconciliation)					
036	FW	Concrete material; 4,500 psi; complete system	**60**	cy	1,450.00	87,000	
037							
038		Foundation spread footing, allow 8'x8'x2'-0", final sizing TBD	***50***	*ea*			
039		Formwork	**3,200**	sf	15.00	48,000	
040		Re-bar	**26,100**	lbs.	2.00	52,200	
041	CF	Concrete material; 4,500 psi	**249**	cy	171.00	42,579	
042		Placing concrete	**249**	cy	100.00	24,900	
043		Set anchor bolts grout plates	**50**	ea	150.00	7,500	
044							
045							
046		Piers, allow 2'x2'x2'	***17***	*ea*			
047		Formwork	**272**	sf	15.00	4,080	
048		Re-bar	**2,040**	lbs.	2.00	4,080	
049	P	Concrete material; 4,500 psi	**5**	cy	171.00	855	
050		Placing concrete	**5**	cy	150.00	750	
051		Miscellaneous					
052		Sonotube footings to support exterior galv stairs	**6**	ea	1,000.00	6,000	
053							
054	*072100*	*THERMAL INSULATION*					
055		2.5" Polyiso 4' vertical on foundation wall per W&S	**2,966**	sf	2.50	7,415	
056		3.5" Polyiso 4' vertical on foundation wall per W&S	**1,229**	sf	4.10	5,039	
057							
058	*312000*	*EARTHWORK*					
059		Building Earthwork				w/ site	
060							
061		Strip footings					
062		Excavation	**1,236**	cy	14.00	17,304	
063		Backfill with existing fill	**206**	cy	25.00	5,150	
064		Gravel fill beneath footings, 6"	**103**	cy	35.00	3,605	
065		Remove off-site	**549**	cy	15.00	8,235	

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 1 Detail							
	Spread footings						
	Excavation	**623**	cy	14.00	8,722		
	Store on site for reuse	**623**	cy	12.00	7,476		
	Backfill with existing fill	**618**	cy	10.00	6,180		
	SUBTOTAL					$ 903,555	
A1020	**SPECIAL FOUNDATIONS**						
	No work in this section						
	SUBTOTAL					$ -	
A1030	**LOWEST FLOOR CONSTRUCTION**						
033000	*CONCRETE*						
	Slab on grade, 6"D @ mech office, parts and fluid storage	***1,525***	*sf*		-		
	Vapor barrier, heavy duty, 15 mil	**1,525**	sf	1.00	1,525		
	WWF reinforcement	**1,754**	sf	1.80	3,157		
SOG	Concrete - 4" thick; 4,500 psi	**20**	cy	171.00	3,420		
	Placing concrete	**20**	cy	120.00	2,400		
	Finishing and curing concrete	**1,525**	sf	4.00	6,100		
	Moisture vapor reduction admixture; barrier one	**20**	cy	60.00	NR		
	Slab on grade, 8"D @ Vehicle Storage	***33,080***	*sf*		-		
	Vapor barrier, heavy duty, 15 mil	**33,080**	sf	1.00	NR		
	WWF reinforcement	**38,042**	sf	1.80	68,476		
SOG	Concrete - 8" thick; 4,500 psi	**851**	cy	171.00	145,521		
	Placing concrete	**851**	cy	120.00	102,120		
	Finishing and curing concrete	**33,080**	sf	4.00	132,320		
	Moisture vapor reduction admixture; barrier one	**851**	cy	60.00	NR		
072100	*THERMAL INSULATION*						
	1" polyiso insulation below slabs at vehicle maintenance and shops	**8,002**	sf	1.50	12,003		
312000	*EARTHWORK*						
	Slab on grade						
	Compacted granular fill, 6"	**641**	cy	40.00	25,640		
	Geo textile fabric	**34,605**	sf	0.75	25,954		
	Compact sub-grade	**34,605**	sf	0.55	19,033		
	Underslab drainage , lower level	**34,605**	sf	2.00	69,210		
	E & B for underslab plumbing	**34,605**	sf	1.00	34,605		
	SUBTOTAL					651,484	
	TOTAL - FOUNDATIONS						**$1,555,039**
A20	***BASEMENT CONSTRUCTION***						
A2010	**BASEMENT EXCAVATION**						
	No Work in this section		cy				
	SUBTOTAL					$ -	
A2020	**BASEMENT WALLS**						
	No Work in this section		cy				
	SUBTOTAL					$ -	
	TOTAL - BASEMENT CONSTRUCTION						
B10	***SUPERSTRUCTURE***						
B1010	**FLOOR CONSTRUCTION**						
033000	*CONCRETE*						
	Concrete on Metal Deck	*9,520*	*sf*				
	WWF reinforcement	**10,948**	sf	1.80	19,706		
	Concrete fill to metal deck; normal weight, 5-1/2" thick; 4,000 psi	**162**	cy	190.00	30,780		
SOG	Place and finish concrete	**9,520**	sf	3.00	28,560		
	Rebar to decks	**2,856**	lbs	2.00	5,712		
051200	*STRUCTURAL STEEL FRAMING*						
	Steel framing at mezzanine; allow 11lbs/SF	**57**	tns	6,000.00	342,000		
	Moment connections, allowance	**19**	ea	900.00	17,100		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 1 Detail							
	Shear studs	**1,904**	ea	7.00	13,328		
	2"D 18 GA deck	**9,520**	sf	5.00	47,600		
078400	*FIREPROOFING/FIRESTOPPING*						
	Firestopping throughout	**1**	ls	2,500.00	2,500		
	SUBTOTAL					$ 507,286	
B1020	**ROOF CONSTRUCTION**						
	Roof construction				Scope included w/ Pre-Engineered Metal Building		
	SUBTOTAL					$ -	
	TOTAL - SUPERSTRUCTURE						**$507,286**
B20	***EXTERIOR CLOSURE***						
B2010	**EXTERIOR WALLS**						
040001	*MASONRY*						
	CMU veneer over concrete knee wall	**2,225**	sf	42.00	93,450		
	Staging/lifts to exterior wall	**2,225**	sf	5.00	NR		
052000	*MISC. METALS*						
	Misc. metals at masonry	**2,225**	sf	1.00	2,225		
	Cane detection rail below exterior galv steel stairs	**15**	lf	200.00	3,000		
	Exterior bollards at galv steel stair (OH door bollards w/ site)	**4**	ea	1,100.00	4,400		
	Exterior galv steel catwalk with stairs - 34'-0" total length	**1**	ea	70,000.00	70,000		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	AVB; peel & stick	**2,225**	sf	9.50	21,138		
	AVB at window openings	**811**	lf	15.00	12,165		
	Miscellaneous sealants	**2,225**	sf	0.50	1,113		
	AVB at soffits		sf	7.00	NR		
072100	*THERMAL INSULATION*						
	Temporary exterior finish between phase 1 & 3 - 2" rigid insulation board	**5,400**	sf	3.00	16,200		
074210	*WALL PANELS*						
	Mockups				NR		
092900	*GYPSUM BOARD ASSEMBLIES*						
	Temporary exterior finish between phase 1 & 3, fiberglass faced GWB sheathing on z-track	**5,400**	sf	8.00	43,200		
101400	*SIGNAGE*						
	Signage above OH doors - single numbers 16"	**11**	ea	300.00	3,300		
	SUBTOTAL					$ 270,191	
B2020	**WINDOWS**						
061000	*ROUGH CARPENTRY*						
	Wood blocking at openings	**811**	lf	15.00	12,165		
	Insulation at window openings	**811**	lf	4.00	3,244		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Backer rod & double sealant	**811**	lf	14.00	11,354		
080001	*WINDOWS/CURTAINWALL*						
	TRIPLE GLAZED						
	Translucent panel daylight systems; kalwall (Window FSB)	**1,384**	sf	125.00	173,000		
	Door transoms, triple glazed	**130**	sf	190.00	24,700		
	Premium for openings				incl		
	Premium for security glass, including at doors		sf	75.00	TBD		
	Premium for ballistic glass				NR		
	Horizontal sunshades; 24" deep	**28**	lf	250.00	7,000		
089000	*LOUVERS*						
	Louvers; allowance	**1**	ls	5,000.00	5,000		
	SUBTOTAL					$ 236,463	

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 1 Detail							
B2030	**EXTERIOR DOORS**						
061000	*ROUGH CARPENTRY*						
	Wood blocking at openings	**170**	lf	15.00	2,550		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Backer rod & double sealant	**170**	lf	14.00	2,380		
081110	*HOLLOW METAL DOORS AND FRAMES*						
	Doors						
	HM door - single	**3**	ea	550.00	1,650		
	HM door with glazed vision panel - single	**7**	ea	650.00	4,550		
	Frames						
	Hollow metal frames, single	**10**	ea	450.00	4,500		
083323	*OVERHEAD DOORS*						
	OH doors@ fleet maintenance, insulated 16x16 with vision panels	**6**	ea	26,880.00	161,280		
	OH doors@fleet storage: High performance insulated fast acting flex PVC/polycarb 18x16; electrically operated	**2**	ea	31,680.00	63,360		
	OH doors@wash bay: High performance insulated fast acting flex PVC/polycarb 16x16; electrically operated	**2**	ea	28,160.00	56,320		
087100	*DOOR HARDWARE*						
	Hardware to doors	**10**	set	1,600.00	16,000		
	Premium auto openers; allow	**1**	ea	5,000.00	5,000		
090007	*PAINTING*						
	Finish doors and frames	**10**	ea	220.00	2,200		
	SUBTOTAL					$ 319,790	
	TOTAL - EXTERIOR CLOSURE						**$826,444**
B30	***ROOFING***						
B3010	**ROOF COVERINGS**						
	Roof coverings				Scope included w/ Pre-Engineered Metal Building		
	Gutters and downspouts				Scope included w/ Pre-Engineered Metal Building		
	SUBTOTAL					$ -	
B3020	**ROOF OPENINGS**						
	Skylights, assumed not included in PEMB	**528**	sf	200.00	105,600		
	SUBTOTAL					$ 105,600	
	TOTAL - ROOFING						**$105,600**
C10	***INTERIOR CONSTRUCTION***						
C1010	**PARTITIONS**						
040001	*MASONRY*	5,097	sf				
	8" CMU	**3,849**	sf	36.00	138,564		
	8" CMU, 1 hr-rated	**606**	sf	38.00	23,028		
	12" CMU	**492**	sf	42.00	20,664		
	12" CMU - 1 hr rated	**150**	sf	44.00	6,600		
050001	*MISCELLANEOUS METALS*						
	Seismic clips	**46**	ea	200.00	9,200		
	Misc. metals & lintels as req'd at CMU partitions	**5,097**	sf	1.50	7,646		
061000	*ROUGH CARPENTRY*						
	Wood blocking and misc. rough carpentry as req'd in partitions	**9,895**	sf	0.50	4,948		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Miscellaneous sealants at partitions	**14,992**	sf	0.30	4,498		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 1 Detail							
072100	*THERMAL INSULATION*						
	Rigid insulation at Type F separation walls	**1,000**	sf	2.50	2,500		
	3" spray foam at Type F separation walls	**5,500**	sf	9.00	49,500		
080002	*GLASS AND GLAZING*						
	Interior window at mechanics office	**16**	sf	110.00	1,760		
081110	*HOLLOW METAL DOOR FRAMES*						
	No Work in this section		sf	35.00			
092900	*GYPSUM BOARD ASSEMBLIES*	9,895	sf				
	1S	*1,666*					
	2S	*8,229*					
	Furring wall at mechanics office - 2-1/" MS w/ 1 lyr GWB, insulation	**666**	sf	9.50	6,327		
	Interior drywall partition at geothermal and compressor rooms - 3-5/8" MS, 1 lyr GWB b/s, insulation	**1,269**	sf	17.00	21,578		
	Washbay interior wall - 6" MS w/ 1 lyr GWB b/s, insulation	**1,460**	sf	19.00	27,738		
	Premium for PVC liner panel at washbay; allowance	**4,432**	sf	20.00	88,640		
	Type F separation wall - lower; 6" MS, 1 lyr GWB o/s	**1,000**	sf	12.50	12,500		
	Type F separation wall - upper; 2 rows 6" MS, 1 lyr GWB b/s, insulation	**5,500**	sf	27.00	148,500		
	SUBTOTAL					$ 574,191	
C1020	**INTERIOR DOORS**						
	Interior Door Summary						
	Single Leaf	***5***	ea				
	Double Leaf	***5***	ea				
061000	*ROUGH CARPENTRY*						
	Wood blocking at openings	**185**	lf	4.00	740		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Backer rod & double sealant	**185**	lf	3.50	648		
080002	*GLASS AND GLAZING*						
	Sidelites	**24**	sf	35.00	840		
	Vision panel in door	**40**	sf	35.00	1,400		
081113	*HOLLOW METAL DOORS AND FRAMES*						
	Frames						
	HM frame, single	**5**	ea	450.00	2,250		
	HM frame, double	**5**	ea	600.00	3,000		
	Premium for sidelite frames	**24**	sf	45.00	1,080		
	Doors						
	Flush HM door, double	**3**	pr	1,200.00	3,600		
	Flush HM door, single	**1**	ea	600.00	600		
	HM door with upper glazed panel, double	**2**	pr	1,400.00	2,800		
	HM door with upper glazed panel, single	**4**	ea	700.00	2,800		
	Premium for fire and sound rated doors, allow	**1**	ls	2,000.00	2,000		
	Install doors	**15**	ea	150.00	2,250		
083110	*ACCESS DOORS AND FRAMES*						
	Access doors	**1**	ls	500.00	500		
087100	*DOOR HARDWARE*						
	Hardware, typical interior	**15**	set	1,100.00	16,500		
090007	*PAINTING*						
	Paint doors & frames	**15**	ea	160.00	2,400		
	SUBTOTAL					$ 43,408	
C1030	**SPECIALTIES / MILLWORK**						
055000	*MISCELLANEOUS METALS*						
	Interior bollards - 6" diameter	**18**	ea	1,100.00	19,800		
	Mechanical platform railing - allow	**60**	lf	250.00	15,000		
	Mezzanine double swing gate with chain	**3**	ea	500.00	1,500		
	Mezzanine railing	**329**	lf	250.00	82,250		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 1 Detail							
	Tie-off point for OSHA fall arrest system near mezzanine swing gate	**3**	ea	3,000.00	9,000		
	Wire mesh double door at sign storage rooms	**1**	ea	600.00	600		
	Wire mesh partition at storage rooms	**24**	lf	150.00	3,600		
	Misc. metals as req'd throughout, allowance	**34,605**	gsf	3.50	121,118		
061000	*ROUGH CARPENTRY*						
	Rough carpentry as req'd throughout, allowance	**34,605**	gsf	0.25	8,651		
064020	*INTERIOR ARCHITECTURAL WOODWORK*						
	No Work in this section		sf				
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Joint sealants as req'd throughout, allowance	**34,605**	gsf	2.00	69,210		
101100	*VISUAL DISPLAY SURFACES*						
	No Work in this section		sf				
101400	*SIGNAGE*						
	Room/door signage	**10**	ea	120.00	1,200		
	Mezz swing gate signage - 4" H - "200lbs/sf maximum mezzanine loading"	**3**	ea	1,000.00	3,000		
102600	*WALL & DOOR PROTECTION*						
	Wall protection/corner guard allowance	**1**	ls	10,000.00	10,000		
102800	*TOILET ACCESSORIES*						
	Single bathroom accessories	**1**	ea	1,000.00	1,000		
104400	*FIRE PROTECTION SPECIALTIES*						
	Fire extinguisher cabinets	**12**	ea	350.00	4,200		
	SUBTOTAL					$ 350,129	
	TOTAL - INTERIOR CONSTRUCTION						**$967,728**
C20	***STAIRCASES***						
C2010	**STAIR CONSTRUCTION**						
033000	*CONCRETE*						
	Concrete to stairs	**4**	flt	4,000.00	16,000		
055000	*MISCELLANEOUS METALS*						
	4 tread level changing steps at mezzanine	**1**	flt	2,000.00	2,000		
	L - shaped mezzanine stairs	**1**	flt	35,000.00	35,000		
	Stairs to access mechanical platform - allow	**1**	flt	30,000.00	30,000		
	Straight mezzanine stairs	**2**	flt	24,000.00	48,000		
	SUBTOTAL					$ 131,000	
C2020	**STAIR FINISHES**						
	Paint to mezzanine stairs	**4**	flt	2,500.00	10,000		
	Sealed concrete treads @ all stairs; assumed	**4**	flt	800.00	3,200		
	SUBTOTAL					$ 13,200	
	TOTAL - STAIRCASES						**$144,200**
C30	***INTERIOR FINISHES***						
C3010	**WALL FINISHES**						
090002	*TILE*						
	Ceramic wall tile wainscot at bathrooms - 5'-4" high	**129**	sf	40.00	5,160		
090007	*PAINTING*						
	Paint CMU walls	**8,257**	sf	1.30	10,734		
	Paint GWB walls	**18,124**	sf	1.00	18,124		
	Miscellanous painting, touch ups etc.	**34,605**	gsf	1.00	34,605		
	SUBTOTAL					$ 68,623	

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 1 Detail							
C3020	**FLOOR FINISHES**	**42,812**					
033000	*CONCRETE*						
	Sealed concrete	**42,760**	sf	2.50	106,900		
090002	*TILE*						
	Ceramic floor tile at restrooms	**52**	sf	42.00	2,184		
	Tile base at restrooms	**29**	lf	20.00	580		
090005	*RESILIENT FLOORS*						
	Floor base, rubber	**3,035**	lf	3.00	9,105		
	SUBTOTAL					$ 118,769	
C3030	**CEILING FINISHES**						
090003	*ACOUSTICAL TILE*						
	ACT 2x2	**220**	sf	8.00	1,760		
092900	*GYPSUM BOARD ASSEMBLIES*						
	GWB ceiling	**9,300**	sf	14.00	130,200		
090007	*PAINTING*						
	PES, Paint exposed structure, ceiling @ geothermal mech and compressor room	**950**	sf	2.75	2,613		
	Paint GWB ceiling	**9,300**	sf	1.50	13,950		
	Paint deck, columns, exposed steel of PEMB	**43,185**	sf	2.00	86,370		
098400	*ACOUSTIC ROOM COMPONENTS*						
	No Work in this section		sf				
	SUBTOTAL					$ 234,893	
	TOTAL - INTERIOR FINISHES						**$422,285**
D10	***CONVEYING SYSTEMS***						
D1010	**ELEVATOR**						
	No Work in this section						
	SUBTOTAL					$ -	
	TOTAL - CONVEYING SYSTEMS						
D20	***PLUMBING***						
D2000	**PLUMBING, GENERALLY**						
	Equipment						
	Water Service Entrance	**1**	ea	8,500.00	8,500		
	Reduced pressure back flow preventer	**1**	ea	7,500.00	7,500		
	Water Meter	**1**	ea	6,000.00	6,000		
	Water heating equipment	**1**	ls	35,000.00	35,000		
	Air compressor and accessories	**1**	ea	20,000.00	20,000		
	Rainwater harvesting pumps, floats, etc... (if included w/ base holding tank in Civil)	**1**	ea	35,000.00	35,000		
	Miscellaneous plumbing equipment, backflows, accessories	**34,605**	sf	1.00	34,605		
	Plumbing Fixtures & Specialties						
	Water closet	**2**	ea	2,300.00	4,600		
	Urinal	**2**	ea	2,200.00	4,400		
	Lavatory, wall	**2**	ea	2,150.00	4,300		
	Shower	**1**	ea	4,500.00	4,500		
	Mop sink	**1**	ea	2,000.00	2,000		
	Service sink	**2**	ea	2,400.00	4,800		
	Electric water cooler, bi-level	**1**	ea	4,600.00	4,600		
	Emergency shower/eyewash/w/mixing valve	**2**	ea	3,850.00	7,700		
	Hose Bibb	**6**	ea	600.00	3,600		
	Exterior wall hydrant	**6**	ea	1,000.00	6,000		
	Compressed air reel	**6**	ea	1,500.00	9,000		
	Floor Drains	**10**	ea	1,650.00	16,500		
	Trench Drains (allow)	**400**	lf	225.00	90,000		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Phase 1 Detail						
	Wash bay equipment connections	**1**	ls	25,000.00	25,000		
	Roof Drains - not required				NIC		
	Domestic Water Type L Copper Pipe						
	Domestic water pipe with fittings & hangers	**34,605**	sf	3.00	103,815		
	Domestic water pipe insulation	**34,605**	sf	1.00	34,605		
	Sanitary Waste And Vent Pipe w/ Hangers						
	Sanitary waste pipe with fittings & hangers	**34,605**	sf	2.50	86,513		
	Compressed Air Pipe w/ Hangers						
	Compressed air pipe with fittings & hangers	**1,000**	lf	55.00	55,000		
	Valves & accessories	**1**	ls	13,750.00	13,750		
	Storm Drainage						
	Gutters and downspouts - by others				NIC		
	Gas And Fuel Distribution Pipe						
	Gas pipe with fittings & hangers	**34,605**	sf	1.50	51,908		
	Hydraulics & fluids equipment						
	Piping, connections, distribution	**34,605**	sf	1.00	34,605		
	Miscellaneous						
	Management & supervision	**1**	ls	50,000.00	50,000		
	Coordination & BIM	**1**	ls	15,000.00	15,000		
	Coring, sleeves & firestopping	**1**	ls	15,000.00	15,000		
	Testing and sterilization	**1**	ls	3,000.00	3,000		
	Fees & permits	**1**	ls	11,952.02	11,952		
	SUBTOTAL					$ 808,753	
	TOTAL - PLUMBING						**$808,753**
D30	***HVAC***						
D3000	**HVAC, GENERALLY**						
	Geothermal Heating and Cooling Plant:						
	Closed loop type quad-loop ground source geothermal wells, assume 30 wells based on narrative	**30**	ea	40,000.00	1,200,000		
	Vault and main distribution	**1**	ea	25,000.00	25,000		
	Modular ground water source to water simultaneous heating/cooling heat pump chillers with heat recovery	**75**	tons	3,200.00	240,000		
	Expansion tanks	**1**	ea	6,500.00	6,500		
	Air separators	**1**	ea	4,500.00	4,500		
	Flow meter(s)	**1**	ea	5,000.00	5,000		
	Glycol feeder	**1**	ea	8,550.00	8,550		
	Chemical shot feeder	**1**	ea	3,500.00	3,500		
	3 way control valve	**1**	ea	15,000.00	15,000		
	Radiant heating/Vehicle maintenance	**9,374**	sf	15.00	140,610		
	Split systems	**3**	ea	12,500.00	37,500		
	Misc. Mech equipment	**9,374**	sf	1.00	9,374		
	Pumps						
	Water to Water Variable speed pumps	**3**	ea	18,500.00	55,500		
	Primary & Secondary pumps	**2**	ea	15,500.00	31,000		
	Geothermal water pumps	**2**	ea	25,000.00	50,000		
	VFD	7	ea	3,500.00	24,500		
	HVAC Equipment						
	Cabinet unit heater, electric	**6**	ea	3,000.00	18,000		
	Unit heater, electric	**20**	ea	2,500.00	50,000		
	Air Handling Equipment						
	ERU-2, Vehicle Maint/Garage	**1**	ea	216,200.00	216,200		
	H&V Unit, Vehicle Wash Bay	**1**	ea	36,000.00	36,000		
	MAU equipment, Vehicle Storage	**1**	ea	226,350.00	226,350		
	Exhaust fan						
	Exhaust fan, Vehicle Maint/Wash Bay	**9,374**	sf	1.00	9,374		
	Exhaust fan, Vehicle Storage	**25,231**	sf	1.00	25,231		
	HVLS fan, Vehicle Storage	**6**	ea	5,000.00	30,000		
	Vehicle exhaust system at Maintenance Bays	**1**	ls	100,000.00	100,000		
	Sheet metal & Accessories						
	Galvanized steel ductwork	**17,262**	lbs	18.00	310,716		
	Aluminum ductwork	**2,500**	lbs	24.00	60,000		
	Duct Insulation	**10,357**	sf	6.00	62,142		
	Registers, grilles & diffusers	**34,605**	sf	0.75	25,954		
	Roof hoods & Louvers	**1**	ls	8,657.16	8,657		
	Duct accessories	**1**	ls	22,940.60	22,941		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 1 Detail							
	HVAC Piping						
	HW/CW Supply & Return	**34,605**	sf	10.50	363,353		
	Refrigeration piping	**400**	lf	55.00	22,000		
	Condensate	**200**	lf	35.00	7,000		
	HVAC Pipe insulation	**34,605**	sf	4.00	138,420		
	Automatic Temperature Controls						
	Automatic temperature controls DDC	**34,605**	sf	8.00	276,840		
	Balancing						
	System testing & balancing	**34,605**	sf	1.00	34,605		
	Miscellaneous						
	Glycol fill & chemical	**1**	ls	35,000.00	35,000		
	Management & supervision	**1**	ls	120,000.00	120,000		
	Coordination & BIM	**1**	ls	30,000.00	30,000		
	Coring, sleeves & fire stopping	**1**	ls	15,000.00	15,000		
	Equipment start-up and inspection	**1**	ls	5,000.00	5,000		
	Rigging & equipment rental	**1**	ls	30,000.00	30,000		
	SUBTOTAL					$ 4,135,317	
	TOTAL - HVAC						**$4,135,317**
D40	***FIRE PROTECTION***						
D4000	**FIRE PROTECTION, GENERALLY**						
	Double check valve, 6"	**1**	ea	8,500.00	8,500		
	Wet alarm check valve	**1**	ea	5,500.00	5,500		
	Dry pipe valve - vehicle Storage	**1**	ea	6,500.00	6,500		
	Nitrogen generator, panel & associated trim	**1**	ea	18,500.00	18,500		
	Zone control assembly	**1**	ea	3,100.00	3,100		
	Fire department connection	**1**	ea	1,200.00	1,200		
	Alarm bell	**1**	ea	750.00	750		
	Misc. Fire Protection accessories and trim	**1**	ea	3,524.00	3,524		
	Sprinkler Distribution						
	Sprinkler heads and distribution piping, high bay areas	**252**	ea	105.00	26,460		
	Sprinkler heads and distribution piping, mezzanines	**95**	ea	105.00	9,975		
	Sprinkler heads and distribution piping, maintenance, storage	**94**	ea	105.00	9,870		
	Sprinkler heads and distribution Fire protection, Main piping	**1,103**	lf	57.00	62,871		
	Sprinkler heads and distribution branch lines	**4,851**	lf	40.00	194,040		
	Miscellaneous						
	Management & supervision	**1**	ls	25,000.00	25,000		
	Coordination & BIM	**1**	ls	12,500.00	12,500		
	Hydraulic calculations	**1**	ls	5,500.00	5,500		
	Coring, sleeves & firestopping	**1**	ls	7,500.00	7,500		
	Shop drawings	**1**	ls	3,000.00	3,000		
	Seismic restraints	**1**	ls	4,000.00	4,000		
	Fees & permits	**1**	ls		Waived		
	SUBTOTAL					$ 408,290	
	TOTAL - FIRE PROTECTION						**$408,290**
D50	***ELECTRICAL***						
D5010	**SERVICE & DISTRIBUTION**						
	800A 277/480V Switchboard	**1**	ea	40,000.00	40,000		
	Associated transformers, panelboards and feeders	**34,524**	sf	6.00	207,144		
	300KW diesel generator with SA/WP cover	**1**	ea	135,000.00	135,000		
	Associated ATS's, transformers, panelboards and feeders	**34,524**	sf	2.50	86,310		
	PV						
	Provisions including empty 4" conduits and pull boxes	**1**	ea	5,000.00	5,000		
	Equipment Wiring						
	ERU feed and connection	**1**	ea	4,500.00	4,500		
	HP/Chiller feed and connection	**1**	ea	6,500.00	6,500		
	HV feed and connection	**1**	ea	4,500.00	4,500		
	Rainwater harvesting pumps, floats, etc... (if included w/ base holding tank in Civil)	**1**	ea	5,000.00	5,000		
	Exhaust fan feed and connection	**2**	ea	1,200.00	2,400		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 1 Detail							
	Vehicle exhaust system feed and connection	**1**	ls	5,000.00	5,000		
	Geothermal well pump feed and connection	**7**	ea	3,500.00	24,500		
	MAU feed and connection	**1**	ea	3,500.00	3,500		
	CUH/UH feed and connection	**26**	ea	1,000.00	26,000		
	Split unit feed and connection	**3**	ea	2,500.00	15,000		
	Garage fan feed and connection	**6**	ea	1,500.00	1,500		
	Water heater feed and connection	**1**	ea	1,500.00	1,500		
	VFD's feed and connection only	**7**	ea	850.00	5,950		
	Air compressor feed and connections	**1**	ea	3,000.00	3,000		
	Wash Bay equipment feed and connections	**1**	ls	8,500.00	8,500		
	Overhead doors feed and connection	**10**	ea	2,500.00	25,000		
	Lifts feed and connection (allow)	**6**	ea	2,000.00	12,000		
	Cord reels with feed and connection (allow)	**10**	ea	1,650.00	16,500		
	Misc. equipment feed and connections	**24,524**	sf	0.50	12,262		
	SUBTOTAL					$ 656,566	
D5020	**LIGHTING & POWER**						
	Lighting & Branch Power						
	LED Lighting fixtures with installation labor (Garage/Loading/Wash/Maint Bays)	**34,524**	sf	4.00	138,096		
	Exit and egress lighting	**34,524**	sf	0.50	17,262		
	Exterior building lighting	**1**	ls	5,000.00	5,000		
	Lighting control system						
	Lighting controls (Garage/Loading/Wash/Maint Bays)	**34,524**	sf	0.50	17,262		
	Lighting circuitry						
	Lighting & branch circuitry	**34,524**	sf	3.50	120,834		
	Branch devices						
	Branch devices	**34,524**	sf	0.50	17,262		
	Branch circuitry						
	Branch circuitry	**34,524**	sf	3.50	120,834		
	SUBTOTAL					$ 436,550	
D5030	**COMMUNICATION & SECURITY SYSTEMS**						
	Fire Alarm						
	Modify and make connections at control panel	**1**	ls	500.00	500		
	Devices and cabling	**34,524**	sf	2.00	69,048		
	Testing and programming	**1**	ls	250.00	250		
	Mass Notification (NR)				NR		
	Bi-Directional System						
	BDA system	**34,524**	sf	0.85	29,345		
	Security System						
	Security System	**34,524**	sf	4.00	138,096		
	Telephone/Data/CATV						
	VoIP, data switches/ wireless equip, computer equip				By others		
	Tel/Data cabling (Garage/Maint/Wash Bays)	**34,524**	sf	0.75	25,893		
	Telecommunications rough in	**34,524**	sf	0.20	6,905		
	Public Address/Clock System						
	PA system	**34,524**	sf	1.25	43,155		
	SUBTOTAL					$ 313,192	
D5040	**OTHER ELECTRICAL SYSTEMS**						
	Miscellaneous						
	Lightning Protection				NIC		
	Grounding & Bonding	**1**	ls	10,000.00	10,000		
	Temp power and lights	**1**	ls	30,000.00	30,000		
	Coordination, BIM	**1**	ls	40,000.00	40,000		
	Fees & Permits				Waived		
	SUBTOTAL					$ 80,000	
	TOTAL - ELECTRICAL						**$1,486,308**
E10	***EQUIPMENT***						
E1000	**EQUIPMENT, GENERALLY**						
110000	*EQUIPMENT*						
	DPW equipment; CF/CI	**1**	ls	804,870.00	804,870		
	SUBTOTAL					$ 804,870	

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 1 Detail							
	TOTAL - EQUIPMENT						**$804,870**
E20	***FURNISHINGS***						
E2010	**FIXED FURNISHINGS**						
122100	*WINDOW TREATMENT*						
	Window treatment, allowance		sf	12.00			
123000	*CASEWORK*						
124810	*ENTRANCE FLOOR MAT AND FRAMES*						
	RFG-1 recessed floor grill		sf	90.00	NR		
126100	*FIXED AUDIENCE SEATING*						
	No Work in this section		seats	350.00			
	SUBTOTAL					$ -	
E2020	**MOVABLE FURNISHINGS**						
	All movable furnishings to be provided and installed by owner				NIC		
	SUBTOTAL					$ -	
	TOTAL - FURNISHINGS						
F10	***SPECIAL CONSTRUCTION***						
F1000	**SPECIAL CONSTRUCTION**						
	Pre-Engineered Metal Building, allowance - budget to be finalized: scope includes the following	**34,605**	sf	110.00	3,806,550		
	Complete structure minus foundations (see Div 03 for Foundations)						
	Exterior cladding: panel, siding & trim, interior face insulation & liner - limited areas						
	Windows / Storefront excluded						
	Exterior doors & overhead doors excluded						
	Roof cover, standing seam metal, w/accessories: gutters/downspouts/snow guards						
	Entrance canopies excluded						
	SUBTOTAL					$ 3,806,550	
	TOTAL - SPECIAL CONSTRUCTION						**$3,806,550**
F20	***SELECTIVE BUILDING DEMOLITION***						
F2010	**BUILDING ELEMENTS DEMOLITION**						
	No items in this section						
	SUBTOTAL					$ -	
F2020	**HAZARDOUS COMPONENTS ABATEMENT**						
	No items in this section						
	SUBTOTAL					$ -	
	TOTAL - SELECTIVE BUILDING DEMOLITION						
G10							
F1000	**SPECIAL CONSTRUCTION**						
	No items in this section						
	SUBTOTAL					$ -	
	TOTAL - SPECIAL CONSTRUCTION						

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Phase 1 Salt Shed Addition						
	A10 FOUNDATIONS						
A1010	**STANDARD FOUNDATIONS**						
	Sonotube footings to support canopy columns (includes excavation)	**9**	ea	1,300.00	11,700		
	SUBTOTAL					**$ 11,700**	
	TOTAL - FOUNDATIONS						**$11,700**
	B10 SUPERSTRUCTURE						
B1020	**ROOF CONSTRUCTION**						
061000	*ROUGH CARPENTRY*						
	Structurally independent wood framed trusses to match existing salt shed structure, 3/4" ply sheathing	**3,602**	sf	40.00	144,080		
	Wood beams to support canopy	**153**	lf	65.00	9,945		
	Wood columns to support canopy - 16'-6" high	**9**	ea	1,072.50	9,653		
	Allow for misc. connections	**1**	ls	24,551.70	24,552		
	SUBTOTAL					$ 188,230	
	TOTAL - SUPERSTRUCTURE						**$188,230**
	B30 ROOFING						
B3010	**ROOF COVERINGS**						
	Standing seam mtl roofing on ice & water	**3,602**	sf	40.00	144,080		
	Gutter	**112**	lf	45.00	5,040		
	Downspouts	**33**	lf	45.00	1,485		
	Fiber cement soffit; allow	**2,072**	sf	59.00	assumed NR		
	SUBTOTAL					$ 150,605	
B3020	**ROOF OPENINGS**						
	No Work in this section						
	SUBTOTAL					$ -	
	TOTAL - ROOFING						**$150,605**
	D50 ELECTRICAL						
	Electrical work to Storage Canopy (Salt Shed)	**7,840**	sf	3.00	23,520		
	SUBTOTAL					$ 23,520	
	TOTAL - ELECTRICAL						**$23,520**

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST

Site Detail Phase 1

000		***G***	***SITEWORK***					
001								
002		**G10**	**SITE PREPARATION & DEMOLITION**					
003	*311000*		*GENERAL CONDITIONS*					
004			6' high site construction fence	**2,018**	lf	25.00	50,450	
005			6' high site construction fence double gate	**2**	loc	5,000.00	10,000	
006			Site construction entrance and removal/restoration	**2**	loc	12,000.00	24,000	
007			Site construction fence maintenance	**2,018**	lf	8.00	16,144	
008			Mobilization & Demobilization	**1**	ea	25,000.00	25,000	
009			Temp laydown areas	**1**	acres	10,000.00	10,000	
010			Temporary signs	**1**	ls	5,000.00	5,000	
011			Layout/As-builts/Survey	**1**	ls	10,000.00	10,000	
012			Snow removal - allowance	**1**	ls		Excluded	
013			Winter conditions - allowance	**1**	ls		Excluded	
014			Police details	**1**	ls		Excluded	
015			Site security	**1**	ls		Excluded	
016			Job site construction trailer	**1**	ls		Excluded	
017			Temp utilities for job trailer	**1**	ls		Excluded	
018	*311000*		*SITE DEMOLITION AND RELOCATIONS*					
019			Pulverize pavement for reuse	**2,444**	sy	7.00	17,108	
020			Stockpile pulverized material for reuse	**407**	cy	2.50	1,018	
021			Demolish existing concrete shed pad	**3,561**	sf	2.00	7,122	
022			Miscellaneous site demolition; furnishings, concrete pads, signs etc.	**1**	ls	15,000.00	15,000	
023	*311000*		*UTILITY DEMOLITION*					
024			Remove lightpole	**2**	ea	500.00	1,000	
025			Misc. utility demo allowance	**1**	ls	10,000.00	10,000	
026	*311000*		*ROADWAY WORK*					
027			Sawcut	**260**	lf	8.25	2,145	
028			Remove pavement	**878**	sf	3.50	3,073	
029			Temp pavement patching	**878**	sf	8.00	7,024	
030			Steel plates	**1**	ls	2,500.00	2,500	
031			Police details	**7**	dy	850.00	5,950	
032			Permanent pavement patch	**878**	sf	10.00	8,780	
033	*311000*		*VEGETATION & TOPSOIL MANAGEMENT*					
034			Tree clearing	**2**	acres	12,000.00	24,000	
035			Strip + dispose forest mat	**2,800**	cy	11.50	32,200	
036	*312000*		*SOIL DISPOSAL - conversion factor 1.7 to tons*					
037			Load excess soils for disposal	**2,800**	cy	2.50	7,000	
038			Less than RCS-1 - clean non-regulated	**4,760**	tn	23.00	109,480	
039	*312000*		*EROSION & SEDIMENT CONTROL*					
040			Silt Fence; installation and removal	**2,018**	lf	18.00	36,324	
041			Silt Sacks; installation and removal	**3**	ea	325.00	975	
042			Groundwater management/ control measures	**1**	ls	20,000.00	20,000	
043			Street sweeping & dust control allowance	**1**	ls	40,000.00	40,000	
044			Erosion Control monitoring & maintenance	**1**	ls	20,000.00	20,000	
045			SUBTOTAL					521,293
046								
047	*312000*		*BUILDING EARTHWORK*					
048			Cut	**2,000**	cy	12.00	24,000	
049			Fill - import structural - 25% swell	**1,000**	cy	50.00	50,000	
050	*312000*		*SOIL DISPOSAL - conversion factor 1.7 to tons*					
051			Load excess soils for disposal	**2,000**	cy	2.50	5,000	
052			Less than RCS-1 - clean non-regulated	**3,400**	tn	23.00	78,200	
053			SUBTOTAL					157,200
054								
055	*312000*		*SITE EARTHWORK*					
056			Site cut to design subgrade	*3,400*	*cy*			
057			Cut	**3,400**	cy	10.00	34,000	
058			Store cut onsite	**400**	cy	3.50	1,400	

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Site Detail Phase 1							
	Site fill to design subgrade	*400*	*cy*				
	Fill - from cut	**400**	cy	12.00	4,800		
312000	*SOIL DISPOSAL - conversion factor 1.7 to tons*						
	Load excess soils for disposal	**3,000**	cy	2.50	7,500		
	Less than RCS-1 - clean non-regulated	**5,100**	tn	23.00	117,300		
312000	*GEOTHERMAL*						
	Support of geothermal	**12**	ea	3,500.00	42,000		
312000	*ESTABLISHING GRADE*						
	Sub grade establishment	**90,000**	sf	0.15	13,500		
	Fine grading throughout the site	**90,000**	sf	0.25	22,500		
312000	*HAZARDOUS MATERIALS*						
	UST removal allowance	**1**	ls	50,000.00	Assume NR		
	Soil disposal & replacement allowance	**10**	cy	430.00	Assume NR		
	SUBTOTAL					243,000	
	TOTAL - SITE PREPARATION						**$921,493**
G20	**SITE IMPROVEMENTS**						
320000	***ROADWAYS AND PARKING LOTS***						
	Heavy Duty Asphalt Paving	*21,311*	*sf*				
	gravel base; 12" thick	**789**	cy	50.00	39,450		
	asphalt top; 2" thick	**272**	tns	175.00	47,600		
	asphalt binder; 3" thick	**407**	tns	130.00	52,910		
	Vehicular Concrete	*1,900*	*sf*				
	gravel base; 8" thick	**47**	cy	50.00	2,350		
	Broom finish concrete paving; 8" thick	**1,900**	sf	22.00	41,800		
320000	*CURBING*						
	Asphalt berm	**300**	lf	13.00	3,900		
320000	*ROAD MARKINGS AND SIGNS*						
	Sign allowance	**1**	ls	5,000.00	5,000		
	Pavement markings allowance	**1**	ls	10,000.00	10,000		
	SUBTOTAL					203,010	
320000	***PEDESTRIAN PAVING***						
	Concrete sidewalks	*160*	*sf*				
	gravel base; 8" thick	**4**	cy	50.00	200		
	Broom finish concrete paving; 4" thick	**160**	sf	12.00	1,920		
	Gravel surfacing	*7,350*	*sf*				
	gravel base; 12" thick	**272**	cy	50.00	13,600		
	SUBTOTAL					15,720	
320000	***SITE FURNISHINGS***						
	Bollards	**32**	ea	1,100.00	35,200		
	Sound wall allowance	**200**	lf	3,000.00	600,000		
	Electrical gate and power	**1**	ls	35,000.00	35,000		
	SUBTOTAL					670,200	
329900	***LAWN AND SEED***						
	Topsoil - imported 6" thick; swell 25%	**579**	cy	65.00	37,635		
	Power rake and hydroseed disturbed areas	**25,000**	sf	0.35	8,750		
	Slope stabilization matting	**5,000**	sf	1.25	6,250		
329900	*TREES*						
	Allowance for permitting	**50**	ea	1,200.00	60,000		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Site Detail Phase 1							
329900	*MAINTENANCE*						
	Watering to grow-in	**1**	ls	5,000.00	5,000		
	SUBTOTAL					117,635	
	TOTAL - SITE IMPROVEMENTS						**$1,006,565**
G30	**CIVIL MECHANICAL UTILITIES**						
210000	*FIRE PROTECTION*						
	6" CLDI	**200**	lf	75.00	15,000		
	Fire department connection	**1**	ea	2,500.00	2,500		
	Gate valve	**4**	ea	1,200.00	4,800		
	Thrust blocks	**6**	ea	500.00	3,000		
331000	*WATER UTILITIES*						
	4" CLDI	**200**	lf	56.00	11,200		
331000	*CONNECTIONS*						
	Connect to existing water line; 6/8/10 (in roadway)	**2**	ea	10,000.00	20,000		
312000	*EXCAVATION & BACKFILL*						
	DI piping excavation/backfill (inside site)	**400**	lf	46.75	18,700		
	Pressure test & chlorinate	**400**	lf	5.00	2,000		
	Allowance for temporary water service	**1**	ea	25,000.00	NR		
	Allowance for temporary support of existing utilities	**1**	ea	15,000.00	NR		
	SUBTOTAL					77,200	
333000	*SANITARY SEWER*						
	6" PVC	**100**	lf	35.00	3,500		
	10,000 gal tank	**10,000**	gal	10.00	100,000		
	E/B	**1**	ls	25,000.00	25,000		
	Oil water separator	**1**	ea	20,000.00	20,000		
333000	*CONNECTIONS*						
	Connect to existing (in roadway)	**1**	ea	10,000.00	10,000		
312000	*EXCAVATION & BACKFILL*						
	PVC gravity piping excavation/backfill (inside site)	**100**	lf	46.75	4,675		
	Pressure testing	**100**	lf	4.00	400		
	SUBTOTAL					163,575	
334000	*STORM DRAINAGE*						
	12" HDPE	**300**	lf	70.00	21,000		
	18' HDPE	**170**	lf	90.00	15,300		
	4' Dia. DMH - 5-12' deep	**4**	ea	5,200.00	20,800		
	OCS	**1**	ea	8,000.00	8,000		
	CB - 4' Dia.	**2**	ea	3,800.00	7,600		
	SUBTOTAL					72,700	
	TOTAL - SITE MECHCANICAL UTILITIES						**$313,475**
G40	***SITE ELECTRICAL UTILITY***						
	Site Electrical Civil Work						
	Concrete:						
	Primary duct bank	**200**	lf	35.00	7,000		
	Secondary service duct bank	**60**	lf	70.00	4,200		
	Generator service duct bank	**90**	lf	35.00	3,150		
	Telecommunications duct bank	**200**	lf	65.00	13,000		
	Transformer pad	**1**	ea	3,500.00	3,500		
	Generator pad	**1**	ea	3,500.00	3,500		
	Excavation and backfill						
	Primary duct bank	**200**	lf	25.00	5,000		
	Secondary service duct bank	**60**	lf	40.00	2,400		
	Generator service duct bank	**90**	lf	30.00	2,700		
	Telecommunications duct bank	**200**	lf	30.00	6,000		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Site Detail Phase 1							
	SUBTOTAL					50,450	
	Power						
	Utility co. back charges, allow				By Owner		
	Utility pole riser	**1**	ls	1,500.00	1,500		
	Manhole	**1**	ea	8,500.00	8,500		
	Primary duct bank 2-4" duct bank, empty, allow (from Civil plans)	**200**	lf	50.00	10,000		
	Transformer by utility company				By Utility Co.		
	Transformer pad grounding	**1**	ls	1,000.00	1,000		
	800A Secondary service (allow)	**60**	lf	394.00	23,640		
	250A, 100A & control wiring Generator service (allow)	**90**	lf	158.00	14,220		
	Communications						
	Pole riser	**1**	ea	1,500.00	1,500		
	Tele/data/catv duct bank 4-4", allow	**200**	lf	125.00	25,000		
	Site Lighting						
	Site Lighting and circuitry	**1**	ls	85,000.00	85,000		
	Site Security						
	Pole mounted cameras and circuitry	**1**	ls	15,000.00	15,000		
	EV Stations (Future Rough-in only)						
	Dual EV Station and circuitry	**8**	loc	15,000.00	120,000		
	Site Demolition						
	Site demolition work	**1**	ls	10,000.00	10,000		
	SUBTOTAL					315,360	
	TOTAL - SITE ELECTRICAL UTILTIES						**$365,810**
	TOTAL - SITE DEVELOPMENT						**$2,607,343**

Phase 2 Temp Shops Detail

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
D20	***PLUMBING***						
D2000	**PLUMBING, GENERALLY**						
	Hook-ups and connections to Admin Trailers	**1**	ls	13,500.00	13,500		
	SUBTOTAL					$ 13,500	
	TOTAL - PLUMBING						**$13,500**
D30	***HVAC***						
D3000	**HVAC, GENERALLY**						
	HVAC Equipment						
	Unit heater, electric	**1**	ea	2,500.00	2,500		
	Exhaust fan						
	Exhaust fan, allow	**1**	ea	1,500.00	1,500		
	Sheet metal & Accessories						
	Galvanized steel ductwork	**500**	lbs	19.00	9,500		
	Registers, grilles & diffusers	**1**	ls	500.00	500		
	Automatic Temperature Controls						
	Automatic temperature controls DDC	**1**	ls	4,500.00	4,500		
	Balancing						
	System testing & balancing	**1**	ls	2,000.00	2,000		
	Miscellaneous						
	Management & supervision	**1**	ls	3,500.00	3,500		
	Coordination & BIM	**1**	ls	4,000.00	4,000		
	Coring, sleeves & fire stopping	**1**	ls	1,500.00	1,500		
	Equipment start-up and inspection	**1**	ls	1,200.00	1,200		
	SUBTOTAL					30,700	
	TOTAL - HVAC						**$30,700**
D40	***FIRE PROTECTION***						
D4000	**FIRE PROTECTION, GENERALLY**						
	Work heads to accommodate temporary shop	**800**	sf	4.50	3,600		
	Miscellaneous						
	Management & supervision	**1**	ls	1,500.00	1,500		
	Coordination & BIM	**1**	ls	3,000.00	3,000		
	Shop drawings	**1**	ls	1,000.00	1,000		
	SUBTOTAL					9,100	
	TOTAL - FIRE PROTECTION						**$9,100**
D50	***ELECTRICAL***						
D5010	**Gear & Distribution**						
	Associated transformers, panelboards and feeders	**673**	sf	2.00	1,346		
	Equipment Wiring						
	UH feed and connection	**1**	ea	1,000.00	1,000		
	EF feed and connection	**1**	ea	1,000.00	1,000		
	Misc. equipment feed and connections	**1**	ls	5,000.00	5,000		
	SUBTOTAL					8,346	
D5020	**LIGHTING & POWER**						
	Lighting & Branch Power						
	LED Lighting fixtures with installation	**673**	sf	9.00	6,057		
	Exterior building lighting	**1**	ls	2,500.00	2,500		
	Lighting control system						
	Lighting controls	**673**	sf	1.00	673		
	Branch devices						
	Branch devices	**673**	sf	0.25	168		
	Branch circuitry						
	Branch circuitry	**673**	sf	3.50	2,356		
	SUBTOTAL					11,754	

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Phase 2 Temp Shops Detail						
D5030	**COMMUNICATION & SECURITY SYSTEMS**						
	Fire Alarm						
	Fire Alarm	**673**	ls	2.00	1,346		
	Bi-Directional System						
	BDA system	**673**	sf	0.85	572		
	Security System						
	Security System	**673**	sf	2.00	1,346		
	Telephone/Data/CATV						
	VoIP, data switches/ wireless equip, computer equip				By others		
	Tel/Data cabling	**673**	sf	0.50	337		
	Telecommunications rough in	**673**	sf	0.20	135		
	SUBTOTAL					3,736	
D5040	**OTHER ELECTRICAL SYSTEMS**						
	Miscellaneous						
	Lightning Protection				NIC		
	Temp power and lights	**1**	ls	1,000.00	1,000		
	Coordination, BIM	**1**	ls	750.00	750		
	Fees & Permits	**1**	ls		Waived		
	SUBTOTAL					1,750	
	TOTAL - ELECTRICAL						**$25,586**
E10	***EQUIPMENT***						
E1000	**EQUIPMENT, GENERALLY**						
110000	*EQUIPMENT*						
	Temporary trailers				by owner		
	DPW equipment; CF/CI	**1**	ls	2,300.00	2,300		
	SUBTOTAL					$ 2,300	
	TOTAL - EQUIPMENT						**$2,300**

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST

Site Detail Phase 2

		G	***SITEWORK***					
		G10	**SITE PREPARATION & DEMOLITION**					
	311000		*GENERAL CONDITIONS*					
			6' high site construction fence	**1,700**	lf	25.00	42,500	
			6' high site construction fence double gate	**2**	loc	5,000.00	10,000	
			Site construction entrance and removal/restoration	**2**	loc	12,000.00	24,000	
			Site construction fence maintenance	**1,700**	lf	8.00	w_Phase three	
			Mobilization & Demobilization	**1**	ea	25,000.00	25,000	
			Temp laydown areas	**1**	acres	10,000.00	w_Phase one	
			Temporary signs	**1**	ls	5,000.00	5,000	
			Layout/As-builts/Survey	**1**	ls	10,000.00	10,000	
			Snow removal - allowance	**1**	ls		Excluded	
			Winter conditions - allowance	**1**	ls		Excluded	
			Police details	**1**	ls		Excluded	
			Site security	**1**	ls		Excluded	
			Job site construction trailer	**1**	ls		Excluded	
	311000		*SITE DEMOLITION AND RELOCATIONS*					
			Pulverize pavement for reuse	**8,000**	sy	7.00	56,000	
			Stockpile pulverized material for reuse	**1,333**	cy	2.50	3,333	
			Demolish existing concrete walk	**700**	sf	2.00	1,400	
			Demolish existing bollards	**17**	ea	500.00	8,500	
			Miscellaneous site demolition; furnishings, concrete pads, signs etc.	**1**	ls	50,000.00	50,000	
	311000		*UTILITY DEMOLITION*					
			Demolish existing utility structures	**16**	ea	500.00	8,000	
			Demolish existing utility tank	**1**	ea	10,000.00	10,000	
			Demolish existing septic structures	**1**	ea	25,000.00	25,000	
			Remove utility lines	**520**	lf	25.00	13,000	
			Cut/cap utilities	**1**	ls	25,000.00	25,000	
			Misc. demo allowance	**1**	ls	25,000.00	25,000	
	311000		*VEGETATION & TOPSOIL MANAGEMENT*					
			Remove existing trees - allowance	**1**	ls	5,000.00	5,000	
	312000		*EROSION & SEDIMENT CONTROL*					
			Silt Fence; installation	**1,700**	lf	10.00	17,000	
			Groundwater management/ control measures	**1**	ls	20,000.00	20,000	
			Street sweeping & dust control allowance	**1**	ls	40,000.00	40,000	
			Erosion Control monitoring & maintenance	**1**	ls	20,000.00	20,000	
			SUBTOTAL					443,733
			TOTAL - SITE PREPARATION					**$443,733**
		G30	**CIVIL MECHANICAL UTILITIES**					
	331000		*WATER UTILITIES*					
	331000		*CONNECTIONS*					
			Connect to existing water line; 6/8/10	**1**	ea	10,000.00	10,000	
			Connections for trailer allowance	**1**	ea	25,000.00	25,000	
			SUBTOTAL					35,000
	333000		*SANITARY SEWER*					
	333000		*CONNECTIONS*					
			Connect to existing	**1**	ea	10,000.00	10,000	
			Connections for trailer allowance	**1**	ea	25,000.00	25,000	
			SUBTOTAL					35,000
	334000		*STORM DRAINAGE*					
			CB - 4' Dia. - replace cover	**1**	ea	1,250.00	1,250	
			SUBTOTAL					1,250
			TOTAL - SITE MECHCANICAL UTILITIES					**$71,250**

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST

Site Detail Phase 2

	G40	***SITE ELECTRICAL UTILITY***					
	G4010	**ELECTRICAL DISTRIBUTION**					
		Included with Phase 1				**Phase 1**	
		SUBTOTAL				-	
		TOTAL - SITE ELECTRICAL UTILTIES					**$0**
		TOTAL - SITE DEVELOPMENT					**$514,983**

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST

Phase 3 Admin + Shop Detail

GROSS FLOOR AREA CALCULATION

	First floor - Admin/support	**12,255**	sf
	Mezzanine (not included in GFA)	**1,702**	sf
	TOTAL GROSS FLOOR AREA (GFA)	**12,255**	***sf***

A10 *FOUNDATIONS*

A1010 STANDARD FOUNDATIONS

033000	*CONCRETE*						-	
	Concrete Summary							
FW	Foundation Walls		***103***					
WF	Wall Footings		***42***					
CF	Spread Footings		***100***					
P	Piers		***6***					
RW	Retaining Wall & Footing							
SOG	Slab on Grade		***201***					
		Total Concrete	**452**	cy				
	Perimeter wall footing, allow 3'-0"W x 1'-0"H, final sizing TBD		***345***	*lf*				
	Formwork		**690**	sf	18.00	12,420		
	Re-bar		**3,795**	lbs	2.00	7,590		
WF	Concrete material; 4,500 psi		**42**	cy	171.00	7,182		
	Placing concrete		**42**	cy	120.00	5,040		
	Foundation walls, 7'-4" total height including knee wall		***345***	*lf*				
	Formwork		**5,058**	sf	20.00	101,160		
	Re-bar		**8,970**	lbs	2.00	17,940		
FW	Concrete material; 4,500 psi		**103**	cy	171.00	17,613		
	Placing concrete		**103**	cy	120.00	12,360		
	Foundation spread footing, allow 8'x8'x2'-0", final sizing TBD		***20***	*ea*				
	Formwork		**1,280**	sf	15.00	19,200		
	Re-bar		**10,440**	lbs.	2.00	20,880		
CF	Concrete material; 4,500 psi		**100**	cy	171.00	17,100		
	Placing concrete		**100**	cy	100.00	10,000		
	Set anchor bolts grout plates		**20**	ea	150.00	3,000		
	Piers, allow 2'x2'x2'		***20***	*ea*				
	Formwork		**320**	sf	15.00	4,800		
	Re-bar		**2,400**	lbs.	2.00	4,800		
P	Concrete material; 4,500 psi		**6**	cy	171.00	1,026		
	Placing concrete		**6**	cy	150.00	900		
072100	*THERMAL INSULATION*							
	2.5" Polyiso 4' vertical on foundation wall per W&S		**1,028**	sf	2.50	2,570		
	3.5" Polyiso 4' vertical on foundation wall per W&S		**338**	sf	4.10	1,386		
312000	*EARTHWORK*							
	Building Earthwork					w/ site		
	Strip footings							
	Excavation		**403**	cy	14.00	5,642		
	Backfill with existing fill		**67**	cy	25.00	1,675		
	Gravel fill beneath footings, 6"		**34**	cy	35.00	1,190		
	Remove off-site		**160**	cy	15.00	2,400		
	Spread footings							
	Excavation		**250**	cy	14.00	3,500		
	Store on site for reuse		**250**	cy	12.00	3,000		
	Backfill with existing fill		**244**	cy	10.00	2,440		
	SUBTOTAL						$	286,814

A1020 SPECIAL FOUNDATIONS

No work in this section

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 3 Admin + Shop Detail							
	SUBTOTAL					$ -	
A1030	**LOWEST FLOOR CONSTRUCTION**						
033000	*CONCRETE*						
	Slab on grade, 6"D @ admin spaces	***8,875***	*sf*				
	Vapor barrier, heavy duty, 15 mil	**8,875**	sf	1.00	8,875		
	WWF reinforcement	**10,206**	sf	1.80	18,371		
SOG	Concrete - 4" thick; 4,500 psi	**114**	cy	171.00	19,494		
	Placing concrete	**114**	cy	120.00	13,680		
	Finishing and curing concrete	**8,875**	sf	4.00	35,500		
	Moisture vapor reduction admixture; barrier one	**114**	cy	60.00	NR		
	Slab on grade, 8"D @ Workshops	***3,380***	*sf*				
	Vapor barrier, heavy duty, 15 mil	**3,380**	sf	1.00	NR		
	WWF reinforcement	**3,887**	sf	1.80	6,997		
SOG	Concrete - 8" thick; 4,500 psi	**87**	cy	171.00	14,877		
	Placing concrete	**87**	cy	120.00	10,440		
	Finishing and curing concrete	**3,380**	sf	4.00	13,520		
	Moisture vapor reduction admixture; barrier one	**87**	cy	60.00	NR		
072100	*THERMAL INSULATION*						
	1" polyiso insulation below slabs at vehicle maintenance and shops	**3,380**	sf	1.50	5,070		
312000	*EARTHWORK*						
	Slab on grade						
	Compacted granular fill, 6"	**227**	cy	40.00	9,080		
	Geo textile fabric	**12,255**	sf	0.75	9,191		
	Compact sub-grade	**12,255**	sf	0.55	6,740		
	Underslab drainage , lower level	**12,255**	sf	2.00	24,510		
	E & B for underslab plumbing	**12,255**	sf	1.00	12,255		
	SUBTOTAL					208,600	
	TOTAL - FOUNDATIONS						**$495,414**
A20	***BASEMENT CONSTRUCTION***						
A2010	**BASEMENT EXCAVATION**						
	No Work in this section		cy				
	SUBTOTAL					$ -	
A2020	**BASEMENT WALLS**						
	No Work in this section		cy				
	SUBTOTAL					$ -	
	TOTAL - BASEMENT CONSTRUCTION						
B10	***SUPERSTRUCTURE***						
B1010	**FLOOR CONSTRUCTION**						
033000	*CONCRETE*						
	Concrete on Metal Deck	*1,702*	*sf*				
	WWF reinforcement	**1,957**	sf	1.80	3,523		
	Concrete fill to metal deck; normal weight, 5-1/2" thick; 4,000 psi	**29**	cy	190.00	5,510		
SOG	Place and finish concrete	**1,702**	sf	3.00	5,106		
	Rebar to decks	**511**	lbs	2.00	1,022		
051200	*STRUCTURAL STEEL FRAMING*						
	Steel framing at mezzanine; allow 11lbs/SF	**10**	tns	6,000.00	60,000		
	Moment connections, allowance	**3**	ea	900.00	2,700		
	Shear studs	**340**	ea	7.00	2,380		
	2"D 18 GA deck	**1,702**	sf	5.00	8,510		
078400	*FIREPROOFING/FIRESTOPPING*						
	Firestopping throughout	**1**	ls	2,500.00	2,500		
	SUBTOTAL					$ 91,251	
B1020	**ROOF CONSTRUCTION**						

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 3 Admin + Shop Detail							
051200	*STRUCTURAL STEEL FRAMING*						
	Canopy structure at staff entrance; allow 11lbs/SF	**0.12**	tns	6,000.00	720		
	Roof construction over public lobby and vestibule - assumed stick built; allow 11lbs/SF	**1**	tns	6,000.00	6,000		
	2"D 18 GA deck	**20**	sf		-		
	SUBTOTAL					$ 6,720	
	TOTAL - SUPERSTRUCTURE						**$97,971**
B20	***EXTERIOR CLOSURE***						
B2010	**EXTERIOR WALLS**						
040001	*MASONRY*						
	CMU veneer over concrete knee wall	**945**	sf	42.00	39,690		
	Staging/lifts to exterior wall	**945**	sf	5.00	NR		
052000	*MISC. METALS*						
	Misc. metals at masonry	**945**	sf	1.00	945		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	AVB; peel & stick	**945**	sf	9.50	8,978		
	AVB at window openings	**735**	lf	15.00	11,025		
	Miscellaneous sealants	**945**	sf	0.50	473		
	AVB at soffits	**20**	sf	7.00	140		
072100	*THERMAL INSULATION*						
	Temporary exterior finish between phase 1 & 3 - 2" rigid insulation board	**5,400**	sf	3.00	w/ phase 1		
074210	*WALL PANELS*						
	Staging/lifts to soffits	**1**	ls	500.00	500		
	Mockups				NR		
092900	*GYPSUM BOARD ASSEMBLIES*						
	Temporary exterior finish between phase 1 & 3, fiberglass faced GWB sheathing on z-track	**5,400**	sf	8.00	NR		
	Framing at soffits	**20**	sf	20.00	400		
	Insulation at soffits	**20**	sf	4.00	80		
	Furring to inside of admin walls including sheathing and stud	**3,500**	sf	24.50	85,750		
101400	*SIGNAGE*						
	12" signage - Town of Acton Department of Public works	**1**	ea	250.00	250		
	8" signage - Acton Public Works	**1**	ea	200.00	200		
	Town seal	**1**	ea	5,000.00	5,000		
	Vinyl graphic signage on entry doors	**2**	ea	600.00	1,200		
	SUBTOTAL					$ 154,631	
B2020	**WINDOWS**						
061000	*ROUGH CARPENTRY*						
	Wood blocking at openings	**735**	lf	15.00	11,025		
	Insulation at window openings	**735**	lf	4.00	2,940		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Backer rod & double sealant	**735**	lf	14.00	10,290		
080001	*WINDOWS/CURTAINWALL*						
	TRIPLE GLAZED						
	Translucent panel daylight systems; kalwall	**295**	sf	125.00	36,875		
	Door transoms, triple glazed	**20**	sf	190.00	3,800		
	Windows, triple glazed	**660**	sf	180.00	118,800		
	Curtainwall, triple glazed	**365**	sf	210.00	76,650		
	Premium for openings				incl		
	Premium for security glass, including at doors		sf	75.00	TBD		
	Premium for ballistic glass				NR		
	Horizontal sunshades; 24" deep	**130**	lf	250.00	32,500		
089000	*LOUVERS*						

CODE	DESCRIPTION		QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 3 Admin + Shop Detail								
	Louvers; allowance		**1**	ls	1,000.00	1,000		
	SUBTOTAL						$ 293,880	
B2030	**EXTERIOR DOORS**							
083323	*OVERHEAD DOORS*							
	OH doors@ workshops, insulated 14x14 with vision panels		**3**	ea	20,580.00	61,740		
084113	*ALUMINUM FRAMED ENTRANCES AND STOREFRONTS*							
	Glazed entrance doors including frame and hardware							
	Single		**5**	ea	7,000.00	35,000		
	SUBTOTAL						$ 96,740	
	TOTAL - EXTERIOR CLOSURE							**$545,251**
B30	***ROOFING***							
B3010	**ROOF COVERINGS**							
070002	*ROOFING AND FLASHING*		166	total area				
	Canopy roofing and soffit at staff entrance		**20**	sf	70.00	1,400		
	Roof edge at canopy and main entrance roof		**58**	lf	30.00	1,740		
	Roofing membrane over public lobby and vestibule		**146**	sf	35.00	5,110		
	Gutters and downspouts at entry roof		**65**	lf	35.00	2,275		
	Roof to wall flashing		**30**	lf	25.00	750		
	Miscellaneous flashings		**166**	sf	1.00	166		
	Roof coverings to PEMP					Scope included w/ Pre-Engineered Metal Building		
	Gutters and downspouts					Scope included w/ Pre-Engineered Metal Building		
	SUBTOTAL						$ 11,441	
B3020	**ROOF OPENINGS**							
	Skylights				200.00	NR		
	SUBTOTAL						$ -	
	TOTAL - ROOFING							**$11,441**
C10	***INTERIOR CONSTRUCTION***							
C1010	**PARTITIONS**							
040001	*MASONRY*		1,150	sf				
	6" CMU		**35**	sf	32.00	1,120		
	8" CMU		**1,115**	sf	36.00	40,140		
050001	*MISCELLANEOUS METALS*							
	Seismic clips		**12**	ea	200.00	2,400		
	Misc. metals & lintels as req'd at CMU partitions		**1,150**	sf	1.50	1,725		
061000	*ROUGH CARPENTRY*							
	Wood blocking and misc. rough carpentry as req'd in partitions		**15,248**	sf	0.50	7,624		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*							
	Miscellaneous sealants at partitions		**16,398**	sf	0.30	4,919		
080002	*GLASS AND GLAZING*							
	Interior storefront at lobby		**91**	sf	110.00	10,010		
	Service window at public lobby		**24**	sf	160.00	3,840		
081110	*HOLLOW METAL DOOR FRAMES*							
	No Work in this section			sf	35.00			
092900	*GYPSUM BOARD ASSEMBLIES*		15,248	sf				
		1S	*6,050*					
		2S	*9,198*					
	2 1/2" MS w/ 1 lyr GWB o/s		**1,345**	sf	9.50	12,778		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 3 Admin + Shop Detail							
	3-5/8" MS w/ 1 lyr GWB o/s, insulation	**2,347**	sf	12.50	29,338		
	3- 5/8" MS w/ 1 lyr GWB b/s, insulation	**9,198**	sf	17.00	156,366		
	6" MS w/ 1 lyr GWB b/s, insulation	**2,358**	sf	19.00	44,802		
	Premium for MR GWB at toilet and locker rooms	**540**	sf	1.00	540		
	SUBTOTAL					$ 315,602	
C1020	**INTERIOR DOORS**						
	Interior Door Summary						
	Single Leaf	***33***	ea				
	Double Leaf	**2**	ea				
061000	*ROUGH CARPENTRY*						
	Wood blocking at openings	**601**	lf	4.00	2,404		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Backer rod & double sealant	**601**	lf	3.50	2,104		
080002	*GLASS AND GLAZING*						
	Sidelites	**21**	sf	35.00	735		
	Vision panel in door	**95**	sf	35.00	3,325		
081113	*HOLLOW METAL DOORS AND FRAMES*						
	Frames						
	HM frame, single	**33**	ea	450.00	14,850		
	HM frame, double	**2**	ea	600.00	1,200		
	Premium for sidelite frames	**21**	sf	45.00	945		
	Doors						
	Flush door, double	**2**	pr	1,200.00	2,400		
	Flush door, single	**14**	ea	600.00	8,400		
	Door with upper glazed panel, double		pr	1,400.00			
	Door with upper glazed panel, single	**19**	ea	700.00	13,300		
	Premium for fire and sound rated doors, allow	**1**	ls	2,000.00	2,000		
	Install doors	**37**	ea	150.00	5,550		
083110	*ACCESS DOORS AND FRAMES*						
	Access doors	**1**	ls	2,000.00	2,000		
084113	*ALUMINUM FRAMED ENTRANCES AND STOREFRONTS*						
	Glazed entrance doors including frame and hardware						
	Single	**1**	ea	7,000.00	7,000		
087100	*DOOR HARDWARE*						
	Hardware, typical interior	**37**	set	1,100.00	40,700		
090007	*PAINTING*						
	Paint doors & frames	**37**	ea	160.00	5,920		
	SUBTOTAL					$ 112,833	
C1030	**SPECIALTIES / MILLWORK**						
055000	*MISCELLANEOUS METALS*						
	Hat and coat hooks	**39**	ea	75.00	2,925		
	Mezzanine double swing gate with chain	**2**	ea	500.00	1,000		
	Mezzanine railing	**36**	lf	250.00	9,000		
	Tie-off point for OSHA fall arrest system near mezzanine swing gate	**2**	ea	3,000.00	6,000		
	Wire mesh double door at sign storage rooms	**2**	ea	600.00	1,200		
	Wire mesh partition at storage rooms	**24**	lf	150.00	3,600		
	Misc. metals as req'd throughout, allowance	**12,255**	gsf	3.50	42,893		
061000	*ROUGH CARPENTRY*						
	Rough carpentry as req'd throughout, allowance	**12,255**	gsf	0.25	3,064		
064020	*INTERIOR ARCHITECTURAL WOODWORK*						
	Allowance for WD accent walls a conference rooms	**1**	ls	7,500.00	7,500		
	Allowance for wood chair rail and wainscot in public spaces	**1**	ls	10,000.00	10,000		
	Bathroom vanities	**13**	lf	350.00	4,550		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 3 Admin + Shop Detail							
	Desk on public lobby side of service window	**12**	lf	800.00	9,600		
	Reception counter	**10**	lf	400.00	4,000		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Joint sealants as req'd throughout, allowance	**12,255**	gsf	3.00	36,765		
101100	*VISUAL DISPLAY SURFACES*						
	Mapboard at workforce alcove	**1**	ea	700.00	700		
	Markerboard/Tackboard allowance	**1**	ls	3,000.00	3,000		
101400	*SIGNAGE*						
	Room/door signage	**35**	ea	120.00	4,200		
	Mezz swing gate signage - 4" H - "200lbs/sf maximum mezzanine loading"	**2**	ea	1,000.00	2,000		
102110	*TOILET COMPARTMENTS*						
	Toilet partition - standard	**2**	ea	1,600.00	3,200		
	Toilet partition - ADA	**3**	ea	1,800.00	5,400		
	Urinal screen	**1**	ea	600.00	600		
	Shower Units, standard	**3**	ea	1,800.00	5,400		
102600	*WALL & DOOR PROTECTION*						
	Wall protection/corner guard allowance	**1**	ls	10,000.00	10,000		
102800	*TOILET ACCESSORIES*						
	Single bathroom accessories	**3**	ea	1,000.00	3,000		
	Gang bathroom accessories	**2**	ea	2,500.00	5,000		
	Janitor storage, accessories	**1**	rms	300.00	300		
	Shower accessories	**3**	ea	800.00	2,400		
104400	*FIRE PROTECTION SPECIALTIES*						
	Fire extinguisher cabinets	**4**	ea	350.00	1,400		
105113	*LOCKERS*						
	Single tier @ locker rooms	**31**	ea	400.00	12,400		
	Locker bench	**8**	lf	150.00	1,200		
	Locker bench - ADA	**7**	lf	250.00	1,750		
	SUBTOTAL					$ 204,047	
	TOTAL - INTERIOR CONSTRUCTION						**$632,482**
C20	***STAIRCASES***						
C2010	**STAIR CONSTRUCTION**						
033000	*CONCRETE*						
	Concrete to stairs	**2**	flt	4,000.00	8,000		
055000	*MISCELLANEOUS METALS*						
	Straight mezzanine stairs	**2**	flt	24,000.00	48,000		
	SUBTOTAL					$ 56,000	
C2020	**STAIR FINISHES**						
	Paint to mezzanine stairs	**2**	flt	2,500.00	5,000		
	Sealed concrete treads @ all stairs; assumed	**2**	flt	800.00	1,600		
	SUBTOTAL					$ 6,600	
	TOTAL - STAIRCASES						**$62,600**
C30	***INTERIOR FINISHES***						
C3010	**WALL FINISHES**						
064100	*FINISH CARPENTRY*						
	FRP at janitors closet and laundry	**278**	sf	16.00	4,448		
090002	*TILE*						
	Ceramic wall tile wainscot at bathrooms - 5'-4" high	**1,032**	sf	40.00	41,280		
	Tile backsplash at kitchenette; allow	**22**	sf	40.00	880		

CODE		DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 3 Admin + Shop Detail								
	090007	*PAINTING*						
		Paint CMU walls	**1,863**	sf	1.30	2,422		
		Paint GWB walls	**27,946**	sf	1.00	27,946		
090007		Miscellanous painting, touch ups etc.	**12,255**	gsf	1.00	12,255		
		SUBTOTAL					$ 89,231	
	C3020	**FLOOR FINISHES**	**40,346**			-		
	033000	*CONCRETE*						
		Sealed concrete	**5,170**	sf	2.50	12,925		
	090002	*TILE*						
		Ceramic floor tile at public vestibule, lobby and staff entry	**390**	sf	42.00	16,380		
		Ceramic floor tile at restrooms	**114**	sf	42.00	4,788		
		Tile base	**188**	lf	20.00	3,760		
	090005	*RESILIENT FLOORS*						
		Flooring, LVT	**1,411**	sf	7.00	9,877		
		Floor base, rubber	**2,201**	lf	3.00	6,603		
	096766	*FLUID APPLIED ATHLETIC FLOORING*						
		Resinous floor at locker rooms, laundry and JC w/ integral base	**1,140**	sf	22.00	25,080		
	096800	*CARPETING*						
		Carpet tile at offices, conference and select storage	**3,625**	sf	8.00	29,000		
		SUBTOTAL					$ 108,413	
	C3030	**CEILING FINISHES**						
	090003	*ACOUSTICAL TILE*						
		2x2 ACT	**4,844**	sf	8.00	38,752		
		2x2 ACT - moisture resistant	**848**	sf	9.00	7,632		
	092900	*GYPSUM BOARD ASSEMBLIES*						
		GWB ceiling	**9,300**	sf	14.00	130,200		
		Ceiling G2, MRGWB	**270**	sf	16.00	4,320		
		Horizontal soffit	**1,069**	sf	14.00	14,966		
		Vertical soffit	**402**	lf	21.00	8,442		
	090007	*PAINTING*						
		Paint GWB ceiling	**11,041**	sf	1.50	16,562		
		Paint deck, columns, exposed steel of PEMB	**12,255**	sf	2.00	24,510		
	098400	*ACOUSTIC ROOM COMPONENTS*						
		No Work in this section		sf				
		SUBTOTAL					$ 245,384	
		TOTAL - INTERIOR FINISHES						**$443,028**
	D10	***CONVEYING SYSTEMS***						
	D1010	**ELEVATOR**						
		No Work in this section						
		SUBTOTAL					$ -	
		TOTAL - CONVEYING SYSTEMS						
	D20	***PLUMBING***						
	D2000	**PLUMBING, GENERALLY**						
		Equipment						
		Water Service Entrance (Phase 1)	**1**	ea		NIC		
		Reduced pressure back flow preventer (Phase 1)	**1**	ea		NIC		
		Water Meter (Phase 1)	**1**	ea		NIC		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Phase 3 Admin + Shop Detail						
	Water heating equipment	**1**	ls	25,000.00	25,000		
	Miscellaneous plumbing equipment	**12,255**	sf	1.00	12,255		
	Plumbing Fixtures & Specialties						
	Water closet	**7**	ea	2,300.00	16,100		
	Urinal	**2**	ea	2,200.00	4,400		
	Lavatory, wall	**7**	ea	2,150.00	15,050		
	Shower	**3**	ea	4,500.00	13,500		
	Kitchenette	**1**	ea	1,850.00	1,850		
	Mop sink	**1**	ea	2,000.00	2,000		
	Service sink	**2**	ea	2,400.00	4,800		
	Electric water cooler, bi-level	**2**	ea	4,600.00	9,200		
	Ice maker connection	**1**	ea	600.00	600		
	Laundry connections	**1**	ea	750.00	750		
	Hose Bibb	**2**	ea	600.00	1,200		
	Exterior wall hydrant	**2**	ea	1,000.00	2,000		
	Floor Drains	**5**	ea	1,650.00	8,250		
	Roof Drains - not required				NIC		
	Domestic Water Type L Copper Pipe						
	Domestic water pipe with fittings & hangers	**1,550**	lf	50.00	77,500		
	Domestic water pipe insulation	**1,550**	lf	12.00	18,600		
	Sanitary Waste And Vent Pipe w/ Hangers						
	Sanitary waste pipe with fittings & hangers	**1,440**	lf	65.00	93,600		
	Storm Drainage						
	Gutters and downspouts - by others				NIC		
	Miscellaneous						
	Management & supervision	**1**	ls	25,000.00	25,000		
	Coordination & BIM	**1**	ls	7,500.00	7,500		
	Coring, sleeves & firestopping	**1**	ls	3,500.00	3,500		
	Testing and sterilization	**1**	ls	1,500.00	1,500		
	SUBTOTAL					$ 344,155	
	TOTAL - PLUMBING						**$344,155**
	D30 HVAC						
D3000	**HVAC, GENERALLY**						
	Geothermal Heating and Cooling Plant:						
	Closed loop type quad-loop ground source geothermal wells, assume 30 wells based on narrative (Phase 1)						
	Vault and main distribution (Phase 1)						
	Modular ground water source to water simultaneous heating/cooling heat pump chillers with heat recovery (Phase 1)						
	HVAC Equipment						
	Cabinet unit heater, electric	**2**	ea	3,000.00	6,000		
	Unit heater, electric	**2**	ea	2,500.00	5,000		
	Ducted Fan Coils	**12**	ea	4,500.00	54,000		
	Ductless split system	**1**	ea	12,500.00	12,500		
	Air Handling Equipment						
	ERU-1, Admin area, HW/CW water coils, energy recovery w/ exhaust fan	**8,500**	cfm	28.00	238,000		
	ERU-3, Workshops, HW/CW water coils, energy recovery w/ exhaust fan	**3,500**	cfm	28.00	98,000		
	Sheet metal & Accessories						
	Galvanized steel ductwork	**11,030**	lbs	19.00	209,570		
	Duct Insulation	**6,618**	sf	6.00	39,708		
	Registers, grilles & diffusers	**12,255**	sf	1.00	12,255		
	Duct accessories	**1**	ls	26,153.30	26,153		
	HVAC Piping						
	HW/CW Supply & Return	**12,255**	sf	7.00	85,785		
	Refrigeration piping	**200**	lf	55.00	11,000		
	Condensate	**80**	lf	35.00	2,800		
	HVAC Pipe insulation	**12,255**	sf	4.00	49,020		
	Automatic Temperature Controls						
	Automatic temperature controls DDC	**12,255**	sf	6.00	73,530		
	Balancing						
	System testing & balancing	**12,255**	sf	1.00	12,255		
	Miscellaneous						
	Management & supervision	**1**	ls	25,000.00	25,000		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Phase 3 Admin + Shop Detail						
	Coordination & BIM	**1**	ls	15,000.00	15,000		
	Coring, sleeves & fire stopping	**1**	ls	3,500.00	3,500		
	Equipment start-up and inspection	**1**	ls	6,000.00	6,000		
	Rigging & equipment rental	**1**	ls	10,000.00	10,000		
	SUBTOTAL					$ 995,076	
	TOTAL - HVAC						**$995,076**
D40	***FIRE PROTECTION***						
D4000	**FIRE PROTECTION, GENERALLY**						
	Sprinkler Distribution						
	Sprinkler heads, office area	**123**	ea	125.00	15,375		
	Mains	**246**	lf	65.00	15,990		
	Branch lines & distribution piping, office area	**1,169**	lf	45.00	52,605		
	Miscellaneous						
	Management & supervision	**1**	ls	15,000.00	15,000		
	Coordination & BIM	**1**	ls	7,500.00	7,500		
	Hydraulic calculations	**1**	ls	5,500.00	5,500		
	Coring, sleeves & firestopping	**1**	ls	2,500.00	2,500		
	Shop drawings	**1**	ls	3,000.00	3,000		
	Seismic restraints	**1**	ls	2,000.00	2,000		
	SUBTOTAL					$ 119,470	
	TOTAL - FIRE PROTECTION						**$119,470**
D50	***ELECTRICAL***						
D5010	**SERVICE & DISTRIBUTION**						
	Associated transformers, panelboards and feeders	**12,255**	sf	6.00	73,530		
	Equipment Wiring						
	ERU feed and connection	**2**	ea	4,500.00	9,000		
	Exhaust fan feed and connection	**2**	ea	1,200.00	2,400		
	FCU feed and connection	**12**	ea	1,000.00	12,000		
	CUH/UH feed and connection	**4**	ea	1,000.00	4,000		
	Split unit feed and connection	**1**	ea	2,500.00	2,500		
	Shop equipment feed and connection	**1**	ls	8,500.00	8,500		
	Lifts feed and connection (allow)	**6**	ea	2,000.00	12,000		
	Misc. equipment feed and connections	**12,225**	sf	0.50	6,113		
	SUBTOTAL					$ 130,043	
D5020	**LIGHTING & POWER**						
	Lighting & Branch Power				-		
	LED Lighting fixtures with installation labor (Office)	**12,225**	sf	9.00	110,025		
	Exit and egress lighting	**12,225**	sf	0.50	6,113		
	Exterior building lighting	**1**	ls	5,000.00	5,000		
	Lighting control system						
	Lighting controls (Office)	**12,225**	sf	2.50	30,563		
	Lighting circuitry						
	Lighting & branch circuitry	**12,225**	sf	3.50	42,788		
	Branch devices						
	Branch devices	**12,225**	sf	0.50	6,113		
	Branch circuitry						
	Branch circuitry	**12,225**	sf	3.50	42,788		
	SUBTOTAL					$ 243,390	
D5030	**COMMUNICATION & SECURITY SYSTEMS**						
	Fire Alarm						
	Control panel with voice evacuation	**1**	ls	10,000.00	10,000		
	LCD annunciator	**1**	ea	1,500.00	1,500		
	Beacon	**1**	ea	225.00	225		
	Radio Master Box	**1**	ea	9,500.00	9,500		
	Knox box	**1**	ea	350.00	350		
	Devices and cabling	**12,225**	sf	2.00	24,450		
	Testing and programming	**1**	ls	3,500.00	3,500		
	Mass Notification (NR)				NR		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 3 Admin + Shop Detail							
	Bi-Directional System						
	BDA system	**12,225**	sf	0.85	10,391		
	Security System						
	Security System	**12,225**	sf	4.00	48,900		
	Telephone/Data/CATV						
	VoIP, data switches/ wireless equip, computer equip				By others		
	Tel/Data cabling (Office/Admin)	**12,225**	sf	5.00	61,125		
	Telecommunications rough in	**12,225**	sf	0.20	2,445		
	Public Address/Clock System						
	PA system	**12,225**	sf	1.25	15,281		
	Sound System						
	Multi-Purpose Room	**1**	ls	15,000.00	15,000		
	SUBTOTAL					$ 202,667	
D5040	**OTHER ELECTRICAL SYSTEMS**						
	Miscellaneous						
	Lightning Protection				NIC		
	Grounding & Bonding	**1**	ls	5,000.00	5,000		
	Temp power and lights	**1**	ls	10,000.00	10,000		
	Coordination, BIM	**1**	ls	17,000.00	17,000		
	Fees & Permits	**1**	ls		Waived		
	SUBTOTAL					$ 32,000	
	TOTAL - ELECTRICAL						**$608,100**
E10	***EQUIPMENT***						
E1000	**EQUIPMENT, GENERALLY**						
110000	*EQUIPMENT*						
	Hood	**1**	ea	1,500.00	1,500		
	Microwave; allow	**2**	ea	900.00	1,800		
	Refrigerator	**2**	ea	2,000.00	4,000		
	Range	**1**	ea	3,000.00	3,000		
	DPW equipment; CF/CI	**1**	ls	133,330.00	133,330		
	SUBTOTAL					$ 143,630	
	TOTAL - EQUIPMENT						**$143,630**
E20	***FURNISHINGS***						
E2010	**FIXED FURNISHINGS**						
122100	*WINDOW TREATMENT*						
	Window treatment, allowance	**1,025**	sf	12.00	12,300		
123000	*CASEWORK*						
	Layout area countertop - 6'-2" wide	**8**	lf	900.00	7,200		
	Admin alcove						
	Base cabinet with plam countertop	**15**	lf	450.00	6,750		
	Upper cabinets	**20**	lf	300.00	6,000		
	Copy/mail area						
	Base cabinet with plam countertop	**19**	lf	450.00	8,550		
	Upper cabinets	**19**	lf	300.00	5,700		
	Kitchenette						
	Base cabinet with plam countertop	**17**	lf	450.00	7,650		
	Upper cabinets	**17**	lf	300.00	5,100		
	Large conference						
	Counter at conference room	**13**	lf	300.00	3,900		
	Multi-purpose room						
	Base cabinet with plam countertop	**16**	lf	450.00	7,200		
	Upper cabinets	**16**	lf	300.00	4,800		
	Wall hung counter	**20**	lf	300.00	6,000		
	Small conference						

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Phase 3 Admin + Shop Detail							
	Wall hung counter	**12**	lf	300.00	3,600		
	Workforce alcove						
	Base cabinet with plam countertop	**9**	lf	450.00	4,050		
	Upper cabinets	**9**	lf	300.00	2,700		
124810	*ENTRANCE FLOOR MAT AND FRAMES*						
	Recessed floor grill at staff entrance; allow	**20**	sf	90.00	1,800		
	Entry mat at public entrance; allow	**30**	sf	15.00	450		
	SUBTOTAL					$ 93,750	
E2020	**MOVABLE FURNISHINGS**						
	All movable furnishings to be provided and installed by owner				NIC		
	SUBTOTAL					$ -	
	TOTAL - FURNISHINGS						**$93,750**
F10	***SPECIAL CONSTRUCTION***						
F1000	**SPECIAL CONSTRUCTION**						
	Pre-Engineered Metal Building, allowance - budget to be finalized: scope includes the following	**12,255**	sf	110.00	1,348,050		
	Complete structure minus foundations (see Div 03 for Foundations)						
	Exterior cladding: panel, siding & trim, interior face insulation & liner - limited areas						
	Windows / Storefront excluded						
	Exterior doors & overhead doors excluded						
	Roof cover, standing seam metal, w/accessories: gutters/downspouts/snow guards						
	Entrance canopies excluded						
	SUBTOTAL					$ 1,348,050	
	TOTAL - SPECIAL CONSTRUCTION						**$1,348,050**
F20	***SELECTIVE BUILDING DEMOLITION***						
F2010	**BUILDING ELEMENTS DEMOLITION**						
	No items in this section						
	SUBTOTAL					$ -	
F2020	**HAZARDOUS COMPONENTS ABATEMENT**						
	No items in this section						
	SUBTOTAL					$ -	
	TOTAL - SELECTIVE BUILDING DEMOLITION						
G10							
F1000	**SPECIAL CONSTRUCTION**						
	No items in this section						
	SUBTOTAL					$ -	
	TOTAL - SPECIAL CONSTRUCTION						

Site Detail Phase 3

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	G SITEWORK						
	G10 SITE PREPARATION & DEMOLITION						
311000	*GENERAL CONDITIONS*						
	6' high site construction fence	**1,700**	lf	25.00	w_Phase two		
	6' high site construction fence double gate	**1**	loc	5,000.00	5,000		
	Site construction entrance and removal/restoration	**2**	loc	12,000.00	24,000		
	Site construction fence maintenance	**1,700**	lf	8.00	13,600		
	Mobilization & Demobilization	**1**	ea	25,000.00	25,000		
	Temp laydown areas	**1**	acres	10,000.00	w_Phase one		
	Temporary signs	**1**	ls	5,000.00	5,000		
	Layout/As-builts/Survey	**1**	ls	10,000.00	10,000		
	Snow removal - allowance	**1**	ls		Excluded		
	Winter conditions - allowance	**1**	ls		Excluded		
	Police details	**1**	ls		Excluded		
	Site security	**1**	ls		Excluded		
	Job site construction trailer	**1**	ls		Excluded		
	Temp utilities for job trailer	**1**	ls		w_Phase two		
312000	*EROSION & SEDIMENT CONTROL*						
	Silt Fence; removal	**1,700**	lf	8.00	13,600		
	Silt Sacks; installation and removal	**10**	ea	325.00	3,250		
	Groundwater management/ control measures	**1**	ls	20,000.00	20,000		
	Street sweeping & dust control allowance	**1**	ls	40,000.00	40,000		
	Erosion Control monitoring & maintenance	**1**	ls	20,000.00	20,000		
	SUBTOTAL					179,450	
312000	*BUILDING EARTHWORK*						
	Cut	**50**	cy	12.00	600		
	Fill - import structural - 25% swell	**750**	cy	50.00	37,500		
312000	*SOIL DISPOSAL - conversion factor 1.7 to tons*						
	Load excess soils for disposal	**50**	cy	2.50	125		
	Less than RCS-1 - clean non-regulated	**85**	tn	20.00	1,700		
	SUBTOTAL					39,925	
312000	*SITE EARTHWORK*						
	Site cut to design subgrade	*1,000*	*cy*				
	Cut	**1,000**	cy	10.00	10,000		
	Store cut onsite	**500**	cy	3.50	1,750		
	Site fill to design subgrade	*500*	*cy*				
	Fill - from cut	**500**	cy	12.00	6,000		
312000	*SOIL DISPOSAL - conversion factor 1.7 to tons*						
	Load excess soils for disposal	**500**	cy	2.50	1,250		
	Less than RCS-1 - clean non-regulated	**850**	tn	23.00	19,550		
312000	*GEOTHERMAL*						
	Support of geothermal	**28**	ea	3,500.00	98,000		
312000	*ESTABLISHING GRADE*						
	Sub grade establishment	**96,000**	sf	0.15	14,400		
	Fine grading throughout the site	**96,000**	sf	0.25	24,000		
312000	*HAZARDOUS MATERIALS*						
	UST removal allowance	**1**	ls	50,000.00	Assume NR		
	Soil disposal & replacement allowance	**10**	cy	430.00	Assume NR		
	SUBTOTAL					174,950	
	TOTAL - SITE PREPARATION						**$394,325**

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Site Detail Phase 3							
G20	**SITE IMPROVEMENTS**						
320000	***ROADWAYS AND PARKING LOTS***						
	Heavy Duty Asphalt Paving	*72,355*	*sf*				
	gravel base; 12" thick	**4,020**	cy	50.00	201,000		
	asphalt top; 2" thick	**924**	tns	175.00	161,700		
	asphalt binder; 3" thick	**1,383**	tns	130.00	179,790		
320000	*CURBING*						
	Asphalt berm	**532**	lf	13.00	6,916		
	VGC	**862**	lf	50.00	43,100		
	ADA Curb cuts	**2**	ea	850.00	1,700		
320000	*ROAD MARKINGS AND SIGNS*						
	Parking spot	**38**	ea	85.00	3,230		
	Parking spot ADA	**2**	ea	250.00	500		
	Sign allowance	**1**	ls	20,000.00	20,000		
	Pavement markings allowance	**1**	ls	10,000.00	10,000		
	SUBTOTAL					627,936	
320000	***PEDESTRIAN PAVING***						
	Concrete sidewalks	*1,435*	*sf*				
	gravel base; 8" thick	**36**	cy	50.00	1,800		
	Broom finish concrete paving; 4" thick	**1,435**	sf	12.00	17,220		
	SUBTOTAL					19,020	
320000	***SITE FURNISHINGS***						
	Bike racks	**7**	ea	895.00	6,265		
	Bollards	**6**	ea	1,100.00	6,600		
	Bollards - EV stations	**8**	ea	900.00	7,200		
	Misc. site furnishings	**1**	ls	25,000.00	25,000		
	Flagpole - 30' Ht.	**1**	ea	7,000.00	7,000		
	Flagpole foundation	**1**	ea	4,500.00	4,500		
	Storage bin cover allowance	**8**	ea	3,500.00	28,000		
	Storage bin walls	**1,631**	sf	55.00	89,705		
320000	*FENCING*						
	Fencing allowance	**1**	ls	125,000.00	125,000		
	20' wide vehicle gate; card reader - allowance	**1**	ea	20,000.00	20,000		
	SUBTOTAL					319,270	
329900	***LAWN AND SEED***						
	Topsoil - imported 6" thick; swell 25%	**579**	cy	65.00	37,635		
	Power rake and hydroseed disturbed areas	**25,000**	sf	0.35	8,750		
	SUBTOTAL					46,385	
	TOTAL - SITE IMPROVEMENTS						**$1,012,611**
G30	**CIVIL MECHANICAL UTILITIES**						
333000	*SANITARY SEWER*						
	6" PVC	**70**	lf	35.00	2,450		
	Septic tank	**1**	ls	25,000.00	25,000		
	Septic field	**3,000**	sf	30.00	90,000		
312000	*EXCAVATION & BACKFILL*						
	PVC gravity piping excavation/backfill (inside site)	**70**	lf	40.00	2,800		
	Pressure testing	**70**	lf	4.00	280		
	SUBTOTAL					120,530	
334000	*STORM DRAINAGE*						
	12" HDPE	**470**	lf	70.00	32,900		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Site Detail Phase 3							
	15" HDPE	**50**	lf	80.00	4,000		
	18" HDPE	**170**	lf	90.00	15,300		
	24" HDPE	**256**	lf	125.00	32,000		
	DMH - 5-12' deep	**8**	ea	5,800.00	46,400		
	OCS - 5' dia.	**1**	ea	15,000.00	15,000		
	WQU	**1**	ea	20,000.00	20,000		
	WQU - 5' Dia	**1**	ea	30,000.00	30,000		
	CB - 4' Dia.	**8**	ea	3,800.00	30,400		
	CB - 6' Dia.	**2**	ea	6,000.00	12,000		
	Underground recharger	*7,600*	*sf*				
	MC-4500 chambers and installation	**192**	ea	850.00	163,200		
	Excavate soils; 10' depth	**3,237**	cy	25.00	80,925		
	Load excess soils for disposal	**3,237**	cy	2.50	8,093		
	Less than RCS-1 - clean non-regulated	**5,503**	tn	23.00	126,569		
	Install stone base; 12" thick	**464**	tn	65.00	30,160		
	Fine grade base	**7,600**	sf	0.25	1,900		
	Back-fill infiltration bed with 1-2" crushed stone; 9.1cy/ea	**2,883**	tn	50.00	144,150		
	Geotextile fabrics	**19,000**	sf	0.75	14,250		
	SUBTOTAL					807,247	
	TOTAL - SITE MECHCANICAL UTILITIES						**$927,777**
G40	***SITE ELECTRICAL UTILITY***						
G4010	**ELECTRICAL DISTRIBUTION**						
	Included with Phase 1					**Phase 1**	
	SUBTOTAL					-	
	TOTAL - SITE ELECTRICAL UTILTIES						**$0**
	TOTAL - SITE DEVELOPMENT						**$2,334,713**

	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST

RAIN HARVESTING ALTERNATE

GROSS FLOOR AREA CALCULATION

TOTAL GROSS FLOOR AREA (GFA) ***sf***

RAIN HARVESTING ALTERNATE

D20 PLUMBING

D2000 PLUMBING, GENERALLY

Equipment						
Cistern package, includes storage tank, pumps, piping, trim & assemblies	**1**	ea	75,000.00	75,000		
Reduced pressure back flow preventer, back-up water supply	**1**	ea	5,000.00	5,000		
Miscellaneous plumbing equipment, backflows, accessories	**1**	ls	4,000.00	4,000		
Electrical work feed and connections	**1**	ls	5,000.00	5,000		
Non Potable Water Type L Copper Pipe						
Non potable water pipe with fittings & hangers	**120**	lf	60.00	7,200		
Non potable water pipe insulation	**120**	lf	15.00	1,800		
Storm Drainage						
Storm piping allowance	**100**	lf	85.00	8,500		
Connections to gutters & downspouts	**1**	ls	2,500.00	2,500		
Miscellaneous						
Management & supervision	**1**	ls	5,000.00	5,000		
Coordination & shop drawings	**1**	ls	2,500.00	2,500		
Testing, commissioning and sterilization	**1**	ls	1,500.00	1,500		
SUBTOTAL					$ 118,000	

TOTAL - PLUMBING **$118,000**

D30 HVAC

D3000 HVAC, GENERALLY

No Work this Section

SUBTOTAL -

TOTAL - HVAC

D40 FIRE PROTECTION

D4000 FIRE PROTECTION, GENERALLY

No Work this Section

SUBTOTAL -

TOTAL - FIRE PROTECTION

Town of Acton
New Public Works Facility
Schematic Design Package

Appendix D

Specification TOC

November 2024

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Town of Acton
New Public Works Facility
Schematic Design Package

Appendix E

Mass Save Memorandum of Understanding
Path 1: Zero Carbon & Low EUI Buildings (Site Specific)
&
Potential Ground Source Heat Pump Incentives Memorandum

November 2024

NEW BUILDINGS & MAJOR RENOVATIONS

2024 Memorandum of Understanding for Path 1: Zero Carbon & Low EUI Buildings (Site Specific)

Welcome to the Path 1, Zero Carbon & Low EUI Buildings Program! This Program encourages customers to pursue fully decarbonized building solutions with a sustained focus on low Site Energy Use Intensity (EUI) from early design all the way through post occupancy. Path 1 is a performance-based participation pathway, such that final customer incentives are based on the building's post occupancy site EUI. While the Program is a zero-carbon incentive offer, customers are not required to install solar or purchase renewable energy offsets to participate.

Definition: Site EUI is a measure of a building's gross annual site energy consumption relative to its gross square footage. The units are kBtu/sf/year. For this Program, gross square footage excludes parking garages and penthouse square footage, as these are not typically conditioned spaces.[1] The Program's EUI calculation does not include onsite renewables.

Project Eligibility:

1. To participate, customers must engage Mass Save Sponsors[2] before the end of their project's Design Development phase, but preferably during their project's Feasibility or Conceptual Design phases.

2. **Electrification requirements**

   New buildings and additions may not have a gas meter or include any new fossil fuel equipment for any purpose unless meeting the following exceptions:
   (A)Diesel or propane emergency generation, or
   (B)In emergency facilities, natural gas may be used for emergency generation in lieu of diesel or propane, or
   (C)Propane may be used for lab purposes.

   Major renovations may not have a gas meter or include any new fossil fuel equipment for any purpose unless meeting the following exceptions:
   (A)Diesel or propane emergency generation, or
   (B)In emergency facilities, natural gas may be used for emergency generation in lieu of diesel or propane, or
   (C) In any major renovation where the building had natural gas service prior to the major renovation, natural gas may be used for emergency generation.
   (D)Propane may be used for lab purposes.

   "Emergency facilities" are defined as hospitals, police and fire stations, facilities identified as supporting Critical Transportation Needs or Emergency Shelters in a state or local Comprehensive Emergency Management Plan, acute/post-acute medical facilities with life sustaining equipment, water/sewer pump stations, and emergency communication centers that serve a life safety function (for example, 911 Centers).

   "Emergency generation" is defined as equipment that is available to provide power to all or portions of a building in the event of a power outage.

3. Projects must be whole buildings and must have a minimum of 10,000 square feet of comfort conditioned (heated and cooled) space.

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1. EUI calculations will exclude exterior lighting loads (parking garages/lots) and associated loads in garage space (i.e., exhaust fans). If there are enclosed spaces in garages with equipment loads (i.e., unit heaters in elevators lobbies), these loads and square footages will be included in the building's EUI calculation.
2. The Mass Save Sponsors are National Grid, Eversource, Unitil, Cape Light Compact, Liberty Utilities, and Berkshire Gas. To determine your Mass Save Sponsors, please visit https://www.masssave.com/en/saving/business-rebates.

5. Customers must anticipate year-round occupancy.
6. Building must be separately metered (not on same meters as other buildings).
7. Projects must be new buildings, building additions, or full gut renovations. Gut renovations would qualify for this Program if the scope is such that occupancy is not possible during construction and where scope includes (A) complete removal/replacement/redesign of the entire HVAC system including distribution AND (B) complete redesign/replacement of all lighting (there might be very limited spaces where lighting could remain), AND (C) scope related to one or more of the following: DHW heating equipment, building envelope or process equipment.
8. The project may not include Combined Heat and Power (CHP). Projects connected to campus loops that are served by natural gas fed central plant equipment and projects connected to district steam loops (MATEP or Vicinity) are not eligible for Path 1.
9. Participants must be customers of one of the Mass Save Sponsors. Note that projects located in the service territory of a municipal electric utility are not eligible for this path.

Key Customer Commitments:

1. To participate, project teams must be willing to set a site EUI target within only Tier 1 for Site Specific Table 1 below. An exception may be requested (or necessary) if 25.0 EUI is not a reasonable target due to building type, unusual loads, hours of operation or because some percentage of the building is semi-conditioned. In these situations, participants alternatively may pursue a site EUI target representing a minimum of 40.0% EUI reduction from an approximate code baseline. Mass Save Sponsors must approve any exceptions to 25 EUI.

Table 1: EUI Targets & Incentives

Site Specific	Site EUI	Incentives			
		Payable at end of Construction		Payable at end of 1 yr. post occupancy	
		Construction Incentive $/sf	Heat Pump Adder*	Post Occ. Inc. $/sf	Adder for getting under ZNE EUI target
Tier 1 - ZNE Level	25 or less (or site-specific target)	$2.00	Air Source Heat Pumps: $800/ton Variable Refrigerant Flow (VRF): $1200/ton Ground Source Heat Pumps: $4500/ton"	$ 1.50	**$0.05/EUI point reduction/sf**

* Equipment must be used as a primary heating source to qualify. The heat pump adder is only available for equipment that transfers heat from a source outside of the building (i.e. outside air or a ground loop) for space heating purposes. In order to maximize the benefits of electrification designs, supplemental electric resistance must be limited. Projects not achieving an average annual heating system performance greater than a COP of 2.0 will be considered on a case- by-case basis.
The incentive calculation is based upon the nominal heating capacity (btu/h) at AHRI or ISO conditions divided by 12,000.
• Air Source Heat Pumps (ASHP): heating capacity at AHRI standard rating conditions
Air-to-Air Systems: AHRI 340/360 - OA 47°F db
Air-to-Water Systems: AHRI 550/590 - OA 17°F db, LWT 120°F
• Variable Refrigerant Flow – Air Source (VRF): heating capacity at AHRI 1230 standard rating conditions
Air-to-Refrigerant Systems: OA 47°F db

• Ground Source Heat Pumps: heating capacity at ISO 13256 or AHRI 1230 (if VRF) standard rating conditions
Ground Loop Heat Pump (GLHP): 32°F liquid entering heat exchanger
Ground Water Heat Pump (GWHP): 50°F liquid entering heat exchanger
Incentives for ground source heat pump projects will be based upon the lesser value of the peak heating load capacity of the heat pump systems or the peak heating load capacity of the ground loop/well.

2. Agree to cost share the services of the Mass Save zero carbon/low EUI expert. If a project goes on hold for longer than six months, all outstanding technical assistance fees will be invoiced for time spent to date.

3. Continuously monitor the predicted EUI of the project with iterative energy modeling throughout each phase of design. Design team's energy model should meet the requirements of ASHRAE 90.1 G2.2. At minimum, whole building energy modeling runs must take place at 100% Schematic Design, 50% Design Development, 100% Design Development and 100% Construction Documents (National Grid may request additional runs). Project teams will need to report predicted EUIs to their Mass Save Sponsors at each of these intervals.

4. Ensure electric vehicle charging stations, any on-site generation and any non-ancillary unconditioned spaces (e.g., parking garages) are separately sub-metered or that the energy use is captured separately by the Energy Management System.

5. Meet the requirements of ASHRAE 90.1-2016, para. 8.4.3 related to metering and data storage and provide post occupancy data to the Sponsors of Mass Save as listed in Step 6 of this document at the end of an agreed-upon one-year post occupancy period.

Key Mass Save Sponsor Commitments:

1. Cost share the services of a zero carbon/low EUI expert (50% of fee up to $10,000 cost share) with the customer to help the project team develop a roadmap to low EUI and zero carbon success.

2. Offer project incentives per Table 1 above. Note that the "Certification Incentives" referenced in the table will be offered for projects certified to the specific net zero or Passive House standards listed at the end of this document.

3. Offer a separate Verification Incentive (50% cost share up to $10,000) to help customers and their teams achieve the predicted EUI once the building is operating. Ask your Mass Save Sponsors for details.

NEW BUILDINGS & MAJOR RENOVATIONS

This document outlines the roles and responsibilities of each party to set transparent expectations for all parties participating in the Program. Under no circumstances does this Memorandum require customers or design teams to incorporate any particular EUI reduction strategy, nor does this document bind customers or design teams to a particular EUI target. All assistance offered by Mass Save Sponsors through this Program is offered in an advisory capacity only and is subject to change.

THE MASS SAVE SPONSORS UNDERSTAND THAT THE FOLLOWING CUSTOMER:				
The Customer (name):				
will undertake the following (check applicable):				
☒ new construction		☐ major renovation		☐ addition
Project Schedule (Dates)	100% SD	100% DDs	100% CDs	Expected Construction Completion
	November '24	Spring '25	Summer '25	Fall '27
Premises (address):	14 Forest Rd. Acton, MA 01720			
Premises SF (excluding un-conditioned space):	47,000 sq.ft. (17,000 fully conditioned)	**Premises EUI Target (kBTU/SF):**	25, TBD	
Main Project Contact:	Corey York, Director of Public Works			
Email:	highway@actonma.gov	Phone:	(978) 929-7740	
This project's design team professionals include:				
		Email:	Phone:	
• Architect:	John Comeau	comeauj@wseinc.com	508-203-8334	
• Electrical Engineer:	Dan Marchand	MarchandD@wseinc.com	978-548-6226	
• Mechanical Engineer:	Scott Henriques	HenriquesS@wseinc.com	603-263-9496	
• Other Contact:	Andrea Becerra	abecerra@acton-ma.gov		
Participating Mass Save Sponsors:		sustainability@actonma.gov		
• Electric Sponsor:	Eversource, Trevor Magee, trevor.magee@eversource.com			
• Gas Sponsor:				

IMPORTANT:

Customers participating in this pathway may not also participate in the Mass Save midstream programs where incentives for HVAC, domestic hot water, food service and lighting equipment are offered directly to distributors. To ensure participation in only one Mass Save program pathway, designers must include language in project documents informing contractors that this project is participating in a Mass Save downstream program pathway, and that they may not pursue or accept any HVAC, domestic hot water, food service or lighting midstream incentives for this project.

Detailed Process:

Step 1 – Set an EUI Target and Take Advantage of the Services of a Zero Carbon/Low EUI Expert

Engage with your Mass Save Sponsors as early as possible in design. You'll need to participate in a zero carbon scoping session and set a target EUI as early as possible in design. To assist the project team in achieving its target EUI, Mass Save Sponsors will enlist the support of a zero carbon/low EUI specialist who will provide technical assistance and road mapping services for the project through feasibility and early design. We'll work with you on the best scope to suit your project needs, though we do have a minimum scope that we require and ask customers to cost share.

Step 2 – Design to the Target EUI

The project team will pursue the EUI target throughout design and will conduct the iterative energy modeling necessary to ensure the design remains on track.

Step 3 – Make Sure You're Ready to Assess Post Occupancy Performance

Develop a plan to collect post occupancy EUI data (data collection requirements are detailed in Step 6 below). Consider how you'll take corrective action if the project strays from the final design EUI. Mass Save Sponsors offer a separate "Verification Incentive" that can help. Ask your Mass Save Sponsors for more information.

Step 4 – Mass Save Sponsors Issue Incentive Offer Letters

At the end of design, provide the Mass Save Sponsors with the design team's energy model and a short report that details:

- The final design's site EUI.
- The final predicted energy use.
- The building's total gross square footage per the definition on the first page of this MOU.
- Whether there is a natural gas meter associated with the building for emergency generation.
- If heat pumps are included in the design, state the heat pump type(s) and nominal heating capacity (btu/h) at AHRI conditions divided by 12,000 for each heat pump type.

Mass Save Sponsors will issue incentive offer letters per Table 1 in this document based on the Tier in which the final design EUI lands. If more than one Mass Save Sponsor is participating, the customer may receive two incentive offers summing to the incentive levels in Table 1. The incentive offers will be split into two major components and payment timeframes:

- Payment 1: Mass Save Sponsors will make their first payment at the end of construction. It will include both the $/sf Construction Incentive and the Heat Pump Adder, if applicable.
- Payment 2: Mass Save Sponsors will make the second payment(s) at the end of an agreed upon one-year post occupancy period.

  - The post occupancy payment will be made if the operating EUI lands within the Tier the project set out to achieve.

Customer incentives are capped at 100% of the combined incremental cost of the EUI reduction strategies included in the project. Projects must be cost-effective to receive the full customer incentives and are subject to each Mass Save Sponsor's program budget.

Customers are required to sign:

1. Custom application, formally requesting Mass Save incentives.
2. The Mass Save incentive offer letter from each Mass Save Sponsor, and

3. The Mass Save Minimum Requirements Document (MRD), which lays out the energy-using equipment and system details that will lead the project to achieve the target EUI.

Customers must commit to constructing the building as it was designed and documented in the MRDs. Major deviations from the design could jeopardize the project's ability to achieve the target EUI and opportunity to obtain full incentives.

At the end of design, the Mass Save Sponsors will request pdfs of the Final Design Documents. The Mass Save Sponsors may conduct further analysis at their own expense to determine more granular information regarding Mass Save program energy savings. The Mass Save Sponsors will share the design documents with at least one additional vendor at their discretion at this time.

Step 5 – Construction and Construction Phase Incentive Payment

A few weeks before substantial completion, customers must provide a set of approved submittals, invoices and photographs corresponding with major equipment that is key in attaining the predicted EUI. All projects participating in the Program are subject to inspection by each participating Mass Save Sponsor.

Once Mass Save Sponsors complete their review and affirm the project was built substantially in accordance with the design, they will make the construction phase incentive payments to the customer.

Step 6 – Post Occupancy Incentive, Verification Incentive, and Certification Incentive

Once the building is functioning in a steady state, the customer and the Mass Save Sponsors agree to begin the Mass Save Performance Period, which will last for one year. At the end of the Mass Save Performance Period, the customer is responsible for supplying post occupancy energy usage data for Mass Save Sponsors to review.

The Mass Save Performance Period as it relates to the post occupancy incentive will begin once the customer affirms:

- The sub-metering system or Energy Management System is set up and operating properly per ASHRAE 90.1-2016, para. 8.4.3. The system shall be capable of maintaining all data collected for a minimum of 36 months.
- All significant corrective action the customer intends to take has been completed.
- The occupancy and use of the building have reached a "steady state."

Customer shall supply the Sponsors of Mass Save with the following at the end of the Performance period:

- Final commissioning report, if available.
- Electrical energy usage for the following loads shall be recorded and reported to Mass Save on at least an hourly, daily, monthly and annual basis for the one-year period (Exception – up to 10% of the load for each of the following categories (b) through (e) shall be allowed to be from other electrical loads):

  a. Total building electrical energy
  b. HVAC systems
  c. Interior lighting
  d. Exterior lighting
  e. Receptacle circuits
  f. On site generation

- All data shall be provided in either an Excel or CSV format.

If, at the end of the Mass Save Performance Period, the building achieves an operational EUI, which, when adjusted for weather by the Mass Save Sponsors, falls within the Tier in which the project's final design EUI landed, the Mass Save Sponsors will pay the customer the additional $1.50/sf incentive for this Program. The post occupancy EUI is adjusted for weather so that customers are not unfairly penalized for particularly harsh weather and are not unfairly benefitted by particularly mild weather.

By signing below, customers represent that they (1) will be the lawful utility customers of the Premises and (2) have read, understand, accept, and agree to the terms and conditions for participation in the Program outlined above. The project's lead architect is required to also review and sign the MOU acknowledging that he/she has read and understands the terms and conditions for participation.

Customer Signature:		Customer Printed Name:
Date:	Phone:	Email:
Architect Signature:		Architect Printed Name and Company Affiliation:
Date:	Phone:	Email:

Disclaimers

Except for payment of incentives as set forth hereunder, the Mass Save Sponsors do not make any representations, warranties, promises or guarantees in connection with the Program, energy conservation measures (ECMs), EUI reduction strategies, energy savings, benefits, adequacy or safety of ECMs or other items, or any work, services or other item performed in connection with the Program including, without limitation, the warranty of merchantability or fitness for a particular purpose. Also, other than the (i) energy cost savings realized by Customer, (ii) energy or ancillary service market revenue achieved through market sensitive dispatch, (iii) alternative energy credits, and (iv) renewable energy credits (altogether, the "Customer Credits"), the Mass Save Sponsors have unilateral rights to apply for any credits or payments resulting from the Program or ECMs (the "Sponsor Credits"). Such Sponsor Credits include but are not limited to credits and payments for: (a) ISO-NE capacity, (b) forward capacity credits, (c) other electric or natural gas capacity and avoided cost payments or credits, and (d) demand response program payments. Customer waives, and agrees not to seek, any right to any Sponsor Credit. The Mass Save Sponsors are not responsible for the payment of any taxes assessed by federal, state or local governments on either benefits conferred on the customer by the Sponsor(s) or design incentives paid to the design team.

Potential Ground Source Heat Pump Incentives

Prepared by: Michael Munn; The Green Engineer

Item	Rate	Factor	Total	Notes
Mass Save; Path 1, Zero Carbon & Low EUI Buildings, Site Specific (see Table 1:EUI Targets & Incentives)				
Path 1 – Construction Completion	$2.00 / SF	20,930 SF	$41,860	Incentive award amount excludes vehicle storage bay. Building EUI value includes it.
Path 1 – Post-Occupancy Verification	$1.50 / SF	20,930 SF	$31,395	Verification of Net Zero / Low EUI for 1 year post-completion. Time frame starts at town's discretion
Path 1 – Heat Pump Adder	$4,500 / Ton	50 Tons	$225,000	
Path 1 – Post-occupancy reduced EUI Adder	$0.05 / EUI point reduction / SF	TBD	TBD	Requires further reduction beyond low EUI target. Payable at end of 1 year post-occupancy verification time frame.
Inflation Reduction Act; Investments in Clean Energy and Climate Action				
Direct Pay Credit for Geothermal Heat Pumps Guidebook to IRA https://www.whitehouse.gov/wp-content/uploads/2022/12/Inflation-Reduction-Act-Guidebook.pdf	6% to 30% of qualified energy investment	Approx. cost of $25,000 / well	Approx. $45,000 - $225,000	Estimates are rudimentary and will depend on program requirements being met, who's drilling the wells, and political support for the program. The 6% credit can be increased by 5 times for projects meeting prevailing wage and registered apprenticeship requirements. Credit is increased by up to 10 percentage points for projects meeting certain domestic content requirements for steel, iron, and manufactured products. Credit is increased by up to 10 percentage points if located in an energy community. It is critical to consider the possibility of reimbursement funds not being available by the time the project is complete. Projects that begin construction after December 31, 2024, will need to qualify under the new credit regime of section 48E clean energy investment tax credits and section 45Y clean electricity production tax credits. The Green Engineer, Inc is not a tax advisor.
		Approx. Total: $343,255 – $523,255		Incentive values are estimates and are subject to various program requirements being satisfied. The Green Engineer, Inc. is not responsible for the accuracy of this potential rebate information.

Town of Acton
New Public Works Facility
Schematic Design Package

Appendix F

Sustainability Documents

- Sustainability Workshop Meeting Notes
- Photovoltaic (PV) System Analysis
- LEED NC v4 Scorecard – Overview
- LEED NC v4 Scorecard – Detailed
- LEED Product Data Submittal Form
- Example Specification Section 01 74 00 Construction Waste Management
- Example Specification Section 01 81 10 Sustainable Design Requirements
- Example Specification Section 01 81 20 Construction IAQ Management

November 2024

Meeting Notes

Project:	Acton Public Works
Re:	Sustainability Kickoff Workshop
Meeting Date:	August 1, 2024
Date Issued:	August 13, 2024
Prepared By:	Michael Munn*, The Green Engineer Chris Schaffner, TGE

		Attended Meeting
To:	Corey York, Town of Acton	X
	Brian Defilippis, PMA Consultants	X
	John Comeau, WSE	X
	Frederick Soule, WSE	X
	Kyran Vig, Acton (intern)	X
	Lauren West, Acton	X
	Della Donahue, WSE	X
	QinRu Pang, Acton	X
	Carl Maria, Acton	X
	Trevor Magee, Eversource	X
Enclosed:	LEED-NC v4 Scorecard	

This document includes information gathered at the August 1st Sustainability Kickoff Meeting for the Acton Public Works project (Project), held in-person and virtually via Teams. The meeting was conducted to review sustainability requirements and goals.

PROJECT INFORMATION

1. The Project is in the early stages of concept design, working towards schematic design. Reuse of existing facilities was explored, and it was determined a new facility was necessary.
2. At this time, the newly constructed facility will be about 48,000 square feet consisting of administrative office space, Public Works employee facilities, locker rooms, workshops, vehicle storage, vehicle maintenance, and vehicle washdown.
3. The current facility has reported issues / concerns with ventilation in vehicle service areas and inadequate sleeping arrangements for extreme events – some employees are at the facility 24/7, even more during snowstorms.
4. The current facility serves as a place of respite for employees working out in the field during extreme heat. It is a place to cool down while they prepare food and eat lunch on their breaks.
5. A challenge for the Project will be the phased construction and demolition of Acton's current Public Works facility. The construction schedule will be such that critical operations for the Town will be maintained throughout the process at 14 Forest Rd, Acton, MA, 01720. The two largest phasing issues to work around will be:
    a. Minimal displacement of the mechanics.
    b. Keeping the snow plows out of the weather.
6. Acton is a Specialized Opt-In Code community regarding the Project's energy code requirements.
7. The Project has not yet been put to Town vote for funding approval.

DISCUSSION ITEMS

1. Meeting Intent

a. Identify potential alternative energy solutions and sustainable design elements that will be incorporated into the new facility to assist the community in developing an energy efficient fossil-fuel free facility.
b. Introduce Eversource Rebate and Grant Opportunities
c. Determine LEED certification opportunities
d. Cost Analysis of potential renewable energy/fossil fuel free construction

2. What will make this project a success regarding sustainability?
    a. The Project must be all-electric / fossil-fuel free.
    b. The Town is targeting Net Zero emissions by 2030 for its public buildings.
    c. Employees have comfortable living conditions and good air quality.
    d. LEED certification is a nice-to-have. Feasibility is being explored and a decision to pursue will be made later.
    e. The Project leverages the various sources of funding for energy efficiency whether it be from the Utility, IRA, grants, etc.
    f. The Project is aligned with and fully supports Acton's ActOn Climate Plan.
3. Low-EUI / Net-Zero Energy
    a. The Town is already a 100% renewable energy community.
    b. The ActOn Climate Plan contains the electrification of public vehicles and equipment. Electrical demand for the Facility and Electric Vehicle Charging Infrastructure need to account for future growth of fossil-fuel free equipment and vehicles.
    c. A Ground Source Heat Pump scheme (Geothermal) is being explored for the site.
        i. Seen as a strategy for resilience – ground-source systems heat well in extreme cold conditions.
        ii. Question: Will the adjacent capped landfill impact the ground-source system? No – it will be a closed loop system. The Project just needs to figure out well locations and the impacts from phased construction.
        iii. Multiple sources of third-party funding for ground-source heat pump systems are available and detailed below.
        iv. WSE has proposed drilling one test well to understand capacity and can serve as one of the system's wells should the project proceed with a ground-source loop.
    d. Building Envelope is currently looking at pre-engineered metal buildings with an insulated metal panel skin. This is the most economical approach and provides a large span with no columns, reduces thermal bridging, and exceeds code requirements around envelope performance. Windows still requires additional study and design. Daylighting polycarbonate windows at high wall locations will be incorporated.
    e. Air conditioning is being investigated for the workshops. It was noted that if the project uses a ground-source heat pump system, AC would be required to maintain a balanced ground temperature to not degrade the ground source. Currently, large fans are used for air movement, which is considered sufficient, if not possibly better than air conditioning.
    f. Domestic Hot Water - The Project will need a constant tempered water loop for facility showers and emergency eye wash stations. The vehicle wash pit will have a standalone loop with heated water.
        i. Vehicle wash water is considered industrial waste. It's stored on-site underground then pumped out.
    g. Process loads at the facility will include administrative computers, refrigerators, kitchen appliances, living quarters, workshop tools like welders, lifts, and pumps.
        i. It was noted that plug loads are often a key point to manage in order to achieve a low-EUI / low energy load.
    h. A Life-Cycle Cost Analysis (LCCA) is required by state law. It will help understand first costs and operating costs of system options proposed for the Project. In order to conduct the LCCA, the Project Team will need current utility rate information, confirmation if they're stable rates or not, and any interest rates on borrowed money associated with the Project. Information to be requested from Finance Committee.
    i. Renewable Energy systems serving as paved / parking area canopy discussed. Desired by Public Works for among other reasons, the shading it provides. The concern with PV canopies will be

vehicle clearance. Fron-end loaders are 11 – 14 ft tall. If the canopy is high enough to allow for large vehicle clearance, then there's no concern.

4. Third Party Funding
    a. Mass Save: Confirmed there'd be no incentive funding if a project demolishes existing facilities and installs new systems running on gas. Not a concern for the Project.
        i. A diesel backup generator will be fine –will not disqualify project from seeking incentives through Mass Save.
        ii. Facility likely qualifies as an emergency facility – if roads are not passable, emergency responders can't respond.
        iii. Mass Save's Commercial New Construction or Major Renovation incentive lends itself more to larger buildings with heat pumps but could still consider Path 2 if the low-EUI requirement of Path 1 is too challenging. The project will likely need to study a site-specific low-EUI target to set as a goal for the incentive program.
        iv. There will be a dedicated kickoff call (energy charrette) for the Mass Save incentive program after the project moves into SDs and has plans to help develop a custom EUI target if pursuing Path 1.
    b. Battery Storage: Peak load shedding incentive program discussed briefly. The program lies with another department within Eversource – ConnectedSolutions. Battery storage has been installed at other Acton public buildings but has been controversial when near residents. There have been town fights over them already.
        i. The Project will need to have open dialogue with Eversource regarding interconnection if there will be more solar PV, battery storage, or electric vehicle charging on-site.
        ii. A "guesstimate" of total funding and associated strategies / requirements was requested of Eversource to include in presentation material / cost analysis to put before the Town when voting to fund the project.
    c. Power Purchase Agreements: Engaged for existing community PV array and the rooftop PV to be replaced / expanded. It was recommended to review the duration of the existing lease with Nexamp on the rooftop PV regarding what happens at the end of the contract. Will existing systems need to be relocated to the new facility? Will Nexamp come collect PV panels? What are the conditions of the existing rooftop PV PPA that needs to be navigated as the new facility looks to expand / replace its rooftop PV?
    d. Ground-Source Heat Pumps are eligible for utility incentives for around $4,500 / ton. In addition to utility incentives, the Inflation Reduction Act stacks on top of this funding for up to / about 30% of total cost.
        i. Considerations for ground-source heat pumps incentives are:
            - The political positions on the Inflation Reduction Act from the Republican Party and any threat of repeal.
            - Bridging payment – paying up front cost of system and waiting for funding to be returned.
    e. Outdoor Lighting: Eversource confirmed there's no incentive for outdoor lighting if pursuing the Commerical New Construction and Major Renovation incentive program, which far outweighs the funding that could be awarded from the prescriptive lighting incentive program. The Commercial New Construction and Major Renovation program is strictly looking at the internal EUI of the Project.

5. Other Sustainability Goals
    a. **Tree Preservation**: The Project will likely need to cut into the tree buffer along Forest Rd. Although not desired by the Project, additional space is needed especially considering the phased nature of construction and having essentially two facilities on site temporarily. The Project will look to minimize cutting.
        i. Acton is a Tree City - The Team discussed re-planting trees to offset what's cut.
        ii. The Team discussed abutting neighbors' concerns with lights at night and the noises from trucks backing up. Trees are currently helping to mitigate both – A fence and other mitigation strategies will be explored.
    b. 3rd party Commissioning

i. The Project is committed to 3rd party commissioning. It was noted that this is a requirement for the Mass Save incentive program as well as a requirement to achieve LEED certification.
ii. There is incentive funding available to use the same Commissioning Authority on the project to measure post-occupancy EUI as part of the incentive program.

c. LEED
   i. Rainwater Management:
      - Flood Zone – Although located adjacent to the site, flooding is not a concern thanks to a steep increase in elevation up to the site.
      - Rainwater could be captured and reused for vehicle wash water and will be explored further. Refer to Douglas-Gates School for deployment of full treatment of rainwater on-site.
      - Other site design strategies like infiltration basins and rain gardens will be incorporated to slow the rate of rainwater leaving the site.
   ii. Light Pollution Reduction:
      - Current outdoor lighting is too bright (old lights).
      - Action has adopted Dark Sky requirements, but the Project will be a 24-hour facility. New lighting carefully designed to not impact neighbors and avoid uplighting will be an improvement.
   iii. Bicycle Parking:
      - It was noted that the Planning Board may want to see bike parking included in the project. At least to serve transfer station needs (short-term bike parking).
   iv. Electric Vehicle Charging:
      - The Project will provide 5% of total vehicle parking spaces with EV charging per code (not applicable to large equipment / trucks).
   v. Advanced Energy Metering: It was noted that submetering of end-uses greater than 10% of total energy consumption for the Project would be a requirement if pursuing Mass Save incentives via Path 1. If not following Path 1, there was no strong request for the information to be metered to this extent.
   vi. Whole-building Life Cycle Analysis (LCA): It was noted that the Town may want to have this study conducted. Inquiries into the cost to conduct them is being asked by advisory boards more frequently for projects.

d. International Living Future Institute: Zero Carbon Certification: A third-party certification focused on carbon emissions – both embodied and from operations – was introduced to the Team to gauge interest. It focuses on carbon neutrality and could serve as a framework and verification of net zero project goals.

e. Social Equity: Women's facilities are frequently insufficient in quantity. Current plans had one shower in the women's locker room but will update plans to include more based on the expectations and trend of more women joining the Public Works and other traditionally male-dominant work roles / places.

f. Material / Furniture Reuse: Will be explored but will need to be sourced from other places in Town. Save for any computers or administrative office elements, there isn't much considered worthy of reuse at the current facility.

g. Site Preservation: The existing transfer station on-site is robust and well-liked by the Town. Proposed changes to it have been split off the new Public Works Facility project.

h. Waterway Impact Mitigation:
   i. Currently, snow is dumped on the capped landfill. Studies have shown that this is causing an issue in Cole's brook (which also runs along, and is impacted by, Route 2). The Project will be sensitive to any potential impacts on waterways and is considering moving the designated snow dumping location elsewhere.
   ii. Road salt is currently well maintained on site – no changes are proposed.
   iii. Vehicle wash capture will be an improvement.

NEXT STEPS

1. Action Items summarized from above:
    a. **TGE** to deliver latest LEED scorecard update after the meeting
    b. **PMA / WSE** / **Acton** to determine existing rooftop solar PV PPA contract terms

END OF DOCUMENT

*The foregoing discussions of this meeting are recorded as understood by the writer (marked by *), who should be notified of any omissions or corrections. Unless the writer is notified to the contrary, this report is presumed correct.*

Acton Public Works – PV Analysis

On-site Photovoltaic (PV) System Analysis:

The rooftop area for the Project is slated to be free of mechanical equipment and intends to install rooftop solar panels. Architectural SD Progress Set dated October 3, 2024, sheet 3.A14 – Phase 3 Overall Roof Plan indicates a solar-ready roof area of 29,865 square feet. The solar-ready roof area is split into two sets of factors listed as Component 1 and Component 2 in the table below to reflect differing roof pitches and orientations.

Preliminary PV study assumptions:

- Assumed PV performance: 15.4 watts (peak)/sf
- Estimated installation cost: $3.01/Watt (peak)[1]
- Estimated utility rate: $0.1928/kWh (2023 MA avg. electricity rate - Commercial)[2]
- Available solar-ready space:
  - 14,724 SF Vehicle Storage Roof
  - 15,140 SF Maintenance Shops & Admin Roof
- Estimated PV coverage of available space:
  - 100% of solar-ready roof space

The PV potential was calculated using the PV Watts[3] program. Detailed outputs of the analysis are provided in the following Table-1.

Table 1: Roof PV Analysis

Acton Public Works: Roof Top PV Feasibility									
Panel Orientation	Net Roof / PV Panel Area	Array Capacity	Azimuth	Tilt	Annual Production	Annual Value	Installed Cost	Annual GHG Reduction	Simple Payback w/o Incentives
	SF	kW	(Deg)	(Deg)	kWh/yr	($)	($)	MT CO2e	(Years)
7 Deg Panel Tilt (Vehicle Storage Roof)	14,724	226.7	225	7	266,606	$ 51,402	$ 682,516	65	13.3
5 Deg Panel Tilt (Shop / Admin Roof)	15,140	233.2	45	5	251,779	$ 48,543	$ 701,800	62	14.5
Total:	**29,864**	**459.9**			**518,385**	**$ 99,945**	**$ 1,384,316**	**127**	

Note: The project should and will participate in any available incentive program (e.g., SMART). However, given the project schedule, and the unpredictable nature of renewable energy funding, it is unclear what incentives will be available to the project. Therefore, incentives have been omitted from this analysis.

Off-site Renewable and Other Clean Energy Sources and Credits

To accomplish net-zero energy status, the project is planning to incorporate ground-source heat pumps to reduce building energy demand. Further, the Town of Acton is already engaged in an electricity aggregation program – Acton Power Choice – to provide 100% renewable energy for the remainder of the project's energy needs.

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[1] *Reference: MassCEC Solar Electricity Cost and Performance. Median installer costs for Suffolk County.* https://www.masscec.com/solar-costs-performance

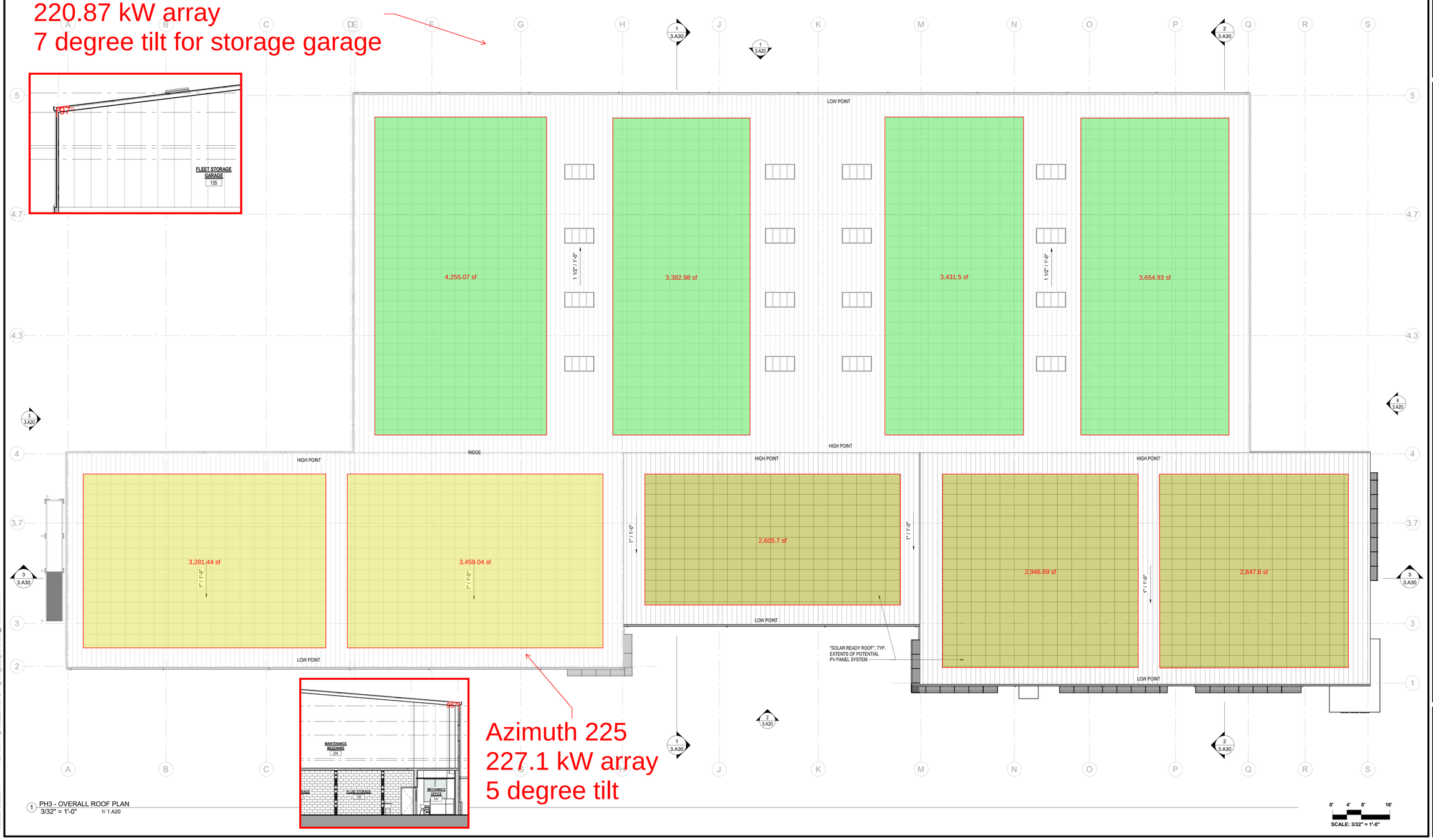
[2] *Reference: EIA* https://www.eia.gov/electricity/data/browser

[3] *Reference: PVWatts – NREL* https://pvwatts.nrel.gov/

Legend

Description	Quantity	Unit
Shops / Admin Roof	15,140.45	sf
Vehicle Storage Roof	14,724.47	sf

Azimuth 45 (NE sloping)
220.87 kW array
7 degree tilt for storage garage



Azimuth 225
227.1 kW array
5 degree tilt

1 PH3 - OVERALL ROOF PLAN
3/32" = 1'-0" 1/ 1.A20

SCALE: 3/32" = 1'-0"

GENERAL ROOF NOTES - METAL BUILDINGS

1. REFER TO EQUIPMENT, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL ROOF PENETRATIONS AND EQUIPMENT NOT SHOWN. ANY DISCREPANCIES REGARDING LOCATION OF EQUIPMENT SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT FOR RESOLUTION IN FIELD.
2. ROOF SLOPE = 1'-0" : 12'-0"
3. SEE GENERAL NOTES ON A012
4. ALL GUTTERS TO PITCH TOWARDS DOWNSPOUTS AT A MINIMUM 1/16" PER FOOT AND SUPPORTED AS PER METAL BUILDING MANUFACTURER.
5. ROOF PENETRATIONS TO BE CUT AND FLASHED BY METAL BUILDING MANUFACTURER.
6. PROVIDE ROOF FLASHING AT ALL PENETRATIONS INCLUDING BUT NOT LIMITED TO VENT STACKS, FLUES, AND EXHAUST FANS. REVIEW PLUMBING, EQUIPMENT, MECHANICAL, AND ELECTRICAL DRAWINGS FOR CONSTRUCTION NOT INDICATED ON THIS DRAWING.
7. PROVIDE CRICKETS AT ALL ROOFTOP EQUIPMENT AND PENETRATIONS TO CREATE ADEQUATE ROOF DRAINAGE.
8. SUPPLEMENTAL FRAMING AND CURBS FOR ALL ROOFTOP EQUIPMENT SHALL BE PROVIDED AND INSTALLED BY THE METAL BUILDING MANUFACTURER.

STANDING SEAM METAL ROOF ASSEMBLY (BY MBMI)

- STANDING SEAM METAL ROOF PANEL
- R-5 THERMAL BLOCKS AT PURLINS W/ UNFACED BATT INSULATION BETWEEN THERMAL BLOCKS (UPPER INSULATION LAYER)
- UNFACED BATT INSULATION LAYER BETWEEN PURLINS (STRUCTURE INSULATION LAYER)
- FABRIC LINER / VAPOR RETARDER, TAPE AND SEAL
- ALL PENETRATIONS AND EDGES
- MINIMUM R-VALUE OF 38

Project:
NEW PUBLIC WORKS FACILITY
14 FOREST ROAD, ACTON MA 01720

TOWN OF ACTON

Weston & Sampson
Weston & Sampson Engineers, Inc.
100 Foxborough Boulevard, Suite 250
Foxborough, MA 02035
978.532.1900 800.SAMPSON
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Consultants:

Revisions:

No.	Date	Description

CDA:

Seal:

Issued For:
PRICING SET

Scale: As indicated

Key Plan:

Date:	Issue Date
Draw By:	Author
Reviewed By:	Checker
Approved By:	Approver
W&S Project No.:	ENG24-1080
W&S File No.:	XXX

Drawing Title:
PH3 - OVERALL ROOF PLAN

Sheet Number:
3.A14

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LEEDv4 BD+C: New Construction (LEEDv4 NC)
Project Scorecard

The Green Engineer
Sustainable Design Consulting

Project: **Acton Public Works**
Address: **14 Forest Road, Acton, MA**
Date: **10/17/2024**

	Yes	Maybe	No				
	0	0	1	**INTEGRATIVE PROCESS**		**1**	**Responsible**
D			1	IPc1	Integrative Process	1	Team
	Yes	Maybe	No				
	3	2	11	**LOCATION & TRANSPORTATION**		**16**	**Responsible**
D			N	LTc1	LEED for Neighborhood Development Location	16	Team
D	1			LTc2	Sensitive Land Protection	1	Civil
D		2		LTc3	High Priority Site	1-2	Env. Eng.
D			5	LTc4	Surrounding Density and Diverse Uses	1-5	TGE
D			5	LTc5	Access to Quality Transit	1-5	TGE
D			1	LTc6	Bicycle Facilities	1	Arch/LA
D	1			LTc7	Reduced Parking Footprint	1	Arch/Civil
D	1			LTc8	Green Vehicles	1	Arch/Civil
	Yes	Maybe	No				
	5	1	4	**SUSTAINABLE SITES**		**10**	**Responsible**
C	Y			SSpr1	Construction Activity Pollution Prevention	Req'd	Civil/CM
D	1			SSc1	Site Assessment	1	Arch/Civil/LA
D			2	SSc2	Site Development - Protect or Restore Habitat	1-2	LA
D	1			SSc3	Open Space	1	LA
D	2	1		SSc4	Rainwater Management	2-3	Civil
D			2	SSc5	Heat Island Reduction	1-2	Arch/LA
D	1			SSc6	Light Pollution Reduction	1	MEP/LA
	Yes	Maybe	No				
	4	5	2	**WATER EFFICIENCY**		**11**	**Responsible**
D	Y			WEpr1	Outdoor Water Use Reduction	Req'd	LA
D	Y			WEpr2	Indoor Water Use Reduction	Req'd	MEP
D	Y			WEpr3	Building-level Water Metering	Req'd	Owner/MEP
D	2			WEc1	Outdoor Water Use Reduction	1-2	LA
D	2	4		WEc2	Indoor Water Use Reduction	1-6	MEP
D			2	WEc3	Cooling Tower Water Use	1-2	MEP
D		1		WEc4	Water Metering	1	MEP
	Yes	Maybe	No				
	27	6	0	**ENERGY & ATMOSPHERE**		**33**	**Responsible**
C	Y			EApr1	Fundamental Commissioning and Verification	Req'd	CxA
D	Y			EApr2	Minimum Energy Performance	Req'd	Team/Modeler
D	Y			EApr3	Building-level Energy Metering	Req'd	MEP
D	Y			EApr4	Fundamental Refrigerant Management	Req'd	MEP
C	5	1		EAc1	Enhanced Commissioning	2-6	CxA
D	16	2		EAc2	Optimize Energy Performance	1-18	Team/Modeler
D	1			EAc3	Advanced Energy Metering	1	MEP
C		2		EAc4	Demand Response	1-2	Owner/MEP
D	5			EAc5	Renewable Energy Production	1-5	Owner
D		1		EAc6	Enhanced Refrigerant Management	1	MEP
C	x			EAc7	Green Power and Carbon Offsets	1-2	Owner

	Yes	Maybe	No					
	5	6	2	**MATERIALS & RESOURCES**			13	Responsible
D	Y			MRpr1	Storage & Collection of Recyclables		Req'd	Owner/Arch.
C	Y			MRpr2	Construction and Demolition Waste Management Planning		Req'd	CM
C		3	2	MRc1	Building Life-Cycle Impact Reduction		2-5	Arch
C	2			MRc2	Building Product Disclosure & Optimization-EPD's		1-2	Arch/CM
C	1	1		MRc3	Building Product Disclosure & Optimization-Raw Materials		1-2	Arch/CM
C	1	1		MRc4	Building Product Disclosure & Optimization-Material Ingredients		1-2	Arch/CM
C	1	1		MRc5	Construction and Demolition Waste Management		1-2	CM
	Yes	Maybe	No					
	8	7	1	**INDOOR ENVIRONMENTAL QUALITY**			16	Responsible
D	Y			EQpr1	Minimum IAQ Performance		Req'd	MEP
D	Y			EQpr2	Environmental Tobacco Smoke (ETS) Control		Req'd	Owner
D	2			EQc1	Enhanced IAQ Strategies		1-2	Arch/MEP
C	3			EQc2	Low-Emitting Materials		1-3	Arch/CM
C	1			EQc3	Construction IAQ Management Plan		1	CM
C		2		EQc4	IAQ Assessment		1-2	Owner/CM
D	1			EQc5	Thermal Comfort		1	MEP
D	1	1		EQc6	Interior Lighting		1-2	Arch/MEP
D		3		EQc7	Daylight		1-3	Arch
D		1		EQc8	Quality Views		1	Arch
D			1	EQc9	Acoustic Performance		1	Acoust. Eng.
	Yes	Maybe	No					
	4	2	0	**INNOVATION**			6	Responsible
D	1			INc1.1	Innovation: TBD		1	Team
D		1		INc1.2	Innovation: TBD		1	Team
D		1		INc1.3	Innovation: TBD		1	Team
C	1			INc1.4	Innovation: Low-Mercury Lighting		1	Team
C	1			INc1.5	Pilot Credit: MRpc103		1	Team
C	1			INc2	LEED Accredited Professional		1	Team
	Yes	Maybe	No					
	2	1	0	**REGIONAL PRIORITY 01720 (underlined)**			4	Responsible
S			x	RPc1	Regional: SSc Site Development - Protect and Restore Habitat (2 pts)		1	-
ve			x	RPc2	Regional: LTc Access to Quality Transit (1 pt)		1	-
		1		RPc3	Regional: MRc Building Life-Cycle Impact Reduction (2 pts)		1	-
	1			RPc4	Regional: EAc Optimize Energy Performance (8 pts)		1	-
	1			RPcX	Regional: Renewable Energy Production (2 pts)		1	-
				RPcX	Regional: LTc Surrounding Density & Diverse Uses (4 pts)		1	-
	Yes	Maybe	No					
	58	30	21	**PROJECT TOTALS (Certification Estimates)**			110	

Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80+ points

LEEDv4 BD+C: New Construction
Project Scorecard

Project: **Acton Public Works**
Address: **14 Forest Road, Acton, MA**
Date: **10/17/2024**

The Green Engineer
Sustainable Design Consulting

Legend
Recent notes have been bolded.
Questions on compliance highlighted in BLUE.
Critical path items highlighted in RED.
Changes to scorecard highlighted in YELLOW
Credit not applicable or not pursued.

LEED Goal	"Silver" per initial tracking and communciation to cost estimator.
EUI Target	TBD (Low EUI / Net-Zero goal for project). TA to determine. Vehicle Storage area included in EUI's gross SF, excluded from incentive award.
Bldg Area	47,180 sf (includes 26,250 sf minimally heated / no cooling "Fleet Storage")
Parking	40 per SD progress drawings.
Site Area	TBD (217,754 SF proposed LEED Boundary. Finalize the division of work and adjacent transfer station / public works grounds)
FTE	About 20
Visitors	TBD

POINT TOTALS

Yes	M +	M -	No
58	22	8	22

				GENERAL PROJECT DOCUMENTATION		**Responsible**	**Pre-SD Sustainability Kickoff**
D	Y			PIf1	Minimum Program Requirements	Req'd	Team	REQUIRED: Project must meet all MPRs to be eligible for LEED certification.
Yes	M +	M -	No					
0	0	0	1	**INTEGRATIVE PROCESS**		**1**	**Responsible**	**Pre-SD Sustainability Kickoff**
D				1	IPc1	Integrative Process	1	Team	CREDIT: Perform energy and water-use analysis in early design through the use of a "simple box" model and development of a water budget, respectively. **8.4.24: Project would need to conduct a simple energy model analysis to explore energy conservation measures for the project in SD.**
Yes	M +	M -	No					
3	2	0	11	**LOCATION & TRANSPORTATION**		**16**	**Responsible**	**Pre-SD Sustainability Kickoff**
D				N	LTc1	LEED for Neighborhood Development Location	15	Team	CREDIT: Project located in a LEED ND development.
D	1				LTc2	Sensitive Land Protection	1	Civil	CREDIT: Locate the development footprint on land that has been previously developed.
D		2			LTc3	High Priority Site	1-2	Env. Eng.	CREDIT: Option 1: Locate on an infill location in a historic district (1 pt) OR Option 2: Locate within a Federal Empowerment Zone, QCT, DDA, or other priority designation (1 pt) OR Option 3: Locate on a brownfield where soil or groundwater contamination has been identified, and where the local, state, or national authority (whichever has jurisdiction) requires its remediation (2 pts). 8.1.24: Project not located in a QCT or DDA for Option 2. Not in a historic district. NEED to confirm if a brownfield and will be remediated - it's adjacent a capped landfill. **10.8.24: Phase I ESA being conducted next week. Assume some historical impact on the site that will need remediation. Boundary adjacent to monitored capped landfill.**
D				5	LTc4	Surrounding Density and Diverse Uses **v4.1**	1-5	TGE	**v4.1** CREDIT: Avg. surrounding density within 1/4 mile >22,000 sf (2pts) or >35,000 (3pts) AND/OR within 1/2 mile walking distance of at least 4-7 diverse uses (1pt) or >8 diverse uses (2pts) OR locate on a site with a WalkScore of 50-59 (1 pts); 60-69 (2 pts); 70-79 (3 pts); 80-89 (4 pts); 90-100 (5 pts). Physical education spaces that are part of the project site, such as playing fields and associated buildings used during sporting events only (e.g., concession stands) and playgrounds with play equipment, are excluded from the development density calculations. **8.1.24: Project not located in a densely populated area nor is it highly served by public transportation.**
D				5	LTc5	Access to Quality Transit **v4.1**	1-5	TGE	**v4.1** CREDIT: 1pt - 72 wkdy & 30 wknd; 2 pts - 100 wkdy & 70 wknd; 3 pts - 144 wkdy & 108 wknd; 4 pts - 250 wkdy & 160 wknd trips; 5 pts - 360 wkdy & 216 wknd trips. **8.1.24: Project not located in a densely populated area nor is it highly served by public transportation.**
D				1	LTc6	Bicycle Facilities **v4.1**	1	Arch/LA	**v4.1** CREDIT: Locate within 200-yd walking or bicycling distance of bicycle network. Provide long-term bike storage for at least 5% of all regular building occupants and short-term storage for at least 2.5% of all peak visitors. (4 spaces minimum for each.) Provide one shower for the first 100 regular building occupants and one additional for every 150 thereafter. Short-term bicycle storage must be within 200 feet walking distance of any main entrance. Long-term bicycle storage must be within 300 feet walking distance of any functional entry and covered to protect from rain and snow. **8.6.24: South Acton train station is within 3 miles, no clear bicyle network to reach it. Main St path along Rt 27 is the only option that doesn't require travel on Rt 2, and Main St has a posted speed limit of 35, exceeding the 25 mph maximum to qualify as a bike network. 4 short-term and 4 long-term bike parking spots needed to meet other requirements. Point moved to No.**

D	1				LTc7	Reduced Parking Footprint **v4.1**	1	Arch/Civil	**v4.1** CREDIT: Option 1 (1 pt): No off-street parking. Option 2 Reduced Parking (1 pt): Do not exceed the minimum local code requirements for parking capacity. Provide parking capacity that is a 30% reduction below the base ratios recommended by the Parking Consultants Council. Option 2 (1pt): Carshare: Provide at least one vehicle parking space for carshare vehicles for every 100 occupants. Option 3 Unbundled Parking: Sell parking separately from all property sales and leases at a daily parking fee equal or greater than the cost of municipal public transit. For ALL projects: The credit calculations must include all existing and new off-street parking spaces that are leased or owned by the project, including parking that is outside the project boundary but is used by the project. On-street parking in public rights-of-way is excluded from these calculations. **8.6.2024: 178 base ratio total spaces (using medium size office as project use). Providing 30 parking spaces would be an 82% reduction**
D	1				LTc8	Electric Vehicles **v4.1**	1	Arch/Civil	**v4.1** CREDIT: Option 1 (1 pt) Install electrical vehicle supply equipment (EVSE) in 5% of all parking spaces used by the project. Option 2 (1 pt) Make 10% of all parking spaces (6 spaces minumim) EV ready. Including a dedicated electrical circuit with sufficient capacity for each required space. **10.11.24: SD plans for phase 3 show 40 total parking spaces and 4 EV charging spaces (10%).**

	Yes	M +	M -	No					
	5	1	0	4	**SUSTAINABLE SITES**		10	Responsible	**Pre-SD Sustainability Kickoff**
C	Y				SSpr1	Construction Activity Pollution Prevention	Req'd	Civil/CM	REQUIRED: Create/implement an ESC plan for all construction activities associated with the project. The plan must conform to the requirements of the 2012 U.S. EPA Construction General Permit (CGP).
D	1				SSc1	Site Assessment	1	Arch/Civil/LA	CREDIT: Complete and document a site assessment that includes: Topography, Hydrology, Climate, Vegetation, Soils, Human Use, Human health effects. **8.1.24: Project Team will coordinate responses to the Site Assessment Worksheet.**
D				2	SSc2	Protect or Restore Habitat **v4.1**	1-2	LA	**v4.1** CREDIT: Preserve and protect from all development and construction activity 40% of the greenfield area on the site (if such areas exist) AND restore 15% (1 pt) or 25% (2 pts) of the previously developed site area with native & adaptive vegetation (including the building footprint). **8.1.24: Project will not be restoring habitat to a sufficient degree for credit achievement.**
D	1				SSc3	Open Space	1	LA	CREDIT: Provide outdoor space greater than or equal to 30% of the total site area (including building footprint). A minimum of 25% of that outdoor space must be vegetated (turf grass does not count as vegetation) or have overhead vegetated canopy. The outdoor space must be physically accessible. **10.11.24: 72,487 sf vegetated open space of 217,754 total site area sf = 33.3% open space, of which 100% is vegetated. 1 point moved to 'Yes'.**
D	2	1			SSc4	Rainwater Management **v4.1**	2-3	Civil	**v4.1** CREDIT: On site, manage the runoff from the developed site for the 80th percentile (1 pt) 85th percentile (2pts) or 90th percentile (3pts) of regional or local rainfall events using LID & GI strategies that best mimic natural site hydrology OR manage on site the annual increase in runoff volume from the natural land cover condition to the post developed condition. **8.4.24: Project will explore rainwater capture and reuse, as well as treating for high percentile storms and slowing rainwater runoff.** **10.11.24: Appears project not tied to sewer and will capture and treat all rainwater on site. Infiltration chambers located located beneath parking and vehicle paving. Civil to confirm capacity to manage 80th - 90th percentile storms.**
D				2	SSc5	Heat Island Reduction	1-2	Arch/LA	CREDIT: Use any combination of non-roof Measures, high-Reflectance roof, or vegetated roof to be equal to or greater than the total roof + hardscape area on-site AND/OR place a minimum of 75% of parking spaces under cover. **10.11.24: Large area of bituminous pavement on site. Roof area will largely be covered by PV, negating white roof contributions to heat island reduction. Moved to 'No'.**
D	1				SSc6	Light Pollution Reduction	1	MEP/LA	CREDIT: Do not exceed allowable backlight, uplight or glare (BUG) ratings for all exterior lighting as determined by the project's lighting zone (LZ). **10.11.24: Civil drawings 3.C20 indicate fully shielded LED lighting to be in compliance with Acton's Dark Skies initiative and bylaws. BUG ratings TBD. No fixtures are shown to be closer than 50' from proposed project boundary. Lighting Zone 3 appropriate for night-time activity needs of the site - Target BUG thresholds of B5, U3, G3 (B4 and G2 if 1-2 mounting heights from boundary). Lighting design to confirm.**

	Yes	M +	M -	No					
	4	5	0	2	WATER EFFICIENCY	11	Responsible	Pre-SD Sustainability Kickoff
D	Y				WEpr1 Outdoor Water Use Reduction	Req'd	LA	REQUIRED: Install landscape that does not require a permanent irrigation system beyond a maximum two-year establishment period OR reduce the project's landscape water requirement by at least 30% from the calculated baseline for the site's peak watering month. **8.1.24: See WEc1.**
D	Y				WEpr2 Indoor Water Use Reduction	Req'd	MEP	REQUIRED: Flush and flow fixtures must reduce aggregate water consumption by 20% from the baseline. All newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling must be WaterSense labeled. **8.1.24: See WEc2.**
D	Y				WEpr3 Building-level Water Metering	Req'd	Owner/MEP	REQUIRED: Install permanent water meters that measure the total potable water use for the building and associated grounds. Commit to sharing with USGBC the resulting whole-project water usage data for a five-year period. **8.1.24: No-issue.**
D	2				WEc1 Outdoor Water Use Reduction	1-2	LA	CREDIT: Credit Reqs: Show that the landscape does not require a permanent irrigation system beyond a maximum two-year establishment period (2pts) OR reduce the project's landscape water requirement (LWR) by at least 50% (1pt) or 100% (2pts) from the calculated baseline for the site's peak watering month. **8.1.24: No irrigation currently, and non planned for new facility.**
D	2	4			WEc2 Indoor Water Use Reduction	1-6	MEP	CREDIT: Further reduce fixture and fitting water use from the calculated baseline in WE Prerequisite Indoor Water Use Reduction and install equipment that meets the minimum requirements. All newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling must be WaterSense labeled. **8.1.24: Project will install water efficient flush / flow fixtures.**
D				2	WEc3 Cooling Tower Water Use	1-2	MEP	CREDIT: Conduct a one-time potable water analysis, measuring at least the five control parameters required. Calculate the number of cooling tower cycles by dividing the maximum allowed concentration level of each parameter by the actual concentration level of each parameter found in the potable makeup water. Limit cooling tower cycles to avoid exceeding maximum values for any of these parameters. **8.1.24: Not applicable to project.**
D		1			WEc4 Water Metering	1	MEP	CREDIT: Install permanent water meters for two or more of the following water subsystems: irrigation, indoor plumbing fixtures and fittings, domestic hot water, boiler, reclaimed water, and/or other process water. **8.1.24: Project will consider submetering water systems.**

	Yes	M +	M -	No				
	27	5	1	0	ENERGY & ATMOSPHERE	33	Responsible	Pre-SD Sustainability Kickoff
C	Y				EApr1 Fundamental Commissioning and Verification	Req'd	CxA	REQUIRED: A qualified CxA must be engaged by end of DD to perform Cx services for all base-building HVAC&R equipment serving the project. An OPR document, BoD, and Current Facilities Requirements and Operations and Maintenance Plan must be prepared with information necessary to keep the building operating efficiently. **8.1.24: Project committed to Enhanced Cx and BECx.**
D	Y				EApr2 Minimum Energy Performance **2024 Update**	Req'd	Team/Modeler	REQUIRED: Demonstrate an improvement of at least 10% in the proposed building performance rating compared with the ASHRAE 90.1–2010 baseline using a metric of energy cost, source energy, or greenhouse gas emissions. **8.1.24: Project will be a fossil-fuel free / Net Zero facility. Will perform well against energy requirements.**
D	Y				EApr3 Building-level Energy Metering	Req'd	MEP	REQUIRED: Install new or use existing base building-level energy meters, or submeters that can be aggregated to provide base building-level data representing total building energy consumption and commit to sharing whole-building energy-use data with USGBC for 5 years. **8.1.24: No issue.**
D	Y				EApr4 Fundamental Refrigerant Management	Req'd	MEP	REQUIRED: Do not use chlorofluorocarbon (CFC)-based refrigerants in new HVAC&R systems. **8.1.24: No existing systems to phase out. New mechanical system won't contain CFCs.**
C	5		1		EAc1 Enhanced Commissioning	2-6	CxA	CREDIT: Perform Enhanced Cx services for all base-building HVAC&R equipment (3pts) AND/OR develop monitoring-based procedures and identify points to be measured and evaluated to assess performance of energy- and water-consuming systems (1pt) AND/OR complete all required Cx process activities for the building's thermal envelope (2pts). **8.1.24: See EAp1.**
D	16	2			EAc2 Optimize Energy Performance **2024 Update**	1-18	Team/Modeler	CREDIT: Demonstrate a percentage improvement in the proposed building performance rating compared with the ASHRAE 90.1–2010 baseline. Total points are awarded as the sum of energy cost or source energy reduction of at least 20% (1 pt) up to 60% (9 pts) and greenhouse gas emissions reduction of at least 20% (1 pt) up to 85% (9 pts). **8.1.24: See EAp2.**
D	1				EAc3 Advanced Energy Metering	1	MEP	CREDIT: Permanent advanced energy metering must be installed for all energy sources used by the base building as well as any individual energy end uses that represent 10% or more of the total annual consumption of the building. The advanced energy metering must be permanently installed, record at intervals of one hour or less, and transmit data to a remote location. Electricity meters must record both consumption and demand. Whole-building electricity meters should record the power factor, if appropriate. The data collection system must use a local area network, building automation system, wireless network, or comparable communication infrastructure. The system must be capable of storing all meter data for at least 36 months. The data must be remotely accessible. All meters in the system must be capable of reporting hourly, daily, monthly, and annual energy use. **8.1.24: Energy submetering to these standards are required if the Project pursues Utility Incentives through Mass Saves Commercial New Construction or Major Renovation program's Path 1. Incorporation of advanced energy metering if not following Path 1 unlikely.**

C		2			EAc4	Grid Harmonization **v4.1**	1-2	Owner/MEP	**v4.1** CREDIT: Option 1: Participate in an existing demand response (DR) program and design a system with the capability for real-time, fully-automated DR based on external initiation by a DR Program Provider (2 pts) OR Option 2: If a DR program is not available, provide infrastructure to take advantage of future demand response programs or dynamic, real-time pricing programs and develop a comprehensive plan for shedding at least 10% of building estimated peak electricity demand (1 pt) AND/OR Option 3: Implement one or more load flexibility and management strategies. Demonstrate through peak load optimization (1 pt) AND/OR on-site thermal/electricity storage (1 pt) reduce on-peak load by at least 10%. **8.1.24: Program participation and battery storage's role in meeting peak load shedding demands will be explored.**
D	5				EAc5	Renewable Energy **v4.1**	1-5	Owner	CREDIT: Use renewable energy systems to offset building energy costs by 1% (1pt), 5% (2pts), or 10% (3pts). **v4.1** CREDIT: Use Tier 1 on-site renewable energy to offset at least 2% of total energy use (1 pt) up to 20% (5pts) OR Use Tier 2 new off-site renewable energy to offset at least 10% of total energy use (1 pt) up to 50% (5 pts) OR Use Tier 3 off-site renewable energy that is Green-e Energy certified to offset at least 35% of total energy use (1 pt) up to 100% (3 pts). **8.1.24: Town is already a 100% renewable energy community (offsets). New PV will be installed on the roof (on-site generation).** **10.11.24: SD Roof plan shows a total of 29,864 sf of PV-ready roof area. Vehicle Storage roof (14,724 sf) is sloping NE at a 7 degree roof pitch. Shops / Admin roof (15,140 sf) is sloping SW at a 5 degree tilt. Annual production estimated to be 518,385 kWh/yr. Approach to achieving LEED credits points pending understanding of building energy consumption in DD - CD (on-site PV sufficient for points? Provide additional info on Acton Power Choice? TBD).**
D		1			EAc6	Enhanced Refrigerant Management	1	MEP	CREDIT: Credit Reqs: Select refrigerants that are used in HVAC&R equipment to minimize or eliminate the emission of compounds that contribute to ozone depletion and climate change (1 pt). **8.1.24: Pending calculations by engineer once HVAC&R system designed.**

Yes	M +	M -	No				
5	3	3	2	**MATERIALS & RESOURCES**	**13**	**Responsible**	**Pre-SD Sustainability Kickoff**
D Y				MRpr1 Storage & Collection of Recyclables	Req'd	Owner/Arch.	REQUIRED: Provide dedicated areas for the collection and storage of recyclable materials for the entire building that includes mixed paper, corrugated cardboard, glass, plastics, and metals. Safe collection, storage, and disposal measures must also be provided for two of the following: batteries, mercury-containing lamps, and electronic waste. **8.1.24: Project will point to adjacent transfer station.**
C Y				MRpr2 Construction & Demo Waste Management Planning	Req'd	CM	REQUIRED: Develop and implement a compliant construction and demolition waste management plan that establishes waste diversion goals for the project by identifying at least five materials targeted for diversion, approximate a percentage of the overall project waste that these materials represent, whether materials will be separated or commingled, descriptions of the diversion strategies planned, and describe where the material will be taken/how the recycling facility will process the material. **8.1.24: Project will incorporate requirements into Specifications, Division 1.**
C		3	2	MRc1 Building Life-Cycle Impact Reduction **v4.1**	2-5	Arch	**v4.1** CREDIT: Option 1, Path 1: Maintain the existing building structure (including floor and roof decking) and envelope (exterior skin and framing, excluding window assemblies) for 15% (1 pt), 30% (2 pts), 45% (3 pts), 60 (4 pts), or 75% (5 pts) by surface area AND/OR Option 1, Path 2: Maintain existing interior nonstructural elements (interior walls, doors, floor coverings, and ceiling systems) for at least 30%, by surface area, of the building. Option 2. Conduct a life-cycle assessment of the project's structure and enclosure (1 pt) Demonstrate a minimum of 5% (2 pts), or 10% (3 pts)reduction compared with a baseline building in at least three of the six impact categories, one of which must be global warming potential OR Demonstrate at least 20% redcution for global warming potential and demonstrate at least 10% reduction in two additional impact categories v4 CREDIT: Option 1: Historic Building Reuse (5pts); Option 2: Renovation of Abandoned or Blighted Building (5pts) **8.1.24: Project will not be maintaining / reusing existing structure. Town may want a whole-building LCA conducted. TBD.**
C 2				MRc2 Building Product Disclosure & Optimization-EPD's **v4.1**	1-2	Arch/CM	**v4.1** CREDIT: Option 1: Provide EPDs for at least 20 different permanently-installed products (EP point 40 products) from 5 or more manufacturers (1pt) AND/OR Option 2: Use at least 5 products from 3 or more manufacturers with embodied carbon optimization reports of LCA actions plans (1 pt). **8.1.24: Project will satisfy credit requirements by designing to include compliant materials / products and specify appropriate tracking requirements.**
C 1	1			MRc3 BPDO-Sourcing of Raw Materials **v4.1**	1-2	Arch/CM	**v4.1** CREDIT: Responsible Sourcing of Raw Materials: Use products sourced from at least three different manufacturers that meet at least one of the responsible sourcing and extraction criteria for at least 15%, by cost, of the total value of permanently installed building products in the project (1 point). Five different manufacturers and 30% (2 points). 60% (1 EP point). Regional: 100 miles (160 km) of the project site. **8.1.24: Project will satisfy credit requirements by designing to include compliant materials / products and specify appropriate tracking requirements.**
C 1	1			MRc4 BPDO-Material Ingredients **v4.1**	1-2	Arch/CM	**v4.1** CREDIT: Option 1: Provide HPDs or C2C certification for at least 20 different permanently-installed products (EP point 40 products) from 5 or more manufacturers (1pt) AND/OR Option 2: Use at least 5 products from 3 or more manufacturers with material ingredient optimization reports or action plans (1 pt). **8.1.24: Project will satisfy credit requirements by designing to include compliant materials / products and specify appropriate tracking requirements.**

C	1	1			MRc5	Construction and Demo Waste Management **v4.1**	1-2	CM	**v4.1** CREDIT: Option 1: Divert at least 50% of the total construction and demolition material (1pt) OR Option 2: Divert at least 50% of demolition material AND do not generate more than 10 lbs of construction waste per square foot of the building's floor area (2 pts). **8.1.24: See MRp2.**
	Yes	M +	M -	No					
	8	4	3	1	**INDOOR ENVIRONMENTAL QUALITY**		**16**	**Responsible**	**Pre-SD Sustainability Kickoff**
D	Y				EQpr1	Minimum IAQ Performance	Req'd	MEP	REQUIRED: Comply with the requirements of ASHRAE 62.1-2010, Ventilation for Acceptable Indoor Air Quality.
D	Y				EQpr2	Environmental Tobacco Smoke (ETS) Control **v4.1**	Req'd	Owner	**v4.1** REQUIRED: Project must prohibit smoking inside the building and outside the building except in designated smoking areas located at least 25 feet from all entries, outdoor air intakes, and operable windows. Communicate the no-smoking policy to occupants. Have in place provisions for enforcement or no-smoking signage.

D	2				EQc1	Enhanced IAQ Strategies	1-2	Arch/MEP	CREDIT: Comply with the following requirements for 1pt: Entryway Systems, Interior Cross-Contamination Prevention, and Filtration. For an additional point, comply with the one of the following: Exterior Contamination Prevention, Increased Ventilation, Carbon Dioxide Monitoring, Additional Source Control, or Monitoring.
C	3				EQc2	Low-Emitting Materials **v4.1**	1-3	Arch/CM	**v4.1** CREDIT: Project must install compliant products that meet the (1) emissions testing requirements AND (2) VOC content standards (wet-applied prodcuts only) for 2 (1pt), 3 (2pts), or 4 (3pts), 5 (3 points + EP) of the following categories: adhesives/sealants, paints/coatings, flooring, composite wood, ceilings, wall panels, insulation, and furniture. **8.1.24: Project will satisfy credit requirements by designing to include compliant materials / products and specify appropriate tracking requirements.**
C	1				EQc3	Construction IAQ Management Plan	1	CM	CREDIT: Develop and implement an IAQ management plan that requires compliance with all applicable control measures of the SMACNA IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008–2008, Chapter 3. **8.1.24: Project will incorporate requirements into Specifications, Division 1.**
C		2			EQc4	IAQ Assessment **v4.1**	1-2	Owner/CM	**v4.1** CREDIT: Select one of the following two options to be implemented after construction ends and the building has been completely cleaned. All interior finishes must be finished. Option 1, Flush-Out: Path 1: Before Occupancy: Install new filtration media and perform a building flush-out. Path 2: During Occupancy: If occupancy is desired before the flush-out is completed, the space may be occupied only after delivery of a minimum of 3,500 cubic feet of outdoor air per square foot of gross floor area (1 pt) OR Option 2, Air Testing: Before occupancy, but under ventilation conditions typical for occupancy, conduct baseline IAQ testing for all occupied spaces testing for particulate matter and inorganic gases (1 pt) AND/OR volatile organic compounds (1 pt). For each sampling point where the concentration exceeds the limit, take corrective action and retest for the noncompliant contaminants at the same sampling points. Repeat until all requirements are met (2 pts). **8.1.24: Project will determine interest in air quality testing or feasibility of a flush out at a later date.**
D	1				EQc5	Thermal Comfort	1	MEP	CREDIT: Provide individual thermal comfort controls for at least 50% of individual occupant spaces. Provide group thermal comfort controls for all shared multioccupant spaces. Thermal comfort controls allow occupants, whether in individual spaces or shared multioccupant spaces, to adjust at least one of the following in their local environment: air temperature, radiant temperature, air speed, and humidity. Design thermal comfort system to ASHRAE Standard 55-2010 or to Iso and Cen Standards: Design HVAC systems and the building envelope to meet the requirements of the applicable standard. **8.4.24: Engineers to design spaces to meet ASHRAE 55. Controlability of thermal comfort shouldn't be an issue.**
D	1	1			EQc6	Interior Lighting **v4.1**	1-2	Arch/MEP	**v4.1** CREDIT: For regularly occupied spaces, comply with 1 of the following strategies for 1 pt OR 3 strategies for 2 pts. Option 1 Glare: use light fixtures with a luminance of less than 7,000 candela per square meter (cd/m2) between 45 and 90 degrees from nadir OR achieve a maximum Unified Glare Rating (UGR) rating of <19. Option 2 Color Rendering: use light sources that have a Color Rendering Index (CRI) of at least 90 OR have a Color Fidelity Index >78 and a gamut index between 97 and 110. Option 3 Lighting Control: for at least 90% of regularly occupied spaces, provide dimmable or multilevel lighting. Option 4 Surface Reflectivity: for at least 90% of regularly occupied spaces, use finishes with a surface reflectance >80% for ceilings and >55% for walls. If in scope, use furniture finishes with a surface reflectance > 45% for work surfaces and >50% for movable partitions. **8.4.24: Lighting design will explore lighting quality design strategies in DD.**
D		1	2		EQc7	Daylight **v4.1**	1-3	Arch	**v4.1** CREDIT: Option 1: Demonstrate through simulation that sDA of at least 40% (1pt), 55% (2pt), or 75% (3pts) is achieved. Option 2: Demonstrate through modeling that illuminance levels will be between 300 lux and 3,000 lux for 9 a.m. and 3 p.m., both on a clear-sky day at the equinox, for 55% (1pt). 75% (2 pts), or 90% (3pts) of the regularly occupied floor area. Option 3: With furniture, fixtures and equipment in place, conduct an on-site measurement that demonstrates the project achieves illuminance levels equal to Option 2 for 55% (1pt), 75% (2pts), or 90% (3pts) of the regularly occupied floor area. **8.1.24: Daylighting is being explored as design progresses. Project aiming to provide ample daylighting to workshops, etc.**
D			1		EQc8	Quality Views **v4.1**	1	Arch	**v4.1** CREDIT: Achieve a direct line of sight to the outdoors via vision glazing, with a VLT above 40%, for at least 75% of all regularly occupied floor area that includes at least one of the following: nature, urban landmarks, or art; objects at least 25' from the exterior. Direct access must be within 3 times the head height of the glazing. **8.1.24: Pending calculations, to be conducted in DD.**
D				1	EQc9	Acoustic Performance **v4.1**	1	Acoust. Eng.	**v4.1** CREDIT: For all occupied spaces, meet the requirements, as applicable, for HVAC background noise, sound transmission, reverberation time, and sound reinforcement and masking. **8.1.24: Confirmed not appropriate criteria for project type.**

Yes	M +	M -	No					
4	2	0	0	**INNOVATION**		**6**	**Responsible**	**Pre-SD Sustainability Kickoff**
D 1				INc1.1	Innovation: TBD	1	Team	CREDIT Options: Ergonomics Approach for Computer Users, Community Outreach and Involvement, Occupant Comfort Survey, O+M Starter Kit
D	1			INc1.2	Innovation: TBD	1	Team	CREDIT:
D	1			INc1.3	Innovation: TBD	1	Team	CREDIT:
C 1				INc1.4	Innovation: Low-Mercury Lighting	1	Team	CREDIT: Purchasing - Lamps

C	1				INc1.5	Pilot Credit: MRpc103	1	Team	CREDIT: Integrative Analysis of Building Materials
C	1				INc2	LEED Accredited Professional	1	Team	Multiple LEED APs on Team.
	Yes	M +	M -	No					
	2	0	1	1	**REGIONAL PRIORITY 01720 (underlined)**		**4**	**Responsible**	**Pre-SD Sustainability Kickoff**
				x	RPc1	Regional: SSc Site Development - Protect and Restore Habit	1	-	SSc Site Development - Protect and Restore Habitat
				x	RPc2	Regional: LTc Access to Quality Transit (1 pt)	1	-	LTc Access to Quality Transit
			1		RPc3	Regional: MRc Building Life-Cycle Impact Reduction (2 pts)	1	-	MRc Building Life-Cycle Impact Reduction
	1				RPc4	Regional: EAc Optimize Energy Performance (8 pts)	1	-	EAc Optimize Energy Performance
	1				RPcX	Regional: Renewable Energy Production (2 pts)	1	-	Renewable Energy Production
				1	RPcX	Regional: LTc Surrounding Density & Diverse Uses (4 pts)	1	-	LTc Surrounding Density & Diverse Uses
	Yes	M +	M -	No					
	58	22	8	22	**PROJECT TOTALS (Certification Estimates)**		**110**		

Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80+ points

LEED PRODUCT DATA SUBMITTAL - SUSTAINABLE ATTRIBUTES REPORTING FORM

THIS FORM IS REQUIRED TO BE SUBMITTED *WITH ALL 'Product Data Submittals'*

You must include backup documentation such as *SPECIFIC* Product Data Sheets, Cut Sheets, Product Specific Letter from Manufacturer, etc. DO NOT INCLUDE GENERIC MARKETING MATERIAL

PROJECT NAME: _____

SUBCONTRACTOR: _____

Specification Section: _____ Submittal Number: _____

				MR Building Product Disclosure and Optimization Information (BPDO)										IEQ Low-Emitting Materials Information			
				EPDs		*Sourcing of Raw Materials*					*Material Ingredients*			*Product Categories*		*Some Emissions Evaluation Standards*	
														Paints, Coatings, Adhesives, Sealants		CDPH v1.1 or 1.2; or i.e, Greenguard Gold	
														Composite (Particle Board, MDF, Hardwood Plywood)		NAF or CARB ULEF	
																FloorScore or Green Label Plus	
														Flooring		CDPH v1.1 or 1.2; or i.e, Greenguard Gold	
														Ceilings		CDPH v1.1 or 1.2; or i.e, Greenguard Gold	
														Wall Panels		CDPH v1.1 or 1.2; or i.e, Greenguard Gold	
														Insulation (Thermal & Acoustic)		ANSI/BIFMA Level 7.6.1 or 7.6.2	
	Project Product Data *Applies to permenently installed products, Divisions 3-10, 31 and 32 (31.60.00, 32.10.00, 32.30,00, 32.90.00)* *(MEP - optional, furniture - optional)*			Environmental Product Declaration[2]	Life Cycle Assessment Action Plan	FSC Certified[4] Wood Products	Post-Consumer Recycled Content[5]	Pre-Consumer Recycled Content[6]	Extended Producer Responsibility	Locally Sourced	Declare Label	Health Product Declaration[3]	Cradle to Cradle	*GENERAL EMISSIONS EVALUATION [7, 9]*		*VOC CONTENT [8]*	
	Product Description	Manufacturer	Product Costs[1] (only exclude install labor) ($)	Product Specific (PS) or Industry Wide (IW)?	LCA Action Plan or LCA Impact Reductions?	(%)	(%)	(%)	Manufacturer Takeback Program?	Extracted, Manufactured, & Purchased within 100 miles?	Ingredient disclosure greater than 1000 ppm?	Ingredient disclosure greater than 1000 ppm?	C2C version (2.1.1 or 3.0) Level of Certification?	**Product Category from above? (Select one or NA)** Applies to all products installed within waterproofing membrane	Which Emissions Evaluation Standard does it meet?	**VOC Content[8] (grams/liter)** (Applies ONLY to Paints, Coatings, Adhesives and Sealants installed within waterproofing membrane	Wet-Applied Products Volume Used (liters or gallons)
Ex.	ABC Product	ABC. Inc.	$ XX,XXX	Yes/No; PS/IW	Yes / No	%	%	%	Yes / No	Yes/No; # miles	Yes / No	Yes / No	Yes / No	Select Category	List compliance name	# grams/liter	# liters or gallons
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	

NOTES / DEFINITIONS:

1. Furnish Costs include all expenses to deliver the material to the project site, including taxes, transport, fabrication and profit. Do not include site labor or installation.
2. Environmental Product Declarations which conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope. https://spot.ul.com/
3. The end use product has a published, complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open Standard. https://www.hpd-collaborative.org/hpd-public-repository/
4. Wood products must be certified by the Forest Stewardship Council (FSC) and must be provide proof of vendor FSC Chain-of-Custody with this Product Data Submittal. http://info.fsc.org/certificate.php
5. Post-Consumer Recycled Content: Sourced from recovered Consumer Waste and used as a raw material (e.g. plastic bottles, newspaper, etc).
6. Pre-Consumer Recycled Content: Recovered Industrial Materials diverted from municipal solid waste for use in a different mfg. process, prior to use by a consumer. Note: "home scrap" from the original mfg. process that are reused / reprocessed do not qualify.
7. Building Products must have a 'General Emissions Evaluation' that tested and determined compliance in accordance with California Department of Public Health (CDPH) Standard Method v1.1–2010 or v1.2-2017 http://www.usgbc.org/resources/low-emitting-materials-third-party-certification-table
8. All paints and coatings wet-applied on site must meet applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011. All adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications, as analyzed by the methods specified in Rule 1168.
9. Composite Wood Evaluation as defined by the California Air Resources Board (CARB), Airborne Toxic Measure to Reduce Formaldehyde Emissions from Composite Wood Products Regulation, must be documented to have low formaldehyde emissions that meet the CARB ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde (NAF) resins.
10. Millwork and Fixtures: Built-in cabinetry/bespoke joinery, countertops, window treatments (e.g., curtains, blinds), window films and freestanding partition panels. Beddings, pillows, artwork, rugs and appliances are not considered.
11. RoHS Restrictions: Acronym for Restriction of Hazardous Substances, a Europe-based regulation that limits certain chemicals in electrical and electronic components. https://www.rohsguide.com/

I, _____ a duly authorized representative of _____ hereby certify that the material information submitted here is an accurate representation of the material to be provided under our contract.

EMAIL CONTACT FOR AUTHORIZED REPRESENTATIVE: _____ Direct Phone: _____

SIGNATURE OF AUTHORIZED REPRESENTATIVE: _____ DATE: _____

SECTION 017400

CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

A. This Section includes requirements for the Contractor's implementation of waste management controls and systems for the duration of the Work.

B. Sustainable Design Intent: Refer to Section 018110 - SUSTAINABLE DESIGN REQUIREMENTS for LEED certification requirements.

1. Construction and Demolition Waste Management Planning: Develop a waste management plan, quantifying material diversion by either weight or volume to recycle and/or salvage non-hazardous construction and demolition debris.

a. Exclude excavated soil and land-clearing debris from calculations.
b. Diverted waste includes recycled, salvaged, reused, and donated materials.
c. Include materials destined for alternative daily cover (ADC) in the calculations as waste (not diversion).
d. Include wood waste converted to fuel (bio-fuel) in the calculations as diversion. Other types of waste-to-energy are not considered diversion for this credit.

2. Construction and Demolition Waste Management: For non-hazardous construction and demolition debris comply with **one** of the following paths, as directed by the LEED Checklist:

a. Divert at least 50 percent of total construction and demolition materials.
b. Divert at least 50 percent of all renovation and demolition waste AND generate no more than 10 pounds of waste per square foot of the building’s floor area from new construction activities.

C. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 011000 - GENERAL REQUIREMENTS for general submittal requirements.
2. Section 024100 - DEMOLITION for demolition, salvage, and reuse requirements.

1.3 INTENT

A. The Owner and Architect have established that this Project shall generate the least amount of waste practical and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.

1. With regard to these goals the Contractor shall develop, for the Architect's review, a Waste Management Plan (WMP) for this Project.

    a. Final Waste Management Plan shall be submitted for LEED certification.
    b. Include both demolition and construction waste management.

2. Each Subcontractor shall be responsible for segregating their own waste into different dumpsters as directed by the Contractor.
3. Source Separation, Definition: Source separated construction or demolition waste materials that are sorted into separate bins on the project site (aka on-site).

    a. This waste strategy often isolates waste materials targeted for reuse, donation, or recycling programs.
    b. Typically, sorted materials on-site include metals, wood, ceiling tiles, furniture, and concrete.

B. Contractor shall be responsible for ensuring that debris will be disposed of at appropriately designated licensed solid waste disposal facilities, as defined by local authorities having jurisdiction.

C. Hazardous Wastes: Any unforeseen hazardous wastes shall be separated, stored, and disposed of according to local regulations and as directed by the Owner. Hazardous wastes shall not be included in diversion calculations.

1.4 SUBMITTALS

A. Construction and Demolition Waste Management Plan (WMP): Submit within 21 calendar days after receipt of Notice to Proceed, in a format acceptable to the Owner and in compliance with USGBC requirements. Demolition shall not begin until WMP has been approved.

1. Establish waste diversion goals for the project by identifying at least five materials (both structural and nonstructural) targeted for diversion. Approximate a percentage of the overall project waste that each material represents.
2. Construction and Demolition Handling Facilities:

    a. Indicate the name(s) of the facilities where construction and demolition waste will be delivered and the applicable tipping fees.
    b. Furnish Contractor’s statement of verification that facilities proposed for use are licensed for types of waste to be delivered and have sufficient capacity to receive waste from this project.
    c. Landfill Options: The name of the landfills where the non-recyclable Construction and Demolition waste will be taken to be disposed of, applicable tipping fees and the projected cost of disposing of the Project waste in landfills.
    d. Off-Site Sorting: The name of off-site sorting facilities to receive commingled demolition and construction debris collected in mixed materials containers on site.
        1) If sorted off-site identify the sorting facilities and how the materials will be processed

    e. Alternative daily cover (ADC) does not qualify as material diverted from disposal. Land-clearing debris is not considered construction, demolition, or renovation waste that can contribute to waste diversion.

3. Material Handling Procedures, at Construction and Demolition Handling Facilities:

a. Indicate annual recycling rates and material streams, as defined by local authorities having jurisdiction.
b. Specify which materials shall be source separated or commingled and describe the diversion strategies planned for the project. Describe where the materials will be taken and how the recycling facilities will process the materials.

4. Landfill Certification: Provide a statement of verification that the landfills proposed for use are licensed for types of waste to be deposited and have sufficient capacity to receive the estimated waste from this project
5. Co-Mingled Materials: Co-mingled waste may be considered only one material stream unless the facility can provide project specific diversion rates for specific materials. Provide one or both of the following for co-mingled materials collected in mixed containers on site and sorted off-site:

a. For Each Container: A detailed breakdown of the weight of each material after sorting, including materials diverted to landfills
b. For Each Sorting Facility: A detailed annual average recycling rate for EACH facility where off-site sorting takes place.
    1) Additionally, provide documentation that the facility is State regulated.

6. Alternatives to Landfilling: A list of each material proposed to be salvaged or recycled during the course of the Project. Include the following and any additional items proposed:

a. Cardboard and paper products.
b. Clean dimensional wood. If means of diversion is Wood Derived Fuel (WDF) refer to submittal requirements below.
c. Beverage containers and employee food containers.
d. Concrete.
e. Slurry wall materials.
f. Bricks and masonry.
g. Asphalt.
h. Metals from framing, banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
i. Mechanical and electrical equipment.
j. Building components which can be removed relatively intact from existing construction.
k. Packaging materials, including cardboard, boxes, plastic sheet and film, polystyrene packaging, wood crates, and plastic pails.
l. Glass.
m. Scraps from new gypsum wall board (drywall).
n. Carpet and pad.
o. Acoustical ceiling panels.
p. Plastics, including plastic pails, polyethylene sheet, and bubble wrap.
q. Rigid foam.

7. Meetings: A description of the regular meetings to be held to address waste management.
8. Materials Handling Procedures, at Project Site: A description of the means by which any waste materials identified above will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.

a. Indicate which material streams shall be source separated and which shall be commingled.

9. Transportation: A description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site for offsite sorting) and destination of materials.

B. Waste Management Progress Reports: Concurrent with each Application for Payment, submit a written Waste Management Progress Report in the same format as required for Final Report.

1. Provide updated LEED v4 Construction and Demolition Waste Calculator with each progress report.

C. Waste Management Final Report: Prior to Substantial Completion, submit a written Waste Management Final Report summarizing the types and quantities of materials recycled and disposed of under the Waste Management Plan. Include the name and location of disposal facilities. Quantity may be measured by either weight or volume; be consistent in calculations. Include the following:

1. Material category, including source separated material streams.
2. Generation point of waste.
3. Total quantity of waste, by weight.
4. Quantity of waste salvaged, both estimated and actual.
5. Quantity of waste recycled, both estimated and actual.
6. Total quantity of waste diverted (salvaged plus recycled).
7. Total quantity of waste diverted (salvaged plus recycled) as a percentage of total waste.

D. Other Submittals:

1. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
2. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
3. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, and/or receipts.
4. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, and/or receipts.
5. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
6. Specific LEED v4 Submittals:

    a. Provide completed LEED v4 Construction and Demolition Waste Calculator.
    b. Provide final report detailing waste streams generated, including tipping slips, disposal rates, and diversion rates.

E. Commingling Waste Vendor Submittals: Provide annual report from local or state government authority and summary attachment of diverted materials with the average annual recycling rate. Figures in the summary must be derived from the annual reports in concise clear language.

1. Commingling waste shall be considered one material stream.
2. Provide tipping invoices for commingled waste and the following:

    a. Vendor’s most recent annual report from local or state government authority.

b. Vendor's annual report summary attachment of diverted materials in tonnage, with the average annual recycling rate and percent ADC.

3. If Wood Derived Fuel (WDF) was listed as a diverted material in the above, vendors shall furnish a letter from the biomass plant stating their DOE operating permit number and that WDF was received from vendor, for the same year as the annual report.

1.5 CONTRACTORS

A. Contractor may subcontract work of this Section to a sub-contractor specializing in recycling and salvaging of construction waste.

B. Acoustical Ceiling Panel Recycling: Demolition and construction waste pulpable mineral fiber ceiling panels may be recycled by Armstrong World Industries and US Gypsum. Contact Armstrong at 1-877-ARMSTRONG (1-877-276-7876) or www.armstrongceilings.com/recycling or contact USG at 1-800-USG-4YOU (1-800-874-4968 x2) or www.usgdesignstudio.com, to coordinate recycling efforts, apply for product approvals, and receive reclamation procedure requirements.

C. Carpet Recycling: Demolition and construction waste carpet and carpet padding may be recycled by Carpet America Recovery Effort (CARE). Visit www.carpetrecovery.org to locate carpet reclaimers in local project area and reclamation procedure requirements.

PART 2 - PRODUCTS [Not Used]

PART 3 - EXECUTION

3.1 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. General: Implement Waste Management Plan as approved by the Architect. Provide containers, storage, signage, transportation, and other items as required to implement WMP for the entire duration of the Contract.

1. Deliver waste directly to construction and demolition handling facilities. Do not deliver to transfer stations.

B. Commingling Waste: Commingling waste at the job site may be allowed, provided that the following conditions are met:

1. Commingled materials shall be included in the Waste Management Plan (WMP).
2. Additional commingled materials must be pre-approved by the Architect via WMP addenda, prior to tipping on the job site.

C. Manager: The Contractor shall designate an on-site person responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.

D. Distribution: The Contractor shall distribute copies of the Waste Management Plan to the Job Site Foreman, each Subcontractor, the Owner and the Architect.

E. Instruction: The Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project.

F. Separation Facilities: The Contractor shall lay out and label a specific area to facilitate separation of materials for recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials. Location shall be acceptable to the Architect.

1. Commingling: Waste commingling shall be approved prior to jobsite tipping, per requirements of this Section.

END OF SECTION

SECTION 018110

SUSTAINABLE DESIGN REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Section includes general requirements and procedures for compliance with certain prerequisites and credits needed for Project to obtain USGBC "LEED Version 4 for Building Design and Construction" (LEED v4 BD+C) certification.

1. Specific requirements for LEED are also included in other Sections.
2. Some LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
3. A copy of the LEED Project checklist, with certification level target, is attached at the end of this Section for information only.

    a. Some LEED prerequisites and credits needed to obtain the indicated LEED certification depend on aspects of Project that are not part of the Work of the Contract.

4. A copy of the LEED Product Data Submittals Form is attached at the end of this Section.
5. Definitions included in the "LEED Version 4 for Building Design and Construction" (LEED v4 BD+C) Reference Guide and online amendments apply to this Section.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 011000 - SUMMARY for general submittal procedures; for temporary heating and cooling requirements; construction photography; and for operations and maintenance data.
2. Section 017400 - CONSTRUCTION WASTE MANAGEMENT.
3. Section 018120 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT.
4. Section 019100 - GENERAL COMMISSIONING REQUIREMENTS.

5. Divisions 01 through 49 Sections for LEED requirements specific to the work of each of these Sections. Requirements may or may not include reference to LEED.

1.3 DEFINITIONS

A. Bio-Based Materials: Materials that meet the Sustainable Agriculture Network's Sustainable Agriculture Standard. Bio-based raw materials shall be tested using ASTM D 6866 and be legally harvested, as defined by the exporting and receiving country.

B. CDPH Standard Method v1.2: California Department of Public Health (CDPH) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, v1.2–2017, for the emissions testing and requirements of products and materials.

C. Chain-of-Custody (COC): A procedure that tracks a product form the point of harvest or extraction to its end use, including all successive stage of processing, transformation, manufacturing, a distribution.

D. Chain-of-Custody Certificates: Certificates signed by manufacturers and fabricators certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001.

E. Composite Wood and Agrifiber: Products made of wood particles and/or plant material pressed and bonded with adhesive or resin such as particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates, and door cores.

F. Corporate Sustainability Report: A third-party verified report that outlines the environmental impacts of extraction operations and activities associated with the manufacturer’s product and the product’s supply chain.

G. Environmental Product Declaration (EPD): An independently verified report based on life-cycle assessment studies that have been conducted according to a set of common rules for each product category and peer-reviewed.

1. Product-Specific Declaration: A product with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that has at least a cradle to gate scope.
2. Industry-Wide (Generic) EPD: Provide products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator. EPD must conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
3. Product-Specific Type III EPD: A product with a third-party certification, including external verification, in which the manufacturer is explicated recognized by the program operator. EPD must conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.

H. Extended Producer Responsibility (EPR): Measures undertaken by the maker of a product to accept its own and sometimes other manufacturers' products as postconsumer waste at the end of the products' useful life.

I. Health Product Declaration Open Standard (HPD): A standard format for reporting product content and associated health information for building products and materials.

J. Indoor Air Quality (IAQ) Management Plan: Plan developed by the Contractor to provide a healthy indoor environment for workers and building occupants during construction. Plan must meet or exceed the recommendations of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) "IAQ Guidelines for Occupied Buildings Under Construction."

K. Leadership Extraction Practices: Products that meet at least one of the responsible extraction criteria, which include: extended producer responsibility; bio-based materials; FSC wood products; materials reuse; recycled content; and other USGBC approved programs.

L. Material Cost: The dollar value of materials being provided to the site, after Contractor mark-ups, including transportation costs, taxes, fees, and shop labor, but excluding field equipment and field labor costs.

M. Materials Reuse: Reuse includes salvaged, refurbished, or reused products.

N. Multi-Attribute Optimization: Third party certified products that demonstrate impact reduction below industry average in at least three of the following six categories: global warming potential; stratospheric ozone depletion; acidification; eutrophication; tropospheric ozone creation; nonrenewable resource depletion.

O. Passive (As Related to MEP): Not part of the active portions of the Mechanical, Electrical, and Plumbing systems, for example piping, pipe insulation, ducts, duct insulation, conduit, plumbing fixtures, faucets, showerheads, and lamp housings.

P. Recycled Content: Recycled content is the sum of postconsumer recycled content plus one-half the preconsumer recycled content, based on cost.

1. "Postconsumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
2. "Preconsumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials, such as rework, regrind, or scrap, generated in a process and capable of being reclaimed within the same process that generated it.

Q. Regional Materials: Materials that are extracted, harvested, recovered, and manufactured within a radius of 100 miles from the Project site.

R. Volatile Organic Compounds (VOC) Emissions Test: Refer to CDPH Standard Method definition.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Work of this project includes completed building and application for LEED certification. Work is not complete until Owner has accepted USGBC's final review of LEED certification.

1. Provide documentation required by LEED and LEED review.

B. Provide materials and procedures necessary to obtain LEED prerequisites and credits required in this Section. Other Sections may specify requirements that contribute to LEED prerequisites and credits. Refer to other sections for additional materials and procedures necessary to obtain LEED prerequisites and credits.

C. Respond to questions and requests for additional information from Architect and the USGBC regarding LEED credits until the USGBC has made its determination on the project's LEED certification application.

D. LEED Online Submittals: Upload LEED documentation submittal data directly to USGBC project "LEED Online" website. Complete online forms at least bi-weekly and as necessary to document LEED credits for submittals required in this Section.

E. LEED Conference: Schedule and conduct a conference at a time convenient to Owner and Architect within 21 days prior to commencement of the work. Advise Architect, Owner's Commissioning Authority, and Owner's Project Manager of scheduled meeting dates.

1. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Owner's Project Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: LEED goals for the project, Contractor's action plans, and discussion of targeted LEED Prerequisites and Credits.
3. Minutes: Record and distribute minutes to attendees and other entities with responsibilities for obtaining LEED Credits.

1.5 ACTION SUBMITTALS

A. General: Submit additional LEED submittals required by other Specification Sections.

1. Submit each LEED submittal simultaneously with applicable product submittal.

B. LEED Documentation Submittals:

1. General, LEED v4 Product Data Submittal Reporting Form: Project submittals must be accompanied by a completed LEED v4 Product Data Submittal Reporting Form, which follows this Section. Submittal packages must also include highlighted documentation supporting the sustainability claims made on the LEED v4 Product Data Submittal Reporting Form.

    a. Provide location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material.

2. Heat Island Reduction: Product data for roof and non-roof hardscape products indicating compliance with solar reflectance index (SRI) and solar reflectance (SR) requirements.
3. Optimize Energy Performance: Product data for appliances and equipment that are the responsibility of the contractor. Eligible appliances and equipment must be Energy Star rated. Include rated power in submittal documentation.
4. Building-Level Energy Metering: Product data for meters, sensors, and data collection system used to provide continuous metering of building energy-consumption performance.
5. Advanced Energy Metering: Meter Product cut sheets that include the following information: recording interval, ability to record consumption and demand, data transmission capability, data collection system description, storage capacity, and remote data retrieval capability.
6. Construction and Demolition Waste Management: Comply with submittal requirements of Section 017400 - CONSTRUCTION WASTE MANAGEMENT.
7. Building Product Disclosure and Optimization: Environmental Product Declarations complying with LEED requirements.
8. Building Product Disclosure and Optimization, Sourcing of Raw Materials: Option 2, Leadership Extraction Practices.

    a. Extended Producer Responsibility: Product data and certification letter from product manufacturers, indicating participation in an extended producer responsibility program and statement of costs.
    b. Bio-Based Materials: Product data and certification for bio-based materials, indicating that they comply with requirements. Include statement of costs.
    c. Certified Wood: Product data and chain-of-custody certificates for products containing certified wood. Include statement indicating cost for each certified wood product.
    d. Materials Reuse: Receipts for salvaged and refurbished materials used for Project, indicating sources and costs.
    e. Recycled Content: Product data and certification letter from product manufacturers, indicating percentages by weight of postconsumer and preconsumer recycled content for products having recycled content. Include statement of costs.

9. Building Product Disclosure and Optimization, Material Ingredients: Option 1, Material Ingredient Reporting.

    a. Material ingredient reports for products that comply with LEED requirements for material ingredient reporting, including but not limited to the following:

        1) Manufacturer Inventory.
        2) Health Product Declaration.
        3) Cradle to Cradle certifications.
        4) Declare product labels.
        5) UL Product Lens certifications.
        6) ANSI/BIFMA e3 Furniture Sustainability Standard.

10. Building Product Disclosure and Optimization, Material Ingredients: Option 2, Material Ingredient Optimization.

    a. Reports showing a compliant material ingredient optimization report or action plan.

11. Indoor Air Quality: Comply with submittal requirements of Section 018120 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT.
12. Low-Emitting Materials: Product data, indicating VOC content and emissions testing documents showing compliance with requirements for low-emitting materials, for the following materials:

    a. Paints and coatings.
    b. Adhesives and sealants.
    c. Flooring.
    d. Products containing composite wood or agrifiber products or wood glues.
    e. Thermal and acoustic insulation.
    f. Wall panels.
    g. Ceiling products.
    h. Furniture.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For LEED coordinator.

B. Project Materials Cost Data: Provide statement indicating total cost and shop labor for materials used for Project. Costs exclude site labor, overhead, and profit. Include breakout of costs for the following categories of items:

1. Wood construction materials.
2. Furniture.

3. Passive plumbing materials.
4. Passive mechanical (HVAC) materials.
5. Passive electrical materials.
6. Earthwork and exterior improvements, hard costs.

C. LEED Action Plan Components: Provide preliminary submittals within 21 days of date established for commencement of the Work indicating how the following requirements will be met:

1. Waste management plan, complying with Section 017400 - CONSTRUCTION WASTE MANAGEMENT.
2. Indoor air quality plan, complying with Section 018120 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT.

D. LEED Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with LEED action plans for the following:

1. Waste reduction progress reports complying with Section 017400 - CONSTRUCTION WASTE MANAGEMENT.
2. Building Product Disclosure and Optimization, Environmental Product Declarations (EPD).
3. Building Product Disclosure and Optimization, Sourcing of Raw Materials.

    a. General: Manufacturing locations.
    b. Option 2:

        1) Extended producer responsibility.
        2) Bio-based materials.
        3) Certified wood products.
        4) Materials reuse.
        5) Recycled content.

4. Building Product Disclosure and Optimization, Material Ingredients.
5. Low Emitting Materials.

    a. Low Emitting Materials Tracking Sheet monitoring the project's progress towards targeted LEED Indoor Environmental Quality Credits. Tracking Sheet to be presented at construction meetings.

6. Indoor air quality, during construction, complying with Section 018120 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT.

7. Indoor air quality assessment, complying with Section 018120 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT.

1.7 QUALITY ASSURANCE

A. LEED Coordinator: Engage an experienced LEED-Accredited Professional to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Provide products and procedures necessary to obtain LEED credits required in this Section. Although other Sections may specify some requirements that contribute to LEED credits, the Contractor shall determine additional materials and procedures necessary to obtain LEED credits indicated. Contractor to determine a combination of credit options best suited for achieving credits required.

1. Exclusions: Special equipment, such as elevators, escalators, process equipment, and fire suppression systems, is excluded from the credit calculations. Also excluded are products purchased for temporary use on the project, like formwork for concrete.

B. Unauthorized Products: Materials and products required for work of this section shall not contain asbestos, lead, mercury, polychlorinated biphenyls (PCBs), or other hazardous materials identified by the Owner.

2.2 BUILDING PRODUCT DISCLOSURE AND OPTIMIZATION

A. Building Product Disclosure and Optimization, Environmental Product Declarations (EPD): Option 1. Provide at least 20 permanently installed products (sourced from at least 5 different manufacturers) which meet one of the disclosure criteria:

1. ISO 14044 Conforming LCA: Valued as one whole product.
2. Industry-Wide Type III EPD: Valued as one whole product.
3. Product-Specific Type III EPD (Internally Reviewed): Valued as one whole product.
4. Product-Specific Type III EPD (Externally Reviewed and Verified): Valued as 1-1/2 products.

B. Building Product Disclosure and Optimization, Environmental Product Declarations (EPD): Option 2. Use products that have a compliant embodied carbon optimization report or action plan separate from the LCA or EPD. Use at least 5 permanently installed products sourced from at least three different manufacturers.

C. Building Product Disclosure and Optimization, Sourcing of Raw Materials: Option 2, Leadership Extraction Practices. Provide products that meet at least one of the responsible extraction criteria below for at least 15%, by cost, of the total value of permanently installed building products in the project:

1. Extended producer responsibility program.
2. Bio-based materials.
3. Certified Wood: Wood-based materials include, but are not limited to, the following materials when made from wood, engineered wood products, or wood-based panel products:

    a. Rough carpentry.
    b. Miscellaneous carpentry.
    c. Heavy timber construction.
    d. Wood decking.
    e. Metal-plate-connected wood trusses.
    f. Structural glued-laminated timber.
    g. Finish carpentry.
    h. Architectural woodwork.
    i. Wood paneling.
    j. Wood veneer wall covering.
    k. Wood flooring.
    l. Wood lockers.
    m. Wood cabinets.
    n. Furniture.

4. Materials Reuse: The following materials may be salvaged, refurbished, or reused materials:

    a. As directed by Architect.

5. Recycled content.

    a. Exceptions: Do not include fire protection, operational plumbing, operational mechanical, and operational electrical components, and specialty items, such as elevators and equipment, in the calculation.

AND additionally, for any product meeting at least one of attributes 1-5 above:

6. Provide location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material.

D. Building Product Disclosure and Optimization, Material Ingredients: Option 1, Material Ingredient Reporting.

1. Use at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm), which meet one of the following disclosure criteria:

    a. Manufacturer Inventory.
    b. Health Product Declarations (HPDs).
    c. Cradle to Cradle (C2C) certifications.
    d. Declare product labels.
    e. UL Product Lens certifications.
    f. ANSI/BIFMA e3 Furniture Sustainability Standard.

E. Building Product Disclosure and Optimization, Material Ingredients: Option 2, Material Ingredient Optimization.

1. Use at least 5 permanently installed products sourced from at least three different manufacturers that have a compliant material ingredient optimization report or action plan. Products are weighted as shown below.

    a. Material Ingredient Screening and Optimization Action Plan (0.5 product) - action plan based on publicly available material Inventory to at least 1,000ppm prepared by the manufacturer and signed by a manufacturer executive.
    b. Advanced Inventory and Assessment (1 product) - third-party verified Cradle to Cradle Certified, Material Health Certificate at Bronze Level or higher, Declare Label designated as Red List Free or LBC Red List Free, or Health Product Declaration (HPD) that Inventories Ingredients to at least 100ppm and no GreenScreen LT-1 hazards or GHS Category 1 hazards are present OR 75% by weight of the product Is assessed using GreenScreen and the remaining 25% has been Inventoried.
    c. Material Ingredient Optimization (1.5 products) - third-party verified Cradle to Cradle Certified, Material Health Certificate at Silver Level or higher, Living Product Challenge certified with Imperative 09, or Health Product Declaration (HPD) that Inventories to at least 100ppm and 95% by weight of the product Is assessed using GreenScreen with no BM-1 hazards present and the remaining 5% has been Inventoried and screened using GreenScreen List Translator and no LT-1 hazards are present.

2. Products sourced (extracted, manufactured, purchased) within 100 miles (160 km) of the project site are valued at twice their base contributing number of products, up to a maximum of 2 products.

2.3 LOW-EMITTING MATERIALS

A. Low-Emitting Materials, General Emissions Requirements: Products must demonstrate they have been tested and determined compliant in accordance with California Department of Public Health, (CDPH), Standard Method v1.2-2017, using the applicable exposure scenario. Manufacturer's documentation demonstrating compliance must state the range of total VOCs (tVOC) after 14 days measured as follows:

1. 0.5mg/m3 or less,
2. between 0.5 and 5.0 mg/m3 or,
3. 0.50 mg/m3 or more.

B. Low-Emitting Materials, Paints and Coatings, VOC content: For field applications that are inside the weatherproofing system, 100 percent of paints and coatings shall comply with the limits for VOC content when calculated according to the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, OR the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016.

California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings:

Product Type:	Allowable VOC Content (g/L):
Flat coatings	50
Nonflat coatings	100
Nonflat - High gloss coatings	150
Aluminum roof coatings	400
Basement specialty coatings	400
Bituminous roof coatings	50
Bituminous roof primers	350
Bond breakers	350
Concrete curing compounds	350
Concrete/Masonry sealers	100
Driveway sealers	50
Dry-fog coatings	150

Faux finishing coatings	350
Fire resistive coatings	350
Floor coatings	100
Form-release compounds	250
Graphic arts coatings (sign paints)	500
High temperature coatings	420
Industrial maintenance coatings	250
Low solids coatings	120
Magnesite cement coatings	450
Mastic texture coatings	100
Metallic pigmented coatings	500
Multi-color coatings	250
Pre-treatment wash primers	420
Primers, sealers, and undercoaters	100
Reactive penetrating sealers	350
Recycled coatings	250
Roof coatings	50
Rust preventative coatings	250
Shellac - Clear	730
Shellac - Opaque	550
Specialty primers, sealers, and undercoaters	100
Stains	250
Stone consolidants	450
Swimming pool coatings	340
Traffic marking coatings	100
Tub and tile refinish coatings	420
Waterproofing membranes	250

Wood coatings	275
Wood preservatives	350
Zinc-rich primers	340

South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016:

Product Type:	Allowable VOC Content (g/L):
Bond breakers	350
Colorant - Architectural coatings, excluding IM coatings	50
Colorant - Solvent-based IM	600
Colorant - Waterborne IM	50
Concrete - Curing compounds	100
Concrete - Curing compounds for roadways and bridges	350
Concrete surface retarder	50
Driveway sealer	50
Dry-fog coatings	50
Faux finishing coatings - Clear topcoat	100
Faux finishing coatings - Decorative coatings	350
Faux finishing coatings - Glazes	350
Faux finishing coatings - Japan	350
Faux finishing coatings - Trowel applied coatings	50
Fire-proofing coatings	150
Flats	50
Floor coatings	50
Form release compound	100
Graphic arts (sign) coatings	200
Industrial maintenance coatings	100

Industrial maintenance coatings - color indicating saftey coatings	480
Industrial maintenance coatings - High temperature IM coatings	420
Industrial maintenance coatings - Non-sacrificial anti-graffiti coatings	100
Industrial maintenance coatings - Zinc-rich IM primers	100
Magnesite cement coatings	450
Mastic coatings	100
Metallic pigmented coatings	150
Multi-Color coatings	250
Nonflat coatings	50
Pre-treatment wash primers	420
Primers, sealers, and undercoaters	100
Reactive penetrating sealers	350
Recycled coatings	250
Roof coatings	50
Roof coatings, aluminum	100
Roof primers, bituminous	350
Rust preventative coatings	100
Sacrificial anti-graffiti coatings	50
Shellac - Clear	730
Shellac - Pigmented	550
Specialty primers	100
Stains	100
Stains, interior	250
Stone consolidants	450
Swimming pool coatings - Repair	340

Swimming pool coatings - Other	340
Tile and stone sealers	100
Traffic coatings	100
Tub and tile refinish coatings	420
Waterproofing sealers	100
Waterproofing concrete/masonry sealers	100
Wood coatings - varnish	275
Wood coatings - sanding sealers	275
Wood coatings - lacquer	275
Wood conditioners	100
Wood preservatives	350
Low solids coatings	120

C. Low-Emitting Materials, Paints and Coatings, General Emissions Requirement: For field applications that are inside the weatherproofing system, at least 75 percent of paints and coatings, measured by volume or surface area, shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

1. To comply with the General Emissions Requirement, products shall meet one of the following:

    a. UL Greenguard Gold Certified
    b. SCS Indoor Advantage Gold Certified
    c. MAS Certified Green
    d. Meet California Department of Public Health (CDHP), Standard Method v1.2-2017, using the applicable exposure scenario.

D. Low-Emitting Materials, Adhesives and Sealants, VOC content: For field applications that are inside the weatherproofing system, 100 percent of adhesives and sealants shall comply with the limits for VOC content when calculated according to South Coast Air Quality Management District (SCAQMD) Rule #1168, requirements effective on October 6, 2017.

South Coast Air Quality Management District (SCAQMD) Rule #1168, requirements effective on October 6, 2017:

Product Type	Allowable VOC Content (g/L)
Adhesives for Architectural Applications	
Building envelope membrane adhesive	250
Carpet pad adhesives	50
Ceramic glass, porcelain, & stone tile adhesive	65
Cove base adhesives	50
Dry wall and panel adhesives	50
Multi-purpose construction adhesives	70
Roofing- single ply roof membrane adhesive	250
Roofing- all other roof adhesives	250
Rubber floor adhesives	60
Structural glazing adhesives	100
Structural wood member adhesive	140
Subfloor adhesive	50
VCT and asphalt tile adhesives	50
Wood flooring adhesive	100
All other indoor floor covering adhesives	50
All other outdoor floor covering adhesives	50
Specialty Applications	
Computer diskette manufacturing adhesive	350
Contact adhesive	80
Edge glue adhesive	250
ABS welding cement	325
ABS to PVC transition cement	510
CPVC welding cement	490
PVC welding cement	510

All other plastic cement welding cements	100
Rubber Vulcanization Adhesive	250
Special purpose contact adhesive	250
Thin metal laminating adhesive	780
Tire tread adhesive	100
Top and trim adhesive	250
Waterproof resorcinol glue	170
All other adhesives	250
Substrate Specific Applications	
Metal substrate-specific adhesives	30
Plastic foam substrate-specific adhesives	50
Porous material (except wood) substrate-specific adhesives	50
Wood substrate-specific adhesives	30
Fiberglass substrate-specific adhesives	80
Reinforced plastic composite substrate-specific adhesives	200
Sealants for Architectural Applications	
Clear, paintable, and immediately water-resistant sealant	250
Foam insulation	250
Grout	250
Roadway sealant	250
Non-staining plumbing putty	250
Potable water sealant	250
Roofing - single ply roof membrane sealant	450
Roofing - all other roof sealants	300
All other architectural sealants	50

Marine deck sealant	760
All other sealants	420
Adhesive Primers	
Plastic adhesive primers	550
Pressure sensitive adhesive primers	250
Traffic marking tape adhesive primers	150
Vehicle glass adhesive primers	250
All other adhesive primers	250
Sealant Primers	
Architectural non-porous sealant primer	250
Architectural porous sealant primer	775
Modified bituminous sealant primer	500
Marine deck sealant primer	760
All other sealant primers	750
Other	
Other adhesives, adhesive bonding primers, adhesive primers, or any other primers	250

1. Exception: The provisions of SCAQMD Rule 1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations.

E. Low-Emitting Materials, Adhesives and Sealants, General Emissions Requirement: For field applications that are inside the weatherproofing system, at least 75 percent of adhesives and sealants, measured by volume or surface area, shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

1. To comply with the General Emissions Requirement, products shall meet one of the following:

    a. UL Greenguard Gold Certified
    b. SCS Indoor Advantage Gold Certified
    c. MAS Certified Green

d. Meet California Department of Public Health (CDHP), Standard Method v1.2-2017, using the applicable exposure scenario.

F. Low-Emitting Materials, Flooring, General Emissions Requirement: 90 percent of flooring measured by cost or surface area, shall be tested according to California Department of Public Health (CDPH) Standard Test Method v1.2-2017, using the applicable exposure scenario.

1. To comply with the General Emissions Requirement, products may comply with one of the following:

a. FloorScore Certified (resilient, hard surface, textile flooring, and flooring adhesives).
b. UL Greenguard Gold Certified.
c. CRI Green Label Plus certified (carpet, adhesive, and cushion).
d. SCS Indoor Advantage Gold Certified.
e. NSF/ANSI 332 certified (resilient flooring).

G. Low-Emitting Materials, Composite Wood: 75 percent, measured by cost or surface area, of composite wood and agrifiber products, including Plywood, Medium Density Fiberboard, Hardwood Veneer Plywood, and Structural Composite Wood, shall be made using ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins (NAF) as defined in the California Air Resources Board "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or EPA TSCA Title VI.

H. Low-Emitting Materials, Ceilings, Walls, Thermal and Acoustic Insulation: 90 percent of ceilings, 75 percent of walls, and 75 percent of insulation, measured by cost or surface area, shall comply be tested according to the California Department of Public Health (CDPH) Standard Test Method v1.2-2017, using the applicable scenario.

1. To comply with the General Emissions Requirement, products shall meet one of the following:

a. UL Greenguard Gold Certified
b. SCS Indoor Advantage Gold Certified
c. MAS Certified Green
d. Meet California Department of Public Health (CDHP), Standard Method v1.2-2017, using the applicable scenario.

I. Low-Emitting Materials, Furniture: Furniture, measured by cost, shall be tested in accordance with ANSI/BIFMA Standard Method M7.1-2011; comply with ANSI/BIFMA e3-2011 Furniture Sustainability Standard, Sections 7.6.1 and 7.6.2, using either the concentration modeling approach or the emissions factor approach; and model the test results using the open plan, private office, or seating scenario in ANSI/BIFMA M7.1, as appropriate.

2.4 INDOOR WATER USE REDUCTION

A. Indoor Water Use Reduction:

1. Building Water Use: Provide WaterSense labeled products for interior plumbing fixtures. Do not exceed water flow requirements indicated in Division 22 - PLUMBING.
2. Appliance and Process Water Use: Provide US EPA ENERGY STAR or performance equivalent appliances. Comply with other LEED requirements for process water use, indicated in Division 22 - PLUMBING and Division 23 - HEATING, VENTILATING, AND AIR CONDITIONING.

B. Indoor Water Use Reduction, Plumbing Fixtures: Do not exceed water flow requirements indicated in Division 22 - PLUMBING.

1. Provide US EPA WaterSense labeled plumbing fixtures, where applicable.

PART 3 - EXECUTION

3.1 NONSMOKING BUILDING

A. Environmental Tobacco Smoke Control: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.

1. Refer to Section 018120 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT.

3.2 CONSTRUCTION WASTE MANAGEMENT

A. Construction and Demolition Waste Management: Comply with Section 017400 - CONSTRUCTION WASTE MANAGEMENT.

3.3 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT

A. Construction Indoor Air Quality Management Plan: Comply with Section 018120 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT.

END OF SECTION

SECTION 018120

CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. This Section includes requirements for the Contractor's implementation of indoor air quality management controls and systems for the duration of the Work.

B. Sustainable Design Intent: Refer to Section 018110 - SUSTAINABLE DESIGN REQUIREMENTS for LEED certification requirements.

1. Environmental Tobacco Smoke Control: Prevent exposure of building systems to environmental tobacco smoke during construction.
2. Construction Indoor Air Quality Management Plan: Requirements for minimum indoor air quality (IAQ) performance standards during the construction period.
3. Indoor Air Quality Assessment: Requirements for assessment of minimum indoor air quality (IAQ) performance standards through either building flush-out or air testing before occupancy

C. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 011000 - GENERAL REQUIREMENTS for photographic documentation requirements, submittal requirements, temporary construction facilities, protection, and controls.
2. Section 017420 - CONSTRUCTION WASTE MANAGEMENT for demolition and construction waste management.
3. Division 23 - HVAC for coordination with HVAC requirements.
4. Divisions 02 through 49 Specification Section for specific requirements relating to indoor air quality.

1.3 PERFORMANCE REQUIREMENTS

A. Environmental Tobacco Smoke Control: At a minimum, take the following measures:

1. Do not allow smoking in enclosed portions of the project site, on the rooftop, or in construction trailers.
   a. This prohibition includes tobacco smoke, as well as smoke produced from the combustion of cannabis and controlled substances and the emissions produced by electronic smoking devices.

2. Locate exterior designated smoking areas at least 25 feet away from entries, outdoor air intakes, and operable windows. Provide signage for designated smoking areas, located within 10 feet of each entry. Provide ash receptacles and clean areas daily.

B. Construction Indoor Air Quality Management Plan: During construction, comply with the following requirements:

1. Coordinate with Owner's current IAQ management plans and procedures.
2. Meet or exceed the minimum requirements of the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, Second Edition, November 2007, Chapter 3.
3. If permanently installed air handlers are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 shall be used at each return air grille, as determined by ASHRAE 52.2-2007. Protect active outdoor air intakes and return air grilles with applicable filtration media. Periodically inspect temporary media and replace as necessary. Replace filtration media immediately prior to occupancy, according to Division 23 – HVAC.
4. Protect absorptive materials stored on-site and installed from moisture damage. Immediately remove from site and properly dispose of any materials susceptible to microbial growth and replace with new, undamaged materials.

C. Indoor Air Quality Assessment: Comply with one of the following requirements:

1. Option 1: Perform a building flush-out with outside air, either before occupancy or during occupancy.
2. Option 2: Conduct IAQ testing for air contaminant levels in the building, after construction ends and before occupancy.

1.4 SUBMITTALS

A. Construction Indoor Air Quality Management Plan: Within 21 calendar days after receipt of Notice to Proceed, the Contractor shall submit Construction IAQ Management Plan.

1. Construction IAQ Management Plan: Include, but do not limit to, the following:
   a. HVAC Protection.
   b. Source Control.
   c. Pathway Interruption.
   d. Housekeeping.
   e. Scheduling.

2. Product Data: Submit for each type of filtration media used during construction and installed immediately prior to occupancy, with MERV values clearly identified.

B. Indoor Air Quality Assessment:

1. Option 1, Flushout: Signed statement describing the building air flush-out procedures, including the dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.
   a. Product Data: Submit for filtration media used during flush-out and occupancy, with MERV values clearly identified.

2. Option 2, IAQ Testing: Report from testing and inspecting agency indicating results of IAQ testing and documentation showing compliance with IAQ testing procedures and requirements, with testing laboratory name and date clearly identified.

PART 2 - PRODUCTS

2.1 FILTRATION MEDIA

A. Filtration Media: Comply with ASHRAE 52.2-2007 and provide MERV as required.

PART 3 - EXECUTION

3.1 CONSTRUCTION IAQ MANAGEMENT PLAN IMPLEMENTATION

A. IAQ Manager: The Contractor shall designate an on-site person responsible for instructing workers and overseeing and documenting results of the Construction IAQ Management Plan for the Project.

1. Distribution: The Contractor shall distribute copies of the Construction IAQ Management Plan to the Job Site Foreman, each subcontractor, the Owner, and the Architect.
2. Instruction: The Contractor shall provide on-site instruction of appropriate procedures and methods to be used by all parties at the appropriate stages of the Project.

B. Preconditioning: Allow products, which have odors and significant VOC emissions, to off-gas in a dry, well-ventilated space for sufficient period to dissipate odors and emissions prior to delivery to Project.

1. Remove containers and packaging from materials prior to conditioning to maximize off-gassing of VOCs.
2. Condition products in ventilated warehouse or other building.

C. Ventilation: Ventilate interior spaces directly to the exterior to minimize accumulation of odors and VOC emissions during construction.

D. Coordinate Construction IAQ Management Plan with construction cleaning and final cleaning as indicated in Section 011000 -GENERAL REQUIREMENTS.

3.2 INDOOR AIR QUALITY (IAQ) ASSESSMENT

A. Indoor Air Quality Assessment: Option 1, Flush-Out:

1. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total volume of 14,000 cu. ft. of outdoor air per sq. ft. of floor area while maintaining an internal temperature of at least 60 deg F and a relative humidity no higher than 60 percent.

    a. Operating Requirements: Refer to Division 23 - HVAC.

2. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cu. ft. of outdoor air per sq. ft. of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm per sq. ft. of outside air or the design minimum outside-air rate, whichever is greater. During each day

of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14,000 cu. ft./sq. ft. of outside air has been delivered to the space.

a. Operating Requirements: Refer to Division 23 - HVAC.

B. Indoor Air Quality Assessment: Option 2, Indoor Air Quality Testing: Engage testing agency to perform the following:

1. Conduct baseline IAQ testing, after construction ends and prior to occupancy, using testing protocols consistent with the EPA's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air," and as additionally detailed in the USGBC's "LEED Reference Guide for Building Design and Construction."
2. Demonstrate that contaminants do not exceed the concentrations listed below:

    a. Formaldehyde: 27 ppb.
    b. Particulates (PM10): 50 micrograms/cu. m.
    c. Ozone: 0.075 ppm.
    d. Total Volatile Organic Compounds (TVOCs): 500 micrograms/cu. m.
    e. Carbon Monoxide (CO): 9 ppm and no greater than 2 ppm above outdoor levels.
    f. Target Volatile Organic Compounds: California Department of Public Health (CDPH) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, v1.2–2017, Table 4-1.

3. For each sampling point where the concentration exceeds the limit, take corrective action and retest for the noncompliant contaminants at the same sampling points. Repeat until all requirements are met.
4. Air-sample testing shall be conducted as follows:

    a. All measurements shall be conducted prior to occupancy but during normal occupied hours, and with building ventilation system starting at the normal daily start time and operated at the minimum outside-air flow rate for the occupied mode throughout the duration of the air testing.
    b. Building shall have all interior finishes installed, including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Nonfixed furnishings, such as workstations and partitions, are encouraged, but not required, to be in place for the testing.
    c. Number of sampling locations varies depending on the size of building and number of ventilation systems. For each portion of building served by a separate ventilation system, the number of sampling points shall not be less than one per 5000 sq. ft.
        1) For large open spaces, one sampling point per 50,000 sq. ft. may be used.
    d. Air samples shall be collected between 3 and 6 feet from the floor to represent the breathing zone of occupants, and over a minimum four-hour period.

END OF SECTION