ACTON DPW FACILITY - FEASIBILITY STUDY

FINAL REPORT - CONCEPT OPTIONS
ACTON, MA
15 OCTOBER, 2025

ARROWSTREET
ARCHITECTURE & DESIGN

PM&C

GGD Consulting Engineers, Inc.

RSE ASSOCIATES Inc.

ACTON DPW FACILITY - FEASIBILITY STUDY

FINAL REPORT OF CONCEPT OPTIONS

- SUMMARY
- CONCEPT OPTIONS
- OPTIONS ANALYSIS
- APPENDICES

EXECUTIVE SUMMARY

SUMMARY OF SCOPE

In July of 2025, the Town of Acton engaged Arrowstreet to assist with studying options to reduce the overall project cost from the previously considered new building project for the DPW. Arrowstreet was familiar with the DPW facilities, having previously completed a town wide-facilities study in 2023 that included some of the other buildings on site as well as completing other projects for the Town.

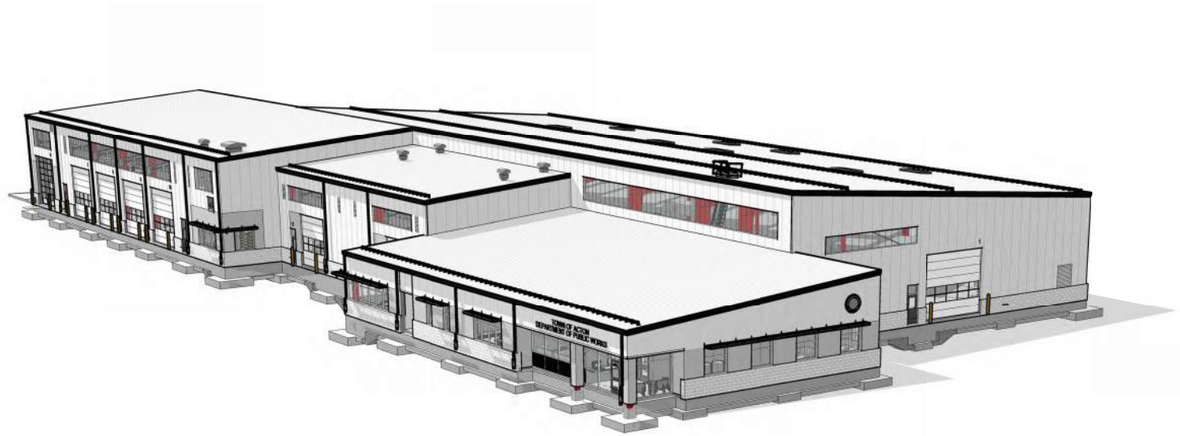
Our team included RSE Engineers, GGD Consulting Engineers, and PM+C cost estimators. We began with an existing conditions analysis which involved reviewing the original 1987 drawings and the 2025 40% DD Set by Weston and Sampson. We visited the site to better understand the conditions of the exterior envelope and building operations. We conducted interviews with Weston & Sampson team and with the DPW staff to better understand the needs and goals for the DPW. The process included meetings with the Town Manager's Office, Town of Acton Facilities, the DPW Building Committee, and the Finance Committee.

Existing Conditions Analysis- From the initial site visit attended by Arrowstreet, RSE Engineers, and DPW staff, we observed that the exterior, unreinforced CMU walls are mostly intact except for a few areas damaged from impact or from water infiltration; recommended repairs of the exterior are documented in the Appendix. In the interior we observed numerous accessibility issues that were previously recorded in the 2019 ADA Title II Assessment by EMG. These include non-accessible building entries, bathrooms, shower rooms, etc. Overall, the existing building appears to need maintenance but shows no major signs of structural distress. Programmatically, we learned from our interview with the DPW staff that the fleet storage area is undersized; having a properly sized garage that can store the winter fleet is a major goal for the department. The number one concern though was safety for the workers in the building. This stems from unsafe vehicle circulation patterns, a lack of separation between public and staff interfaces, and a dysfunctional ventilation system with truck exhaust entering into staff spaces.

Arrowstreet was not directed to perform a full re-programming analysis but to use the program from the W&S design and to minimize some areas that were oversized or redundant.

Concept Options- The process for the study continued with the development of conceptual options for either a new building with reduced square footage or to find a way to renovate the existing building while still meeting the DPW's program needs within a lower cost that the Town could consider. We developed five options with a range of costs and programmatic areas as summarized below. Common components for all options include a pre-engineered super structure for new construction, all-electric buildings with an air source heat pump system, insulated envelopes (new construction achieves higher thermal performance than renovated areas), triple-glazed windows, and accessibility upgrades in order to meet current code requirements. With the exception of Option 1, all other options retain the existing building or portions of; with maintenance and upgrades, we believe the existing building continues to have value and could potentially extend the life by 20-25 years.

Option 1- VE 40% DD set: Strategies included reducing the building footprint of the Weston & Sampson design and reducing the size of some program with a goal of 10% of the GSF area. Squaring up the footprint of the building helps to reduce costs in the exterior envelope. Each program area was studied to determine where uses could be cut or square foot areas could be reduced. Circulation space is tightened up, opportunities for more shared spaces are considered and some program areas are eliminated. The full area needed for the fleet storage is maintained. The option meets all the needs of the DPW but has the least cost savings at just over 13% in cost reduction from the W&S 40% DD set. Deeper reductions could be taken with further collaboration with the DPW to focus their programmatic needs on the highest priorities.



Rendering of Proposed DPW by Weston & Sampson

EXECUTIVE SUMMARY

Option 2- Reno: We took a step back to re-examine the potential to renovate the existing building. This option is able to meet most of the goals of health and safety, with improved separation of staff/ public circulation on site and within the building and with a new HVAC system for cleaner air, but does not improve the ability to expand the parking space beyond current conditions, and therefore cannot park the department's winter fleet, and the existing maintenance shop remains undersized. Critical improvements to the exterior envelope, including structural reinforcement of the CMU walls, are needed in order to extend the life of the building for the next 15-20 years. These improvements are defined in the Appendix (refer to the Architectural and Structural Narratives). Without those improvements, the life expectancy could be less. The cost estimate for this option is the lowest of the five, however, the money spent should be considered a short-term solution as it makes modest improvements that are focused on bringing the building up to accessibility code and improving ventilation but does not completely solve the programmatic needs of the department now or into the future.

Option 3- Reno + Attached Fleet Addition: Next, we looked at salvaging half the building for the staff/ support/maintenance program of the building and then removing the southern half to build an addition for the fleet storage. The northern existing portion follows the same scope as proposed in Option 2 for the use of staff, support, and maintenance. Building the new addition up against the existing structure requires an increased level of complexity. Because the work area exceeds 30% of the roof and floor area, Level 3 Alterations are triggered (refer to the Structural Narrative for further review) which requires additional structural reinforcements. Disadvantages of this option include lack of a sound buffer with the neighborhood, insufficient vehicle storage and workspace, and a high proportion of costs going towards structural reinforcement.

Option 4A: Reno + New Fleet Building: This option provides a new fleet storage building sized per the Weston & Sampson design and full use of the existing building for admin/support/maintenance program. Using the existing building provides more space than is needed for that program. It's possible to reduce costs further by reducing the size of the fleet storage, but the existing building remains oversized for its purpose. The more energy intensive use is located in the existing building which will result in higher energy use than other options because it is not as efficient as a new building due to the envelope only being able to be improved to a certain level.

Option 4B: Reno + New Admin./Support/Maint. Building: This option is the reverse of Option 4A by switching the fleet storage to fit within the existing building and the other programs in a new building. It puts priority on the staff with a new building designed to best meet the department's needs. Further cost reductions for the new building could be taken with continued collaboration with the DPW to focus their programmatic needs on the highest priorities. Option 4B has a lower energy use than Option 4A, because the use (staff) with the higher heating and cooling loads is placed in the new building, which will have a more efficient envelope than an existing building. Further cost savings could include reducing the area of the new building and minimizing the improvements to the existing building (ie. do not replace windows). Option 4B allows flexibility to make future retrofits to allow for more vehicle storage (refer to Opt. B Alternate Fleet Storage plan- p. 16) or to tear down and reconstruct.

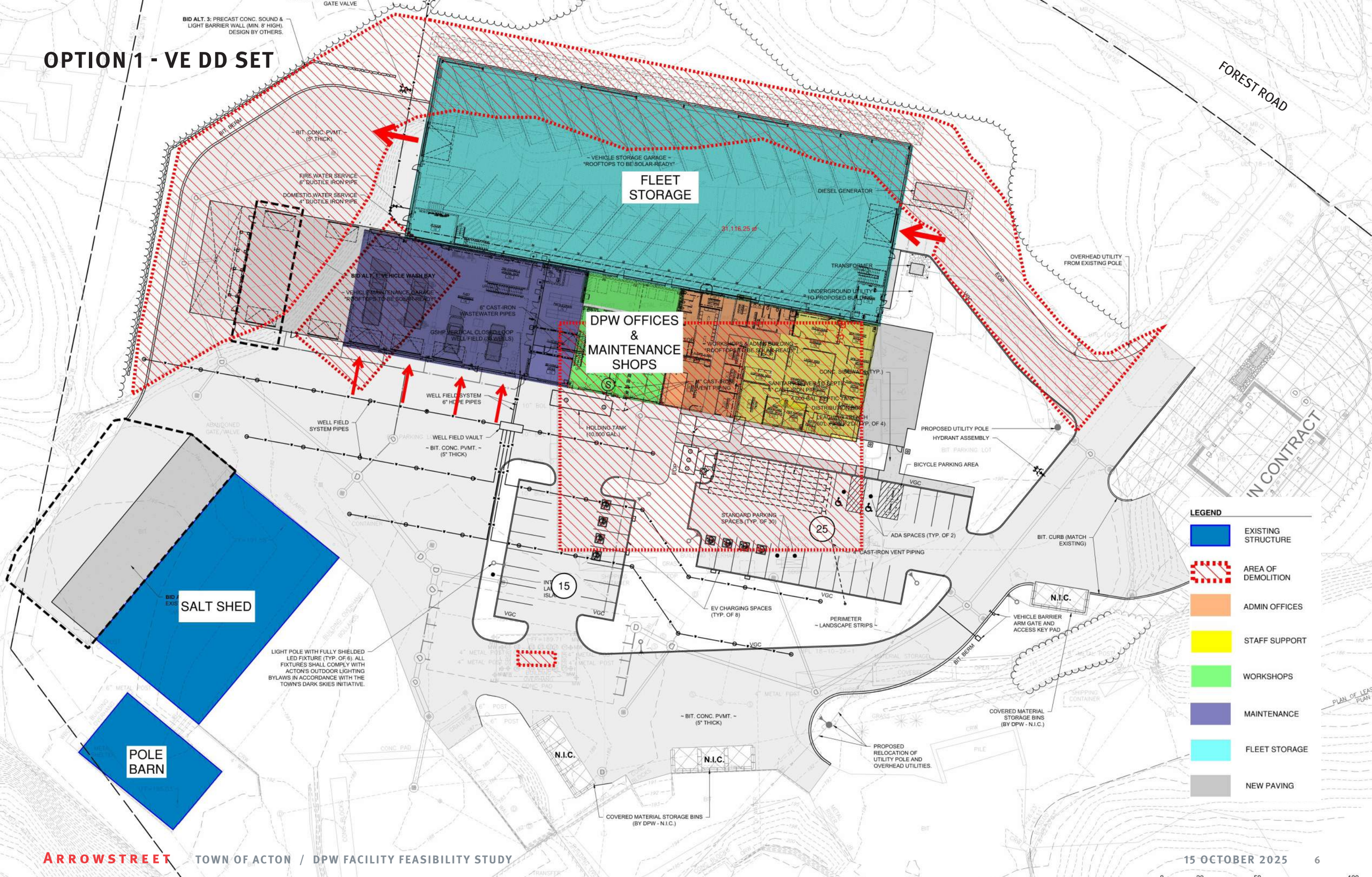
NEXT STEPS

The way to cut costs further for the project is to reduce the building area. Consideration should be given towards studying further reduction in program area within each of the options; for example, could less vehicles be stored in the fleet storage building? We did not consider reductions in staff as the department explained that having the tree and engineering departments in the same building helped to improve work communication and productivity. Consideration for work-share space and less workshop area could be looked at, although the savings would not be significant (potentially $1M range) to make a difference in comparing the conceptual options to each other. Furthermore, Options 1, 3, 4A, and 4B all increase the building area to the extent that Level 3 Alterations are triggered and it is highly unlikely to be able to reduce the work area to avoid this. As a result, costly structural upgrades are required.

CONCEPT OPTIONS

- OPTION 1 - VE 40% DD SET
- OPTION 2 - RENO
- OPTION 3 - RENO + NEW ATTACHED FLEET ADDITION
- OPTION 4A - RENO + NEW FLEET BUILDING
- OPTION 4B - RENO + NEW ADMIN/SUPPORT/MAINT. BUILDING

OPTION 1 - VE DD SET



OPTION 1 - VE DD SET

LEGEND

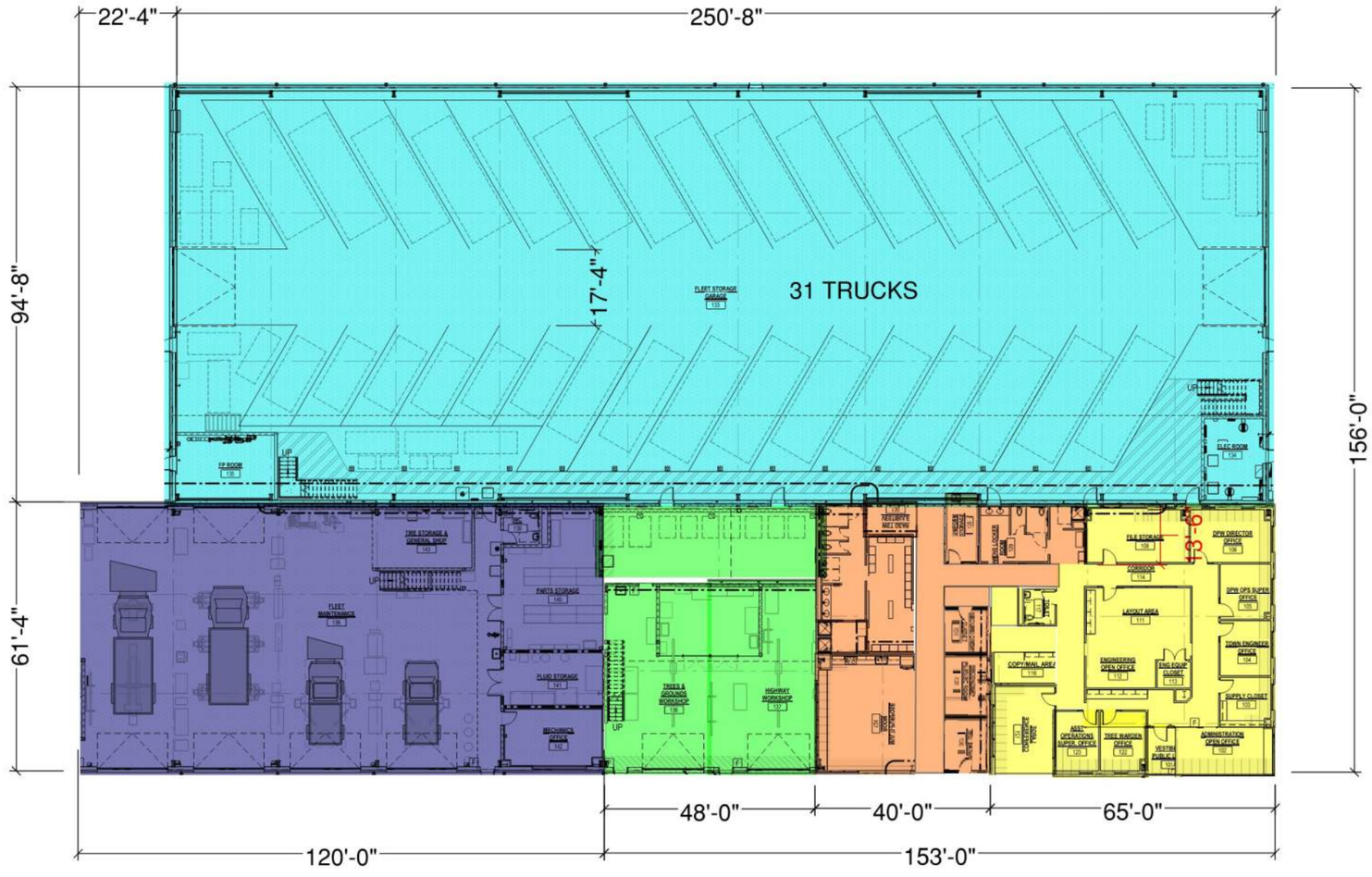
- EXISTING STRUCTURE
- AREA OF DEMOLITION
- ADMIN OFFICES
- STAFF SUPPORT
- WORKSHOPS
- MAINTENANCE
- FLEET STORAGE
- NEW PAVING

SUMMARY OF SCOPE

- Approx. 10% reduction in the W&S DD design building area
- Fleet Storage: maintains W&S DD design

CONSTRAINTS

- Of viable options, highest cost/sf and least cost savings: 13.4% project cost reduction from the W&S DD Design
- Requires temporary staff and operations relocations

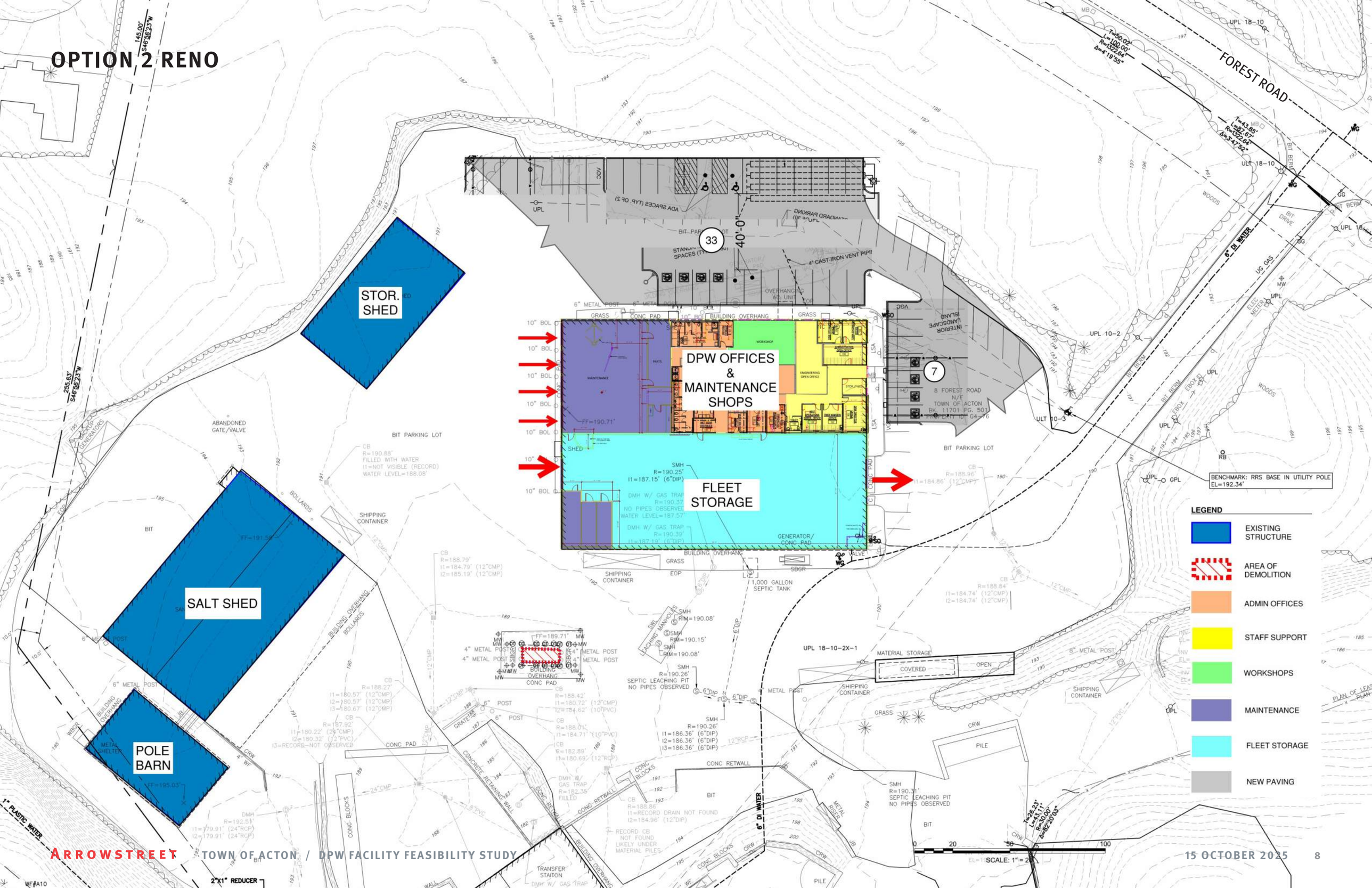


0' 8' 16'

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

TOTAL AREA = 40,641 GSF

OPTION 2 RENO



OPTION 2 RENO

LEGEND

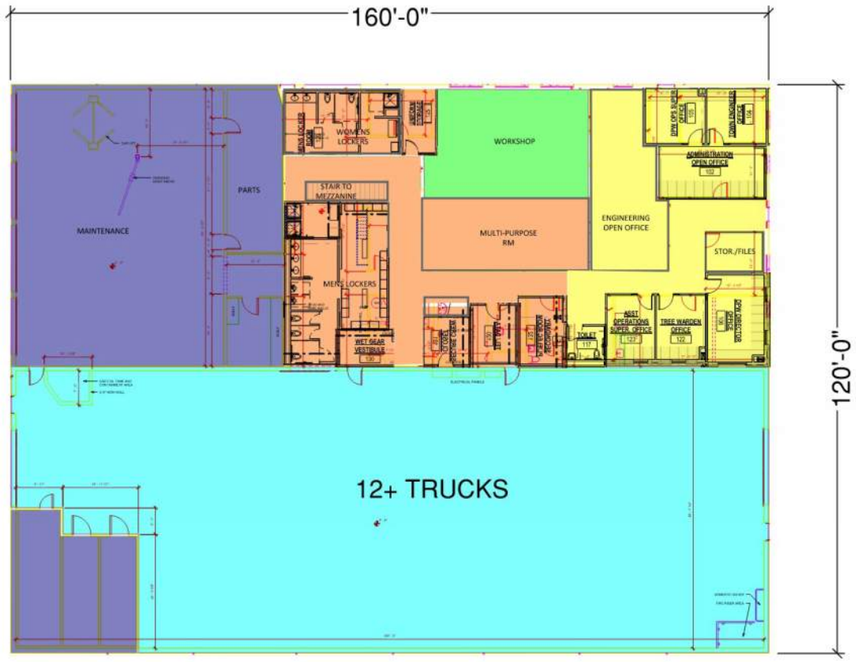
- EXISTING STRUCTURE
- AREA OF DEMOLITION
- ADMIN OFFICES
- STAFF SUPPORT
- WORKSHOPS
- MAINTENANCE
- FLEET STORAGE
- NEW PAVING

SUMMARY OF SCOPE

- Renovation of the existing building (limited to 30% area) to include:
  - structural upgrades
  - repairs to the exterior envelope
  - accessible upgrades
  - refurbishment of all interior spaces
  - new electric HVAC system, lighting, and plumbing for all spaces

CONSTRAINTS

- Does not meet program needs
- Meets code minimums required for structural and accessibility upgrades
- Requires temporary staff and operations relocations

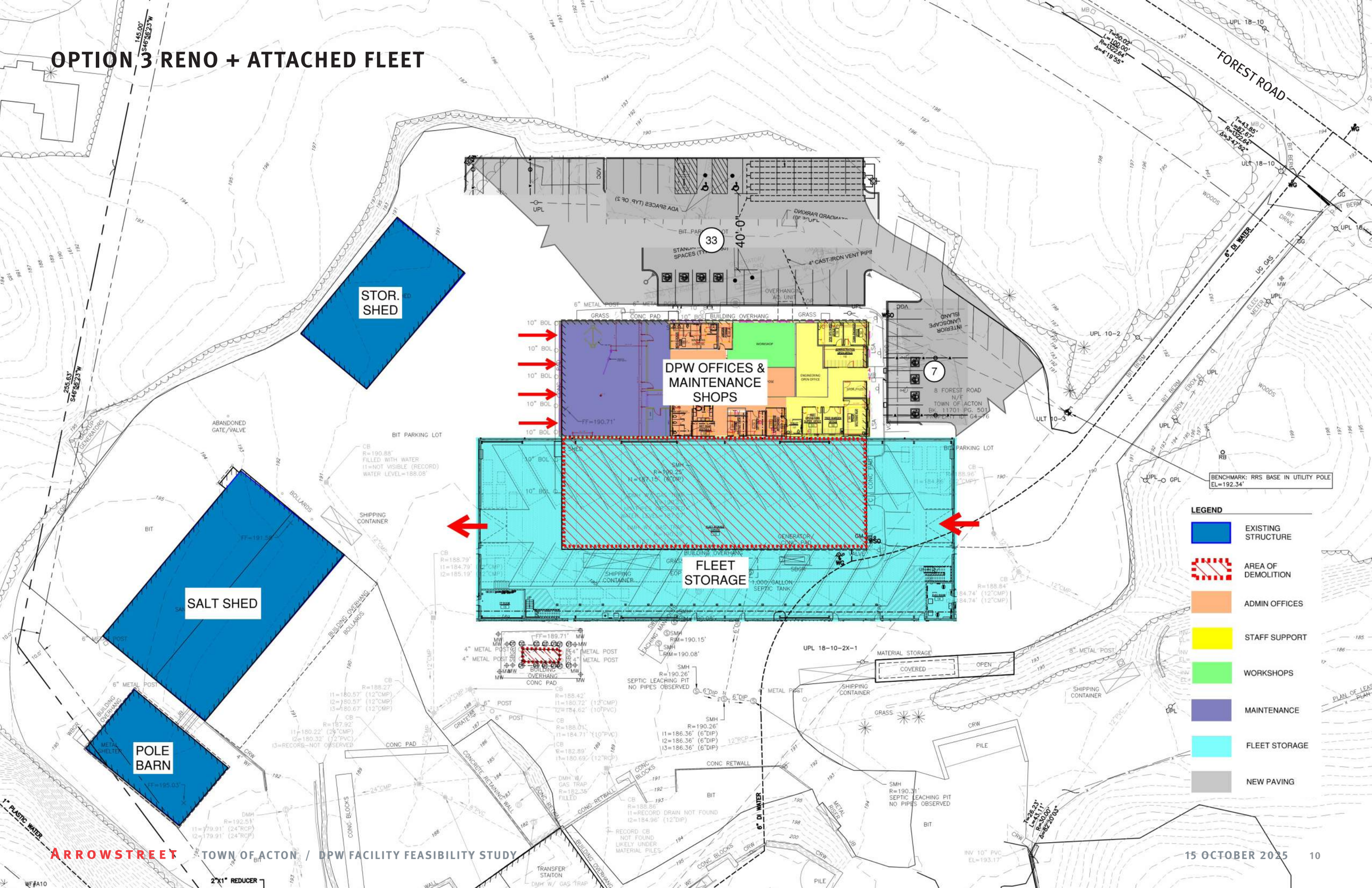


0' 8' 16'

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

TOTAL AREA = 19,200 GSF

OPTION 3 RENO + ATTACHED FLEET



OPTION 3 RENO + ATTACHED FLEET

LEGEND

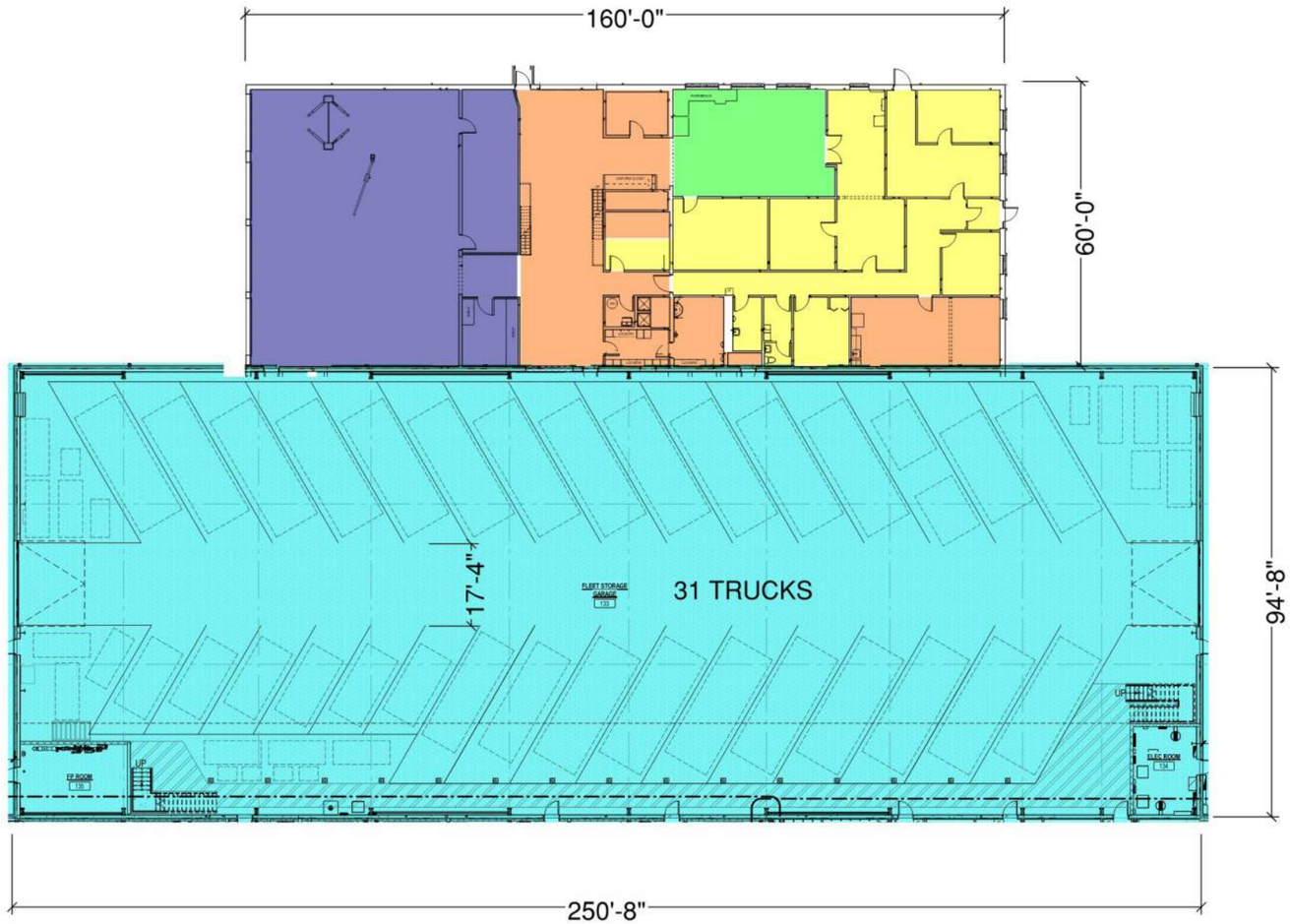
- EXISTING STRUCTURE
- AREA OF DEMOLITION
- ADMIN OFFICES
- STAFF SUPPORT
- WORKSHOPS
- MAINTENANCE
- FLEET STORAGE
- NEW PAVING

SUMMARY OF SCOPE

- Renovation of the northern half of the building to include
  - structural upgrades
  - repairs to the exterior envelope
  - accessible upgrades
  - refurbishment of all interior spaces
  - new electric HVAC system, lighting, and plumbing for all spaces
- Replaces the southern half with a new fleet storage - addition to match size and layout of W&S DD design

CONSTRAINTS

- Requires most structural upgrades and complexity to add the attached addition
- Does not meet program needs for operations and staff and does not include a wash station
- Requires temporary staff and operations relocations

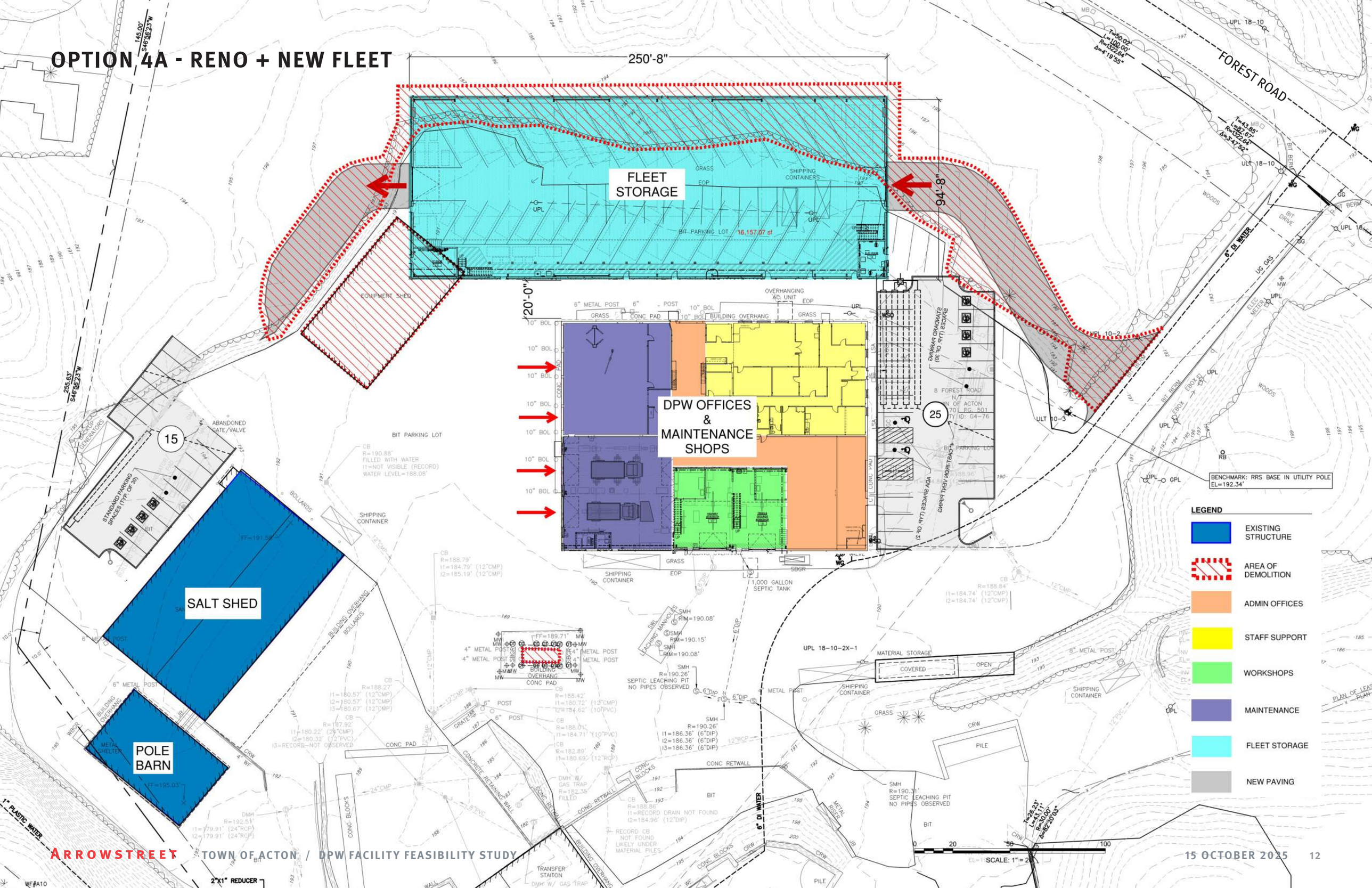


0' 8' 16'

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

TOTAL AREA = 33,497 GSF

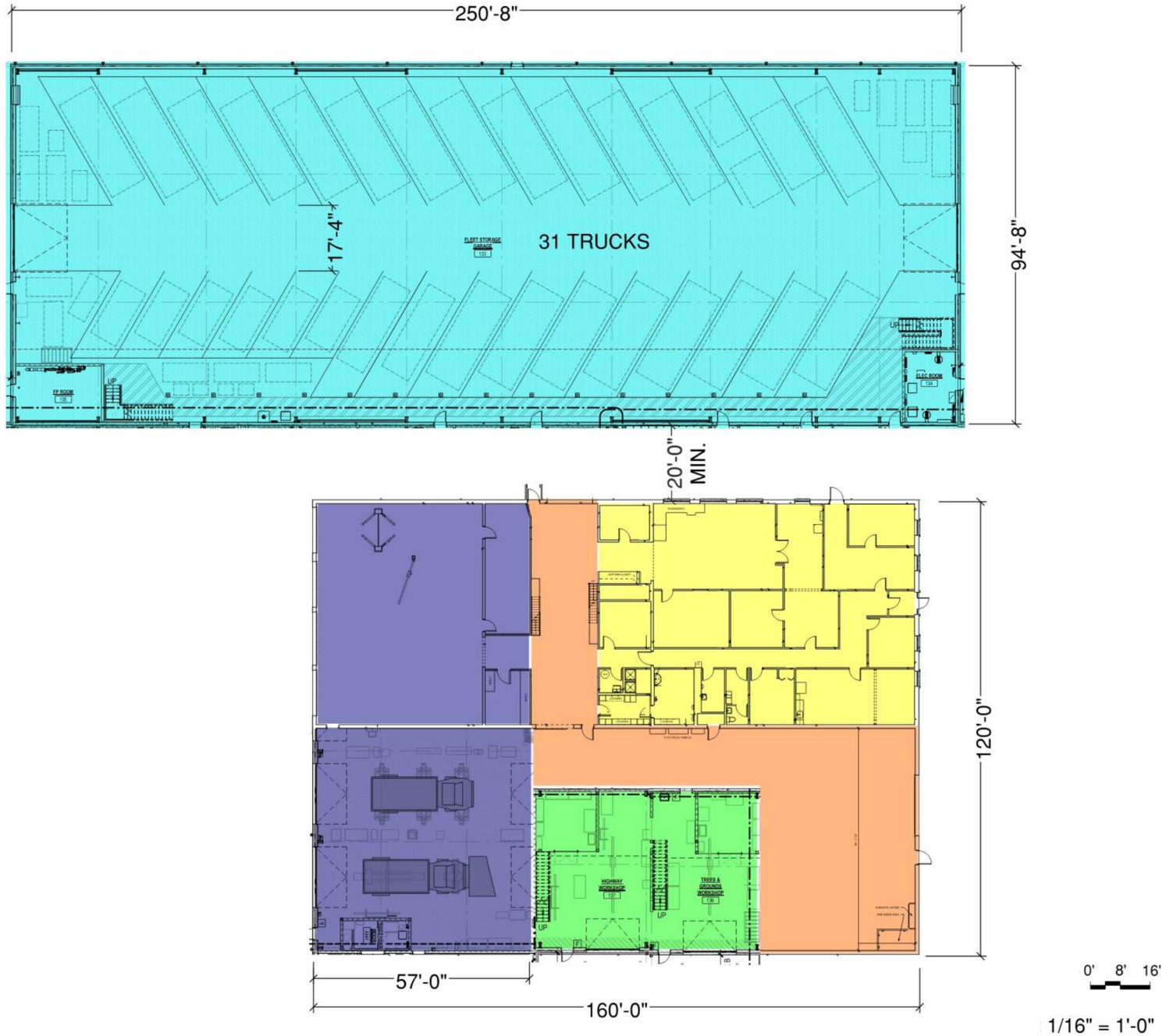
OPTION 4A - RENO + NEW FLEET



OPTION 4A - RENO + NEW FLEET

LEGEND

- EXISTING STRUCTURE
- AREA OF DEMOLITION
- ADMIN OFFICES
- STAFF SUPPORT
- WORKSHOPS
- MAINTENANCE
- FLEET STORAGE
- NEW PAVING



TOTAL AREA = 43,097 GSF

SUMMARY OF SCOPE

- New fleet storage building to match size and layout as W&S DD design
- Renovation of the existing Maintenance/ Support/Admin spaces with an expansion into the Fleet Storage space; includes:
  - structural upgrades
  - repairs to the exterior envelope
  - insulation at walls/roof and replacement windows
  - accessible upgrades
  - refurbishment of all interior spaces
  - new electric HVAC system, lighting, and plumbing for all spaces

CONSTRAINTS

- Renovated building will be less energy efficient

OPTION 4B - RENO + NEW ADMIN/SUPPORT/MAINT.

DPW OFFICES & MAINTENANCE SHOPS

FLEET STORAGE (18 TRUCKS)

SALT SHED

POLE BARN

FUTURE FLEET STORAGE

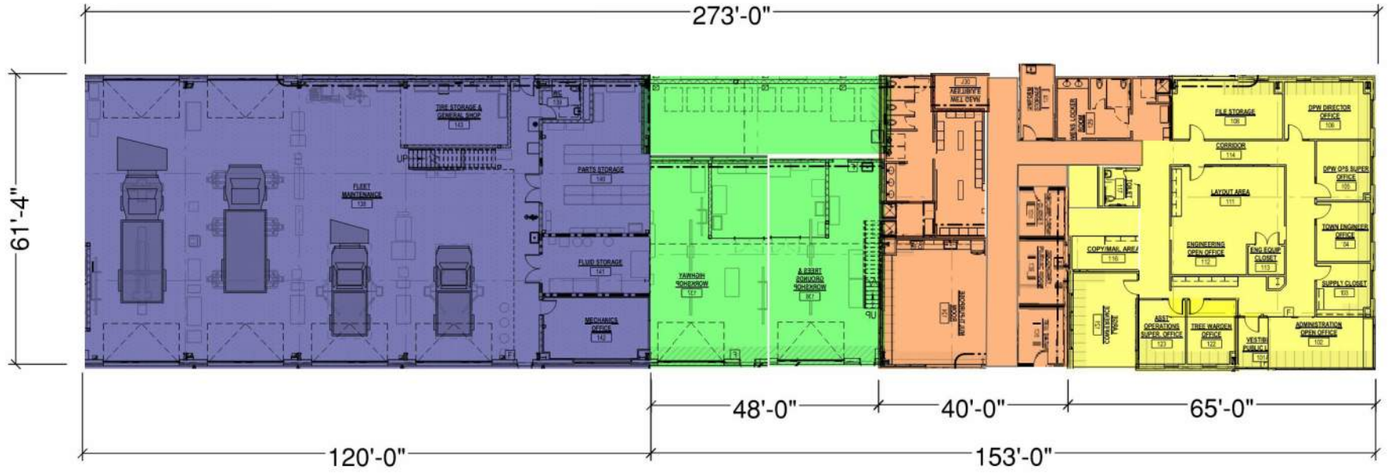
LEGEND

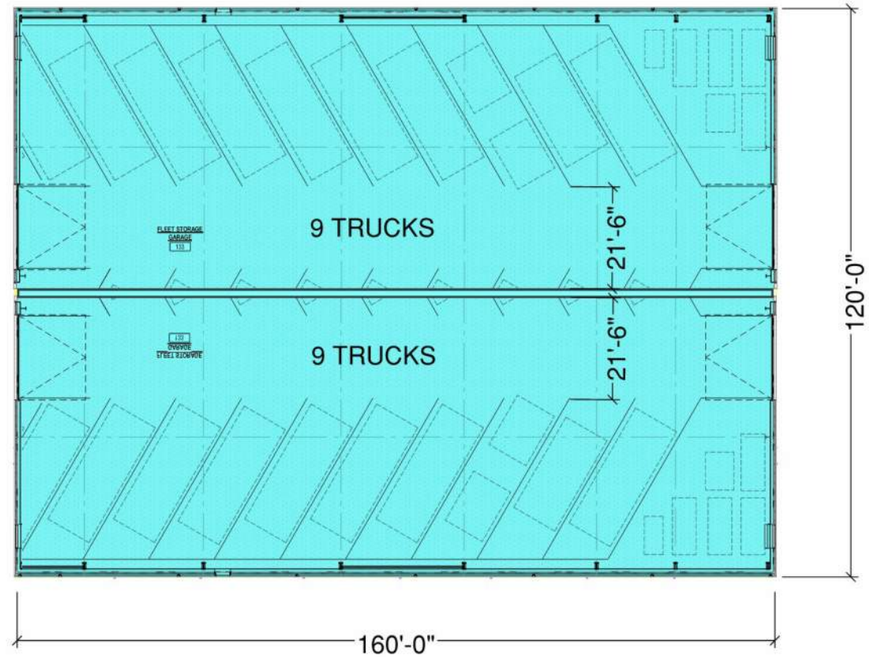
- EXISTING STRUCTURE
- AREA OF DEMOLITION
- ADMIN OFFICES
- STAFF SUPPORT
- WORKSHOPS
- MAINTENANCE
- FLEET STORAGE
- NEW PAVING

OPTION 4B - RENO + NEW ADMIN/SUPPORT/MAINT.

LEGEND

- EXISTING STRUCTURE
- AREA OF DEMOLITION
- ADMIN OFFICES
- STAFF SUPPORT
- WORKSHOPS
- MAINTENANCE
- FLEET STORAGE
- NEW PAVING





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

TOTAL AREA = 37,523 GSF

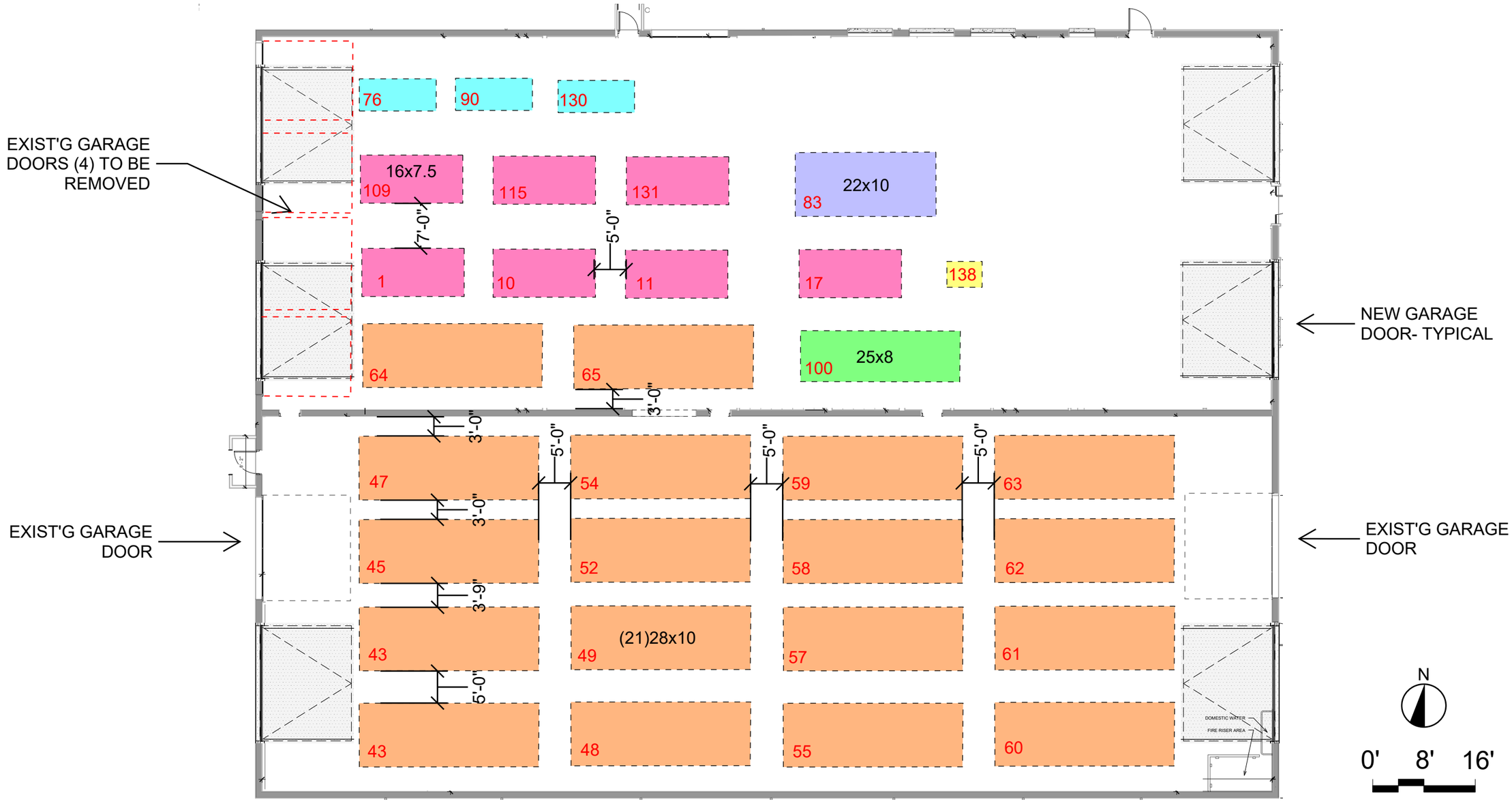
SUMMARY OF SCOPE

- Approx. 10% reduction in the W&S DD design building area
- Existing building is converted to all Fleet storage; includes:
  - structural upgrades
  - repairs to the exterior envelope
  - insulation at walls/roof and replacement windows
  - new electric HVAC system, lighting, and plumbing

CONSTRAINTS

- Needs for truck storage not met, but room for future right-sized new fleet building and possible future wash station
- Limited openings allowed in demising load bearing wall
- Alt layout can fit winter fleet but requires extensive structural work

OPTION 4B - RENO + NEW ADMIN/SUPPORT/MAINT. - ALTERNATE FLEET STORAGE



NOTES:
1. Vehicle numbers represent the winter fleet as marked in the Vehicle Inventory List received from the DPW on 8/7/25
2. Colored blocks represent vehicle space from the 40% DD Weston & Sampson drawings
3. For new garage door openings, extensive CMU reinforcement or steel bracing will be required to maintain lateral bracing on the east and west walls.
4. Two to three brace frames would be needed to replace the center CMU load bearing wall. It will be labor intensive work to resupport the existing roof joists.
5. This alternate has not been priced yet.

OPTIONS ANALYSIS

- » CONCEPTUAL ESTIMATES
- » PROGRAM AREA COMPARISONS
- » ENERGY & EMISSIONS
- » SCORES

OPTION ESTIMATES SUMMARY

CONCEPT OPTIONS	CONSTR ESTIMATE	AREA	$/SF	PROJECT ESTIMATE
40% DD (3/27/25 Estim.)	$29,791,811	44,872 GSF	$664/SF	$39,783,199
Option 1: VE New	$27,551,084	40,641 GSF	$678/SF	$34,438,855
Option 2: Reno Existing	$8,815,200	19,200 GSF	$459/SF	$11,019,000
Option 3: Reno + Attached Fleet Storage	$22,651,925	33,497 GSF	$676/SF	$28,314,906
Option 4A: Reno + New Fleet Storage	$27,041,129	43,097 GSF	$627/SF	$33,801,411
Option 4B: Reno + New Admin/Maint	$23,780,436	37,523 GSF	$634/SF	$29,725,545

NOTES:

1. 6% escalation of Construction Estimate assumed for Aug. '27 construction start, included in Project Estimates
2. Project Estimates based on 125% of Construction Estimate
3. Alt. Fleet Storage w/ added garage door openings not included in estimate of Option 4B
4. Refer to Appendix for Cost Estmates of each Option concept

OPTION PROGRAM AREA COMPARISON

OPTION	FLEET STORAGE AREA	ADMIN. AREA	STAFF SUPPORT AREA	WORKSHOPS AREA	MAINT. AREA	WASH STATION	MEZZANINE STORAGE *(not included in GSF)*	TOTAL GSF	% GSF Reduction from DD
40% DD (3/27/25 Estim.)	23,897	4,677	3,268	3,502	7,893	1,635	*8,350*	44,872	
Option 1: VE New	23,897	3,690	2,750	2,944	7,360	0	*8350*	40,641	9%
Option 2: Reno Existing	8,867	2,363	3,000	792	4,178	0	*1000*	19,200	
Option 3: Reno + Attached Fleet Storage	23,897	2,363	3,000	792	3,445	0	*7,000*	33,497	25%
Option 4A: Reno + New Fleet Storage	23,897	5,060	4,570	2,650	6,920	0	*7,000*	43,097	4%
Option 4B: Reno + New Admin/Maint	19,200	4,864	3,492	2,840	7,127	0	*3,350*	37,523	16%

ENERGY & EMISSIONS SUMMARY

	Option	Energy Use Intensity (EUI)	Annual Energy Use	Carbon Emissions Intensity (CEI)	Annual Emissions
		kBtu/sf/yr	kWh/yr	kgCO2e/sf/yr	MTCO2e/yr
all new	W&S DD	50	658	3.7	164
all new	1	50	596	3.7	148
reno	2	67	377	4.9	94
office reno, fleet new	3	63	619	4.6	154
office reno, fleet new	4A	63	796	4.6	198
office new, fleet reno	4B	56	616	4.1	153
Existing Building (no reno)		71	651	3.3	123

Existing bldg shown for referrence only. The options, except Option 2, are about double the SF of the existing building and are not appropriate to compare annual numbers to.

OPTION SCORES

OPTION SCORES		40% DD 3/27/25 Estim. + 3/28/25 Dwgs.	SCORE	OPTION 1: VE of 40% DD New Bldg	SCORE	OPTION 2: Reno Existing	SCORE	OPTION 3: Reno + Attached Fleet Storage	SCORE	OPTION 4A: Reno + New Fleet Storage	SCORE	OPTION 4B: Reno + New Admin/Maint	SCORE
PROJECT COST	CONST + INDIR.**	$39,783,199	0	$34,438,855	2	$11,019,000	5	$28,314,906	4	$33,801,411	3	$29,725,545	4
	AREA	44,872 SF	5	40,641 SF	4	19,200 SF	0	33,977 SF	3	43,097 SF	5	37,523 SF	4
	CONSTR COST/SF	$664		$678		$459		$676		$627		$634	
PROGRAM	FLEET STORAGE	31 Veh.	5	31 veh.	5	12 +/- veh.	1	31 veh.	5	31 veh.	5	18 veh.	3
	ADMIN.		5	Shared kit, conf rms	4	Reno only	1	Reno only	1	Reno + Expansion	4	Shared kit, conf rms	4
	STAFF SUPPORT		5	Slightly reduced area	4	Reno only	1	Reno only	1	Reno + Expansion	5	Slightly reduced area	4
	WORKSHOPS		5	Slightly reduced area	4	Reno only	1	Reno only	1	Reno + Expansion	4	Slightly reduced area	4
	MAINTENANCE		5	Same as 40% DD	5	Reno only	1	Reno only	1	Reno + Expansion	5	Same as 40% DD	5
	MEZZANINE STOR.		5	Same as 40% DD	5	Reno only	1	Reno + New	4	Reno + New	4	In new Bldg only	3
	WASH STATION	Alt. for future	5	Alt. for future	5	Reno only	0		0		0		0
	SUBTOTAL		35		32		6		13		27		23
SITE	PARKING	40 spaces	5	40 spaces	5	40 spaces	5	40 spaces	5	40 spaces	5	35 spaces	4
	CIRCULATION		5		4		2		4		4		4
	ABUTTER IMPACTS	Operations shielded	5	Operations shielded	5	Operations exposed	0	Operations exposed	0	Operations shielded	5	Operations shielded	5
	SUBTOTAL		15		14		7		9		14		13
ENERGY IMPROVEMENTS	ENVELOPE	New	5	New	5	Replace	1	Replace/New	3	Replace/New	3	Replace/New	3
	EUI	50	5	50	5	67	1	63	2	63	1	56	4
	SUBTOTAL		10		10		2		5		4		7
SCHEDULE/PHASING		Req. relocations	0	Req. relocations	0	Req. relocations		Can be phased	5	Can be phased	5	Can be phased	5
TOTAL SCORE			**65**		**62**		**20**		**39**		**58**		**56**

NOTES:
1. 31 vehicles includes winter fleet
2. Wash Station not included in concept option areas
3. Parking: provides separate parking for staff and visitors, meets # of spaces per W&S Study
4. Circulation: provides operational efficiency for DPW fleet
5. Abutter Impacts: minimizes noises in to neighborhood
6. EUI for Option 4A is lower than existing building; however because of the renovation, the annual energy use is actually higher than the existing building

** Includes 6% Escalation for Aug '27 start (Note: 40% DD Proj. Cost estimate from 3/25 was $37,995,690)

OPTION SCORES

OPTION SCORES		40% DD 3/27/25 Estim. + 3/28/25 Dwgs.	SCORE	OPTION 1: VE of 40% DD New Bldg	SCORE	OPTION 2: Reno Existing	SCORE	OPTION 3: Reno + Attached Fleet Storage	SCORE	OPTION 4A: Reno + New Fleet Storage	SCORE	OPTION 4B: Reno + New Admin/Maint	SCORE
PROJECT COST	CONST + INDIR.**	$39,783,199	0	$34,438,855	2	$11,019,000	5	$28,314,906	4	$33,801,411	3	$29,725,545	4
	AREA	44,872 SF	5	40,641 SF	4	19,200 SF	0	33,977 SF	3	43,097 SF	5	37,523 SF	4
	COST/SF	$664		$678		$459		$676		$627		$634	
PROGRAM	FLEET STORAGE	31 Veh.	5	31 veh.	5	12 +/- veh.	1	31 veh.	5	31 veh.	5	18 veh.	3
	ADMIN.		5	Shared kit, conf rms	4	Reno only	1	Reno only	1	Reno + Expansion	4	Shared kit, conf rms	4
	STAFF SUPPORT		5	Slightly reduced area	4	Reno only	1	Reno only	1	Reno + Expansion	5	Slightly reduced area	4
	WORKSHOPS		5	Slightly reduced area	4	Reno only	1	Reno only	1	Reno + Expansion	4	Slightly reduced area	4
	MAINTENANCE		5	Same as 40% DD	5	Reno only	1	Reno only	1	Reno + Expansion	5	Same as 40% DD	5
	MEZZANINE STOR.		5	Same as 40% DD	5	Reno only	1	Reno + New	4	Reno + New	4	In new Bldg only	3
	WASH STATION	Alt. for future	5	Alt. for future	5		0		0		0		0
	SUBTOTAL		35		32		6		13		27		23
SITE	PARKING	40 spaces	5	40 spaces	5	40 spaces	5	40 spaces	5	40 spaces	5	35 spaces	4
	CIRCULATION		5		4		2		4		4		4
	ABUTTER IMPACTS	Operations shielded	5	Operations shielded	5	Operations exposed	0	Operations exposed	0	Operations shielded	5	Operations shielded	5
	SUBTOTAL		15		14		7		9		14		13
ENERGY IMPROVEMENTS	ENVELOPE	New	5	New	5	Replace	1	Replace/New	3	Replace/New	3	Replace/New	3
	EUI	50	5	50	5	67	1	63	2	63	1	56	4
	SUBTOTAL		10		10		2		5		4		7
SCHEDULE/PHASING		Req. relocations	0	Req. relocations	0	Req. relocations	0	Can be phased	5	Can be phased	5	Can be phased	5
TOTAL SCORE			**65**		**62**		**20**		**39**		**58**		**56**

NOTES:
1. 31 vehicles includes winter fleet
2. Wash Station not included in concept option areas
3. Parking: provides separate parking for staff and visitors, meets # of spaces per W&S Study
4. Circulation: provides operational efficiency for DPW fleet
5. Abutter Impacts: minimizes noises in to neighborhood
6. EUI for Option 4A is lower than existing building; however because of the renovation, the annual energy use is actually higher than the existing building

** Includes 6% Escalation for Aug '27 start (Note: 40% DD Proj. Cost estimate from 3/25 was $37,995,690)

APPENDICES

- » ENERGY & EMISSION BY OPTION
- » ARCHITECTURAL NARRATIVE
- » STRUCTURAL NARRATIVE
- » MEP NARRATIVE
- » COST ESTIMATES

ENERGY & EMISSIONS BY OPTION

W&S 40%DD

	Annual Energy Use			Energy Use Intensity (EUI)
	Electricity (MWh/yr)	Natural Gas (MMBtu/yr)	Total (MWh/yr)	(kBtu/sf/yr)
Baseline Case	66	1,996	651	71.0
Design Case	658	0	658	50.0
Delta	-592	1,996	-7	21.0
Percent Delta	**-901%**	**100%**	**-1%**	**30%**

		Annual GHG Emissions			GHG Intensity (CEI)
		Electricity (MTCo2e/yr)	Natural Gas (MTCo2e/yr)	Total (MTCo2e/yr)	(kg CO2e/sf/yr)
2025 emissions factors	Baseline Case	16	106	123	2.7
	Design Case	164	0.0	164	3.7
	Delta	-148	106	-41	-0.9
	Percent Delta	**-901%**	**100%**	**-34%**	**-34%**
predicted 2035 emissions factors	Baseline Case	12	106	118	2.6
	Design Case	117	0.0	117	2.6
	2035 Delta	-106	106	1	0.0
	2035 Percent Delta	**-901%**	**100%**	**1%**	**1%**

OPTION 1

	Annual Energy Use			Energy Use Intensity (EUI)
	Electricity (MWh/yr)	Natural Gas (MMBtu/yr)	Total (MWh/yr)	(kBtu/sf/yr)
Baseline Case	66	1,996	651	71.0
Design Case	596	0	596	50.0
Delta	-530	1,996	55	21.0
Percent Delta	**-807%**	**100%**	**8%**	**30%**

		Annual GHG Emissions			GHG Intensity (CEI)
		Electricity (MTCo2e/yr)	Natural Gas (MTCo2e/yr)	Total (MTCo2e/yr)	(kg CO2e/sf/yr)
2025 emissions factors	Baseline Case	16	106	123	3.0
	Design Case	148	0.0	148	3.7
	Delta	-132	106	-26	-0.6
	Percent Delta	**-807%**	**100%**	**-21%**	**-21%**
predicted 2035 emissions factors	Baseline Case	12	106	118	2.9
	Design Case	106	0.0	106	2.6
	2035 Delta	-94	106	12	0.3
	2035 Percent Delta	**-807%**	**100%**	**10%**	**10%**

BASELINE REPRESENTS THE EXISTING 19,200 SF BUILDING BASED ON 2023 UTILITY DATA

ENERGY & EMISSIONS BY OPTION

OPTION 2

	Annual Energy Use			Energy Use Intensity (EUI)
	Electricity (MWh/yr)	Natural Gas (MMBtu/yr)	Total (MWh/yr)	(kBtu/sf/yr)
Baseline Case	66	1,996	651	71.0
Design Case	377	0	377	67.0
Delta	-311	1,996	274	4.0
Percent Delta	**-474%**	**100%**	**42%**	**6%**

		Annual GHG Emissions			GHG Intensity (CEI)
		Electricity (MTCo2e/yr)	Natural Gas (MTCo2e/yr)	Total (MTCo2e/yr)	(kg CO2e/sf/yr)
2025 emissions factors	Baseline Case	16	106	123	6.4
	Design Case	94	0.0	94	4.9
	Delta	-78	106	29	1.5
	Percent Delta	**-474%**	**100%**	**23%**	**23%**
predicted 2035 emissions factors	Baseline Case	12	106	118	6.1
	Design Case	67	0.0	67	3.5
	2035 Delta	-55	106	51	2.6
	2035 Percent Delta	**-474%**	**100%**	**43%**	**43%**

OPTION 3

	Annual Energy Use			Energy Use Intensity (EUI)
	Electricity (MWh/yr)	Natural Gas (MMBtu/yr)	Total (MWh/yr)	(kBtu/sf/yr)
Baseline Case	66	1,996	651	71.0
Design Case	619	0	619	63.1
Delta	-553	1,996	32	7.9
Percent Delta	**-842%**	**100%**	**5%**	**11%**

		Annual GHG Emissions			GHG Intensity (CEI)
		Electricity (MTCo2e/yr)	Natural Gas (MTCo2e/yr)	Total (MTCo2e/yr)	(kg CO2e/sf/yr)
2025 emissions factors	Baseline Case	16	106	123	3.7
	Design Case	154	0.0	154	4.6
	Delta	-138	106	-32	-0.9
	Percent Delta	**-842%**	**100%**	**-26%**	**-26%**
predicted 2035 emissions factors	Baseline Case	12	106	118	3.5
	Design Case	110	0.0	110	3.3
	2035 Delta	-99	106	8	0.2
	2035 Percent Delta	**-842%**	**100%**	**6%**	**6%**

ENERGY & EMISSIONS BY OPTION

OPTION 4A

	Annual Energy Use			Energy Use Intensity (EUI)
	Electricity (MWh/yr)	Natural Gas (MMBtu/yr)	Total (MWh/yr)	(kBtu/sf/yr)
Baseline Case	66	1,996	651	71.0
Design Case	796	0	796	63.0
Delta	-730	1,996	-145	8.0
Percent Delta	**-1111%**	**100%**	**-22%**	**11%**

		Annual GHG Emissions			GHG Intensity (CEI)
		Electricity (MTCo2e/yr)	Natural Gas (MTCo2e/yr)	Total (MTCo2e/yr)	(kg CO2e/sf/yr)
2025 emissions factors	Baseline Case	16	106	123	2.8
	Design Case	198	0.0	198	4.6
	Delta	-182	106	-76	-1.8
	Percent Delta	**-1111%**	**100%**	**-62%**	**-62%**
predicted 2035 emissions factors	Baseline Case	12	106	118	2.7
	Design Case	142	0.0	142	3.3
	2035 Delta	-130	106	-24	-0.6
	2035 Percent Delta	**-1111%**	**100%**	**-20%**	**-20%**

OPTION 4B

	Annual Energy Use			Energy Use Intensity (EUI)
	Electricity (MWh/yr)	Natural Gas (MMBtu/yr)	Total (MWh/yr)	(kBtu/sf/yr)
Baseline Case	66	1,996	651	71.0
Design Case	616	0	616	56.0
Delta	-550	1,996	35	15.0
Percent Delta	**-838%**	**100%**	**5%**	**21%**

		Annual GHG Emissions			GHG Intensity (CEI)
		Electricity (MTCo2e/yr)	Natural Gas (MTCo2e/yr)	Total (MTCo2e/yr)	(kg CO2e/sf/yr)
2025 emissions factors	Baseline Case	16	106	123	3.3
	Design Case	153	0.0	153	4.1
	Delta	-137	106	-31	-0.8
	Percent Delta	**-838%**	**100%**	**-25%**	**-25%**
predicted 2035 emissions factors	Baseline Case	12	106	118	3.1
	Design Case	110	0.0	110	2.9
	2035 Delta	-98	106	8	0.2
	2035 Percent Delta	**-838%**	**100%**	**7%**	**7%**

ARCHITECTURAL NARRATIVE - OPTIONS

Option 1: 'VE Weston & Sampson DD Building'

- Proposes approx. 10% reduction in the DD building area, simplifies the footprint, maintains parking and site circulation design
- Admin: Maintains all staff offices and program from the W&S design except for removal of Admin. Kitchenette; reduces areas of Vestibules, Large Conference Rm, and Corridors
- Staff Support Area: Reduced areas of Mens & Womens Locker Rooms, and the Multi-Purpose Room.
    - Reduced area of (2) Workshops
    - Vehicle Maintenance area remains as designed but does not include the car wash station; located so that car wash station can be added in the future
- Fleet Storage: no change from DD set

Option 2: 'Renovate Existing Building' – Level 2 Alterations

- Proposes a renovation of the existing building (limited to 30% area) to include structural upgrades, repairs to the exterior envelope, accessible upgrades, and a refurbishment of all interior spaces; refer to Structural narrative for structural scope. Assume all new electric HVAC system, lighting, and plumbing for all spaces. Includes new triple glazed windows and insulation. Restripe asphalt paving to create 40 parking spaces.
- Admin:
    - Demolition of existing bathrooms, Multi-purpose room to create space for Unisex bathroom and three offices
    - Engineering Open Offices, Admin, two offices, vestibule ETR- all new finishes
    - New accessible storefront at Main entry
- Staff Support Area:
    - Demolition of existing Parts storage and mezzanine, staff bathrooms, locker rooms
    - Create new accessible Mens & Womens Locker Rooms, Multi-purpose room, and support/utility rooms (sizes same as in Option 1)
    - Workshop space- paint & clean-up
    - Maintenance & Parts- paint & clean-up
- Fleet Storage: Provide continuous steel curb against south wall

Option 3: 'Renovate 1/2 of Existing Building + New Fleet Storage Addition'- Level 3 Alt.

- Proposes a renovation of the northern half of the building and replacing the southern half with a new, right-sized fleet storage attached addition; this option requires most structural upgrades and complexity to add the attached addition. Assume all new electric HVAC system, lighting, and plumbing for all spaces. Includes new triple glazed windows and insulation. Restripe asphalt paving to create 40 parking spaces.
- Admin:
    - Same as proposed for Option 2
- Staff Support Area:
    - Same as proposed for Option 2
- Fleet Storage: Addition to match size and layout as W&S DD design

ARCHITECTURAL NARRATIVE- OPTIONS

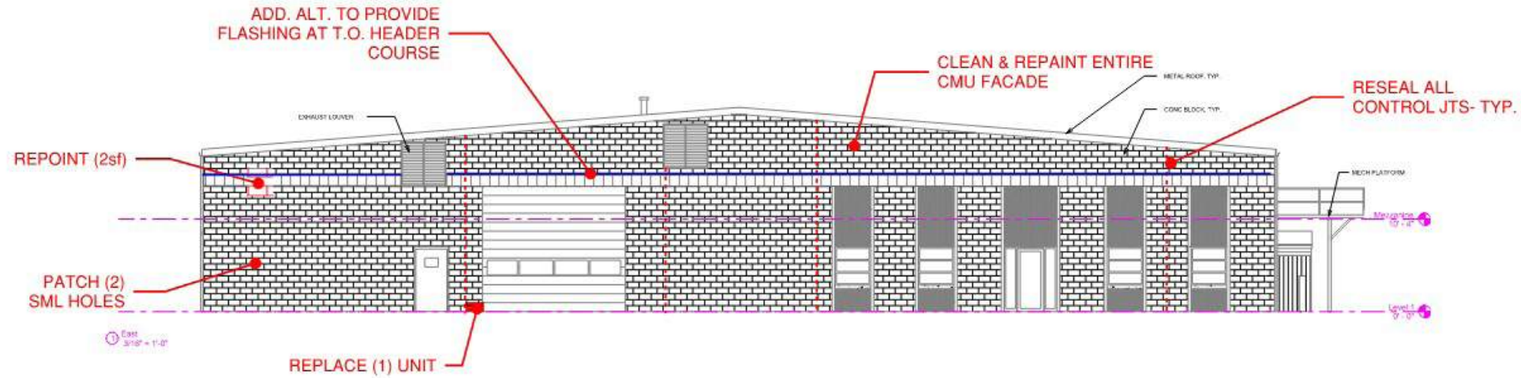
Option 4A: 'Renovate Existing Building + New Fleet Storage Building' – Level 3 Alt.

- Proposes a new, right-sized Fleet storage building, a renovation of the existing Maintenance/Support/Admin spaces with an expansion into the Fleet Storage space. Assume all new electric HVAC system, lighting, and plumbing for all spaces. Includes new triple glazed windows and insulation. Modifications to and new asphalt paving to create 40 parking spaces.
- Admin:
  - Demolition of existing bathrooms and locker rooms, Workshop, and Support spaces.
  - Renovation and expansion of office spaces within the northern half of the building.
- Staff Support Area:
  - Create new staff bathrooms, locker rooms, & support/utility rooms within the existing Fleet Storage space (sizes same as Option 1)
  - Workshop space- retrofit two workshop spaces inside existing Fleet Storage space (sizes sim. to Option 1)
  - Existing Maintenance & parts rooms ETR; retrofit exist'g Fleet Storage space for additional Maintenance shop with 2 bays
- Fleet Storage: New building to match size and layout as W&S DD design
  - Location requires some regrading- mostly fill

Option 4B: 'Renovate Existing Building + New Admin/Maintenance Building'

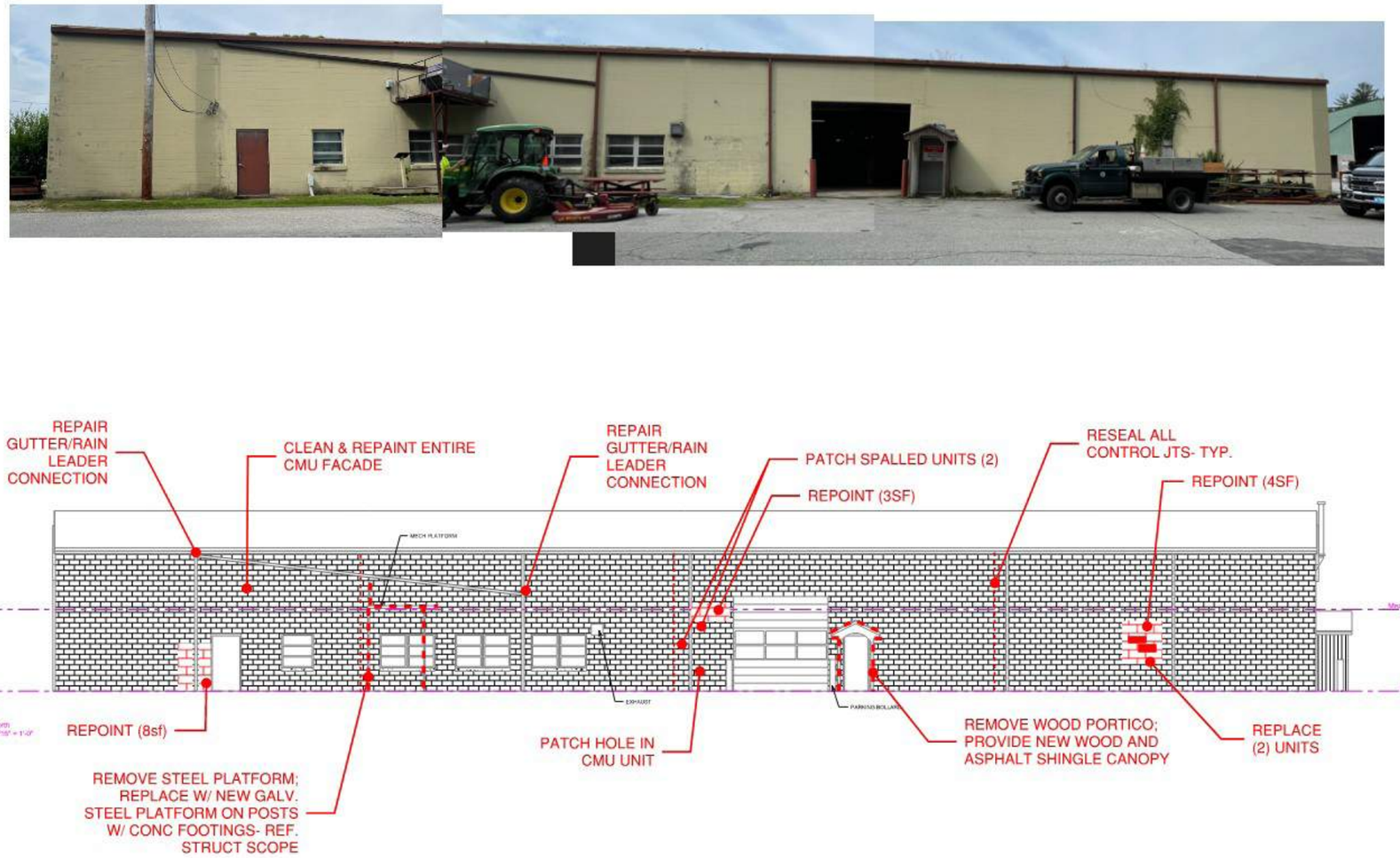
- Proposes a new building for maintenance, staff support, and admin spaces while the existing building is converted to all Fleet storage. Assume all new electric HVAC system, lighting, and plumbing for all spaces. Includes new triple glazed windows and insulation. Modifications to and new asphalt paving to create 40 parking spaces.
- Admin: Maintains all staff offices and program from the W&S design except for removal of Admin. Kitchenette; reduces areas of Vestibules, Large Conference Rm, and Corridors
- Staff Support Area:
  - Reduced areas of Mens & Womens Locker Rooms, and the Multi-Purpose Room.
  - Reduced area of (2) Workshops
  - Vehicle Maintenance area remains as designed but does not include the car wash station; located so that car wash station can be added in the future
- Fleet Storage:
  - Interior of building is completely demolished; patch & repair of existing slab on grade
  - Alterations to east and west walls to remove storefront & Maintenance garage doors; a new larger garage door to be added at each end of northern half.
  - Continuous steel guard rails to run along both north and south walls

ARCHITECTURAL NARRATIVE - EXTERIOR ENVELOPE REPAIRS



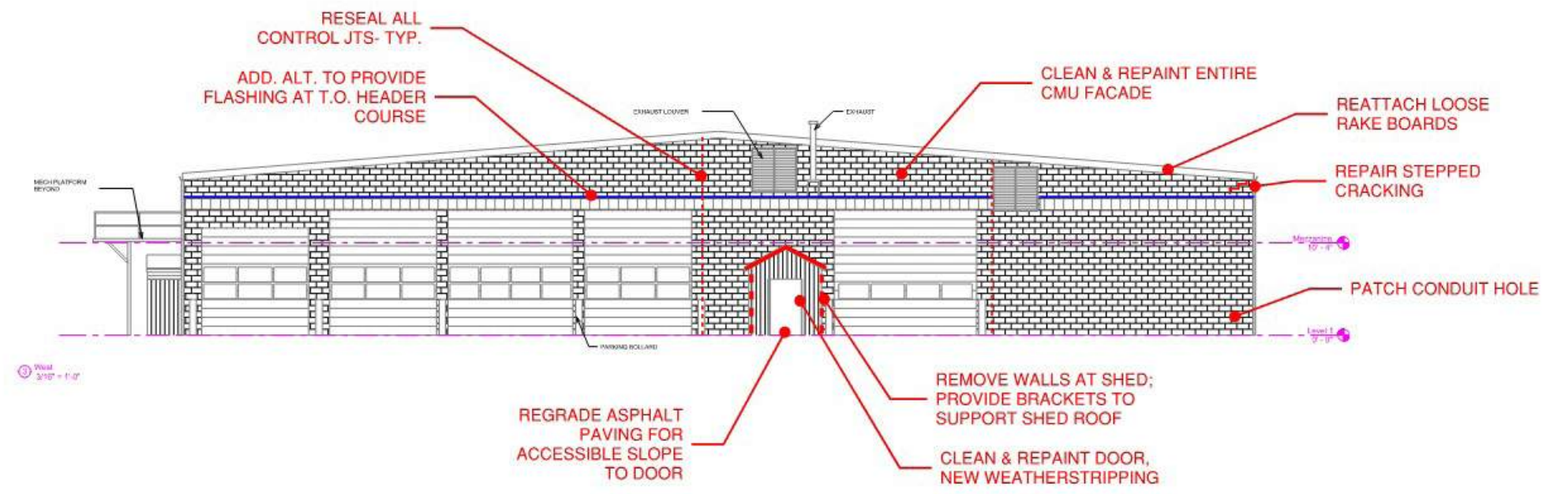
EAST ELEVATION

NOTES:
1. Elevations NTS
2. Repair notes for conceptual pricing only; all areas are approximate



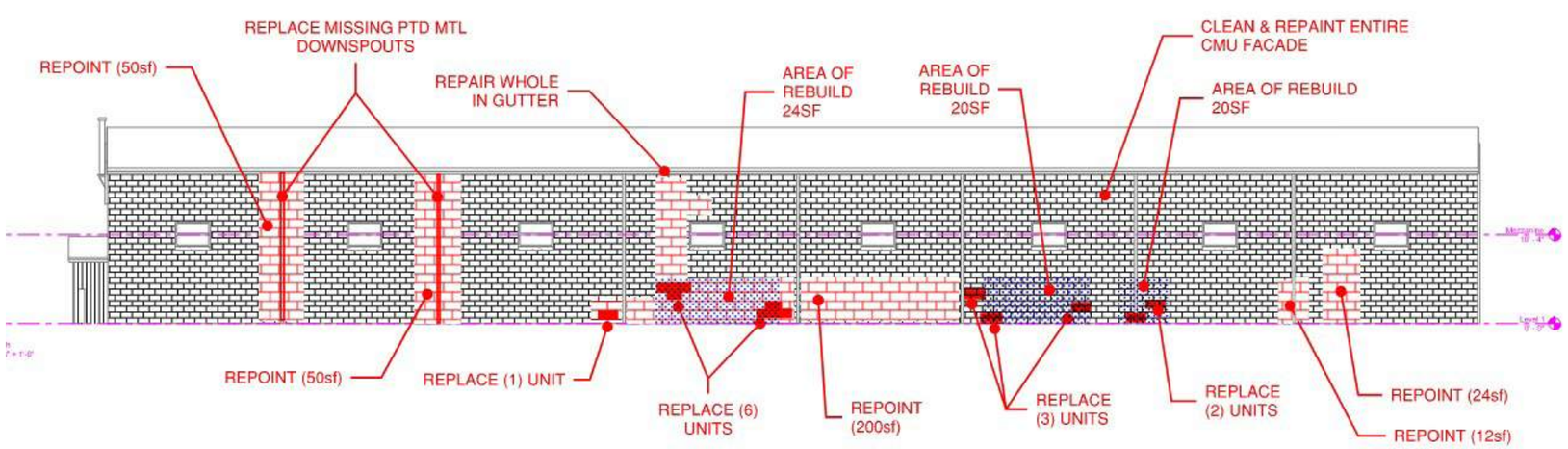
NORTH ELEVATION

NOTES:
1. Elevations NTS
2. Repair notes for conceptual pricing only; all areas are approximate



WEST ELEVATION

NOTES:
1. Elevations NTS
2. Repair notes for conceptual pricing only; all areas are approximate



SOUTH ELEVATION

NOTES:
1. Elevations NTS
2. Repair notes for conceptual pricing only; all areas are approximate

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Acton DPW Building Structural Report

EXISTING CONDITIONS

INTRODUCTION

On July 2nd, 2025, RSE visited the DPW Building in Acton, MA to make observations of the existing building structure. No exploratory probes were performed at this time. All field observations were limited to structure exposed to view. Some structural drawings from the original construction (S-1 and S-2, dated September 1970) were available for reference.

EXISTING CONSTRUCTION

The DPW Building was constructed in 1971. The foundation consists of slab on grade and frost walls. The single-story superstructure consists of steel roof deck on open web steel roof joists that frame into load-bearing CMU walls. Based on available documentation, CMU walls contain horizontal reinforcement, but no vertical reinforcement. There is also a wood framed storage mezzanine.

Photo: Steel joists and roof deck framing into load-bearing CMU walls

There is no explicit lateral system called out in the documentation, but the CMU walls provide lateral resistance to wind and seismic loads.

Primary use of the building is for vehicular storage and maintenance with some office space on the north side of the building.

STRUCTURAL CONDITIONS ASSESSMENT

There were signs of water infiltration, cracking, and impact damage on the existing exterior CMU walls, especially on the south side of the building. The south wall impact damage is most likely due to the large trucks that are stored in that area of the building. The interior CMU load bearing wall running at the center of the building was in better condition.
The steel framing was in overall good condition with no signs of rust or deformation. The wood framed mezzanine level also appeared in good condition, although certain areas appear to be framed improperly or framing has been modified in an unsound manner (joist hangers missing, wood posts that are spliced mid height).

Gutters and downspouts have not been properly maintained leading to deterioration in the exterior CMU walls. The resulting loss of joint mortar led to water infiltration.

Photo: Condition of exterior masonry walls

Photo: Condition of exterior masonry walls

STRUCTURAL NARRATIVE

CODE REVIEW

The existing buildings appears to need maintenance but shows no major signs of structural distress. No repairs are structurally required unless a proposed renovation or addition triggers structural upgrades per the International Existing Building Code (IEBC) 2021 with Massachusetts amendments. The code provides the following classifications:

1. **Level 1 Alterations – minor cosmetic changes such as repainting and changes floor finishes, repointing and selective repair of the existing exterior CMU walls, new MEP equipment.**
    a. Structural elements will be maintained.
    b. Support for new equipment will be designed for current code-mandated loads.
2. **Level 2 Alterations – reconfiguration of walls, changes to any doors or windows.**
    a. Structural elements can remain:
        i. If existing gravity loads are not increased more than 5%, or capacity of structural elements carrying gravity loads is not reduced by more than 5%. Gravity elements include roof rafters, concrete slabs, beams, columns, load-bearing walls, and concrete footings.
        ii. If capacity of existing lateral elements is not reduced by more than 10%. Lateral elements can be assumed to be the masonry shear walls.
    b. Structural elements need to be designed for current IBC 2021 loads:
        i. If the demand/capacity ratio listed above has been exceeded.
        ii. New structural elements
        iii. Voluntarily for the purposes of improving seismic performance.
3. **Level 3 Alterations – work area exceeds 30% of the total roof and floor area.**
    a. Substantial structural alteration requires existing gravity and lateral systems to be designed for current IBC 2021 loads and reduced seismic loads.
4. **Addition – horizontal or vertical addition**
    a. For a horizontal addition with an expansion joint between new and existing, the new structure should be designed for current IBC 2021 loads.
    b. For a horizontal and vertical addition that adds more than 5% gravity load or 10% lateral load to the existing structure, the affected structure should be designed for current IBC 2021 loads. This includes additional snow drift that may occur if a new addition is taller than the existing roof.

RENOVATION OPTIONS

OPTION 1 – CONSTRUCTION OF A NEW DPW BUILDING

This option involves the construction of a new one-story DPW building. See notes below about new construction requirements.

OPTION 2 – LIGHT RENOVATION AND RECONFIGURATION OF THE EXISTING DPW BUILDING

This option will involve minor renovation of the existing building. That level of work will be classified as Level 2 Alterations. Modifications to the CMU walls will stay below threshold to be considered substantial structural alteration. Thereby this option will not require a seismic upgrade. The required modifications to the exterior CMU walls are described in the Repair section below, no additional lateral reinforcement is required in this option.

OPTION 3 – DEMO OF PORTION OF EXISTING BUILDING AND NEW VEHICULAR STRUCTURE

This option will involve demolition of half of the existing building including significant portions of CMU walls and renovation to all of the remaining portion of existing building. That level of work will be classified as Level 3 Alterations. It is expected that this renovation will meet the threshold for substantial structural alterations. A seismic upgrade will be triggered and the lateral system (non-reinforced CMU walls) will need to be reinforced. Reinforcement may include shotcrete or steel strapping to create frames at exterior CMU walls.

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The existing roof joists do not have capacity to support the current snow loads. With this option, the existing roof joists will need to be either reinforced or new joists will need to be added (one additional joist for every existing joist will be required).

For framing requirements of the new addition, see notes below about new construction requirements.

OPTION 4A – MAJOR RENOVATION OF EXISTING BUILDING AND NEW VEHICULAR STRUCTURE

This option with be classified as Level 3 alterations. A seismic upgrade is not triggered due to a limited reduction in masonry shear walls based on an initial structural evaluation. See notes below about required repairs.

See notes below about new construction requirements.

OPTION 4B – MAJOR RENOVATION OF EXISTING BUILDING AND NEW OFFICE STRUCTURE

This option with be classified as Level 3 alterations. A seismic upgrade will be triggered and the lateral system (non-reinforced CMU walls) will need to be reinforced. Reinforcement may include shotcrete or steel strapping to create frames at exterior CMU walls.

See notes below about required repairs.

See notes below about new construction requirements.

REQUIRED REPAIRS

- Repointing and strategic rebuilding of portions of CMU walls where block has been damaged or displaced. See architectural wall elevations for full extent of required repairs.
- Some additional carpentry may be required to reframe and rebuild wood mezzanine elements depending on proposed reconfiguration.
- See options above for lateral reinforcement requirements per option.

NEW ADDITION/BUILDING STRUCTURAL SCOPE

INTRODUCTION

In the options mentioned above, some require the construction of a new one-story addition or a new one-story building. The additions will be separated from the existing building with seismic expansion joints or far enough away from the existing building so as to avoid imposing snow drift loads. The structure for the addition/new building will be designed per the current code adopted by the Commonwealth of Massachusetts, which is the IBC 2021.

FOUNDATIONS

A geotechnical investigation including drilled borings and test pits, will be needed which will provide subsurface recommendations for the foundations. Based on the existing drawings for the existing buildings, it is anticipated that the foundations will consist of reinforced concrete spread footings. In order to avoid underpinning and/or undermining the existing buildings' foundations, the proposed footings should be located offset from the exterior wall by approximately 4 feet. The lowest level will have a 5" slab on grade and the foundation wall will be 20" thick with #5@12" oc.

SUPERSTRUCTURE

The superstructure can be framed with steel columns, steel beams, concrete on metal deck floors, and metal roof deck at the roof. The lateral system will be steel braced frames and ordinary steel moment frames if needed due to space constraints. For pricing assume 13 PSF steel tonnage, plus 10% for connections and 2 PSF for miscellaneous steel such as relieving angles and kickers.

As an alternate, the new building may be pre-engineered steel building.

STRUCTURAL NARRATIVE

STRUCTURAL DESIGN GUIDELINES

DESIGN REFERENCES

- Design will anticipate compliance with 2021 International Building Code
- Risk Category for this building is IV
- Floor live loads:
  - Offices — 40 PSF + 15 PSF partition load
  - Mechanical Spaces — 150 PSF
- Dead loads:
  - Structure self-weight + superimposed load from ceiling/finishes/hung MEP
  - Future PV
- Roof snow loads:
  - Ground Snow Load (pg) — 50 PSF
  - Exposure Factor Ce — 1.0
  - Thermal Factor — 1.0
  - Importance Factor — 1.25
- Wind loads:
  - Basic Wind Speed Vult (Cat II) — 130 MPH
  - Exposure — C
- Seismic loads:
  - Seismic Importance Factor — 1.5
  - Ss/S1 — .302/.070
  - Site Class — TBD
  - Seismic Design Category — TBD
  - Seismic System — TBD
  - Response Modification Factor — TBD
  - Analysis Procedure — Equivalent Lateral Force Procedure

MEP NARRATIVE

Acton DPW - Option 1			
Element #	**Element Title**	**Recommendations (Value Engineering)**	
D2090	Plumbing Fixtures	None	
D2090	Water System	None	
D3020	HVAC System	HVAC System Review Note: The currently proposed HVAC System is a high efficiency system capable of providing high level of indoor air quality and thermal comfort. The following VE items are proposed as first cost savings measures, and would have lower energy efficiency and thermal comfort. Therefore if the project budget can afford the originally proposed HVAC system then that would be recommended.	
D3020	HVAC System	Administration Area - Potential change from Ground water Source Heat pump system to Air Source Heat Pump System	
D3020	HVAC System	Remove Radiant Floor Slab Heating System and replace with additional Hydronic Hot Water Unit Heaters served by ASHP system. Additional space unit heater equipment would be required to offset removed radiant floor slab heating capacity. This VE could be for all or select areas (Fleet Maintenance, Highway Workshop, Tree & Grounds Workshop, and/or Fleet storage areas)	
D4010	Fire Protection - Sprinklers	Eliminate nitrogen generator in dry system.	
D5010	Electrical Service & Distribution	Utilize Aluminum feeders for 100 amperes and higher.	
D5020	Lighting & Branch Wiring	None	
D5020	Lighting & Power	None	
D5020	Lighting & Power	Simplify lighting controls to a non-networked system that meets the energy code.	
D5030	Comms & Security	Consider reducing data drops by 50%.	
D5030	Comms & Security	Consider reduction of access control to main entry points only on the exterior.	
D5030	Comms & Security	Consider Eliminating interior CCTV cameras.	
D5030	Comms & Security	Consider Eliminating building wide paging and utilize phones for paging.	
D5090	Emergency Power	None	

Acton DPW - Option 2			
Element #	**Element Title**	**Recommendations**	
D2090	Plumbing Fixtures	Provide new high efficiency plumbing fixtures including supports, connections, fittings, and any incidentals to make a complete installation.	
D2090	Drainage System	Provide new Soil, Waste, and Vent piping system is provided to connect to all fixtures and equipment. System runs from 10 feet outside building and terminates with stack vents through the roof. Provide separate Garage Waste and Vent System starting with connection to an exterior 5,000 gallon holding tank running through the Vehicle Parking areas and Work Shop floor drains and terminating with a vent terminal through the roof.	
D2090	Water System	Provide new domestic water service including new water meter and reduced pressure backflow preventer. Provide cold water distribution main is provided. Provide new non-freeze wall hydrants with integral back flow preventers along the exterior of the building.	
D2090	Water System	Install new electric hybrid water heater with thermostatic mixing valve. Provide circulation pump to recirculate hot water from piping system.	
D2090	Water System	Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder or press-fit system. All piping will be insulated with 1 in. thick high-density fiberglass.	
D2090	Compressed Air	Air compressor shall be Quincy Model QGS-30s-T1D, rotary screw air compressor, 114 CFM, 30HP, 208V, 3 phase 60 HZ motor, mounted on 120 gallon ASME receiver, compressor-mounted full-function motor starter with a 120 volt control voltage transformer with on-off switches and manual resets, automatic condensate drain, tank mounted pressure gage, integrated air dryer, service valve, safety valve, and MA approved riser kit. Compressed air piping shall be High density polyethylene piping and socket fittings, PE100, ASTM D-3350, chemical resistant, pressure rating of 230 PSI, Air-Pro Piping by Asahi/America or equal.	
D3020	HVAC System	General: A new all-electric HVAC system is proposed. The administration area shall be heated and air conditioned by an air source VRF (Variable refrigerant) heat pump system. Ventilation air shall be provided by a roof, grade or split indoor air handling unit with energy recovery, air source heat pump heating and cooling, supply and exhaust fans with VFDs or EC motors, and MERV-13 filters. Vehicle Storage & Workshop Areas: These area shall be heating by space mounted air source heat pump fan coil units that shall be connected to outdoor heat pump condensing units, mounted on stands at roof or grade level. These spaces shall be ventilated by an roof, grade or split indoor air handling unit with energy recovery, air source heat pump heating, supply and exhaust fans with VFDs or EC motors, and MERV-13 filters.	
D3020	HVAC System	Demolition: The existing building HVAC system including all associated equipment, ductwork, piping and controls should be demolished and removed.	
D3040	Distribution	Provide all associated ductwork and piping distribution with insulation and hangers to serve the HVAC system air source heat pump and air handling unit equipment and systems.	
D3040	Air Handling Units	Provide high efficiency air source heat pump air handling units equipped with supply and return/exhaust fans equipped with VFD or EC motors, heat pump heating/cooling, energy recovery, economizer, filters, access sections. Air handling units shall be provided for each separate areas of the building (i.e. Admin, Vehicle Storage, Vehicle Maintenance , and Each Workshops Area)	
D3040	Terminal Equipment	Provide air source heat pump fan coil units, including hangers, ductwork, piping, power wiring and controls to provide heating and air conditioning to administration and workshop areas, and heating in vehicle storage areas.	
D3040	Exhaust Fans	Provide general exhaust air fan system including fans, ductwork, controls to serve the Vehicle Storage and Workshop Areas. Provide Vehicles exhaust air capture systems for Vehicle Maintenance area and any other areas of the building where vehicles will be operated continuously within the building. Provide specialty exhaust systems for any welding, sanding and paint booths.	
D3045	Destratification Fan	Provide Destratification Fans for Vehicle Storage and Workshop Areas of the Building	
D3050	Misc.	All HVAC systems shall be tested, adjusted, balanced and commissioned.	

MEP NARRATIVE

Acton DPW - Option 2			
Element #	**Element Title**	**Recommendations**	
D3060	Controls & Instrumentation	A new automatic temperature control (ATC) and building management system (BMS) shall be provided. The BMS shall be a remote web accessible and BACNet open protocol system that is integrated into the Town Wide BMS.	
D4010	Fire Protection - Sprinklers	Existing dry sprinkler system to remain and be modified in the renovated areas to provide 100% protection.	
D5010	Electrical Service & Distribution	Electrical power will be brought into the site via underground medium voltage cables from the utility company network. A pad mounted step-down transformer will be located at grade adjacent to the building. Service entrance and distribution switchgear will be located in the electrical room along with lighting and power distribution panels. New Service shall be rated at 800 Ampere main with 1000 Ampere buss, 120/208V, 3 phase, 4 wire.	
D5010	Electrical Service & Distribution	Re-connect existing 76.67KWDC PV system to new distribution system.	
D5020	Lighting & Branch Wiring	All branch circuit wiring will be new and will utilize MC cable where concealed and EMT with THHN/THWN where exposed. Offices will generally have one (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided. Corridors will have a cleaning receptacle at approximately 30-40 foot intervals. Exterior weatherproof receptacles will be installed at exterior doors. Receptacles in garage/shop spaces will be GFI type with weatherproof covers mounted at 48 inches above floor.	
D5020	Lighting & Power	General office lighting fixtures will consist of recessed mounted direct luminaries with LED lamps and electronic drivers. The fixtures will be wired for automatic dimming control where natural daylight is available and also for multi-level switching. Corridors and other functional lighting fixtures will consist of acrylic recessed direct fixtures with LED lamps and electronic drivers. Storage, mechanical, apparatus, etc. will be LED industrial fixtures with acrylic lens. Exit signs will be of the energy efficient, long life LED type. Lighting system will consist of LED sources with electronic drivers.	
D5020	Lighting & Power	Each area will be locally switched and designed for multi-level controls. Each office space and toilet rooms will have an occupancy sensor to turn lights off when unoccupied. Daylight dimming sensors will be installed in each space with daylight contribution for automatic dimming of light fixtures.	
D5020	Lighting & Power	The entire facility will be controlled with an automatic lighting control system for programming lights on & off.	
D5030	Comms & Security	New Category 6A wiring will be provided with new patch panels and data racks to service the building. Each location will be provided with 3 data drops.	
D5030	Comms & Security	A new Access control system will be provided with access control readers at main entry points and Five interior readers.	
D5030	Comms & Security	A new IP CCTV cameras with a video management system including an on premise NVR will be provided. Cameras will be located around the perimeter, at entry points and within Truck bay and maintenance areas as well as interior corridors and public facing spaces.	
D5030	Comms & Security	A new intrusion detection system will be provided with door contacts intrusion control panel and intrusion keypads at main entry points.	
D5090	Emergency Power	A 200kW, 250kVA, 120/208V, 3Ø, 4W diesel fired emergency generator will be provided and include automatic starting and safety controls. The unit will be housed outdoors on a concrete pad. The generator will include three (2) service breakers: one (1) for the building ATS, and one (1) for the load bank. The generator will be sized for 100% of the building. The emergency power distribution system will consist of one 800 Ampere automatic transfer switch that will back up an N/E 800Ampere distribution panel.	
D5090	Emergency Power	Battery units will be utilized for emergency egress lighting	

Acton DPW - Option 2			
Element #	**Element Title**	**Recommendations**	
D5090	Other	A fire alarm and detection system will be provided with 60 hour battery back-up. The system will be of the addressable type, where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways. Smoke detectors with low frequency sounder base will be provided in dorm rooms. The sprinkler system will be supervised for water flow and tampering with valves. Horn/strobes will be provided in egress ways, assembly spaces, open areas and other large spaces. Strobe only units will be provided in single toilets and conference rooms. Manual pull stations will be provided at exit discharge personnel doors. The system will be connected to automatically report alarms to the fire department.	
D5090	Other	Provide Lightning protection system	
D5090	Other	A central paging system will be installed and integrated with the telephone system.	

MEP NARRATIVE

Acton DPW - Option 3			
Element #	**Element Title**	**Recommendations**	
D2090	Plumbing Fixtures	Provide new high efficiency plumbing fixtures including supports, connections, fittings, and any incidentals to make a complete installation.	
D2090	Drainage System	Provide new Soil, Waste, and Vent piping system is provided to connect to all fixtures and equipment. System runs from 10 feet outside building and terminates with stack vents through the roof. Provide separate Garage Waste and Vent System starting with connection to an exterior 5,000 gallon holding tank running through the Vehicle Parking areas and Work Shop floor drains and terminating with a vent terminal through the roof.	
D2090	Water System	Provide new domestic water service including new water meter and reduced pressure backflow preventer. Provide cold water distribution main is provided. Provide new non-freeze wall hydrants with integral back flow preventers along the exterior of the building.	
D2090	Water System	Install new electric hybrid water heater with thermostatic mixing valve. Provide circulation pump to recirculate hot water from piping system.	
D2090	Water System	Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder or press-fit system. All piping will be insulated with 1 in. thick high-density fiberglass.	
D2090	Compressed Air	Air compressor shall be Quincy Model QGS-30s-T1D, rotary screw air compressor, 114 CFM, 30HP, 208V, 3 phase 60 HZ motor, mounted on 120 gallon ASME receiver, compressor-mounted full-function motor starter with a 120 volt control voltage transformer with on-off switches and manual resets, automatic condensate drain, tank mounted pressure gage, integrated air dryer, service valve, safety valve, and MA approved riser kit. Compressed air piping shall be High density polyethylene piping and socket fittings, PE100, ASTM D-3350, chemical resistant, pressure rating of 230 PSI, Air-Pro Piping by Asahi/America or equal.	
D3020	HVAC System	General: A new all-electric HVAC system is proposed. The administration area shall be heated and air conditioned by an air source VRF (Variable refrigerant) heat pump system. Ventilation air shall be provided by a roof, grade or split indoor air handling unit with energy recovery, air source heat pump heating and cooling, supply and exhaust fans with VFDs or EC motors, and MERV-13 filters. Vehicle Storage & Workshop Areas: These area shall be heating by space mounted air source heat pump fan coil units that shall be connected to outdoor heat pump condensing units, mounted on stands at roof or grade level. These spaces shall be ventilated by an roof, grade or split indoor air handling unit with energy recovery, air source heat pump heating, supply and exhaust fans with VFDs or EC motors, and MERV-13 filters.	
D3020	HVAC System	Demolition: The existing building HVAC system including all associated equipment, ductwork, piping and controls should be demolished and removed.	
D3025	HVAC System (Alternate)	As an alternate the new Vehicle Storage building shall be heated by a radiant floor slab heating system that shall be connect to an air source to hydronic hot water heat pump system.	
D3040	Distribution	Provide all associated ductwork and piping distribution with insulation and hangers to serve the HVAC system air source heat pump and air handling unit equipment and systems.	

Acton DPW - Option 3			
Element #	**Element Title**	**Recommendations**	
D3040	Air Handling Units	Provide high efficiency air source heat pump air handling units equipped with supply and return/exhaust fans equipped with VFD or EC motors, heat pump heating/cooling, energy recovery, economizer, filters, access sections. Air handling units shall be provided for each separate areas of the building (i.e. Admin, Vehicle Storage, Vehicle Maintenance , and Each Workshops Area)	
D3040	Terminal Equipment	Provide air source heat pump fan coil units, including hangers, ductwork, piping, power wiring and controls to provide heating and air conditioning to administration and workshop areas, and heating in vehicle storage areas.	
D3040	Exhaust Fans	Provide general exhaust air fan system including fans, ductwork, controls to serve the Vehicle Storage and Workshop Areas. Provide Vehicles exhaust air capture systems for Vehicle Maintenance area and any other areas of the building where vehicles will be operated continuously within the building. Provide specialty exhaust systems for any welding, sanding and paint booths.	
D3045	Destratification Fan	Provide Destratification Fans for Vehicle Storage and Workshop Areas of the Building	
D3050	Misc.	All HVAC systems shall be tested, adjusted, balanced and commissioned.	
D3060	Controls & Instrumentation	A new automatic temperature control (ATC) and building management system (BMS) shall be provided. The BMS shall be a remote web accessible and BACNet open protocol system that is integrated into the Town Wide BMS.	
D4010	Fire Protection - Sprinklers	Demolish existing sprinkler service and dry system in razed building. Provide new 8 inch fire service, double check valve assembly, two (2) dry alarm valves complete with electric bell, and fire department connection meeting local thread standards. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks, Watts 757-OSY or equal. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler/standpipe piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe. All pipe and fittings to be galvanized for dry system. Existing dry system in DPW Offices shall be modified to protect the new architectural layouts.	
D5030	Electrical Service & Distribution	Electrical power will be brought into the site via underground medium voltage cables from the utility company network. A pad mounted step-down transformer will be located at grade adjacent to the building. Service entrance and distribution switchgear will be located in the electrical room along with lighting and power distribution panels. New Service shall be rated at 600 Ampere main with 800 Ampere buss, 277/480V, 3 phase, 4 wire.	
D5010	Electrical Service & Distribution	Re-connect existing 76.67KWDC PV system to new distribution system.	
D5090	Lighting & Branch Wiring	All branch circuit wiring will be new and will utilize MC cable where concealed and EMT with THHN/THWN where exposed. Offices will generally have one (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided. Corridors will have a cleaning receptacle at approximately 30-40 foot intervals. Exterior weatherproof receptacles will be installed at exterior doors. Receptacles in garage/shop spaces will be GFI type with weatherproof covers mounted at 48 inches above floor.	

MEP NARRATIVE

Acton DPW - Option 3			
Element #	**Element Title**	**Recommendations**	
D5090	Lighting & Power	General office lighting fixtures will consist of recessed mounted direct luminaries with LED lamps and electronic drivers. The fixtures will be wired for automatic dimming control where natural daylight is available and also for multi-level switching. Corridors and other functional lighting fixtures will consist of acrylic recessed direct fixtures with LED lamps and electronic drivers. Storage, mechanical, apparatus, etc. will be LED industrial fixtures with acrylic lens. Exit signs will be of the energy efficient, long life LED type. Lighting system will consist of LED sources with electronic drivers.	
D5090	Lighting & Power	Each area will be locally switched and designed for multi-level controls. Each office space and toilet rooms will have an occupancy sensor to turn lights off when unoccupied. Daylight dimming sensors will be installed in each space with daylight contribution for automatic dimming of light fixtures.	
D5090	Lighting & Power	The entire facility will be controlled with an automatic lighting control system for programming lights on & off.	
	Comms & Security	New Category 6A wiring will be provided with new patch panels and data racks to service the building. Each location will be provided with 3 data drops.	
D5030	Comms & Security	A new Access control system will be provided with access control readers at main entry points and Five interior readers.	
D5030	Comms & Security	A new IP CCTV cameras with a video management system including an on premise NVR will be provided. Cameras will be located around the perimeter, at entry points and within Truck bay and maintenance areas as well as interior corridors and public facing spaces.	
D5030	Comms & Security	A new intrusion detection system will be provided with door contacts intrusion control panel and intrusion keypads at main entry points.	
D5090	Emergency Power	A 350kW, 437.5kVA, 277/480V, 3Ø, 4W diesel fired emergency generator will be provided and include automatic starting and safety controls. The unit will be housed outdoors on a concrete pad. The generator will include three (2) service breakers: one (1) for the building ATS, and one (1) for the load bank. The generator will be sized for 100% of the building. The emergency power distribution system will consist of one 800 Ampere automatic transfer switch that will back up an N/E 800Ampere distribution panel.	
D5090	Emergency Power	Battery units will be utilized for emergency egress lighting	

Acton DPW - Option 3			
Element #	**Element Title**	**Recommendations**	
D5090	Other	A fire alarm and detection system will be provided with 60 hour battery back-up. The system will be of the addressable type, where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways. Smoke detectors with low frequency sounder base will be provided in dorm rooms. The sprinkler system will be supervised for water flow and tampering with valves. Horn/strobes will be provided in egress ways, assembly spaces, open areas and other large spaces. Strobe only units will be provided in single toilets and conference rooms. Manual pull stations will be provided at exit discharge personnel doors. The system will be connected to automatically report alarms to the fire department.	
D5090	Other	Provide Lightning protection system	
D5090	Other	A central paging system will be installed and integrated with the telephone system.	

MEP NARRATIVE

Acton DPW - Option 4A			
Element #	**Element Title**	**Recommendations**	
D2090	Plumbing Fixtures	Provide new high efficiency plumbing fixtures including supports, connections, fittings, and any incidentals to make a complete installation.	
D2090	Drainage System	Provide new Soil, Waste, and Vent piping system is provided to connect to all fixtures and equipment. System runs from 10 feet outside building and terminates with stack vents through the roof. Provide separate Garage Waste and Vent System starting with connection to an exterior 5,000 gallon holding tank running through the Vehicle Parking areas and Work Shop floor drains and terminating with a vent terminal through the roof.	
D2090	Water System	Provide new domestic water service including new water meter and reduced pressure backflow preventer. Provide cold water distribution main is provided. Provide new non-freeze wall hydrants with integral back flow preventers along the exterior of the building.	
D2090	Water System	Install new electric hybrid water heater with thermostatic mixing valve. Provide circulation pump to recirculate hot water from piping system.	
D2090	Water System	Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder or press-fit system. All piping will be insulated with 1 in. thick high-density fiberglass.	
D2090	Compressed Air	Air compressor shall be Quincy Model QGS-30s-T1D, rotary screw air compressor, 114 CFM, 30HP, 208V, 3 phase 60 HZ motor, mounted on 120 gallon ASME receiver, compressor-mounted full-function motor starter with a 120 volt control voltage transformer with on-off switches and manual resets, automatic condensate drain, tank mounted pressure gage, integrated air dryer, service valve, safety valve, and MA approved riser kit. Compressed air piping shall be High density polyethylene piping and socket fittings, PE100, ASTM D-3350, chemical resistant, pressure rating of 230 PSI, Air-Pro Piping by Asahi/America or equal.	
D3020	HVAC System	General: A new all-electric HVAC system is proposed. The administration area shall be heated and air conditioned by an air source VRF (Variable refrigerant) heat pump system. Ventilation air shall be provided by a roof, grade or split indoor air handling unit with energy recovery, air source heat pump heating and cooling, supply and exhaust fans with VFDs or EC motors, and MERV-13 filters. Fleet Storage, Maintenance and Workshop Areas: These area shall be heating by space mounted air source heat pump fan coil units that shall be connected to outdoor heat pump condensing units, mounted on stands at roof or grade level. These spaces shall be ventilated by an roof, grade or split indoor air handling unit with energy recovery, air source heat pump heating, supply and exhaust fans with VFDs or EC motors, and MERV-13 filters.	
D3025	HVAC System (Alternate)	As an alternate the new Vehicle Storage building shall be heated by a radiant floor slab heating system that shall be connect to an air source to hydronic hot water heat pump system.	
D3040	Distribution	Provide all associated ductwork and piping distribution with insulation and hangers to serve the HVAC system air source heat pump and air handling unit equipment and systems.	
D3040	Air Handling Units	Provide high efficiency air source heat pump air handling units equipped with supply and return/exhaust fans equipped with VFD or EC motors, heat pump heating/cooling, energy recovery, economizer, filters, access sections. Air handling units shall be provided for each separate areas of the building (i.e. Admin, Vehicle Storage, Vehicle Maintenance , and Each Workshops Area)	

Acton DPW - Option 4A			
Element #	**Element Title**	**Recommendations**	
D3040	Terminal Equipment	Provide air source heat pump fan coil units, including hangers, ductwork, piping, power wiring and controls to provide heating and air conditioning to administration and workshop areas, and heating in vehicle storage areas.	
D3040	Exhaust Fans	Provide general exhaust air fan system including fans, ductwork, controls to serve the Vehicle Storage and Workshop Areas. Provide Vehicles exhaust air capture systems for Vehicle Maintenance area and any other areas of the building where vehicles will be operated continuously within the building. Provide specialty exhaust systems for any welding, sanding and paint booths.	
D3045	Destratification Fan	Provide Destratification Fans for Vehicle Storage and Workshop Areas of the Building	
D3050	Misc.	All HVAC systems shall be tested, adjusted, balanced and commissioned.	
D3060	Controls & Instrumentation	A new automatic temperature control (ATC) and building management system (BMS) shall be provided. The BMS shall be a remote web accessible and BACNet open protocol system that is integrated into the Town Wide BMS.	
D4010	Fire Protection - Sprinklers	Reuse existing fire service and backflow preventer at existing building. Demolish existing dry sprinkler system. Provide new wet alarm valve and wet type sprinkler system throughout the renovated DPW offices and maintenance shops. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler/standpipe piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe.	
D4010	Fire Protection - Sprinklers	Fleet Storage building will be served by a new 8 inch fire service, double check valve assembly, dry alarm valve complete with electric bell, and fire department connection meeting local thread standards. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks, Watts 757-OSY or equal. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler/standpipe piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe. All pipe and fittings to be galvanized for dry system.	
D4010	Fire Protection - Sprinklers	The mechanical rooms and storage rooms are considered Ordinary Hazard Group 1. The Maintenance Bays and Fleet Storage areas are considered Ordinary Hazard Group 2. All other areas are considered light hazard.	
D5030	Electrical Service & Distribution	Electrical power will be brought into the site via underground medium voltage cables from the utility company network. A pad mounted step-down transformer will be located at grade adjacent to the building. Service entrance and distribution switchgear will be located in the electrical room along with lighting and power distribution panels. New Service shall be rated at 800 Ampere main with 1000 Ampere buss, 277/480V, 3 phase, 4 wire.	
D5010	Electrical Service & Distribution	Re-connect existing 76.67KWDC PV system to new distribution system.	
D5090	Lighting & Branch Wiring	All branch circuit wiring will be new and will utilize MC cable where concealed and EMT with THHN/THWN where exposed. Offices will generally have one (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided. Corridors will have a cleaning receptacle at approximately 30-40 foot intervals. Exterior weatherproof receptacles will be installed at exterior doors. Receptacles in garage/shop spaces will be GFI type with weatherproof covers mounted at 48 inches above floor.	

MEP NARRATIVE

Acton DPW - Option 4A			
Element #	**Element Title**	**Recommendations**	
D5090	Lighting & Power	General office lighting fixtures will consist of recessed mounted direct luminaries with LED lamps and electronic drivers. The fixtures will be wired for automatic dimming control where natural daylight is available and also for multi-level switching. Corridors and other functional lighting fixtures will consist of acrylic recessed direct fixtures with LED lamps and electronic drivers. Storage, mechanical, apparatus, etc. will be LED industrial fixtures with acrylic lens. Exit signs will be of the energy efficient, long life LED type. Lighting system will consist of LED sources with electronic drivers.	
D5090	Lighting & Power	Each area will be locally switched and designed for multi-level controls. Each office space and toilet rooms will have an occupancy sensor to turn lights off when unoccupied. Daylight dimming sensors will be installed in each space with daylight contribution for automatic dimming of light fixtures.	
D5090	Lighting & Power	The entire facility will be controlled with an automatic lighting control system for programming lights on & off.	
D5030	Comms & Security	New Category 6A wiring will be provided with new patch panels and data racks to service the building. Each location will be provided with 3 data drops.	
D5030	Comms & Security	A new Access control system will be provided with access control readers at main entry points and Five interior readers.	
D5030	Comms & Security	A new IP CCTV cameras with a video management system including an on premise NVR will be provided. Cameras will be located around the perimeter, at entry points and within Truck bay and maintenance areas as well as interior corridors and public facing spaces.	
D5030	Comms & Security	A new intrusion detection system will be provided with door contacts intrusion control panel and intrusion keypads at main entry points.	
D5090	Emergency Power	A 400kW, 500kVA, 277/480V, 3Ø, 4W diesel fired emergency generator will be provided and include automatic starting and safety controls. The unit will be housed outdoors on a concrete pad. The generator will include three (2) service breakers: one (1) for the building ATS, and one (1) for the load bank. The generator will be sized for 100% of the building. The emergency power distribution system will consist of one 800 Ampere automatic transfer switch that will back up an N/E 800Ampere distribution panel.	
D5090	Emergency Power	Battery units will be utilized for emergency egress lighting	

Acton DPW - Option 4A			
Element #	**Element Title**	**Recommendations**	
D5090	Other	A fire alarm and detection system will be provided with 60 hour battery back-up. The system will be of the addressable type, where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways. Smoke detectors with low frequency sounder base will be provided in dorm rooms. The sprinkler system will be supervised for water flow and tampering with valves. Horn/strobes will be provided in egress ways, assembly spaces, open areas and other large spaces. Strobe only units will be provided in single toilets and conference rooms. Manual pull stations will be provided at exit discharge personnel doors. The system will be connected to automatically report alarms to the fire department.	
D5090	Other	Provide Lightning protection system	
D5090	Other	A central paging system will be installed and integrated with the telephone system.	

MEP NARRATIVE

Acton DPW - Option 4B			
Element #	**Element Title**	**Recommendations**	
D2090	Plumbing Fixtures	Provide new high efficiency plumbing fixtures including supports, connections, fittings, and any incidentals to make a complete installation.	
D2090	Drainage System	Provide new Soil, Waste, and Vent piping system is provided to connect to all fixtures and equipment. System runs from 10 feet outside building and terminates with stack vents through the roof. Provide separate Garage Waste and Vent System starting with connection to an exterior 5,000 gallon holding tank running through the Vehicle Parking areas and Work Shop floor drains and terminating with a vent terminal through the roof.	
D2090	Water System	Provide new domestic water service including new water meter and reduced pressure backflow preventer. Provide cold water distribution main is provided. Provide new non-freeze wall hydrants with integral back flow preventers along the exterior of the building.	
D2090	Water System	Install new electric hybrid water heater with thermostatic mixing valve. Provide circulation pump to recirculate hot water from piping system.	
D2090	Water System	Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder or press-fit system. All piping will be insulated with 1 in. thick high-density fiberglass.	
D2090	Compressed Air	Air compressor shall be Quincy Model QGS-30s-T1D, rotary screw air compressor, 114 CFM, 30HP, 208V, 3 phase 60 HZ motor, mounted on 120 gallon ASME receiver, compressor-mounted full-function motor starter with a 120 volt control voltage transformer with on-off switches and manual resets, automatic condensate drain, tank mounted pressure gage, integrated air dryer, service valve, safety valve, and MA approved riser kit. Compressed air piping shall be High density polyethylene piping and socket fittings, PE100, ASTM D-3350, chemical resistant, pressure rating of 230 PSI, Air-Pro Piping by Asahi/America or equal.	
D3020	HVAC System	General: A new all-electric HVAC system is proposed. The administration area shall be heated and air conditioned by an air source VRF (Variable refrigerant) heat pump system. Ventilation air shall be provided by a roof, grade or split indoor air handling unit with energy recovery, air source heat pump heating and cooling, supply and exhaust fans with VFDs or EC motors, and MERV-13 filters. Vehicle Storage & Workshop Areas: These area shall be heating by space mounted air source heat pump fan coil units that shall be connected to outdoor heat pump condensing units, mounted on stands at roof or grade level. These spaces shall be ventilated by an roof, grade or split indoor air handling unit with energy recovery, air source heat pump heating, supply and exhaust fans with VFDs or EC motors, and MERV-13 filters.	
D3025	HVAC System (Alternate)	As an alternate the renovated Vehicle Storage building and Vehicle maintenance and workshop areas of the new DPW building shall be heated by a radiant floor slab heating system that shall be connect to an air source to hydronic hot water heat pump system.	
D3040	Distribution	Provide all associated ductwork and piping distribution with insulation and hangers to serve the HVAC system air source heat pump and air handling unit equipment and systems.	

Acton DPW - Option 4B			
Element #	**Element Title**	**Recommendations**	
D3040	Air Handling Units	Provide high efficiency air source heat pump air handling units equipped with supply and return/exhaust fans equipped with VFD or EC motors, heat pump heating/cooling, filters, access sections. Air handling units shall be provided for each separate areas of the building (i.e. Admin, Vehicle Storage, Vehicle Maintenance , and Each Workshops Area)	
D3040	Terminal Equipment	Provide air source heat pump fan coil units, including hangers, ductwork, piping, power wiring and controls to provide heating and air conditioning to administration and workshop areas, and heating in vehicle storage areas.	
D3040	Exhaust Fans	Provide general exhaust air fan system including fans, ductwork, controls to serve the Vehicle Storage and Workshop Areas. Provide Vehicles exhaust air capture systems for Vehicle Maintenance area and any other areas of the building where vehicles will be operated continuously within the building. Provide specialty exhaust systems for any welding, sanding and paint booths.	
D3045	Destratification Fan	Provide Destratification Fans for Vehicle Storage and Workshop Areas of the Building	
D3050	Misc.	All HVAC systems shall be tested, adjusted, balanced and commissioned.	
D3060	Controls & Instrumentation	A new automatic temperature control (ATC) and building management system (BMS) shall be provided. The BMS shall be a remote web accessible and BACNet open protocol system that is integrated into the Town Wide BMS.	
D4010	Fire Protection - Sprinklers	Reuse existing fire service and backflow preventer at existing building. Demolish existing dry sprinkler system back to existing dry alarm valve. Provide new dry type sprinkler system throughout the renovated Fleet Storage building. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler/standpipe piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe. All pipe and fittings to be galvanized for the dry system.	
D4010	Fire Protection - Sprinklers	New Office and Maintenance Shop building will be served by a new 8 inch fire service, double check valve assembly, wet alarm valve complete with electric bell, and fire department connection meeting local thread standards. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks, Watts 757-OSY or equal. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler/standpipe piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe.	
D4010	Fire Protection - Sprinklers	The mechanical rooms and storage rooms are considered Ordinary Hazard Group 1. The Maintenance Bays and Fleet Storage areas are considered Ordinary Hazard Group 2. All other areas are considered light hazard.	
D5030	Electrical Service & Distribution	Electrical power will be brought into the site via underground medium voltage cables from the utility company network. A pad mounted step-down transformer will be located at grade adjacent to the building. Service entrance and distribution switchgear will be located in the electrical room along with lighting and power distribution panels. New Service shall be rated at 600 Ampere main with 800 Ampere buss, 277/480V, 3 phase, 4 wire.	
D5010	Electrical Service & Distribution	Re-connect existing 76.67KWDC PV system to new distribution system.	

MEP NARRATIVE

Acton DPW - Option 4B			
Element #	**Element Title**	**Recommendations**	
D5090	Lighting & Branch Wiring	All branch circuit wiring will be new and will utilize MC cable where concealed and EMT with THHN/THWN where exposed. Offices will generally have one (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided. Corridors will have a cleaning receptacle at approximately 30-40 foot intervals. Exterior weatherproof receptacles will be installed at exterior doors. Receptacles in garage/shop spaces will be GFI type with weatherproof covers mounted at 48 inches above floor.	
D5090	Lighting & Power	General office lighting fixtures will consist of recessed mounted direct luminaries with LED lamps and electronic drivers. The fixtures will be wired for automatic dimming control where natural daylight is available and also for multi-level switching. Corridors and other functional lighting fixtures will consist of acrylic recessed direct fixtures with LED lamps and electronic drivers. Storage, mechanical, apparatus, etc. will be LED industrial fixtures with acrylic lens. Exit signs will be of the energy efficient, long life LED type. Lighting system will consist of LED sources with electronic drivers.	
D5090	Lighting & Power	Each area will be locally switched and designed for multi-level controls. Each office space and toilet rooms will have an occupancy sensor to turn lights off when unoccupied. Daylight dimming sensors will be installed in each space with daylight contribution for automatic dimming of light fixtures.	
D5090	Lighting & Power	The entire facility will be controlled with an automatic lighting control system for programming lights on & off.	
D5030	Comms & Security	New Category 6A wiring will be provided with new patch panels and data racks to service the building. Each location will be provided with 3 data drops.	
D5030	Comms & Security	A new Access control system will be provided with access control readers at main entry points and Five interior readers.	
D5030	Comms & Security	A new IP CCTV cameras with a video management system including an on premise NVR will be provided. Cameras will be located around the perimeter, at entry points and within Truck bay and maintenance areas as well as interior corridors and public facing spaces.	
D5030	Comms & Security	A new intrusion detection system will be provided with door contacts intrusion control panel and intrusion keypads at main entry points.	
D5090	Emergency Power	A 400kW, 500kVA, 277/480V, 3Ø, 4W diesel fired emergency generator will be provided and include automatic starting and safety controls. The unit will be housed outdoors on a concrete pad. The generator will include three (2) service breakers: one (1) for the building ATS, and one (1) for the load bank. The generator will be sized for 100% of the building. The emergency power distribution system will consist of one 800 Ampere automatic transfer switch that will back up an N/E 800Ampere distribution panel.	
D5090	Emergency Power	Battery units will be utilized for emergency egress lighting	

Acton DPW - Option 4B			
Element #	**Element Title**	**Recommendations**	
D5090	Other	A fire alarm and detection system will be provided with 60 hour battery back-up. The system will be of the addressable type, where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways. Smoke detectors with low frequency sounder base will be provided in dorm rooms. The sprinkler system will be supervised for water flow and tampering with valves. Horn/strobes will be provided in egress ways, assembly spaces, open areas and other large spaces. Strobe only units will be provided in single toilets and conference rooms. Manual pull stations will be provided at exit discharge personnel doors. The system will be connected to automatically report alarms to the fire department.	
D5090	Other	Provide Lightning protection system	
D5090	Other	A central paging system will be installed and integrated with the telephone system.	

COST ESTIMATES

PMA Consultants

Updated: 3/27/25		Updated for 40 % DD RECON Estimate 3/27/2025
DIRECT CONSTRUCTION ESTIMATE		
Cost of New Construction (Tci Estimate)	$	29,791,811
TOTAL DIRECT CONSTRUCTION COSTS	**$**	**29,791,811**
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	$	-
Utility Backcharges	$	150,000
Town Fiber	$	75,000
Moving Costs	$	75,000
Owner's Construction Contingency	$	1,489,591
Owner's Soft Cost Contingency	$	500,000
Total Probable Owner's Indirect Costs	**$**	**3,479,591**
TOTAL PROJECT COSTS	**$**	**37,995,690**
6% Escalation (assume Aug. 2027 construction start)	$	39,783,199

Note: Estimate from PMA Consultants; 6% escalation added by Arrowstreet to bring into alignment with Concept Options

PM&C

Acton DPW
New Construction + Renovation Options
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Revised 15-Oct-25

Conceptual Options

MAIN CONSTRUCTION COST SUMMARY

		Gross Floor Area	$/sf	Estimated Construction Cost
OPTION 1				
NEW BUILDING		40,641	$413.33	$16,798,216
Sitework				$3,520,617
Demolition of existing DPW building		19,000	$10.00	$190,000
Demolition of existing DPW building, hazmat allowance				$147,250
SUBTOTAL TRADE COSTS		40,641	$508.26	$20,656,083
Design and Estimating Contingency	8.0%			$1,652,487
Escalation to Construction Start (August 2027)	6.00%			$1,239,365
SUBTOTAL INCLUDING CONTINGENCIES				**$23,547,935**
Subcontractor Bonds				In rates
General Conditions	8.0%			$1,883,835
General Requirements	2.0%			$470,959
Winter Conditions				excl
Insurances - GLI/Builders Risk	2.00%			$470,959
Bond	1.00%			$235,479
Building Permit				Waived
Overhead & Profit	4.0%			$941,917
OPTION 1 - TOTAL ESTIMATED CONSTRUCTION COST		**40,641**	**$678**	**$27,551,084**
OPTION 1 - PROJECT ESTIMATE (125% of Constr. Costs)				$34,438,855

CONCEPTUAL COST ESTIMATES

		Gross Floor Area	$/sf	Estimated Construction Cost
OPTION 2				
RENOVATION		19,200	$293.40	$5,633,173
Sitework - Allowance				$500,000
Demolition of existing DPW building				NR
Existing DPW building, hazmat allowance				$147,250
SUBTOTAL TRADE COSTS		19,200	$327.10	$6,280,423
Design and Estimating Contingency	15.0%			$942,063
Escalation to Construction Start (August 2027)	6.00%			$376,825
SUBTOTAL INCLUDING CONTINGENCIES				$7,599,311
Subcontractor Bonds				In rates
General Conditions	8.0%			$607,945
General Requirements	2.0%			$151,986
Winter Conditions				excl
Insurances - GLI/Builders Risk	2.00%			$151,986
Bond	1.00%			$75,993
Building Permit				Waived
Overhead & Profit	4.0%			$303,972
OPTION 2 - TOTAL ESTIMATED CONSTRUCTION COST		**19,200**	**$459**	**$8,815,200**
OPTION 2 - PROJECT ESTIMATE (125% of Constr. Costs)				**$11,019,000**

		Gross Floor Area	$/sf	Estimated Construction Cost
OPTION 3				
RENOVATION		9,600	$383.91	$3,685,523
NEW ADDITION		23,897	$421.46	$10,071,740
Sitework - Allowance				$2,000,000
Demolition of existing DPW building		9,600	$10.00	$96,000
Existing DPW building, hazmat allowance				$147,250
SUBTOTAL TRADE COSTS		33,497	$477.67	$16,000,513
Design and Estimating Contingency	15.0%			$2,400,077
Escalation to Construction Start (August 2027)	6.00%			$960,031
SUBTOTAL INCLUDING CONTINGENCIES				$19,360,621
Subcontractor Bonds				In rates
General Conditions	8.0%			$1,548,850
General Requirements	2.0%			$387,212
Winter Conditions				excl
Insurances - GLI/Builders Risk	2.00%			$387,212
Bond	1.00%			$193,606
Building Permit				Waived
Overhead & Profit	4.0%			$774,424
OPTION 3 - TOTAL ESTIMATED CONSTRUCTION COST		**33,497**	**$676**	**$22,651,925**
OPTION 3 - PROJECT ESTIMATE (125% of Constr. Costs)				**$28,314,906**

COST ESTIMATES

Acton DPW
New Construction + Renovation Options
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Conceptual Options

MAIN CONSTRUCTION COST SUMMARY

		Gross Floor Area	$/sf	Estimated Construction Cost
OPTION 4A				
RENOVATION		19,200	$293.40	$5,633,173
NEW ADDITION		23,897	$421.46	$10,071,740
PREMIUM FOR ADDITIONAL STRUCTURAL WORK				$250,000
Sitework - Allowance				$3,000,000
Demolition of existing DPW building				ETR
Existing DPW building, hazmat allowance				$147,250
SUBTOTAL TRADE COSTS		43,097	$443.24	$19,102,163
Design and Estimating Contingency	15.0%			$2,865,324
Escalation to Construction Start (August 2027)	6.00%			$1,146,130
SUBTOTAL INCLUDING CONTINGENCIES				**$23,113,617**
Subcontractor Bonds				In rates
General Conditions	8.0%			$1,849,089
General Requirements	2.0%			$462,272
Winter Conditions				excl
Insurances - GLI/Builders Risk	2.00%			$462,272
Bond	1.00%			$229,335
Building Permit				Waived
Overhead & Profit	4.0%			$924,545
OPTION 4A - TOTAL ESTIMATED CONSTRUCTION COST		**43,097**	$627	$27,041,129
OPTION 4A - PROJECT ESTIMATE (125% of Constr. Costs)				**$33,801,411**

Acton DPW
New Construction + Renovation Options
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Conceptual Options

MAIN CONSTRUCTION COST SUMMARY

		Gross Floor Area	$/sf	Estimated Construction Cost
OPTION 4B				
RENOVATION		19,200	$244.83	$4,700,745
NEW ADDITION		18,323	$488.44	$8,949,657
Sitework - Allowance			$447.66	$16,797,652
Demolition of existing DPW building				ETR
Existing DPW building, hazmat allowance				$2,519,648
				$1,007,859
SUBTOTAL TRADE COSTS		37,523	$441.00	**$20,325,159**
Design and Estimating Contingency	15.0%			$2,482,148
Escalation to Construction Start (August 2027)	6.00%			$992,859
SUBTOTAL INCLUDING CONTINGENCIES				**$20,022,659**
Subcontractor Bonds				In rates
General Conditions	8.0%			$1,626,013
General Requirements	2.0%			$406,503
Winter Conditions				excl
Insurances - GLI/Builders Risk	2.00%			$406,503
Bond	1.00%			$203,252
Building Permit				Waived
Overhead & Profit	4.0%			$813,006
OPTION 4B - TOTAL ESTIMATED CONSTRUCTION COST		**37,523**	$634	$23,780,436
OPTION 4B - PROJECT ESTIMATE (125% of Constr. Costs)				**$29,725,545**