New Millis Police Station
&
Fire Station Renovation

Conceptual Design and Construction Cost Estimate

Millis, Massachusetts

Final Report

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Section 1 - Executive Summary

Project Overview

Conceptual design for the new Police Station and renovation of the existing Fire Station are presented within this report by CDR Maguire, Inc. on behalf of the Permanent Building Committee and the Town of Millis, Massachusetts.

The goals established by the PBC for this project were to complete a conceptual design for a new Police Station and renovation of the existing Public Safety Building for use by the Fire Department. In addition to building designs, a schematic design level construction cost estimate for both buildings to establish accurate total project budgets.

The process of completing this study required several preliminary tasks beginning with initial program reviews with the Police and Fire Departments to understand current and future needs. Initial testing and investigations of the existing Public Safety Building and the proposed site were completed to define design parameters and identify environmental and regulatory requirements.

Additional preliminary investigations for this project included the following:

Needs Assessment: Review current and future Fire Department space needs and utilization of existing building following the Police Department relocation.

Building Program: Establish spatial and room requirements for the new Police Station.

Existing Conditions Assessment: Investigate the physical condition of the existing Public Safety Building including; exterior envelope, structural, roof, windows, interior finishes and site conditions.

Geotechnical Investigation: Investigation of the soil conditions to determine suitability of the soil to support a building and establish the foundation design criteria.

Environmental Assessment: Complete a Phase 1 ESA investigation of the property to determine the need for remediation of contaminated soils and indentify environmental restrictions.

Land Survey: Completion of a detailed plan of the existing site that provides locations of property lines, utilities, existing structures, pavement and contours.

<u>Site Design</u>

The site chosen by the Town for construction of the New Police Station is located at the corner of Main Street and Auburn Road in the center of Town and is the location of the old Library. Following the completion of the new Library the old Library is schedule to be demolished under a separate project. The property size and boundary has recently changed in coordination with the development of a new commercial building adjacent to the east of the proposed site.

Site design criteria for the project include the following requirements:

- Construct within setbacks along Main Street consistent with Town Design Standards
- Maintain access to municipal parking from Auburn Road.
- Relocation of the existing war memorial and dedication plaque.
- Rerouting of an existing underground culvert that falls under the Watershed Protection District.

New Police Station Design

Design of the New Police Station consists of a one story, 12,300 square foot structure located on the southern portion of the site. The office and administrative areas are located adjacent to visitor parking along Auburn Road with public asses directly from Main Street. The booking and detention area of the station is located to the north in the rear of the building with direct access to the sallyport and covered parking for patrol cars. The design provides separation of public and police access to the building and allows for transport of detainees in a secure and private location.

Conceptual design drawings of the proposed new Police Station are attached within this report.

Renovations to Existing Fire Station

Design for the Renovation of the existing building for use by the Fire Department consists of establishing department offices with public access on the first floor, reorganization of the apparatus bays with additional equipment storage, decontamination room, fitness room and toilet rooms. The second floor design includes a Day Room, Kitchen, Dormitories and Toilet Rooms. Design for the renovated facility results in a Fire Station that is compliant with building codes, accessibility requirements and gender equity.

Conceptual floor plans for the proposed renovated Fire Station are attached within this report.

Cost Estimate

The report included construction costs for both projects along with design fees, construction escalation and other miscellaneous costs for a projected Total Project Budget.

New Police Station:	$7,058,110
Fire Station Renovation:	$2,902,978
Total Cost:	$9,961,088

A summary sheet with a breakdown of the Total Project budget is attached with this report.

Millis Fire Station Renovation Preliminary Construction Estimate	Variables	Project Costs
Building Square Footage	**9,654**	
Construction Costs		
Renovations to Existing Fire Headquarters	$ 174.98	$ 1,689,254
Subtotal		**$ 1,689,254**
Construction Contingencies	15%	$ 253,388
Subtotal		**$ 1,942,642**
Contractor profit	10%	$ 168,925
Bond	1%	$ 16,893
Construction Cost		**$ 2,128,460**
Design Engineering Fees (Allowance)	9%	$ 174,838
Owners Project Manager (Allowance)	4%	$ 77,706
Furniture and Equipment (Allowance)	10%	$ 194,264
Communication Technologies (Allowance)		$ 125,000
Additional Project Costs (testing, survey, geotech, etc.)	3%	$ 50,678
Subtotal		**$ 2,750,945**
Construction Escalation to 2016 - 9%		$ 152,033
TOTAL PROJECT COST		**$ 2,902,978**

New Millis Police Station Preliminary Construction Estimate	Variables	Project Costs
Building Square Footage	**12,046**	
Construction Costs		
New Police Headquarters	$ 356.69	$ 4,296,693
Subtotal		**$ 4,296,693**
Construction Contingencies	15%	$ 644,504
Subtotal		**$ 4,941,197**
Contractor profit	10%	$ 429,669
Bond	1%	$ 42,967
Construction Cost		**$ 5,413,833**
Design Engineering Fees (Allowance)	9%	$ 444,708
Owners Project Manager (Allowance)	4%	$ 197,648
Furniture and Equipment (Allowance)	10%	$ 494,120
Communication Technologies (Allowance)		$ 250,000
Additional Project Costs (testing, survey, geotech, etc.)	3%	$ 128,901
Subtotal		**$ 6,929,209**
Construction Escalation to 2014 - 3%		$ 128,901
TOTAL PROJECT COST		**$ 7,058,110**

Section 2 – New Police Station Building Program

Space Needs Program

Proposed New
Millis Police Facility
Millis MA

Area/Room Title	SF/	Occpts.	Rm. Area	#of Rms.	Subtotal	Total
Public						
Lobby/Waiting	40 sf	5	200 sf	1	200 sf	
Vestibule	80 sf	0	80 sf	1	80 sf	
Public Toilets	65 sf	0	65 sf	2	130 sf	
Public Interview	25 sf	6	150 sf	1	150 sf	
Public Total:						**560 sf**
Dispatch Center						
Dispatch Room						
Dispatch Positions	65 sf	1	65 sf	1	65 sf	
Reception Desk	65 sf	1	65 sf	1	65 sf	
File/Equipment Area	100 sf	1	100 sf	1	100 sf	
Lockers	4 sf	8	32 sf	1	32 sf	
Break Room/area	20 sf	2	40 sf	1	40 sf	
Unisex Toilet	65 sf	1	65 sf	1	65 sf	
Dispatch Room Total:						367 sf
Emergency Operations Center	20 sf	12	240 sf	0	0 sf	
Unisex Toilet	65 sf	1	65 sf	0	0 sf	
Equipment Room	200 sf	0	200 sf	1	200 sf	
E-911 Equipment Room	40 sf	0	40 sf	1	40 sf	
Records Area						
File Area	60 sf	0	60 sf	1	60 sf	
Future Service Window	50 sf	1	50 sf	0	0 sf	
Records Area Total:						60 sf
Dispatch Center Total:						**667 sf**
Records/Data Processing						
Archives	180 sf	1	180 sf	1	180 sf	
Department Supplies	30 sf	1	30 sf	1	30 sf	
Records/Data Processing Total:						**210 sf**
Shared Patrol Assignment Office						
Shared Office						
Fire Arms Officer	40 sf	1	40 sf	1	40 sf	
Juvenile Officer	40 sf	1	40 sf	1	40 sf	
Court Liaison	40 sf	1	40 sf	1	40 sf	
Domestic Officer	40 sf	1	40 sf	1	40 sf	
Safety Storage	30 sf	1	30 sf	0	0 sf	
Fire Arms Supply	10 sf	1	10 sf	0	0 sf	
Shared Patrol Assignment Office Total:						**160 sf**

Area/Room Title	SF/		Occpts.	Rm. Area		#of Rms.	Subtotal		Total	
Patrol Administration										
Patrol Sergeant's Office										
Sergeants' workstations	40	sf	4	160	sf	1	160	sf		
Off Duty Storage Carrols	20	sf	4	80	sf	0	0	sf		
Patrol Sergeant's Office Total:									160	sf
Patrol Administration Total:									**160**	**sf**
Patrol Facilities										
Roll Call Room	25	sf	8	200	sf	1	200	sf		
Report Preparation	25	sf	3	75	sf	1	75	sf		
Armory	60	sf	0	60	sf	1	60	sf		
Weapons Cleaning	40	sf	0	40	sf	1	40	sf		
Patrol Storage	30	sf	0	30	sf	1	30	sf		
Patrol Facilities Total:									**405**	**sf**
Department Administration										
Principle Clerk's Office										
Clerical workstation	50	sf	0	50	sf	1	50	sf		
Visitor's Chair	10	sf	0	10	sf	2	20	sf		
File Area	20	sf	0	20	sf	1	20	sf		
Office work area	15	sf	0	15	sf	1	15	sf		
Principle Clerk's Office Total:									105	sf
Supply Closet	20	sf	0	20	sf	0	0	sf		
Chief's Office	225	sf	1	225	sf	1	225	sf		
Lieutenant's Office	150	sf	1	150	sf	1	150	sf		
Conference Room	20	sf	10	200	sf	1	200	sf		
Department Administration Total:									**680**	**sf**
Investigative Division										
Detectives Squad Room										
Detectives Work Space	40	sf	3	120	sf	1	120	sf		
File Area	40	sf	0	40	sf	1	40	sf		
Detectives Squad Room Total:									160	sf
Interview Rooms	50	sf	2	100	sf	1	100	sf		
Storage	30	sf	0	30	sf	1	30	sf		
Investigative Division Total:									**290**	**sf**

Area/Room Title	SF/		Occpts.	Rm. Area		#of Rms.	Subtotal		Total
Evidence and Property									
Evidence Receiving	10	sf	0	10	sf	1	10	sf	
Evidence Processing Laboratory	100	sf	0	100	sf	1	100	sf	
Evidence Storage	180	sf	0	180	sf	1	180	sf	
Drug Vault	15	sf	0	15	sf	1	15	sf	
Valuables Vault	10	sf	0	10	sf	1	10	sf	
Weapons Vault	60	sf	0	60	sf	1	60	sf	
Found Property	80	sf	0	80	sf	1	80	sf	
Evidence and Property Total:									**455 sf**
Training Unit									
Supply Storage	25	sf	0	25	sf	2	50	sf	
Training Classrooms	20	sf	40	800	sf	1	800	sf	
Furniture Storage	100	sf	0	100	sf	0	0	sf	
Training Unit Total:									**850 sf**
Staff Facilities									
Male Locker Room	15	sf	22	330	sf	1	330	sf	
Male Toilets	170	sf	0	170	sf	1	170	sf	
Male Showers	30	sf	1	30	sf	1	30	sf	
Female Locker Room	15	sf	4	60	sf	1	60	sf	
Female Toilets	170	sf	0	170	sf	1	170	sf	
Female Showers	30	sf	1	30	sf	1	30	sf	
Break Room	25	sf	6	150	sf	1	150	sf	
Fitness Center	80	sf	5	400	sf	1	400	sf	
Miscellaneous Toilets	65	sf	0	65	sf	2	130	sf	
Laundry	50	sf	0	50	sf	1	50	sf	
Staff Facilities Total:									**1520 sf**
Sally Port									
Vehicle Garage	500	sf	0	500	sf	1	500	sf	
Sally Port Total:									**500 sf**
Adult Prisoner Processing									
Processing Area	450	sf	0	450	sf	1	450	sf	
Temporary Holding Enclosure	15	sf	4	60	sf	1	60	sf	
Intoxilyzer Room	50	sf	0	50	sf	0	0	sf	
Prisoner Toilet/shower	65	sf	0	65	sf	1	65	sf	
Custodial	10	sf	0	10	sf	1	10	sf	
Linens/Blanket Storage	10	sf	0	10	sf	1	10	sf	
Interview Room	50	sf	2	100	sf	1	100	sf	
Prisoner/Visitor Booths	25	sf	1	25	sf	0	0	sf	
Adult Prisoner Processing Total:									**695 sf**

Area/Room Title	SF/		Occpts.	Rm. Area		#of Rms.	Subtotal		Total	
Adult Detention										
Male Cells	135	sf	1	135	sf	2	270	sf		
Female Cells	135	sf	1	135	sf	1	135	sf		
Isolation Cells	135	sf	1	135	sf	0	0	sf		
Adult Detention Total:									**405**	**sf**
Juvenile Detention										
Juvenile Cell	135	sf	1	135	sf	1	135	sf		
Juvenile Detention Total:									**135**	**sf**
Systems Development (combined with Dispatch Equip Room)										
IT Area	60	sf	0	60	sf	1	60	sf		
Computer Network Room	120	sf	0	120	sf	1	120	sf		
Equipment Storage	50	sf	0	50	sf	1	50	sf		
System Development Total:									**230**	**sf**
Facility Maintenance										
Custodial Closets	20	sf	0	20	sf	1	20	sf		
Equipment Storage	60	sf	0	60	sf	1	60	sf		
Facility Maintenance Total:									**80**	**sf**
General Storage										
General Storage Room	80	sf	0	80	sf	1	80	sf		
General Storage Total:									**80**	**sf**
Vehicle Storage Garage										
Vehicle Storage Bay	400	sf	0	400	sf	1	400	sf		
Parts Storage	40	sf	0	40	sf	1	40	sf		
Vehicle Storage Total:									**440**	**sf**
Vertical Circulation										
Stairs	180	sf	0	180	sf	0	0	sf		
Elevator	50	sf	0	50	sf	0	0	sf		
Elevator Machine Room	40	sf	0	40	sf	0	0	sf		
Vertical Circulation Total:									**0**	**sf**

Area/Room Title	SF/	Occpts.	Rm. Area	#of Rms.	Subtotal	Total
Building Services						
Boiler Room	400 sf	0	400 sf	1	400 sf	
Sprinkler Equipment	80 sf	0	80 sf	1	80 sf	
Electrical Equipment	100 sf	0	100 sf	1	100 sf	
Emergency electrical equipment	40 sf	0	40 sf	1	40 sf	
Emergency Generator						Outside
Air Handling Equipment	1000 sf	0	1000 sf	0	0 sf	Attic
Building Services Total:						**620 sf**
Net to Gross Adjustment						
Total Net Area						9,142 sf
Net to Gross Adjustment (Net Area x 0.35)						3,200 sf
Gross Area Total:						**12,342 sf**

Section 3 – New Police Station Building Systems Design Narrative

ARCHITECTURE

The new Police Station design shall incorporate 12,300 square feet of program space into a one-story building with forms and features consistent with the character of the Millis Town Center. The building will be situated on the site so that the structure is on the south portion of the property with public access from Main Street and the visitor parking area located along Auburn Road. Setbacks for the property will be in accordance with the Town design guidelines and shall correspond with the new commercial development to be completed on the adjacent property.

The building program indicating all recommended room requirements and square footages is included with this report.

SITE ACCESS

The existing public parking along the north side of the property will be redesigned with access to the municipal lot adjacent to the east will remain. A clear separation between staff and public parking on the north side of the property will remain. Pedestrian access to the building is directly from Main Street and from the visitor's parking area along Auburn Road. Separate access to the building for Police and staff is located in the rear directly into the sallyport and the detention area. An additional staff access to the building is located off of Auburn Road.

EXTERIOR ENVELOPE

Exterior materials for the new building include the use of 6" clapboards, "hardi board" constructed on load bearing masonry walls. Insulation for the building envelope will consist of rigid insulation under the slab and at the perimeter of the foundation wall. Exterior walls will include spray cellulose insulation. The roof will be constructed with attic roof trusses clad in architectural asphalt shingles. All wood trim, fascia boards and soffits shall be constructed of a wood composite to minimize maintenance. Windows will be fiberglass clad wood windows with tempered glass in the public areas and in sections of the building where security is of a concern.

BUILDING INTERIOR

Interior partitions for the office and public areas shall be constructed of 5/8" drywall on metal stud with corridor walls being constructed of load bearing masonry. Partitions for the detention area will be constructed of 8" painted concrete masonry units. Wood wainscoting shall be installed in all public and office locations. Transaction desks, public counters and casework shall be constructed of plastic laminate. Ceramic wall and floor tile will be installed in all Toilet Rooms. Flooring for Public spaces and patrol will be resilient flooring. Detention area floors and Locker Rooms will be exposed concrete with an epoxy finish. The Fitness Room floor will be sports flooring. Acoustical ceiling tile will be used throughout the facility with drywall soffits are required.

Toilet rooms, including all selection fixtures, shall be designed in compliance with IBC, ADA and MAAB requirements. The facility is a one story with no basement and therefore requires no elevator. A stair is included in the design for access to the attic space which can also be used for dead storage.

DETENTION AREA

The booking and detention areas of the new Police Station are located in the rear to provide a separation from the public area of the facility. Providing safety and privacy of those in police custody is very important to successful law enforcement and the layout of spaces with the station need to provide for these considerations. Police access to the building is on the rear and is also separate from the public entrances. Covered parking spaces for patrol cars as well as the sallyport and garage are on the rear of the building to provide a smooth and efficient transfer of detainees from patrol cars to the booking area.

SECURITY

The dispatch is located directly off of the building entry and Lobby with visual control of the public spaces and entrance. Walls and glazing for the Dispatch and some administrative areas shall be constructed of bullet resistant material and the interior windows are to include bullet resistant glazing. Detention cells shall be designed to maximize visual oversight with durable stainless steel fixtures. Doors and interior windows for the Detention Area will be bullet resistant. Security cameras will be provided throughout the interior and exterior of the facility.

Detailed lists of proposed building materials for the New Police Station are listed in the construction cost estimate for the project. Building Conceptual Design plans and elevations and site plan are included with this report.

STRUCTURAL

Foundations for the building shall be constructed of cast-in-place concrete and will be supported by spread footings. Geotechnical investigations of the site completed for the project indicate that the existing soil is suitable for construction of a building of this type and can be supported with a concrete spread footing. No basement is currently planned for the building and foundations shall be constructed approximately 4 ½' below grade.

Structural framing for the building shall consist of load bearing masonry walls. The canopy on the west façade will be supported with steel columns and beams. The buildings sheer lateral loads are resisted with masonry shear walls and cross bracing as needed. Shear walls are connected to the steel framing with angle clips, anchors and welded reinforcing bars. The roof structure consist of wood trusses with a span of 40' and 72' The building structure will be designed for the following live, snow, wind and seismic loads:

Snow Load:	35 Pounds per square foot (PSF)	
Live Loads:	Office:	50 PSF
	Corridors & Lobbies:	100 PSF
	Mechanical Rooms:	200 PSF
	Partitions:	20 PSF
Wind Loads:	Basic Wind Speed at 90 MPH	
Seismic Load:	Av = 0.12	
	S = 1.2	

MECHANICAL, ELECTRICAL, PLUMBING & FIRE PROTECTION

FIRE PROTECTION

A new sprinkler system shall be provided in accordance with the State Building Code and the 2007 edition of NFPA 13. A new dedicated underground water service shall be provided from the municipal water supply to the building interior. A new backflow preventor assembly with main alarm valve riser(s) shall also be provided. The new sprinkler equipment shall be housed in a mechanical space similar to the domestic water service equipment. A separate sprinkler room is not required but may be included at the owner's or designer's discretion. To supplement the city water supply, a fire department inlet connection shall be provided on the exterior of the building and tied directly into the sprinkler system risers.

The sprinkler system shall be divided into two zones. The majority of the floor will be on a single zone while the jail cells will be served by a separate zone to facilitate an emergency shutdown of those sprinklers should tampering occur. The sprinklers in areas subject to tampering or intentional physical damage such as the jail cells and booking areas shall be institutional type. The sprinklers in the spaces with finished suspended ceilings are proposed to be quick response concealed with white cover plates. The sprinklers in the spaces without finished ceilings (exposed structure) are proposed to be quick response upright, brass finish. The carport shall be protected with dry sidewall sprinklers fed from the wet sprinkler system.

Water supply data is not available at the time of publishing this report. Considering the structure is one story, it is not anticipated that a fire pump will be required. A new hydrant flow test is required prior to finalizing design so the proper pipe sizing criteria can be established.

A standpipe system is not proposed for the building as it is not prescriptively required by the State Building Code because the highest finished floor is less than 30' above grade.

PLUMBING

The work under this Section shall include the furnishings of all materials, labor, equipment and supplies and the performance of all operations to provide complete working systems, in general, to include the following items:

1. Piping – General
2. Roof Drainage, Waste and Vent Piping
3. Indirect Waste Piping
4. Hot and Cold Water Piping
5. Non-potable Cold Water Piping
6. Gas Piping
7. Tempered Water Piping
8. Unions and Flanges
9. Pipe Joint Materials
10. Water Hammer Arrestors
11. Gauges and Thermometers
12. Hangers, Inserts and Supports
13. Seismic Restraints
14. Sleeves, Firestopping

15. Valves
16. Hose Bibbs
17. Plumbing Fixtures and Trim
18. Backflow Preventers
19. Drains – Floor, Roof, and Area
20. Traps
21. Cleanouts
22. Gas Fired Water Heater
23. Thermostatic Mixing Valves
24. Domestic Water Service Meter
25. Gasoline/Sand Interceptor
26. Safe Waste Pans
27. Insulation
28. Watertight Sleeves
29. Access Panels
30. Cleaning and Testing
31. Portable Emergency Eye Wash
32. Operating and Maintenance Manuals
33. Coordination Drawings
34. Shop Drawings
35. Record (As-Built) Drawings

Phasing

There is no phasing associated with the construction of this project. Refer to the overall schedule for additional detail.

Design Criteria

Local and state building codes and health department codes:

1. Building Code: Massachusetts State Building Code 780 CMR, 8th Edition.
2. Plumbing Code: Massachusetts Fuel Gas and Plumbing Code 248 CMR.
3. Cross Connection Control: Massachusetts: Department of Environmental Protection 310 CMR, 22.22.

Domestic Water Service

A new four inch domestic water service beginning at a point 10' – 0" outside the foundation wall will be brought into the building. The service will be fed from an existing main located in Main Street. Connection to the main will be by site Utilities. The service will enter the first floor mechanical room, be metered and distributed throughout the building.

The domestic water service below ground shall be cement lined ductile iron Class 52 with mechanical joints and retainer glands.

Hot And Cold Water Distribution

Provide a complete domestic water distribution system including supply to fixtures, hose bibbs, trap primers and HVAC make-up.

Hot water, cold water and tempered water piping above ground shall be Type L hard drawn copper tubing with cast brass or wrought copper fittings and 95/5 solder joints.

An approved reduced pressure backflow preventer shall be provided on the make-up water supply to the HVAC equipment. The backflow preventer shall be installed in accordance with the Massachusetts Department of Environmental Protection and be complete with shut-off valves and strainer.

Sanitary Waste And Vent

A complete sanitary waste and vent system serving all plumbing fixtures, kitchen equipment, and floor drains will be provided. A four inch sanitary sewer will exit the building by gravity and will extend to a point 10' – 0" outside the foundation wall. Continuation of the sanitary sewer will be by site utilities.

Pipe and fittings below ground shall be service weight cast iron hub and spigot pipe with resilient gaskets. Pipe and fittings aboveground shall be cast iron hubless pipe with Heavy Duty Stainless Steel Band Coupling With Neoprene Gasket. Bank Torque Of 80 Foot-Pounds. 15 PSIG Pressure Rating. Husky SD 4000 Or Clamp-All Hi-Torq 80 or DWV copper pipe with soldered joints.

A gasoline/sand interceptor shall be provided on the waste line serving the Carport and Sallyport Area trench drains. The interceptor shall be sized in accordance with state plumbing code and shall be vented by this contractor independently through the roof. The interceptor shall be located to allow for servicing.

Roof Drainage

The roof will be drained by means of gutters and downspouts. Downspout boots shall be provided at locations designated by the architect. The boots shall extend below grade and discharge by gravity outside of the building to a point 10' – 0" outside the foundation wall. Continuation of the roof drainage will be by site utilities.

Provide an independent secondary roof drain system as required by the Massachusetts Building Code 8th Edition. Point of discharge shall be above grade.

Pipe and fittings below ground shall be service weight cast iron hub and spigot pipe with resilient gaskets. Pipe and fittings aboveground shall be cast iron hubless pipe with Heavy Duty Stainless Steel Band Coupling With Neoprene Gasket. Bank Torque Of 80 Foot-Pounds. 15 PSIG Pressure Rating. Husky SD 4000 Or Clamp-All Hi-Torq 80.

Underslab/Foundation Drains

Furnish and install underslab/foundation drains as noted on the structural plans. Provide cleanouts and backwater valves as necessary. Pipe shall be PVC perforated pipe, ASTM-2729 with bell and spigot joints. Provide nonwoven filter fabric as a drainage medium.

Natural Gas

Gas meter and piping to the meter from the gas main will be provided by the Gas Company. Pay charges associated with Gas Company installation. Gas piping provided under this Section shall begin at building side of gas meter.

Natural gas will be provided for heating and generating domestic hot water; Gas will be low pressure, will be fed from an existing distribution system in Main Street and will be brought to the building by the National Grid Gas Company.

Natural gas piping up to 2 ½ inches shall be Schedule 40 black steel with malleable iron threaded fittings. Piping 3 inches and larger shall be Schedule 40 black steel with welded joints.

For pipe sizes 2 inches and smaller, valves shall be a ball valve with screwed end, T-Handle. For pipe sizes 2 ½ inches and larger, valve shall be iron body lubricated plug valve with flanged ends.

All above ground exterior gas piping or piping located in a corrosive atmosphere shall be protected by a coating of high density polyethylene or a wrapping of an inert material.

Fixtures

Plumbing fixtures, including water closets, urinals and lavatories shall be of the highest quality vitreous china, white in color and shall be manufactured by American Standard, Kohler Toto or approved equal.

Flushometers shall be chrome plated low consumption, type manufactured by Sloan, Toto, Zurn or approved equal.

Faucets shall be metering/mixing type with temperature limit and time stop adjustment. Faucets shall be manufactured by Chicago, Toto, or approved equal.

Prison cell fixtures shall be as provided by Wiiloughby Industries or approved equal.

Domestic Hot Water

Domestic hot water shall be generated by an atmospheric gas fired tank type water heater located in the first floor Mechanical room. The water heater shall be as provided by PVI Industries.

The hot water heater shall be equal to Model 14 L 125A-G, have 125 gallons of storage and be able to provide 191 gallons per hour of hot water recovery with a 100 degree Fahrenheit temperature rise. Heaters shall produce 140 degree Fahrenheit hot water.

The system shall be complete with a high low mixing valve system as provided by Leonard, Powers, or approved equal. Distribution temperature of the hot water shall be 120ºF.

Provide an all bronze circulation pump at water heater complete with immersion aquastat control, wiring, check valve on pump discharge and dial type thermometer on pumps suction. Pump shall be flange mounted.

Pump shall be Taco or equal by Bell & Gossett or Grundfos.

Water heater shall be installed in a safe waste pan and shall be provided with a leak detection system as provided by First Smart Sensor Technology or approved equal.

Insulation

Insulation will be provided on all hot and cold water piping, tempered water, horizontal roof drainage, roof drain bodies and all piping at handicapped accessible fixtures.

insulation shall be four pound density fiberglass with factory applied white fire retardant, reinforced vapor barrier jacket. Insulation shall be 1 inch thick and continuous through sleeves.

Pipe fittings and valves shall be provided with pre-molded PVC covers with fiberglass inserts.

Seismic Restraints

Plumbing piping and equipment shall be braced, anchored or supported to withstand seismic displacements in accordance with the Massachusetts State Building Code, 8th Edition.

Supports, hangers and bracing for required piping and equipment shall be designed by a professional engineer. Submittals shall include shop drawings calculations and cut sheets for all seismic restraints.

HVAC

The new Police Station will be served by two 2,000 MBH gas-fired condensing boilers and (2) 12.5 ton RTU. Each boiler will have a 1/3 HP variable speed in-line pump feeding two inch hot water supply and return piping with distribution to FTR, CUH and UH. HW piping will be a 250 ft reverse return loop feeding 250 ft of FTR in perimeter spaces, (3) egress doors each with a CUH and (2) UH in the Sallyport and Vehicle Storage. Each piece of terminal heating equipment will have a modulating control valve.

Two 12.5 ton gas-fired DX RTU will serve the Police Station. Each 5,000 cfm, variable volume unit will have 30x14 medium pressure supply duct serving (8) variable air volume (VAV) boxes and 36x16 return duct. Each VAV box will have a space mounted thermostat and and (3) spaces will demand control ventilation. There are 40 supply diffusers and 30 return grilles served by these two RTU.

Seven new exhaust systems will serve this building with all fans located on the roof and provided with roof curbs. Fans will serve the following areas and have the listed exhaust rates:

1. Fitness and Men's/Woman's Locker Rooms – 700 cfm.
2. Holding Cells (Qty. 4), Temp Holding Cell, Shower and Gun Cleaning – 700 cfm.
3. Toilet Rooms (Qty. 5), Kitchenette and Janitors Closet – 400 cfm.
4. Evidence, Drug Evidence, Gun Evidence and Fingerprint Room – 400 cfm.
5. Electric Room – 200 cfm.
6. Clothes Dryer Room – 100 cfm.
7. Sallyport – 300 cfm.

A filter will be provided with the exhaust grille for the Gun Cleaning Room. The Electric Room fan will have a space mounted thermostat. The Clothes Dryer fan will have a pressure operated switch. The Sallyport will have flexible hose for direct connection to the vehicle. All other fans will operate on a time clock.

Dedicated cooling will be provided for the Equipment Room (911) and Tel/Data/IT. The Equipment Room will have (2) 7.5 ton split system DX air-conditioning units, and Tel/Data/IT will have (2) 2 ton split

system DX air-conditioning units. Condensing units will be located on the roof. Each space has two units for primary/standby operation for redundancy.

Equipment controls will be a web based DDC system with the boilers, RTUs and associated controls tied into the BMS. Split system air-conditioners will not have DDC.

ELECTRICAL

New building outlined in the overview section shall be equipped with dedicated electrical services rated @ 208Y/120-volt, 3 phase, 4 wire.

Emergency power for Life-safety emergency, Standby emergency and Legally Required Standby emergency loads shall be provided via diesel generator.

Building shall be provided with stand-alone addressable fire alarm systems for early detection. All notification devices shall be speaker/strobe units.

The work under this Section shall include the furnishing of all materials, labor, equipment and supplies and the performance of all operations to provide complete working systems.

Design Criteria

Refer to the attached Schematic Design Service Calculations for the basis of design for the incoming Utility Service size.

Electric Services

Building shall be serviced via pad-mounted transformer located adjacent to the building. High voltage service to the transformer shall be provided by NSTAR from transmission lines located in adjacent streets.

Provide grounding of the transformer pads and underground secondary service entrance conductors (copper conductors in Schedule 40 PVC, concrete encased). Primary shall be in accordance with scope defined for the Site (beyond 10' buffer from building).

The main electric room shall contain the proposed 600-Ampere 120Y/208-volt main utility metering switchboard (MSB1). Main breaker shall be 80% rated insulated case with an adjustable LSI electronic trip unit and customer metering. Distribution over-current protective devices shall be bolt-on thermal magnetic circuit breakers. All bus shall be copper. AIC based upon infinite bus for available fault from the utility shall be 65,000 Amperes symmetrical.

The MSB1 shall be provided with an external TVSS, capable of a Maximum Surge Current Rating of 125kA per mode (250kA per phase).

Electrical Distribution

Provide one (1) 225 Amp MLO, 208Y/120-volt, 3 phase, 4 wire, 42 pole Mechanical panelboard. The panel shall be provided with bolt on circuit breakers for connection to mechanical and plumbing equipment rated 480Y/277-volt.

Provide two (2) 225 Amp MLO, 208Y/120-volt, 3 phase, 4 wire, 42 pole lighting panelboards.

Provide two (2) 225 Amp MLO, 208Y/120-volt, 3 phase, 4 wire, 42 pole Receptacle panelboards. Each panel shall be equipped with a 150A-3P main circuit breaker device. Panels shall be equipped with 15 and 20 Amp, 120-volt bolt on circuit breaker devices for connection to 120/208-volt loads.

Provide one (1) 100 AMCB 208Y/120-volt, 3 phase, 4 wire, 42 pole IT panelboard. Panel shall be equipped with 20 Amp 120-volt bolt on circuit breaker.

All panelboards shall be provided with copper bus, bolt on circuit breakers and have door-in-door construction.

Wiring methods for all feeders shall be EMT for interior and rigid steel where exposed exterior. All feeder conductors shall be copper.

Emergency Power Generation

Provide (1) 150/187.5kw/kva, 208/120-volt, 3 phase, 4 wire diesel powered emergency generator to service entire building electric service.

Unit shall be a diesel powered emergency generator system to service designated life-safety emergency, legally required standby and optional standby loads.

All generator units shall be enclosed within sound attenuated weatherproof enclosure supplied by the generator manufacturer. Fuel shall be stored within a base mounted UL listed double wall tank.

Transfer switches shall be 4 pole with bypass isolation ASCO or equal by Russelectric for life safety.

In general, the following loads shall be applied to the Life-Safety Emergency distribution system:

- Egress and exit lighting
- Fire alarm system
- Fire pump (where applicable)

Emergency Power Distribution

The generator shall be equipped with two (2) output circuit breakers for connection to emergency loads/automatic transfer switches. Provide one (1) unit mounted 100A-3P, one (1) 600A-3P enclosed circuit breakers with LSI electronic trip units located within generator enclosure. Breakers shall be wired to emergency side of transfer switches listed in section below.

Provide three (3) 4-pole Automatic transfer switches with bypass isolation.

- ATS-SB 600A-4P
- ATS-LS 100A-4P

Provide one (1) 100 Amp MLO, 208Y/120-volt, 3 phase, 4 wire panelboard. Panel shall be provided with feed through lugs for connection to additional life-safety lighting panels. Panel shall be connected to load side of ATS-LS for connection to Life-Safety emergency loads.

All panelboards shall be provided with copper bus, bolt on circuit breakers and have door-in-door construction.

Wiring methods for all feeders shall be EMT for interior and rigid steel where exposed exterior. All feeder conductors shall be copper.

General Power Requirements

Provide general-purpose convenience outlets throughout all spaces spaced no more than 40'-0" on center. Mounting height shall be 18" AFF. No more than four (4) general convenience circuits shall be wired to a common 20A-1P circuit.

Provide no fewer four (4) dedicated 120-volt 20-ampere GFCI protected receptacles for each Kitchen/Pantry space.

Provide 4 circuit, 8 wire network branch circuit to all furniture partition clusters. Branch circuit network shall consist of (2) 20A-2P circuit breakers and (4) #12, (2) #10N & (2) #12G – ¾"C.

Provide GFCI protected outlets in each restroom, locker room, at each building elevation at rooftop equipment locations.

Provide power connection to all water coolers.

Plugmold shall be single circuit, rated for 20 Amp, 125V, 2 pole, 3 wire (maximum length 6'). Each section shall be connected to a dedicated 20Amp, 120V circuit. Where located in close proximity to water or damp locations circuits shall be ground fault type.

Provide general-purpose convenience outlets throughout storage areas etc spaced no more than 25'-0" on center. Mounting height shall be 30" AFF or 6" above counter height.

Lighting Systems

Lighting shall be provided in accordance with the architectural reflected ceiling plans, the fixture schedule and the specifications and system descriptions that follow.

Lighting design levels are as follows:

- General open areas/Administrative areas 30 foot-candles maintained with task lighting
- Perimeter offices 30 foot-candles maintained (Daylight Harvesting to be employed) with task lighting

- Corridors 20 foot-candles maintained
- Holding cells 30 foot-candles maintained
- Storage areas 20 foot-candles maintained.
- Reference rooms/libraries 50 foot-candles maintained

Interior lighting fixtures for Administrative & office type applications shall utilize energy efficient fluorescent lamps with high frequency electronic ballasts in conjunction with LED lamp sources whenever possible. The selection of lighting fixtures and layouts shall be coordinated effort between the Architect and Electrical Engineer.

LED/HID lighting shall be provided at the exterior of all entrance/egress doors; surface mounted unless overhead available for recessed fixtures.

Grounds shall be illuminated via building mounted HID floodlights and/or LED luminaires wherever possible.

Grounds shall be illuminated via architectural HID and/or Light Emitting Diode (LED) pole top cutoff fixtures and bollards mounted on concrete pedestal foundations.

Lighting Controls

Lighting in small storage areas, private offices, etc. shall be via occupancy sensor control. Individual perimeter offices shall be controlled via daylight sensors to automatically dim lamps (day-light dimming) based on pre-set light levels to take advantage of daylight where possible.

Corridor lighting shall be programmed for On-Off operation with occupancy sensors to activate lighting during unoccupied periods.

Exterior lighting shall be controlled by photocell ON and either timed sweep or photocell OFF dependent upon function and location.

Emergency lighting shall be via emergency generator to selected fluorescent and incandescent lighting. Switched lighting shall be automatically energized via a supervisory relay on loss of Normal Power. Emergency lighting shall be provided at the building exterior at all egress points.

Mechanical systems

For exact quantities of Mechanical equipment refer to Mechanical Basis of Design narrative.

HVAC

Provide ATC contractor 120 volt power for deriving low voltage control at multiple locations.

Install heat trace systems on exterior piping requiring freeze protection. Circuits powering heat trace shall be Ground Fault equipment rated.

The electrical contractor shall provide all required disconnects, magnetic starters and variable speed drives necessary for the operation and control of all supplied HVAC equipment.

Fire Protection

Wire sprinkler tamper and flow devices provided and installed by the Fire Protection contractor for trouble and alarm indication into the fire alarm control panel.

Provide power to a dry pipe sprinkler system air compressor control panel and wire associated alarm and trouble signals to the fire alarm control panel. Each flow switch shall be independently zoned.

Tamper switch actuation shall initiate system supervisory alarms.

Archival spaces may require dedicated fire protection system.

Fire Alarm

Provide networkable, addressable fire alarm systems equal to Simplex, Edwards, Notifier for initiation device monitoring and evacuation signal initiation.

Fire Alarm system shall be stand-alone, but systems shall be networked for future mass notification enhancement and for central monitoring capabilities.

In general fire alarm initiation devices shall be located @ the following locations:

- Provide manual pull stations @ each egress door or stairwell
- Provide Sprinkler flow and tamper switches
- Provide smoke and heat and carbon monoxide detectors where required by State and local building codes. Detectors shall be analog addressable to provide means of alarm verification and define maintenance cycles.
- Building shall be provided with smoke detector coverage at the electric rooms, storage rooms and elevator lobbies (where applicable).
- Provide analog addressable duct smoke detectors. Provide addressable control modules for interface with the HVAC equipment for automated shutdown.

Alarm notification shall be via speaker/strobe units in compliance with ADA requirements for strobe illumination levels. Strobes shall be synchronized. Synchronized temporal code 3 tone shall provide direction for evacuation upon alarm initiation.

Wiring methods for all fire alarm initiation and notification circuits shall be Type MC where concealed and

Utilize EMT conduit raceway where exposed interior. Type CI cable shall be utilized for all interconnecting communications cables between panels and for NAC circuits which originate outside of the alarm zone. MC shall be listed for fire alarm service and identified with continuous red markings. EMT shall be identified as fire alarm service by red spray painted couplings and junction box covers.

The fire alarm systems shall be interconnected with the lighting controls and dimming systems (where applicable) to bring lighting to full illumination upon an alarm signal.

The fire alarm systems shall be interconnected with the security system to unlock all doors upon an alarm signal.

Fire department notification shall be via buildings master box. A signal shall be forwarded to security desks for both system trouble and alarm.

Telephone / Data / Security

Incoming services for telephone / data and security shall be provided via (4) 4" PVC conduits from service provider to each respective tele/data service entrance location (MDF). Two (2) active conduits and two (2) spare conduits.

Building will contain an MDF location for service entrance. Provide sleeves and raceway between each MDF and IDF. Raceway shall consist of J-Hooks on 4'0" intervals.

All MDFs / IDFs will contain a grounding bus bar connected to building steel via exothermic connection via #2/0 AWG conductor. All equipment (conduits, raceway, cable tray, racks, etc) located within the MDF/ IDF will ground to the rooms ground bus bar via #6AWG conductor.

The electrical contractor shall be responsible for device provisions only at the room level, consisting of box eliminator and pull string to ceiling above.

All low voltage cabling for telephone, data, video, security, etc shall be specified and installed by the Owners Tele/Data Consultant.

Provide security systems at building for monitoring all first floor doors with door contacts and motion sensors for all floor corridors, Foyer and Lobby, exterior parking areas and yards. Activation shall be via keypad at main entry lobby. Interface with dialer to Security. Note: At Police Station security system shall be more robust and be capable of monitoring all holding cells, waiting rooms, corridors and corridors on each level.

Provide a color CCTY monitoring system viewing all first floor egress doors and exterior parking areas/yards. All cameras shall be displayed via one central monitor and recorded via 48 hour slip time system to allow display of past 48 hours events. Interface with the security system to switch monitor views to active doors. Note: At Police Station security system shall be more robust and be capable of monitoring all holding cells, waiting rooms, corridors and corridors on each level.

Lightning Protection

Provide lightning protection systems at building, designed and installed in accordance with NFPA 78 and UL 96A requirements. The system shall be inspected and a UL Lighting Protection Inspection Certificate shall be obtained by the installing contractor.

A 4/0 copper ground loop shall be installed around the building perimeter to bond all down conductors and building structural steel.

All system components shall be copper.

Public Address

Provide centralized paging systems in the building for annunciation throughout all common spaces. Provide with individual localized volume controls to over-ride central controls. Announcement and music interface shall be provided at the main console.

Section 4 – Fire Station Existing Conditions Report

ARCHITECTURE

The existing facility currently used as the Millis Police and Fire Departments is a two-story building with three apparatus bays, two ambulatory bays and two bay sallyport.

The entire structure has a gross square footage (GSF) of 9,639. The first floor of the facility occupies 7,992 gross square feet, 1,697 GSF on the second floor. The building construction consists of exterior masonry walls, with wood framed floors and roofs. The wood framing of the apparatus bay is supplemented with metal trusses spaced approximately 15 feet apart. The apparatus bay and portion of the first floor are slab on grade.

Since the construction of the facility in the late 1950s, other than minor improvements and the 1996 Ambulance Service addition, the facility has virtually remained unaltered.

Building Square Footage		
Floor	**Area/ Current Use**	**Square Footage**
First Floor	Apparatus Bay, Fitness and Support	7,992
Second Floor	Dormitories and Toilet Rooms, Day Room	1,697
	Total:	**9,689**

Currently, the station is manned by three firefighters per shift. The primary apparatus bay consists of three bays exiting onto Main Street, and two other smaller bay doors existing onto the rear of the facility. The bays off of the rear are relegated to the ambulances. Storage for firefighter's equipment and supplies are within the apparatus bays.

The administrative portion of the facility is located on the first floor adjacent to the entry. Fire fighters living quarters are on the first floor of the facility. The living quarters consist of one room serving as kitchen, dining and sleeping area. The second floor consists of administrative space for the Police Department.

Overall the facility is in good structural condition. The following is an architectural evaluation of the station assessed in the following categories:

1. Life safety and code compliance.
2. Accessibility.
3. Waterproofing systems.
4. Integrity of doors, windows, and exterior walls.
5. Interior finishes.
6. Fire department operational issues.
7. Structural.
8. Mechanical.
9. Electrical.
10. Plumbing.

Life Safety and Code Compliance

1. The existing facility does not have a fire suppression system. A new sprinkler system shall be provided in accordance with state building code and 2007 edition of the NFPA 13.

2. The apparatus bays have existing dedicated exhaust systems in place that shall remain.

3. Exit signs are missing, mounted too high or not located properly.

4. Existing stairs and handrails throughout the facility are deficient in a number of ways. New handrails shall be provided.

    a. The diameter and shape of the handrail are incorrect.
    b. The handrails do not have the proper extensions at platforms and landings.
    c. Handrails are at the wrong heights.

5. There are numerous penetrations through rated walls, ceilings and floor assemblies that do not have the required fire stopping.

Accessibility

Since construction of the facility, handicapped requirements have slowly been increased. In 1990, congress passed the "Americans with Disabilities Act" (ADA), which set federal guidelines for the accessibility of buildings by individuals with disabilities. Using ADA, and the Massachusetts Architectural Access Barriers requirements, it has been determined that the Millis Police/ Fire Station is deficient in providing barrier-free access, both in site access and to spaces within the building. Field investigations identified the following issues that need to be addressed:

1. All doors with closers need the speed and pressure adjusted.

2. Many of the doors do not have the proper push and pull clearances.

3. Fire extinguishers, exterior pullboxes and switches are not accessible.

4. Much of the door hardware throughout the building does not comply with accessibility requirements.

5. Existing toilet room sizes, fixtures and accessories are non-compliant with accessibility requirement. New accessible toiled rooms shall be provided on the first and second floor.

6. Exterior doors, other then the front door and from the apparatus bay, are only accessible via a step and consequently do not comply with current accessibility requirements. This is also true for the step between the first floor corridor and existing sallyport.

7. All interior signage need to be upgraded to include Braille and mounted at the correct height.

8. The facility has two levels with no elevator connecting them. Designing the second floor so that it will only be utilized by able bodied firefighters is typically permitted, however a variance is required.

Waterproofing System

Generally, the roofing systems are in fair condition and their warranty periods have either passed or will have passed prior to the start of construction. Recommendations per our field investigation are:

1. The existing asphalt shingle roof over the second floor area needs to be replaced with a new 30 year asphalt shingle roof. The new insulation in the attic area needs to be inspected and determined whether replacement is required.

2. All flat roofs are to be removed down to the existing deck. New EPDM roofing system shall be provided, including underlayment board, vapor barrier, rigid roof insulation, protection board and fully adhered EPDM membrane.

3. Aluminum downspouts, gutters and fascia trim at roof parapets and edges are in fair to good condition and at this time only require pointing.

4. All sealant and caulking joints should be evaluated. It is expected that they have outlived their life expectancy and need to be repaired.

5. There are drainage issues on the existing flat roofs. Tapered insulation will be used on the existing structure to properly direct water to roof drains.

6. The existing facility was constructed during the late 50's, when energy conservation was not an issue. Based on visual inspection it appears that the existing walls were left untouched. Consequently the facility is lacking insulation within the stud cavity space; additionally there is no continuous vapor barrier or infiltration barrier as required by the Massachusetts Energy Code. The ambulance service addition built in 1996 does have 2" rigid insulation in the brick CMU back up cavity wall and rigid insulation on the roof.

Integrity of Doors, Windows and Exterior Walls

Visually, the exterior envelope of the facility appears to be in satisfactory condition. Our field investigations revealed the following:

Doors

1. The weather stripping at the exterior doors is either missing or in poor condition.

2. All door hardware should be evaluated and modified to comply with current codes and guidelines.

3. The overhead doors at the ambulance bay are in fair shape. Some of the operators have been upgraded. The older operators will need to be replaced.

Windows

1. Windows throughout the facility are the original un-insulated double-hung with aluminum storm windows on the exterior and fixed aluminum framed un-insulated transom windows at the apparatus rooms. While the windows are visually in good condition they do not properly seal out the weather, they are not insulated, and most of the sash cords and weights are no longer operational. .

   We recommend that all of the windows be removed and replaced with aluminum clad insulated windows, with divided lights to match existing. The interior and exterior window sills have indications of water damage and should also be repaired or possibly even replaced.

Exterior Walls

The existing masonry facade appears to be in very good condition for its age.

1. A cursory review of the brick façade revealed that the brick has performed very well. Very few cracks or spalled bricks were observed, typically the cracks identified have been filled with either a caulking or a cementitious product. Refer to the Structural portion of the report for additional information.

2. The existing exterior trim and decorative molding needs to be scraped, primed and repainted or replaced in some instances.

3. Exterior conduits, metal railings and piping needs to be scraped, primed and painted.

Interior Finishes

The conditions of the interior finishes within the facility generally vary with the extent of their use. The majority are in good condition. Overall, the facility has been very well-maintained.

1. Interior walls of the administrative offices are in good conditions, no plaster cracking was evident in the walls or the ceilings.

2. The suspended ceilings on the first floor and second floor are in good shape; however there are indications of staining from leaking plumbing fixtures or condensate. Due to the reconfiguration of interior spaces, all suspended ceilings shall be replaced.

3. The existing VCT flooring, is in good shape, with some replacement and abatement required.

Fire Department Operational Issues

Currently there is no accreditation standard for fire stations. Typically each station is designed to suite the specific requirements established by the end users. In discussions with Fire Department personnel the following deficiencies were identified:

1. The stations administrative spaces are greatly undersized.

2. Currently the stations circulation between public, firefighters and administration has no clear circulation separation between the three.

3. The rear apparatus bay is strictly dedicated for ambulances and the perimeter of the space is overcrowded with tools and equipment. This space should be better reconfigured and structured to provide more usable space.

4. Currently there is no separate area for gear storage. Gear is stored in open lockers within the apparatus bay. Since not all of the vehicles are attached to vehicular exhaust system, diesel particulates are being exhausted and deposited on firefighter's gear.

5. The only toilet room facility on the first floor available for the firefighters is extremely small.

6. There is no public Toilet Room.

7. There is no training room. Currently the second floor open space is utilized for training.

8. The size of the apparatus floor cannot accommodate all of the department's vehicles. Some of the apparatus and equipment are currently stored in rear of the facility and are exposed to the elements year round.

9. Oxygen rescue tanks and gear are stored and filled on the apparatus floor and not in a separate contained area.

10. The facility does not have a decontamination area. All contaminated equipment is hosed down within the apparatus bay.

11. There is no dedicated area for a washer and dryer. Additionally, the facility does not have a washer extractor to wash firefighter protective gear.

12. Current storage areas are tight, with storage overflow. Storage of building supplies is scattered throughout the facility.

13. The existing kitchen serves as Day Room and Dining area. This space is extremely undersized and insufficient to accommodate the current staff.

14. The facility has no space for fitness and training.

15. The station cannot accommodate the anticipated growth within the community and within the programmatic requirements of the fire station.

16. The facility has no dormitories and firefighters sleep in the general day room.

17. The male toilet/shower room is small and in need of an upgrade.

18. Existing station has no female facilities.

STRUCTURAL

The existing police and fire station building is constructed of wood bearing walls, wood joists and wood roof trusses. The fire station apparatus bay is constructed of steel beams and columns, wood joists and exterior masonry walls. A small addition constructed of steel joists, metal roof deck and exterior masonry walls was added to the original structure in 1996.

Field Observations

Following items were noted during the walk through of the building:

The coating on the apparatus floor is wearing off. It is recommended that the apparatus floor be shot blasted and new coating be applied. The new coating will provide the slabs protection from salt intrusion.

Some cracks were observed in the exterior masonry, mostly at the steel beam locations. Removal of some masonry indicated that the steel beam is supported on 6-inch diameter steel column. The masonry web is cut out to install the steel column. The lack of control joints in the masonry wall and weakened masonry section at the column location has contributed cracks in masonry. Since the cracks are cosmetic and do not affect the integrity of structure, they can be filled with flexible sealant and painted.

A steel lintel between the original apparatus structure and the addition was observed to have visible deflection and some rotation. The architectural renovation plan includes reducing the span of this steel lintel. It is also recommended that some lateral steel bracing tying the steel lintel top flange to the roof structure be provided to stabilize the beam laterally.

Some metal lath ceiling plaster in the apparatus bay area are in poor condition and falling off. It is recommended that the deteriorated plaster be removed and replaced.

Building Code

The Massachusetts Building Code and the International Existing Building Code (IEBC) require the implementation of the current structural requirements on a sliding scale with full implementation when 50% of the aggregate floor area is renovated. Based on the planned renovation of the building, the alterations will fall under level 3.

Structurally this will require evaluation of design gravity loads and lateral load capacity of the building.

The wind and seismic loads in the building codes have become more stringent since the original police and fire station was built. Old buildings lack the tying requirements of the present day code such as masonry clips and hurricane ties. It was typical to build unreinforced hollow masonry walls (i. e. original apparatus area). An engineering evaluation and analysis will need to be performed that establishes the structural adequacy of the building.

MECHANICAL, ELECTRICAL, PLUMBING & FIRE PROTECTION - EXISTING CONDITIONS

FIRE PROTECTION

The existing Police & Fire Station is not currently sprinkler protected.

A new sprinkler system shall be provided in accordance with the State Building Code and the 2007 edition of NFPA 13. A new dedicated underground water service shall be provided from the municipal water supply to the building interior. A new backflow preventer assembly with main alarm valve riser(s) shall also be provided. The new sprinkler equipment shall be housed in a mechanical space similar to the domestic water service equipment. A separate sprinkler room is not required but may be included at the owner's or designer's discretion. To supplement the city water supply, a fire department inlet connection shall be provided on the exterior of the building and tied directly into the sprinkler system risers.

The sprinkler system shall be zoned per floor such that a flowing sprinkler on the second floor will be annunciated separately than a flowing sprinkler on the first floor. The sprinklers in the spaces with finished suspended ceilings are proposed to be quick response concealed with white cover plates. The sprinklers in the spaces without finished ceilings (exposed structure) are proposed to be quick response upright, brass finish.

Water supply data is not available at the time of publishing this report. Considering the structure is two stories, it is not anticipated that a fire pump will be required. A new hydrant flow test is required prior to finalizing design so the proper pipe sizing criteria can be established.

A standpipe system is not proposed for the building as it is not prescriptively required by the State Building Code because the highest finished floor is less than 30' above grade. Individual standpipe hose outlets for the purpose of fire department training can be incorporated into the overall design if so desired. Close coordination with the fire department personnel is required prior to locating the connections.

PLUMBING

The work under this Section shall include the furnishings of all materials, labor, equipment and supplies and the performance of all operations to provide complete working systems, in general, to include the following items:

1. Piping – General
2. Roof Drainage, Waste and Vent Piping
3. Indirect Waste Piping
4. Hot and Cold Water Piping
5. Non-potable Cold Water Piping
6. Gas Piping
7. Tempered Water Piping
8. Unions and Flanges

9. Pipe Joint Materials
10. Water Hammer Arrestors
11. Gauges and Thermometers
12. Hangers, Inserts and Supports
13. Seismic Restraints
14. Sleeves, Firestopping
15. Valves
16. Hose Bibbs
17. Plumbing Fixtures and Trim
18. Backflow Preventers
19. Drains – Floor, Roof, and Area
20. Traps
21. Cleanouts
22. Gas Fired Water Heater
23. Thermostatic Mixing Valves
24. Gasoline/Sand Interceptor
25. Safe Waste Pans
26. Insulation
27. Watertight Sleeves
28. Access Panels
29. Cleaning and Testing
30. Operating and Maintenance Manuals
31. Coordination Drawings
32. Shop Drawings
33. Record (As-Built) Drawings

Demolition

The existing gas fired water heater shall be removed and all water piping, gas piping and flue piping shall be cut back to the nearest active main and capped gas tight and water tight for potential reconnection to a new gas fired water heater.

Phasing

There is no phasing associated with the construction of this project. Refer to the overall schedule for additional detail.

MECHANICAL, ELECTRICAL, PLUMBING & FIRE PROTECTION - RECOMMENDATIONS

Design Criteria

Local and state building codes and health department codes:

1. Building Code: Massachusetts State Building Code 780 CMR, 8th Edition.
2. Plumbing Code: Massachusetts Fuel Gas and Plumbing Code 248 CMR.
3. Cross Connection Control: Massachusetts: Department of Environmental Protection 310 CMR, 22.22.
4. State Elevator Code: Massachusetts Elevator Regulations 524 CMR.

Domestic Water Service

Domestic water shall be fed from the existing four inch water service which enters the building in the first floor Mechanical Room. The domestic water system sizing shall be reviewed by this contractor to determine if the existing service is adequate to handle all the new water loads of the building.

Hot and cold water distribution

Provide a complete domestic water distribution system including supply to fixtures, hose bibbs, trap primers and HVAC make-up.

Hot water, cold water and tempered water piping above ground shall be Type L hard drawn copper tubing with cast brass or wrought copper fittings and 95/5 solder joints.

An approved reduced pressure backflow preventer shall be provided on the make-up water supply to the HVAC equipment. The backflow preventer shall be installed in accordance with the Massachusetts Department of Environmental Protection and be complete with shut-off valves and strainer.
Sanitary waste and vent

A complete sanitary waste and vent system serving all plumbing fixtures, kitchen equipment, and floor drains will be provided. The new sanitary piping shall connect to the existing underground system at locations of close proximity to new work. All existing underground piping shall be cleaned, rodded, and videoed to verify the integrity of the existing piping before any new connections are made.

Pipe and fittings below ground shall be service weight cast iron hub and spigot pipe with resilient gaskets. Pipe and fittings aboveground shall be cast iron hubless pipe with Heavy Duty Stainless Steel Band Coupling With Neoprene Gasket. Bank Torque Of 80 Foot-Pounds. 15 PSIG Pressure Rating. Husky SD 4000 Or Clamp-All Hi-Torq 80 or DWV copper pipe with soldered joints.

A gasoline/sand interceptor will be provided by the site contractor on the waste line serving the Apparatus Room trench drain. The interceptor shall be sized in accordance with state plumbing code and shall be vented by this contractor independently through the roof. The interceptor shall be located to allow for servicing.

Provide a trench drain and lint interceptor at the commercial wash machine. The interceptor shall be adequately sized to handle the drainage load and shall be as manufactured by Zurn, JR Smith, or approved equal. The trench drain shall be as manufactured by Zurn, JR Smith, or approved equal.

Roof Drainage

The roof shall be drained by means of existing roof drains and internal rainwater leaders. The leaders collect below the first floor slab and discharge by gravity outside of the building. Roof drain bodies and all rain leader piping shall be inspected for the possibility of reuse. All existing underground piping shall be cleaned, rodded, and videoed to verify the integrity of the existing piping before any new connections are made.

Provide an independent secondary roof drain system as required by the Massachusetts Building Code 8th Edition. Point of discharge shall be above grade.
Pipe and fittings below ground shall be service weight cast iron hub and spigot pipe with resilient gaskets. Pipe and fittings aboveground shall be cast iron hubless pipe with Heavy Duty Stainless Steel Band Coupling With Neoprene Gasket. Bank Torque Of 80 Foot-Pounds. 15 PSIG Pressure Rating. Husky SD 4000 Or Clamp-All Hi-Torq 80.

Natural Gas

The existing gas service shall be reviewed to determine if the meter and gas piping is of adequate size to handle all new loads to the building.
Natural gas will be provided for heating, Laundry Room dryer, and generating domestic hot water; Gas will be low pressure.
Natural gas piping up to 2 ½ inches shall be Schedule 40 black steel with malleable iron threaded fittings. Piping 3 inches and larger shall be Schedule 40 black steel with welded joints.
For pipe sizes 2 inches and smaller, valves shall be a ball valve with screwed end, T-Handle. For pipe sizes 2 ½ inches and larger, valve shall be iron body lubricated plug valve with flanged ends.
All above ground exterior gas piping or piping located in a corrosive atmosphere shall be protected by a coating of high density polyethylene or a wrapping of an inert material.

Fixtures

Plumbing fixtures, including water closets, urinals and lavatories shall be of the highest quality vitreous china, white in color and shall be manufactured by American Standard, Kohler, Toto or approved equal. Flushometers shall be chrome plated low consumption, type manufactured by Sloan, Toto, Zurn or approved equal.

Faucets shall be metering/mixing type with temperature limit and time stop adjustment. Faucets shall be manufactured by Chicago, Toto, or approved equal.

A deep stainless steel sink with foot pedal controls shall be provided in the Decon Room. Sink shall be manufactured by Just or approved equal and foot pedal controls and faucet shall be as provided by Chicago Faucet Co. or approved equal.

Domestic Hot Water

Domestic hot water shall be generated by an atmospheric gas fired tank type water heater located in the first floor Mechanical room. The water heater shall be as provided by PVI Industries.

The hot water heater shall be equal to Model 14 L 125A-G, have 125 gallons of storage and be able to provide 134 gallons per hour of hot water recovery with a 100 degree Fahrenheit temperature rise. Heaters shall produce 140 degree Fahrenheit hot water.

The system shall be complete with a high low mixing valve system as provided by Leonard, Powers, or approved equal. Distribution temperature of the hot water shall be 120ºF.

Provide an all bronze circulation pump at water heater complete with immersion aquastat control, wiring, check valve on pump discharge and dial type thermometer on pumps suction. Pump shall be flange mounted.

Pump shall be Taco or equal by Bell & Gossett or Grundfos.

Water heater shall be installed in a safe waste pan and shall be provided with a leak detection system as provided by First Smart Sensor Technology or approved equal.

Insulation

Insulation will be provided on all hot and cold water piping, tempered water, horizontal roof drainage, roof drain bodies and all piping at handicapped accessible fixtures.

Insulation shall be four pound density fiberglass with factory applied white fire retardant, reinforced vapor barrier jacket. Insulation shall be 1 inch thick and continuous through sleeves.

Pipe fittings and valves shall be provided with pre-molded PVC covers with fiberglass inserts.

Seismic Restraints

Plumbing piping and equipment shall be braced, anchored or supported to withstand seismic displacements in accordance with the Massachusetts State Building Code, 8th Edition.
Supports, hangers and bracing for required piping and equipment shall be designed by a professional engineer. Submittals shall include shop drawings calculations and cut sheets for all seismic restraints.

HVAC

The existing combined Police and Fire Station in Millis, MA consists of a hot water condensing boiler, packaged roof top unit (RTU), window mounted air-conditioners, ductless split system air-conditioner, local exhaust systems and air filtration. Mechanical equipment in the building was upgraded in 2001 and included the boiler, RTU, ductless split A/C and Apparatus Bay exhaust fan system and air filtration. The gas-fired xxx MBH Viessman condensing boiler located in the Boiler Room in the center of the building is in good condition and appeared to be well maintained. A new indirect combustion air intake and combustion flue were added during this installation. The combustion air intake draws air from an intake mounted on the roof, and is approximately 8 inches above the roof line. The condensing combustion flue is stainless steel and vented up through the existing chimney located on the pitched roof of the second floor. The hot water distribution consists of a six (6) zone system each with a dedicated circulator. The zones serve fin tube radiation (FTR) throughout the first and second floor and unit heaters in the Apparatus Bay and Police Storage Area. Wall mounted thermostats for zone control are located throughout.

A xx ton gas-fired DX packaged roof top unit on the first floor roof provides heating and cooling to the Dispatch and adjacent first floor spaces. This unit appeared to be in fair condition for an outdoor unit. Window mounted packaged terminal air-conditioners (PTAC) provide cooling to offices and other spaces on the first and second floors.

The IT Room has a 1.5 ton split system DX air-conditioning unit installed in 2001 dedicated to cooling the IT operations. The condensing unit is mounted on grade in front of the building.

There are several local exhaust systems throughout the building in the following locations: holding cells, first floor Men's Room, Shower Room with in the Squad Room, Sergeants Office, Finger Printing Room, second floor Evidence Room and Apparatus Bay. The holding cells are exhausted through a vent on the first floor roof. An inline exhaust fan was not accessible during the walkthrough. The Men's Room, Shower Room, Sergeant's Office and Finger Printing Room all had local exhaust fans at the room ceiling, and termination locations for these exhaust systems could not be identified. The Apparatus bay had a dedicated exhaust system in good condition that discharged out the sidewall and turned up above the roof line. Each vehicle in the Apparatus Bay had a flexible connection tied into the system. Nameplate data for the fan could not be obtained on the day of the field survey.

Recommendations

Following are recommendations for the systems as the building currently operates:

- Relocate the condensing unit mounted at grade to the roof for additional security.
- Enclose the IT Room to improve cooling efficiency for the space and limit access from the Holding Cells to the IT Room.
- Raise the boiler combustion air intake 24 inches above the roof line.
- Eliminate the openings between the Boiler Room and corridor. Combustion air intake and flue were added when the condensing boiler was installed and these previous openings are no longer required.
- Following are recommendations when the existing building is converted to a dedicated Fire Station:
- Replace the RTU to meet needs of the new layout. The existing RTU meets the needs of the current building programming and should remain.
- Maintain use of the boiler for the present use and for the renovation. Unit heaters in the Apparatus Bay can be maintained can also be maintained after the renovation. FTR and distribution piping serving it will be removed throughout the building back to the boiler room. The six zone circulators can be configured to meet the new layout.
- All exhaust systems will be removed and replaced with new to meet the needs of the new layout except the Apparatus Bay exhaust will remain intact.

The boiler system will remain intact within the Boiler Room. Outside the boiler room the unit heaters within the Apparatus Bay will also remain intact. New 1 ¼" distribution piping for five zones will feed FTR located throughout. Each zone will have approximately 150 ft of HW piping, 18 ft of FTR and a thermostat.

Two new 10 ton packaged gas-fired DX RTU will serve the renovated building. One RTU will be in the location of the existing, and the second will be located on the roof of the Apparatus Bay. Each 4,000 cfm, constant volume, variable temperature unit will have 30x16 supply and return duct mains and ducted supply and return to 10 rooms.

Four new exhaust systems will serve the renovated area. One fan will be located on the low roof of the existing building, one fan will be sidewall exhaust out the second floor and three will be located on the Apparatus Bay roof. The fans will serve the following areas and have the listed exhaust rates:

1. Fitness, Locker Room, Gear Room and toilet rooms – 1,200 cfm.
2. Kitchen exhaust fan - 500 cfm.
3. Decon and Ext Wash – 300 cfm.
4. Oxygen – 300 cfm.
5. Work Room, SCBA and Med 3 – 300 cfm.

The kitchen exhaust fan will be UL 762 for kitchen exhaust and include 30 ft of 12x12 welded black iron kitchen exhaust duct with fire wrap insulation.

The Oxygen room will have a gas monitoring system and variable speed fan with local purge switch in the space.

Equipment will be provided with local electronic controls.

ELECTRICAL

The existing Police/Fire Station consisted of a mixture of fluorescent, incandescent, and HID lighting. The existing lighting shall be replaced in its entirety with energy efficient fixtures. Deficiencies in code required exit lighting fixtures were noted.

Lighting Controls

Currently the lighting within the existing Police/Fire Station is manually controlled via wall mounted switches which are old and some are not functioning properly. All existing switching shall be removed.

HVAC/Mechanical

Existing HVAC/Mechanical equipment in the apparatus bay and the boiler room are to remain. The AHU on the roof is to be replaced. The existing AHU is rated 208V/1PH, but is fed from a 120/240V,1PH panel located in the booking room.

Electrical Service

The building currently has (2) services coming into the building. The main service for the building is a 120/240V, 1PH, 400Amp incoming service going to a Federal Pacific main disconnect switch located in the boiler room. The service provider is by NSTAR. The service comes into the building underground from overhead lines at the main road. Within the boiler room there is a trough which is fed by the main service which feeds several panels throughout the building.

The second service is located at/within the apparatus bay. The service comes to the building underground from overhead lines at the main road and comes up into a CT cabinet located outside the

building mounted on the exterior wall with a utility meter. From the CT cabinet the feed comes through the wall into a 120/240V, 1PH Cutler Hammer panel with a 400A/3P main circuit breaker. This panel serves HVAC equipment located within the apparatus bay.

The existing panels throughout the building are load centers and should be replaced with commercial panelboards.

Portions of the electrical distribution system is backed up via an outdoor gas fired generator rated at 55KW/68.75kva, 120/208-volt, single phase, manufactured by Superior Power Systems. The generator appears well maintained. The ASCO automatic transfer switch is located in the boiler room which I believe backs up the boiler room panel B-1.

The two services to the building shall be removed and a new 208V/3PH service should be installed. Refer to section 3.2 for new electrical service.

Fire Alarm System

The existing fire alarm system in the building is an outdated ESL conventional system and should be replaced with a new addressable system. Currently the building has no fire protection so the fire alarm system should have 100% coverage, but there are rooms within the building that do not have heat or smoke detectors. Refer to section 3.7 for new fire alarm system.

Recommendations

Renovated building outlined in the overview section shall be equipped with dedicated electrical services rated @ 400 Amperes, 208Y/120-volt, 3 phase, 4 wire.

The electric service will be fully backed up with a new emergency power generator for, Standby emergency and Legally Required Standby emergency loads with skid base fuel tank.

Life safety lighting will be addressed via designated lighting fixtures with integral battery backup. Building shall be provided with stand-alone addressable fire alarm systems for early detection. All notification devices shall be speaker/strobe units.
The work under this Section shall include the furnishing of all materials, labor, equipment and supplies and the performance of all operations to provide complete working systems.

Electric Services

Remove (2) incoming services, de-energize and remove all conductors and raceways to their points of origin within the area of demolition scope. Items identified for demolition shall not be abandoned in place. Raceways that enter masonry walls and floors shall be cut flush at the surface for patching by others.

Building shall be serviced via a new underground secondary electric service from a nearby N-Star utility pole.

The main electric room shall contain the proposed 400-Ampere 208Y/120-volt main utility metering service entrance rated distribution panelboard. Main breaker shall be 80% rated electronic circuit breaker and with adjustable LSI electronic trip unit customer metering. Distribution over-current

protective devices shall be bolt-on thermal magnetic circuit breakers. All bus shall be copper. AIC based upon infinite bus for available fault from the utility shall be 42,000 Amperes symmetrical.

The main distribution panelboard shall be provided with an external TVSS, capable of a Maximum Surge Current Rating of 125kA per mode (250kA per phase).

Electrical Distribution

Remove all load centers, de-energize and remove all conductors and raceways to their points of origin within the area of demolition scope. Items identified for demolition shall not be abandoned in place. Raceways that enter masonry walls and floors shall be cut flush at the surface for patching by others. Provide one (1) 225 Amp MLO, 208Y/120-volt, 3 phase, 4 wire, 42 pole Mechanical panelboard. The panel shall be provided with bolt on circuit breakers for connection to mechanical and plumbing equipment rated 208Y/120-volt.

Provide two (2) 225 Amp MLO, 208Y/120-volt, 3 phase, 4 wire, 42 pole lighting panelboards.
Provide one (1) 225 Amp MLO, 208Y/120-volt, 3 phase, 4 wire, 42 pole Receptacle panelboards. Each panel shall be equipped with a 150A-3P main circuit breaker device. Panels shall be equipped with 15 and 20 Amp, 120-volt bolt on circuit breaker devices for connection to 120/208-volt loads.
All panelboards shall be provided with copper bus, bolt on circuit breakers and have door-in-door construction.

Wiring methods for all feeders shall be EMT for interior and rigid steel where exposed exterior. All feeder conductors shall be copper.

Lighting control system panels shall be located adjacent to lighting panelboards.

Emergency Power Generation

Provide (1) 100kw/125kva, 208/120-volt, 3 phase, 4 wire diesel powered emergency generator to service entire building electric service.

Generator shall be enclosed with sound attenuated weatherproof enclosure supplied by the generator manufacturer. Fuel shall be stored within a base UL listed double wall tank.

Transfer switches shall be 4 pole with bypass isolation ASCO or equal by Russelectric.

Emergency Power Distribution

The generator shall be equipped with one (1) output circuit breakers for connection to emergency loads/automatic transfer switches. Provide one (1) unit mounted 400 A-3P, one enclosed circuit breakers with LSI electronic trip units located within generator enclosure. Breakers shall be wired to emergency side of transfer switches listed in section below.

General Power Requirements

Remove all receptacles, de-energize and remove all conductors and raceways to their points of origin within the area of demolition scope. Items identified for demolition shall not be abandoned in place. Raceways that enter masonry walls and floors shall be cut flush at the surface for patching by others.

Provide general-purpose convenience outlets throughout all spaces spaced no more than 40'-0" on center. Mounting height shall be 18" AFF. No more than four (4) general convenience circuits shall be wired to a common 20A-1P circuit.

Provide no fewer four (4) dedicated 120-volt 20-ampere GFCI protected receptacles for each Kitchen/Pantry space.

Provide GFCI protected outlets in each restroom, locker room, apparatus room, at each building elevation at rooftop equipment locations.

Provide power connection to all water coolers.

Plugmold shall be single circuit, rated for 20 Amp, 125V, 2 pole, 3 wire (maximum length 6'). Each section shall be connected to a dedicated 20Amp, 120V circuit. Where located in close proximity to water or damp locations circuits shall be ground fault type.

Provide general-purpose convenience outlets throughout storage areas etc spaced no more than 25'-0" on center. Mounting height shall be 30" AFF or 6" above counter height.

Lighting Systems

All interior and exterior lighting throughout the building shall be removed in its entirety.
All removed fluorescent and hid lamps and batteries shall be recycled by a facility approved by the owner's representative. A uniform hazardous waste manifest shall be prepared for all disposals and returned with all applicable signoffs prior to application for final payment.

All ballasts in lighting fixtures to be disposed shall be verified to be pcb free. All ballasts manufactured prior to 1979 and not labeled as pcb free shall be considered to contain pcbs. Provide written verification to the owner's representative that confirms pcb free waste. Where pcb free waste cannot be verified, ballasts shall be recycled by a facility approved by the owner's representative, with pcb components eliminated by a high temperature incineration. a uniform hazardous waste manifest shall be prepared for all disposals and returned with all applicable signoffs prior to application for final payment. All handling shall conform to EPA requirements. Provide breakout cost for this scope
Lighting shall be provided in accordance with the architectural reflected ceiling plans, the fixture schedule and the specifications and system descriptions that follow.

Lighting design levels are as follows:

- General open areas/Administrative areas 30 foot-candles maintained with task lighting
- Perimeter offices 30 foot-candles maintained (Daylight Harvesting to be employed) with task lighting
- Corridors 20 foot-candles maintained
- Holding cells 30 foot-candles maintained
- Storage areas 20 foot-candles maintained.
- Reference rooms/libraries 50 foot-candles maintained

Interior lighting fixtures for Administrative & office type applications shall utilize energy efficient fluorescent lamps with high frequency electronic ballasts in conjunction with LED lamp sources whenever possible. The selection of lighting fixtures and layouts shall be coordinated effort between the Architect and Electrical Engineer.

LED/HID lighting shall be provided at the exterior of all entrance/egress doors; surface mounted unless overhead available for recessed fixtures.

Grounds shall be illuminated via building mounted HID floodlights and/or LED luminaires wherever possible. Grounds shall be illuminated via architectural HID and/or Light Emitting Diode (LED) pole top cutoff fixtures and bollards mounted on concrete pedestal foundations.

Lighting Controls

Lighting in small storage areas, private offices, etc. shall be via occupancy sensor control.
Corridor lighting shall be programmed for On-Off operation with occupancy sensors to activate lighting during unoccupied periods.

Exterior lighting shall be controlled by photocell ON and either timed sweep or photocell OFF dependent upon function and location.

Emergency lighting shall be via emergency integral battery units to selected fluorescent and incandescent lighting. Switched lighting shall be automatically energized via a supervisory relay on loss of Normal Power. Emergency lighting shall be provided at the building exterior at all egress points.

Mechanical Systems

For exact quantities of Mechanical Equipment refer to Mechanical Basis of Design Narrative.

HVAC

Provide ATC contractor 120 volt power for deriving low voltage control at multiple locations.
Install heat trace systems on exterior piping requiring freeze protection. Circuits powering heat trace shall be Ground Fault equipment rated.

The electrical contractor shall provide all required disconnects, magnetic starters and variable speed drives necessary for the operation and control of all supplied HVAC equipment.

Fire Protection

Wire sprinkler tamper and flow devices provided and installed by the Fire Protection contractor for trouble and alarm indication into the fire alarm control panel.
Provide power to a dry pipe sprinkler system air compressor control panel and wire associated alarm and trouble signals to the fire alarm control panel. Each flow switch shall be independently zoned.
Tamper switch actuation shall initiate system supervisory alarms.
Archival spaces may require dedicated fire protection system.

Fire Alarm

Provide networkable, addressable fire alarm systems equal to Simplex, Edwards, Notifier for initiation device monitoring and evacuation signal initiation.

Fire Alarm system shall be stand-alone, but systems shall be networked for future mass notification enhancement and for central monitoring capabilities.

In general fire alarm initiation devices shall be located @ the following locations:

- Provide manual pull stations @ each egress door or stairwell.
- Provide sprinkler flow and tamper switches.
- Provide smoke and heat detectors where required by State and local building codes. Detectors shall be analog addressable to provide means of alarm verification and define maintenance cycles.
- Building shall be provided with smoke detectors. Provide addressable control modules for interface with the HVAC equipment for automated shutdown.

Alarm notification shall be via speaker/strobe units in compliance with ADA requirements for strobe illumination levels. Strobes shall be synchronized. Synchronized temporal code 3 tone shall provide direction for evacuation upon alarm initiation.

Wiring methods for all fire alarm initiation and notification circuits shall be Type MC where concealed . Utilize EMT conduit raceway where exposed interior. Type CI cable shall be utilized for all interconnecting communications cable between panels and for NAC circuits which originate outside of the alarm zone. MC shall be listed for fire alarm service and identified with continuous red markings. EMT shall be identified as fire alarm service by red spray painted couplings and junction box covers. The fire alarm systems shall be interconnected with the lighting controls and dimming systems (where applicable) to bring lighting to full illumination upon an alarm signal.

The fire alarm systems shall be interconnected with the security system to unlock all doors upon an alarm signal.

Fire department notification shall be via buildings master box. A signal shall be forwarded to security desks for both system trouble and alarm.

Telephone/Data/Security

Incoming services for telephone/data and security shall be provided via (4) 4" PVC conduits from service provider to each respective tele/data service entrance location (MDF). Two (2) active conduits and two 92) spare conduits.

Building will contain an MDF location for service entrance. Provide sleeves and raceway between each MDF and IDF. Raceway shall consist of J-Hooks on 4'0" intervals.

All MDFs/IDFs will contain a grounding bus bar connected to building steel via exothermic connection via "2/0 AWG conductor. All equipment (conduits, raceway, cable tray, racks, etc.) located within the MDF/IDF will ground to the rooms ground bus bar via "6AWG conductor.

The electrical contractor shall be responsible for device provisions only at the room level, consisting of box eliminator and pull string to ceiling above.

All low voltage cabling for telephone, data, video, security, etc shall be specified and installed by the owners Tele/Data Consultant.

Provide security systems at building for monitoring all first floor doors with door contacts and motion sensors for all floor corridors, foyer and lobby, exterior parking and yards. Activation shall be via keypad at main entry lobby. Interface with dialer to Security.

Provide a color CCTY monitory system viewing all first floor egress doors and exterior parking areas/yards. All cameras shall be displayed via one central monitor and recorded via 48 hour slip time system to allow display of past 48 hours events. Interface with the security system to switch monitor views to active doors.

Lightning Protection

Provide lightning protection systems at building, designed and installed in accordance with NFPA 78 and UL 96A requirements. The system shall be inspected and a UL Lighting Protection Inspection Certificate shall be obtained by the installing contractor.

A 4/0 copper ground loop shall be installed around the building perimeter to bond all down conductors and building structural steel.

All system components shall be copper.

Public Address

Provide centralized paging systems in the building for annunciation throughout all common spaces. Provide with individual localized volume controls to over-ride central controls. Announcement and music interface shall be provided at the main console.

Section 5 – Geotechnical Report

CDR MAGUIRE

Memorandum

CDR Maguire Project No. 19416.00

Date: March 28, 2013

To: Dan Tuberty, AIA
Principal in Charge, Project Manager

From: David Nacci, P.E.

Subject: Proposed Millis Police Station
25 Auburn Road, Millis, MA
Geotechnical Memorandum

Attachments: Figure 1, Boring Location Plan
Boring Logs
Figure 2A, Western Schematic Subsurface Profile Sketch
Figure 2B, Eastern Schematic Subsurface Profile Sketch

Copies to: Job File, Fabrizio Caruso

I. Introduction

The Millis Police Station is proposed to be located at street address 25 Auburn Road, Assessors Map 23, Lot 79, which is the current location of the Town Library. The Police Station structure is planned to be located over and beyond the existing library structure foot-print. The library is planned to move to a new location sometime during June of 2013. The library structure is a single story slab-on-grade with shallow footings facility that is planned to be demolished.

The proposed Police Station concept is also a single story structure with a mechanical mezzanine having a footprint of approximately 15,600 square feet. At this time the structure is anticipated to be steel framed with either wood or steel stud infill construction, and most likely a wood shingled exterior façade. Interior corridor and detention areas are anticipated to be defined by load bearing masonry shear walls. Foundation design is also anticipated to be similar to the existing library structure, slab-on-grade with shallow footings beneath interior columns, load bearing walls, and building perimeter walls.

The project's elevation datum is the National Geodetic Vertical Datum (NGVD) 1929.

II. Regional and Site Geology

Surficial

Natural soils in the site area are mapped as granular glacial deposits, from top to bottom classified geologically as glacial stratified and glacial till deposits, which are remnants of the last two continental ice sheets that covered all of New England in the latter part of the Pleistocene ice age.

Glacial stratified deposits consist typically of well to poorly sorted gravel, sand, silt, and clay laid-down by flowing meltwater in glacial streams, lakes, and in the coastal marine areas that once occupied Massachusetts during the retreat of the last ice sheet. Compositions of the area's glacial stratified deposits vary with the meltwater flow regimes, which are different for: stream (glaciofluvial), lake bottom (glaciolacustrine), stream entry into lake or sea (glaciodeltaic), and sea bottom (glaciomarine) environments. Identified site strata considered to be glacial stratified deposits are those sorted sand, and sand and gravel layers located immediately beneath the surficial fill deposit.

Glacial till deposits typically consist of non-sorted, generally non-stratified mixtures of clay to boulder sized materials, with a core matrix of fine sand and silt. Boulders and occasional lenses of sorted sand and gravel, and fine-grained sediments occur within area tills. Glacial till is an ice-contact deposit typically found directly over bedrock and beneath stratified meltwater deposits. Glacial till deposits from the last two glaciations are present within Massachusetts. The site area glacial till is thought to be the result of the most recent glaciation, which typically override, are less dense and generally sandier than older till deposits. The identified site stratum considered to be a glacial till deposit is the layer immediately about the assumed bedrock surface.

Bedrock

Bedrock was not sampled during the project boring program, but is mapped locally to be Quincy Granite.

III. Subsurface Exploration Program

For the following subsurface exploration program discussion, refer to the attached Figure 1, Boring Location Plan, and boring logs M-1 through M-6. Project borings were located based upon best information at the time of boring performance, which was an original and now superseded Police Station foot-print concept.

The project's exploration program consisted of the performance of six (6) cased borings, identified as M-1 through M-6, performed by the casing drive and wash method. Borings were laid out in the field by reference to existing site physical features. Borings were performed by New Hampshire Borings of Brockton, MA, on Thursday and Friday, March 21 and 22, 2013. New Hampshire Borings mobilized an all terrain vehicle mounted D-50 drill rig for the work. The boring program was coordinated and monitored in the field on a full time basis by a CDR Maguire staff geotechnical engineer. Ground surface elevations indicated on the bore logs were obtained from the area survey drawing, utilized for the project's Boring Location Plan base.

The initial boring performed, M-3, was advanced "deep" to the assumed bedrock surface depth of 39 feet below existing ground surface. The remaining five cased borings were advanced to the more shallow depths of between 26 and 28 feet. Subsurface conditions were consistent enough such that the subsurface stratigraphy observed during the initial deep boring could be utilized to infer full profile conditions in the areas of shallow boring.

Temporary ground water observation wells, nominal 2 inch ID PVC well pipe, were installed and later retrieved from the two borings performed on Thursday, March 21st, borings M-3 and M-5, in order to determine stabilized ground water conditions. End-of-boring ground water levels were obtained from the remaining four borings performed.

All borings were performed in general conformance with ASTM D1586 procedures. Split-spoon soil sampling, utilizing a standard 1.375 inch ID by 24 inch long split-spoon, was performed at typically five-foot depth intervals or when distinct stratum change was evident.

Concurrent with the project's geotechnical investigation, Sovereign Consulting, Inc. performed an Environmental Phase I Site Investigation. CDR Maguire provided boring information to Sovereign as it became available.

IV. Laboratory Soil Testing Program

No laboratory soil testing was performed for this geotechnical investigation program.

V. Subsurface Conditions

The project's boring exploration program identified the site's full subsurface soil stratigraphy. Identified by the project borings were: a surficial fill, two glacial stratified, and a glacial till stratum; the March 22nd stabilized and end-of-boring ground water levels; and an assumed bedrock surface location. Information obtained from the boring program was generally consistent, and reflective of the site's geologic history.

Revealed subsurface conditions, from top to bottom, are generally described by the Burmister Soil Classification System followed by their Unified Soil Classification Group Symbol(s) below. Refer to the attached boring logs and Figures 2A and 2B, Western and Eastern Schematic Subsurface Profile Sketches for more detailed and an overview of subsurface conditions.

1. FILL: Brown, loose, moist to saturated, FINE TO COARSE SAND, some silt, little to some fine to coarse gravel, trace to little organic matter, roots, asphalt and brick fragments (SM, SP, SW), observed in all six borings
    - Standard Penetration Test (SPT) range: $N_{uncorrected}$ = 2 to 12, average 8
    - Stratum thickness range: 5 to 8 feet, average 6 feet
    - Bottom of stratum elevation range: +95.0 to +99.3, average +96.1

    GROUND WATER LEVEL: March 22, 2013, stabilized at boring locations M-3 and M-5, depth below existing ground surface between 5.5 and 6.0 feet, average elevation +97.5

2. GLACIAL STRATIFIED DEPOSIT, FINE SAND: Gray, medium dense to dense, saturated, FINE SAND, clean, (SP), grading to at bottom of stratum: Gray and brown, medium dense to dense, saturated, FINE SAND, trace silt, varved (SP), observed in all six borings
    - Standard Penetration Test (SPT) range: $N_{uncorrected}$ = 9 to 56, average 26
    - Stratum thickness range: 15.5 to 21 feet, average 18 feet
    - Bottom of stratum elevation range: +74.5 to +80.8, average +78.5

3. GLACIAL STRATIFIED DEPOSIT, SAND AND GRAVEL: Gray to yellow-brown, medium dense to very dense, saturated, FINE TO COARSE SAND, little to some fine to coarse gravel, trace silt (SM, SP, SW), observed in all six borings
    - Standard Penetration Test (SPT) range: $N_{uncorrected}$ = 22 to 43, average 32
    - Stratum thickness range: 2.5 to 5 feet, average 4 feet
    - Bottom of stratum elevation range: +74.6 to +77.5, average +76.1

4. GLACIAL TILL DEPOSIT: Gray, medium dense, saturated, FINE TO COARSE SAND, little to some silt, trace to little fine gravel (SM), bottom 2 feet of stratum: Yellow brown, saturated, medium to coarse gravel, cobbles, boulders, observed only in deep boring M-3
    - Standard Penetration Test (SPT) range: $N_{uncorrected}$ = 11 to 23, average 17
    - Stratum thickness 11 feet
    - Bottom of stratum elevation +63.6

5. Assumed BEDROCK surface: ± 39 feet below existing ground surface, boring M-3, elevation +63.6

VI. Recommendations and Discussion

The following are our foundation recommendations with brief discussions based upon site observations and a review of: the project boring program results, area geologic literature, our project research, and geotechnical experience within the regional area. Recommendations are subject to modification based upon the results of any subsequent geotechnical program findings. Reference to the State Building Code shall mean the Massachusetts State Building Code, 8th Edition, with the latest Massachusetts revisions.

At this time, proposed building finished floor elevation has not been set. Refer to the attached Figures 2A and 2B, Western and Eastern Schematic Subsurface Profile Sketches for a subsurface condition overview.

1. The project site is suited to a building slab-on-grade and shallow spread and continuous footing foundation system. Footings constructed at the State Building Code mandated frost depth of 4 feet below lowest adjacent finished grade are recommended to use a maximum allowable bearing pressure of 4 KSF, based upon minimum footing dimension. Building interior heated space footings constructed at the minimum depth of 1.5 feet below finished floor slab level are recommended to use an allowable bearing pressure of 2 KSF, also based upon minimum footing dimension. Associated footing settlement will be immediate or within a day or so of dead load application, and is estimated to be less than 1 inch, differential settlement between adjacent similarly loaded footings is estimated to be less than ½ inch. Minimum footing dimension is recommended to be 2.0 feet based upon punching shear consideration. It is recommended that footing excavation equipment (rubber tire backhoe type) utilized for finished footing foundation excavations be fitted with smooth blade leading edge bucket to minimize disturbance of the bearing surfaces.

   For adjacent footings constructed at differing elevations, the lower footing should be constructed with invert above a plane extending downward and at an angle of 45° from the horizontal from the higher footing's perimeter at invert elevation, unless soil supporting the higher footing is laterally supported in an approved manner.

2. A recommended subgrade modulus value for reinforced concrete slab-on-grade design is 150 $lb/in^2/in$, based upon a minimum compacted base course thickness of 1 foot and base course support derived from the compacted granular FILL subgrade stratum.

3. Excavation for footings required to extend a minimum of 4 feet below adjacent grade is recommended to terminate on or within the GLACIAL STRATIFIED, FINE SAND stratum,

which will be readily distinguishable by color, texture, and density. From applicable project borings, the surface of the deep footing bearing stratum is located approximately at elevation +95.0. One foot of compacted structural backfill beneath frost protected footings is recommended to be the minimum.

Excavation and compacted structural backfill placement for: building interior heated space footings that can be constructed with minimum invert elevation 1.5 feet below adjacent finished floor, and isolated surficial equipment pads are recommended to extend a minimum of 2 feet below footing/equipment pad invert.

Foundation recommendations for a telecommunication tower foundation, if required, will be provided after manufacturer foundation loadings and recommendations are received.

Footing, slab, and equipment pad excavations and compacted structural backfill placement beneath these foundations are recommended to extend a minimum of one foot beyond foundation element perimeter at invert elevation, and then extend downward to bottom of excavation on a 1H:1V slope or flatter. Structural backfill placement and compaction is recommended to be in maximum 6-inch thick lifts, for multiple levels of compaction effort beneath foundation load bearing elements. Sound judgment relative to compaction equipment, technique, and duration should be exercised considering subgrade soil sensitivity and ground water level conditions at the time of earthwork construction. Monitored subgrade proof compaction should precede all footing, slab, and equipment pad structural backfill placement. Structural re-use of excavated FILL soil is anticipated to be limited, and dependent upon the contractor's earthwork expertise and excavated soil segregation/testing diligence.

4. If earth retaining wall(s) are anticipated to transition grade change, segmental block retaining walls should be a primary consideration for their aesthetics, construction cost and time economy, as well as design and construction flexibility. It is recommended that a clean well graded sand and gravel structural backfill material be used exclusively for retailing wall excavation and below wall backfill. A minimum of 2 feet of compacted structural backfill is recommended to be placed below earth retaining wall structures.

5. Soil compaction within 5 feet of earth retaining walls should be performed by small plate-type compaction equipment utilizing a reduced lift thickness to limit wall stress. Retaining wall design should include the equivalent of 2 feet of surcharge soil to account for typical temporary construction loading and/or wall stress due to adjacent soil compaction. Lateral earth pressures should be included for identified temporary

construction or permanent retaining wall loading. In addition, seismic wall loading should be superimposed on all static lateral wall load calculations.

For earth retaining wall and building footing design, the following compacted structural backfill and existing FILL soil engineering properties are recommended for use:

STRATUM	UNIT WEIGHT (PCF)		SOIL FRICTION ANGLE $\phi°$	SLIDING FRICTION ANGLE $\delta°$
	γ_{MOIST}	$\gamma_{BUOYANT}$		
FILL (existing)	130	68	30	--
Structural Backfill	135	73	34	29*

*For cast-in-place concrete on structural backfill
For precast concrete on structural backfill use $\delta = 22°$

6. It is anticipated that excavation for building foundations will be accomplished by laying-back excavation side slopes due to the extent of open and level site area. Excavation slope laying-back will be the simplest and least cost earthwork option considering the depth of foundation excavation required.

   Referencing OSHA Construction Industry Regulations 29 CFR 1926, Subpart P, Appendix A, site granular FILL soils within the proposed building area foundation excavation depth zone are generally classified as Type C, which allows maximum simple unsupported excavation side slopes of 34° (1½H:1V) or flatter, for slopes less than 20 feet in depth exclusive of surcharge load considerations. Excavation side slopes to remain open and exposed for more than temporary conditions (OSHA considers temporary to mean 24 hours or less) should be protected from degradation due to exposure to the elements.

   Footing, utility trench, or retaining wall excavation side walls less than 5 feet in depth that have been inspected by a "competent person" and found to be stable relative to the possibility of cave-in, need not be sloped or employ engineer designed earth support system measures.

7. Ground water level will be a significant consideration during building construction. Borings were performed by the cased drive and wash method in which drill water is introduced into the borehole to advance the exploration, generally requiring a stabilization period after boring completion in order to obtain a true ground water level. With that said ground water levels from all six project borings appear to be reasonably consistent, probably due to the coarse granular nature of the FILL stratum in which the ground water level was found.

Project borings were performed during a period when ground water is rising toward its spring time seasonal high, typically late winter/early spring. Two project borings had ground water level readings with sufficient stabilization time. Boring M-3 and M-5, in which a temporary well pipe was installed over-night and later retrieved after monitoring the ground water level. Average stabilized ground water level from these borings was elevation +97.5, between 5.5 and 6.0 feet below existing grade, which is the approximate average ground water level (March 22, 2013) considering all six project borings. Boring ground water levels should not be considered seasonal high levels.

The existing library building foundation is a single level slab-on-grade with shallow footings. A brief discussion with the Library Director revealed that they have never within memory had building slab water problems relatable to ground water conditions, and the building's slab-on-grade and wall elements have performed well, without discernible building movement cracks.

If final building foundation design results in consideration of a more extensive excavation dewatering approach than discrete sump pit and pump techniques, a selective laboratory soil testing program (grain size analyses) is recommended to be undertaken using soil samples from the boring program, for dewatering system design.

During foundation construction, ground water levels are recommended to be lowered to a minimum of 2 feet below the deepest anticipated excavation depth.

8. Existing building demolition is recommended to require the complete removal of all existing slab and footing foundation elements, and demolition excavations backfilled with compacted structural quality sand and gravel.

   Earthwork procedures for the proposed Police Station's slab-on-grade and footing foundation, after demolition excavation backfill and stripping of surficial structurally unsuitable topsoil and/or other observed questionable FILL soils is recommended to start with a monitored slab area subgrade proof rolling and densification. Proof rolling is recommended to be performed by a large vibratory roller.

   Monitored proof rolling is recommended to detect soft or loose subgrade areas, and to bring the subgrade to a consistent support condition. Remediation of identified soft or loose areas, if required, typically takes the form of exploratory excavation(s), unsuitable material removal, and replacement by compacted structural backfill. Proof rolling should be accomplished by an approved suitably large (static drum weights in excess of 10,000 pounds) vibratory compactor traveling over the subject area at 2 to 3 mph. Four

passes in each mutually perpendicular direction should be adequate for slab subgrade proof rolling. The proof rolling operation should be observed by a qualified individual, ideally by the person responsible for the overall project earthwork quality control.

If building foot print build-up for slab-on-grade construction is required, placement and compaction of structural backfill up to slab base course subgrade level is recommended before footing excavations are undertaken.

9. Structural fill placed beneath and surrounding foundation: footings, slabs, retaining walls, pavement areas, sidewalks, etc. should be densified uniformly to a minimum of 95 percent maximum dry density as field determined by ASTM D1557 methods. Maximum lift thickness for granular fill compaction is dependent upon the equipment being utilized and its ability to achieve the specified density. Maximum lift thickness, in areas not required to be a maximum of 6 inches, should not exceed 12 inches, with thinner lifts used in confined areas or where small vibratory roller or plate compactor equipment are employed.

10. Our recommendation for structural fill is based upon the Commonwealth of Massachusetts, Standard Specifications for Highways and Bridges, Gravel Borrow material specifications:

    Granular structural backfill is recommended to be M1.03.0, Gravel Borrow, Type d with 1½ inch maximum gravel size, and maximum percent by weight passing the No. 200 sieve of 10%.

11. Recommendations for in-situ compaction are subject to site conditions and experience based good judgment at the time of earthwork construction. Due to the limited nature of boring explorations to reveal subsurface conditions, it is recommended that excavations for: unsuitable material, former building foundation removals, proposed building foundation and site structures, and utility installations be monitored by qualified earthwork personnel to observe the character and response of existing soil materials.

    All exposures foundation subgrade bearing surfaces and their proof compactions should be similarly observed by an experienced, qualified earthwork professional to judge suitability. Foundation area observation should again be performed during structural backfill placement and compaction, and immediately prior to foundation concrete or asphalt placement.

12. The liquefaction susceptibility of site saturated granular soils has been evaluated based upon soil density as determined by standard penetration test (SPT) N values, soil classifications, ground water conditions, and State Building Code criteria (Figure 1806.4b of the Massachusetts Amendments). It is our opinion that site subgrade soils are not susceptible to liquefaction when subject to the design, State Building Code, earthquake motion.

    In conformance with the State Building Code, utilizing uncorrected SPT soil values obtained from the project's boring program, and SPT values for an estimated bedrock thickness over the upper 100 feet of the site's subsurface profile, the project's Site Class is recommended to be "C," reference State Building Code Table 1613.5.2 and Section 1613.5.5.

    State Building Code tabulated maximum earthquake spectral response acceleration at 1-second period (S_1) and at short periods (S_s) for the Town of Millis are: S_1 = 0.065 and S_s = 0.25 (Table 1604.11 of the Massachusetts Amendments), and associated site seismic coefficients F_a and F_v are: F_a = 1.2 (Code Table 1613.5.3(1)) and F_v = 1.7 (Code Table 1613.5.3(2)).

13. During final design, it is recommended that geotechnical project aspects be reviewed and updated as and if necessary.

    Please call the writer if questions or comments arise.

Limitations

1. The recommendations and conclusions contained in this memorandum are based in part upon data obtained from our limited subsurface exploration program. The nature and extent of variations between these explorations may not become evident until construction. If variations appear evident, it will be necessary to re-evaluate the conclusions and recommendations in this memorandum.

2. Ground water level readings have been made in the boreholes at the times and under conditions stated on the boring logs. This data has been reviewed and interpretations made in the text of this memorandum. It must be noted that fluctuations in the ground water level may occur due to variations in rainfall, temperature, season and other factors occurring since the time measurements were made.

3. This memorandum has been prepared for the exclusive use of the Town of Millis, Massachusetts for specific application to the proposed Police Station Facility to be located at 25 Auburn Road, Millis, Massachusetts in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied is made.

   This geotechnical engineering memorandum has been prepared for project use by CDR Maguire, Inc. for geotechnical design purposes only.

ATTACHMENTS

Figure 1, Boring Location Plan
Boring Logs
Figure 2A, Western Subsurface Profile
Figure 2B, Eastern Subsurface Profile

FIGURE 1,
BORING LOCATION PLAN

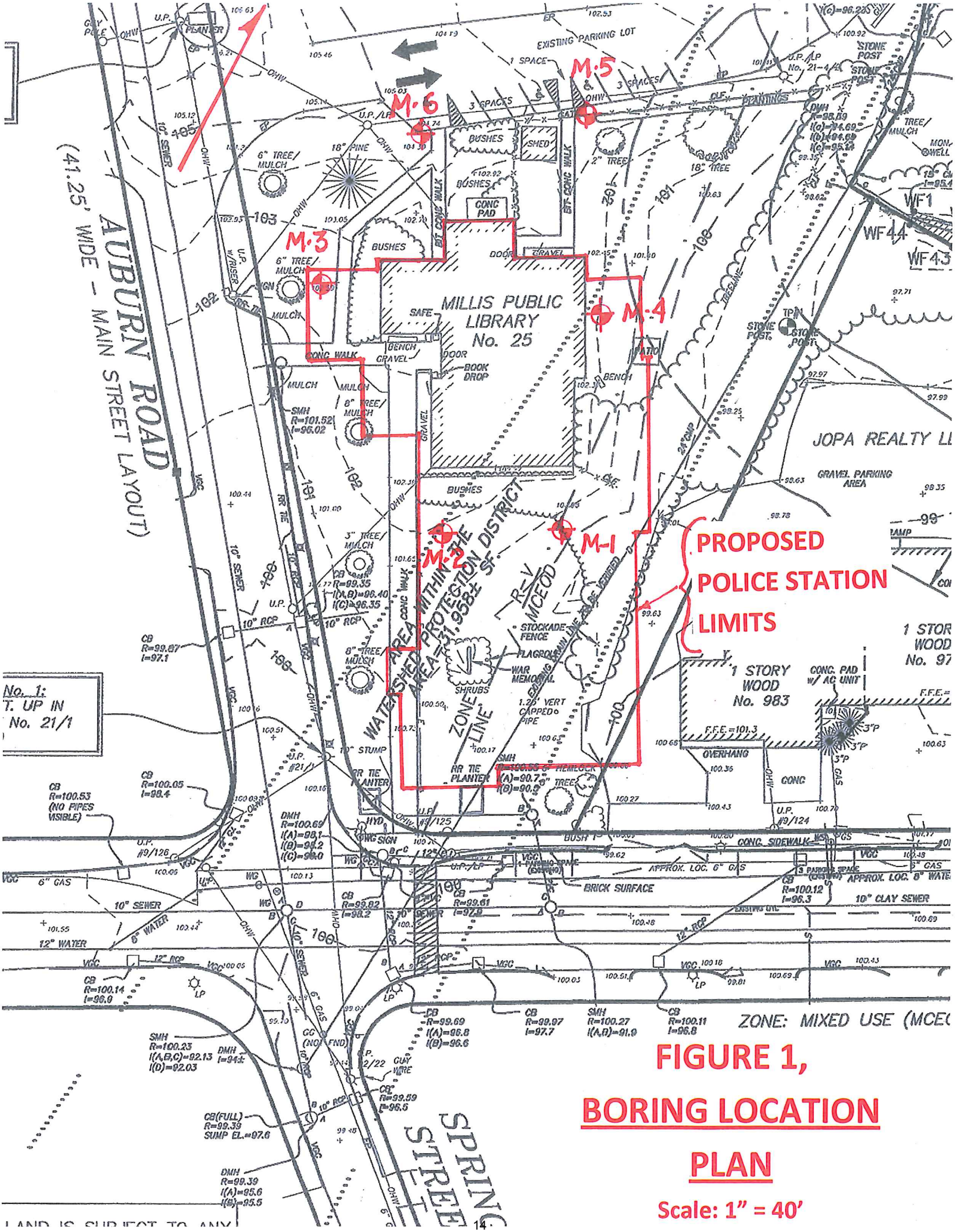


FIGURE 1,

BORING LOCATION PLAN

Scale: 1" = 40'

BORING LOGS

Client Name	New Hampshire Boring, Inc.	Sheet 1 of 2	**Boring No.** M-1
CDR Maguire	1215 W. Chestnut Street Brockton, MA 02301	NHB JOB NUMBER: 26441 / CDRM:19416.00	
City/Town: Millis, MA		PROJECT NAME: Millis Police Station	

Location: 25 Auburn Road	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 3.5' Date & Time: 3/22/13; 3:00 pm	3/22/13; 9:45 am	3/22/13; 11:00 am	
DRILLER: Christopher Knight	HELPER: Glenn Rogers		
Ground Elevation: +100.5	Inspector's Name (Print): Dave Nacci	Inspector's Company: CDR Maguire	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches				Recovery (inches)	Field Description	Strata Changes
		0-6	6-12	12-18	18-24			
S-1	0-2	1	2	7	8	14	Brown, loose, moist, FINE SAND and ORGANIC MATTER, roots, trace asphalt fragment	TOPSOIL 2'
S-2	4-6	8	6	3	2	4	Brown, loose, saturated, FINE TO COARSE SAND, some silt, little fine gravel, trace asphalt fragments	FILL 5'
S-3	9-11	6	8	13	17	12	Gray, medium dense, saturated, FINE SAND, clean	
S-4	14-16	10	12	13	14	18	Gray, medium dense, saturated, FINE SAND, varved, clean	FINE SAND
S-5	19-21	8	14	19	23	18	Gray/brown, dense, saturated, FINE SAND, trace silt, varved	
S-6	24-26	13	15	12	28	18	Gray/brown, dense, saturated, FINE SAND, trace silt, varved	

Remarks:

AUGER SIZE: --

CASING SIZE: NW, 4" OD

SPLIT SPOON SIZE: 1⅜" x 24"

DRILL RIG TYPE: D-50

Penetration Resistance (N) Guide

Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

N = Sum of Second and Third 6" Blow Counts

Terms Used for Second Entry of Descriptions: and = 40-50%, some = 10-40%, trace = 10% or less

Client Name CDR Maguire	New Hampshire Boring, Inc. 1215 W. Chestnut Street Brockton, MA 02301	Sheet 2 of 2	**Boring No.** M-1
		NHB JOB NUMBER: 26441 / CDRM:19416.00	
City/Town: Millis, MA		PROJECT NAME: Millis Police Station	

Location: 25 Auburn Road	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 3.5' Date & Time: 3/22/13; 3:00 pm	3/22/13; 9:45 am	3/22/13; 11:00 am	
DRILLER: Christopher Knight	HELPER: Glenn Rogers		
Ground Elevation: +100.5	Inspector's Name (Print): Dave Nacci	Inspector's Company: CDR Maguire	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches 0-6	6-12	12-18	18-24	Recovery (inches)	Field Description	Strata Changes
							(FINE SAND STRATUM)	**26'**
S-7	26-28	10	25	18	18	24	Gray, very dense, saturated, FINE TO COARSE SAND, little silt, trace fine gravel	**SAND & GRAVEL** **28'**
							BOTTOM OF BORING 28'	

Remarks: _____

Penetration Resistance (N) Guide			
Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

AUGER SIZE:	--
CASING SIZE:	NW, 4" OD
SPLIT SPOON SIZE:	1⅜" x 24"
DRILL RIG TYPE:	D-50

N = Sum of Second and Third 6" Blow Counts

Terms Used for Second Entry of Descriptions: and = 40-50%, some = 10-40%, trace = 10% or less

Client Name	New Hampshire Boring, Inc. 1215 W. Chestnut Street Brockton, MA 02301	Sheet 1 of 1	**Boring No.** M-2
CDR Maguire		NHB JOB NUMBER: 26441 / CDRM:19416.00	
City/Town: Millis, MA		PROJECT NAME: Millis Police Station	

Location: 25 Auburn Road	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 4.0' Date & Time: 3/22/13; 9:30 am	3/22/13; 8:30 am	3/22/13; 9:30 am	
DRILLER: Christopher Knight	HELPER: Glenn Rogers		
Ground Elevation: +101.8	Inspector's Name (Print): Dave Nacci	Inspector's Company: CDR Maguire	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches 0-6	6-12	12-18	18-24	Recovery (inches)	Field Description	Strata Changes
S-1	0-2	1	8	2	4	20	Brown, loose, frozen, FINE TO MEDIUM SAND and ORGANIC MATTER, roots, trace fine gravel	TOPSOIL 2'
							Brown, loose, saturated, FINE TO MEDIUM SAND, some silt, little gravel, little organic matter, roots	FILL 5'
S-2	4-6	1/12"		12	10	18		
							Brown, medium dense, saturated, FINE SAND, clean	
S-3	9-11	3	5	8	10	14	Gray, medium dense, saturated, FINE SAND, clean	FINE SAND
S-4	14-16	7	7	9	9	12	Gray/brown, medium dense, saturated FINE SAND, trace silt, varved	
S-5	19-21	7	9	12	13	16		20.5'
							Gray/brown,medium dense, saturated,FINE TO COARSE SAND, trace fine gravel, clean	SAND & GRAVEL
							Gray/brown, medium dense, saturated,FINE TO COARSE SAND, trace fine gravel, clean	25'
S-6	24-26	10	12	11	15	14	Gray, medium dense, saturated, FINE TO COARSE SAND, little silt,trace fine gravel (Bottom of Boring 26')	GLACIAL TILL

Remarks:

AUGER SIZE: --

CASING SIZE: NW, 4" OD

SPLIT SPOON SIZE: 1⅜" x 24"

DRILL RIG TYPE: D-50

Penetration Resistance (N) Guide

Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

N = Sum of Second and Third 6" Blow Counts

Terms Used for Second Entry of Descriptions: and = 40-50%, some = 10-40%, trace = 10% or less

Client Name	New Hampshire Boring, Inc.	Sheet 1 of 2	**Boring No. M-3**
CDR Maguire	1215 W. Chestnut Street Brockton, MA 02301	NHB JOB NUMBER: 26441 / CDRM:19416.00	
City/Town: Millis, MA		PROJECT NAME: Millis Police Station	

Location: 25 Auburn Road	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 5.5' Date & Time: 3/22/13; 8:00 am	3/21/13; 8:00 am	3/21/13; 2:00 pm	
DRILLER: Christopher Knight	HELPER: Glenn Rogers		
Ground Elevation: +102.6	Inspector's Name (Print): Dave Nacci	Inspector's Company: CDR Maguire	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches 0-6	6-12	12-18	18-24	Recovery (inches)	Field Description	Strata Changes
S-1	0-2	2	19	20	15	6	Brown, loose, frozen, FINE SAND AND SILT, some organic matter, roots	TOPSOIL 3.5'
S-2	4-6	6	4	2	4	8	Brown, loose, saturated, FINE TO MEDIUM SAND AND SILT, some fine to coarse gravel, trace organics	FILL 7'
S-3	9-11	6	6	12	12	9	Gray, medium dense, saturated, FINE SAND, clean	FINE SAND
S-4	14-16	7	10	12	14	18	Gray, medium dense, saturated, FINE SAND, clean	
S-5	19-21	9	13	19	17	16	Gray and brown, dense, saturated, FINE SAND, trace coarse sand, trace silt, clean	23'
S-6	24-26	8	10	12	15	14	Yellow/brown, medium dense, saturated, FINE TO MEDIUM SAND,little fine gravel,trace coarse sand, clean	SAND & GRAVEL

Remarks:

AUGER SIZE: --

CASING SIZE: NW, 4" OD

SPLIT SPOON SIZE: 1⅜" x 24"

DRILL RIG TYPE: D-50

Penetration Resistance (N) Guide

Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

N = Sum of Second and Third 6" Blow Counts

Terms Used for Second Entry of Descriptions: and = 40-50%, some = 10-40%, trace = 10% or less

Client Name CDR Maguire	New Hampshire Boring, Inc. 1215 W. Chestnut Street Brockton, MA 02301	Sheet 2 of 2	**Boring No.** M-3
		NHB JOB NUMBER: 26441 / CDRM:19416.00	
City/Town: Millis, MA		PROJECT NAME: Millis Police Station	

Location: 25 Auburn Road	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 5.5' Date & Time: 3/22/13; 8:00 pm	3/21/13; 8:00 am	3/21/13; 2:00 pm	
DRILLER: Christopher Knight	HELPER: Glenn Rogers		
Ground Elevation: +102.6	Inspector's Name (Print): Dave Nacci	Inspector's Company: CDR Maguire	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches 0-6	6-12	12-18	18-24	Recovery (inches)	Field Description	Strata Changes
								SAND & GRAVEL 28'
S-7	29-31	7	4	7	5	20	Gray, medium dense, saturated, FINE TO COARSE SAND, some silt,trace fine gravel	GLACIAL TILL
S-8	34-36	7	8	9	7	14	Gray, medium dense, saturated, FINE TO COARSE SAND, little fine gravel, little silt	37'
							Gravel, cobbles, boulders: Casing sheared, casing sample: yellow/brown, medium to coarse gravel sized rock fragments	GRAVEL COBBLES BOULDERS
							BOTTOM OF BORING 39' Casing Sheared @ 39'	39'

Remarks:

AUGER SIZE:	--
CASING SIZE:	NW, 4" OD
SPLIT SPOON SIZE:	1⅜" x 24"
DRILL RIG TYPE:	D-50

Penetration Resistance (N) Guide

Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

N = Sum of Second and Third 6" Blow Counts

Terms Used for Second Entry of Descriptions: and = 40-50%, some = 10-40%, trace = 10% or less

Client Name	New Hampshire Boring, Inc.	Sheet 1 of 1	**Boring No.** M-4
CDR Maguire	1215 W. Chestnut Street Brockton, MA 02301	NHB JOB NUMBER: 26441 / CDRM:19416.00	
City/Town: Millis, MA		PROJECT NAME: Millis Police Station	

Location: 25 Auburn Road	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 4.5' Date & Time: 3/22/13; 3:00 pm	3/22/13; 11:30 M	3/22/13; 1:00 PM	
DRILLER: Christopher Knight	HELPER: Glenn Rogers		
Ground Elevation: +102.0	Inspector's Name (Print): Dave Nacci	Inspector's Company: CDR Maguire	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches 0-6	6-12	12-18	18-24	Recovery (inches)	Field Description	Strata Changes
S-1	0-2	3	10	6	7	20	Brown, loose, frozen, FINE TO MEDIUM SAND, some silt, lit gravel, asphalt fragments, little organic matter, roots	TOPSOIL 2'
S-2	4-6	2	2	6	4	14	Brown, loose, saturated, FINE TO COARSE SAND, some silt, little asphalt fragments	FILL 7'
S-3	9-11	9	15	32	18	14	Gray, dense, saturated, FINE SAND, clean	
S-4	14-16	11	16	20	40	14	Gray, dense, saturated, FINE SAND, clean	FINE SAND
S-5	19-21	8	16	11	11	20	Gray and brown, medium dense, saturated, FINE SAND, trace silt varved	25'
S-6	24-26	12	16	16	13	14	Gray, dense, saturated, FINE TO COARSE SAND, little f/m gravel, trace silt (Bottom of Boring 26')	SAND & GRAVEL 26'

Remarks:

AUGER SIZE: --

CASING SIZE: NW, 4" OD

SPLIT SPOON SIZE: 1⅜" x 24"

DRILL RIG TYPE: D-50

Penetration Resistance (N) Guide

Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

N = Sum of Second and Third 6" Blow Counts

Terms Used for Second Entry of Descriptions: and = 40-50%, some = 10-40%, trace = 10% or less

Client Name	New Hampshire Boring, Inc.	Sheet 1 of 1	**Boring No.** M-5
CDR Maguire	1215 W. Chestnut Street Brockton, MA 02301	NHB JOB NUMBER: 26441 / CDRM:19416.00	
City/Town: Millis, MA		PROJECT NAME: Millis Police Station	

Location: 25 Auburn Road	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 6.0' Date & Time: 3/22/13; 8:00 am	3/21/13; 2:00 pm	3/21/13; 3:15 pm	
DRILLER: Christopher Knight	HELPER: Glenn Rogers		
Ground Elevation: +103.8	Inspector's Name (Print): Dave Nacci	Inspector's Company: CDR Maguire	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches 0-6	6-12	12-18	18-24	Recovery (inches)	Field Description	Strata Changes
S-1	0-2	4	11	14	5	10	Brown, loose, frozen, FINE TO MEDIUM SAND and ORGANIC MATTER, some medium to coarse gravel, little silt, trace asphalt fragments	TOPSOIL 2'
S-2	4-6	7	4	5	5	6	Brown, loose moist, FINE TO MEDIUM SAND, some brick, asphalt and fine gravel, little silt, trace organic matter	FILL 8'
S-3	9-11	14	18	22	16	14	Gray, dense, saturated, FINE SAND, clean	
S-4	14-16	6	9	11	10	18	Gray, medium dense, saturated, FINE SAND, clean	FINE SAND
S-5	19-21	9	8	11	8	16	Gray, medium dense, saturated, FINE SAND, clean	23'
S-6	24-26	14	12	18	10	20	Yellow/brown, dense, saturated, FINE TO MEDIUM SAND, little finegravel, trace coarse sand, clean (BOTTOM OF BORING 26')	SAND & GRAVEL 26'

Remarks:

AUGER SIZE:	--
CASING SIZE:	NW, 4" OD
SPLIT SPOON SIZE:	1⅜" x 24"
DRILL RIG TYPE:	D-50

Penetration Resistance (N) Guide

Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

N = Sum of Second and Third 6" Blow Counts

Terms Used for Second Entry of Descriptions: and = 40-50%, some = 10-40%, trace = 10% or less

Client Name	New Hampshire Boring, Inc.	Sheet 1 of 1	**Boring No.** M-6
CDR Maguire	1215 W. Chestnut Street Brockton, MA 02301	NHB JOB NUMBER: 26441 / CDRM:19416.00	
City/Town: Millis, MA		PROJECT NAME: Millis Police Station	

Location: 25 Auburn Road	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 6.0' Date & Time: 3/22/13; 3:00 pm	3/22/13; 1:40 pm	3/22/13; 2:30 pm	
DRILLER: Christopher Knight	HELPER: Glenn Rogers		
Ground Elevation: +104.3	Inspector's Name (Print): Dave Nacci	Inspector's Company: CDR Maguire	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches 0-6	6-12	12-18	18-24	Recovery (inches)	Field Description	Strata Changes
S-1	0-2	1	4	9	13	14	Brown, loose, frozen, FINE SANDY ORGANIC MATTER, roots	TOPSOIL 6"
							Yellow/brown, loose, moist, FINE TO MEDIUM GRAVEL, trace silt,track brick	FILL
S-2	4-6	1	1	1/12"		1	Yellow/brown, very loose, saturated, FINE TO COARSE SAND, some fine to medium gravel, trace silt	8'-6"
S-3	9-11	2	8	8	8	14	Gray, medium dense, saturated, FINE TO COARSE SAND, trace fine gravel, trace silt	
S-4	14-16	14	32	24	20	12	Gray, very dense, saturated, FINE SAND, clean	FINE SAND
S-5	19-21	10	10	12	9	14	Gray, medium dense, saturated, FINE SAND, trace silt, varved Gray/brown, dense, saturated, FINE SAND, varved, grading to orange/brown, FINE TO MEDIUM SAND, varved	25'
S-6	24-26	10	11	20	19	14	Yellow/brown, dense, saturated, FINE TO COARSE SAND, some fine to coarse gravel, trace silt	SAND & GRAVEL (BOB) 26'

Remarks: BOB = Bottom of Boring

AUGER SIZE: --

CASING SIZE: NW, 4" OD

SPLIT SPOON SIZE: 1⅜" x 24"

DRILL RIG TYPE: D-50

Penetration Resistance (N) Guide

Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

N = Sum of Second and Third 6" Blow Counts

Terms Used for Second Entry of Descriptions: and = 40-50%, some = 10-40%, trace = 10% or less

FIGURE 2A,
WESTERN SCHEMATIC SUBSURFACE PROFILE SKETCH

CDR MAGUIRE

Project MILLIS POLICE STATION Acc. No. 19416.00

Subject WESTERN SUBSURFACE Sheet No. 1 of 1

PROFILE, FIGURE 2A Date MARCH 2013

Comp. DMN Check Cont. No.

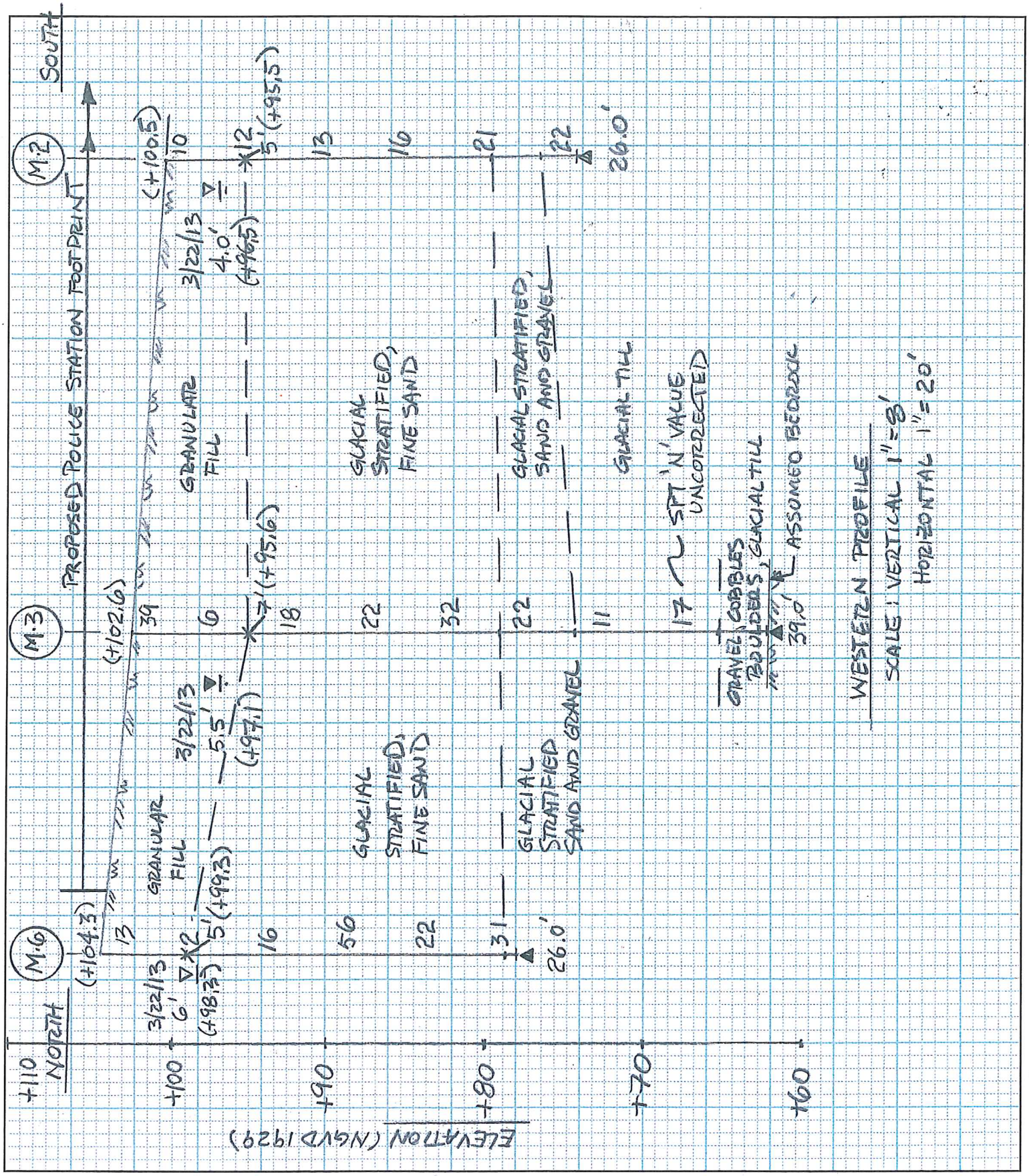


FIGURE 2B,
EASTERN SCHEMATIC SUBSURFACE PROFILE SKETCH

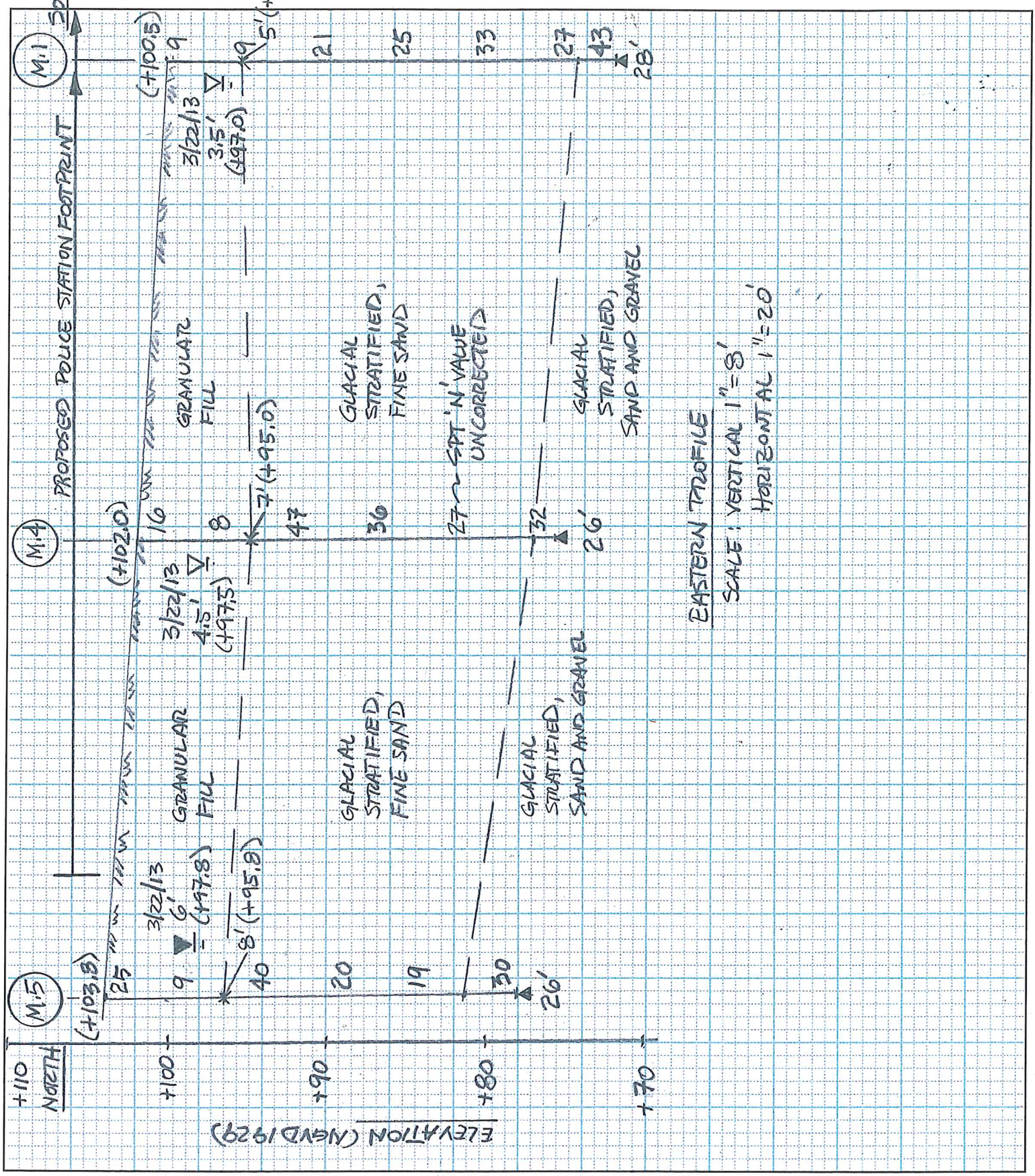
CDR MAGUIRE

Project MILLIS POLICE STATION Acc. No. 19416.00

Subject EASTERN SUBSURFACE PROFILE, FIGURE 2B Sheet No. 1 of 1

Date MARCH 2013

Comp. DMN Check Cont. No.



Section 6 – Environmental Report

SOVEREIGN CONSULTING INC..

PHASE I ENVIRONMENTAL ASSESSMENT

PROPOSED PUBLIC SAFETY BUILDING
37 AUBURN ROAD - LOT 79
MILLIS, MA

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FIGURES

APPENDICES

1.0 INTRODUCTION

Sovereign Consulting Inc. (Sovereign) has performed a Phase I Environmental Site Assessment (ESA) for the property located at 37 Auburn Road, Lot 79, in Millis, Massachusetts, hereinafter referred to as "the Site."

This Phase I ESA was conducted in accordance with the United States Environmental Protection Agency (USEPA) Standards and Practices for All Appropriate Inquiries [(AAI), 40 CFR Part 312] and guidelines established by the American Society for Testing and Materials (ASTM) *in the Standard Practice for Environmental Site Assessments:* Phase I Environmental Site Assessment Process / Designation E 1527-05 (ASTM Standard Practice E 1527-05). This investigation was intended to describe current Site conditions and to establish if there is evidence that a release of oil or hazardous materials has occurred at the Site or that a threat of such a release exists. The tasks conducted at the Site in association with the preparation of the Phase I ESA included the following:

1. As applicable environmental reports were reviewed to determine Site history and usage. Additionally historical aerial photos and historical US Geological Survey (USGS) Maps were reviewed to further document Site history and to determine if there is evidence that oil or hazardous materials have been historically used or stored on or in the vicinity of the Site.

2. An exterior Site inspection was performed by Sovereign personnel on March 20, 2013 to obtain a visual assessment of present Site conditions.

3. Reasonably ascertainable files were reviewed and/or interviews were conducted in the office of the Town of Millis Tax Assessor, Clerk, Health Department, Water and Sewer Department, and Engineering Department.

4. An environmental records search was conducted by Sovereign through environmental databases regarding past releases of oil or hazardous materials on the Site or on properties in the vicinity of the Site. Specifically, the following federal databases were reviewed: USEPA, National Priorities List (NPL), USEPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), USEPA Resource Conservation Recovery Information System (RCRIS), and Emergency Response Notification System (ERNS). Additionally, information contained in the Spills and Sites Databases and available general files from the Massachusetts Department of Environmental Protection (MassDEP) are also included within the environmental database search. This search was undertaken using Environmental Data Resources Inc. (EDR) computerized search service.

2.0 SITE OVERVIEW

The Site is located at 37 Auburn Road, Lot 79, in Millis, Massachusetts. Site Photographs are presented in **Appendix A**.

2.1 Site Parameters

Tax Assessor's Designation	Information at the Town of Millis Tax Assessor's office indicates that 37 Auburn Street is the listed address of the Site. It is identified as Map 23, Lot 79. A copy of the Assessor's Cards are included in **Appendix B**.
Zoning and Land Use	According to the property cards from the Tax Assessor's Office, 37 Auburn Street is zoned residential-suburban. A Watershed Protection District traverses the central portion of the Site along a south to north axis. The local definition of the Watershed Protection District is that it is a 25 foot offset from an existing stream.
Acreage	The parcel that makes up the Site is approximately 1.4 acres.
Coordinates	The southwest corner of the Site is adjacent to the intersection of Main Street and Auburn Road and is located at the following coordinates: Latitude 42° 09' 54.65" N, Longitude 71° 21' 48.09"W
Ownership	According to the Town of Millis Tax Assessor's records, the owner of the parcel is the Town of Millis. The book and page number, as referenced in the Norfolk Registry of Deeds, is 2968/322.
Structures	According to the Town of Millis Tax Assessor's record card, the Site is improved by one building, currently used a library, constructed in 1964 that is approximately 4,104 square feet and is heated with oil heat. A storage shed was added to the property in the 1990's and is located north of the library building.
Utilities	The property is connected to Town water and sewer. The building located on Site is heated with fuel oil.
Waste Disposal	Solid or hazardous waste dumping was not observed during the Site reconnaissance.
Site Access/ Barriers	A parking lot is located on the northern portion of the property and is accessed by Auburn Road. Sidewalks leading to the building's main entrance facing Auburn Road are available from the parking lot, Auburn Road, and Main Street.
Vegetation	The property has landscaping and grass around the building with the exception of a small, paved parking lot north of the building. The Site reconnaissance did not reveal the presence of any stressed or strained

vegetation at the Site.

Surface water — Surface water was not observed at the Site or immediately surrounding the Site. A Watershed Protection District traverses the central portion of the Site along a south to north axis. The local definition of the Watershed Protection District is that it is a 25 foot offset from an existing stream. Removal of the manhole covers to the east of the existing building revealed an apparent stream or channel within a culvert.

2.2 Adjacent Properties

The Site is located in a residential/commercial area. The Site is bound by Auburn Road to the west, Main Street to the south, commercial properties to the east, and residential properties and a rail road to the north.

2.3 Topography, Drainage and Applicable Flood Zones

The Site ranges in elevation from 148 to 153 meters above mean sea level (MSL). The Site is relatively flat with a gentle slope south toward Main Street. Drainage catch basins are located along the eastern property boundary of the Site between the parking lot and Main Street in a low lying area.

According to the Geographic Information System (MassGIS) Environmental Data Map included as **Figure 3**, the Site is not located within a Federal Emergency Management Agency (FEMA) 100 year flood plain. A 100 year flood zone is located approximately 2,000 feet to the west of the Site. It should be noted that wetland areas are located to the north and the south of the Site and an apparent stream or waterway traverses the Site along a north to south axis.

According to the FEMA Flood Insurance Rate Map for the Norfolk County, Massachusetts Community Panel Number 25021C0161E Panel 161 of 430. July 17, 2012, the Site is located in an area designated as "Other Flood Area"

2.4 Sensitive Receptors

Sovereign prepared a Site-specific MassGIS Environmental Data Map as **Figure 3** to evaluate the location of sensitive receptors present in the immediate vicinity of the Site. This included Estimated Habitats of Rare Wetlands Wildlife & Priority Habitats, Protected Open Space, wellhead protection areas, aquifers, water supplies and other potentially sensitive receptors located within a 0.5-mile radius of the Site. The presence of potentially sensitive receptors was also evaluated during the surficial Site reconnaissance.

According to MassGIS, the Site is located within a medium yield aquifer and located approximately 675 feet west of an Interim Well Head Protection Area (IWPA) and 1,500 feet west of an Approved Wellhead Protection Area (Zone II). The closest areas of protected open space are located 500 feet southeast and northwest of the Site. Potential vernal pools are located 1,200 feet southeast and 2,300 feet northwest of the Site. The closest wetland area is located approximately 400 feet north of the Site. Richardsons Pond is located approximately 1,500 feet north of the Site.

It should be noted that wetland areas are located to the north and the south of the Site and an apparent stream or waterway traverses the Site along a north to south axis.

3.0 SITE HISTORY

A limited Site history was determined by a review of information on file at the Town of Millis municipal offices. Sovereign also reviewed historical USGS maps and aerial photography available through MassGIS and EDR.

3.1 Ownership History

The Town of Millis Assessors' Tax Card indicated that the Town of Millis has been the owner of the parcel since December 1950. Additional information was also available through the Norfolk Country Registry of Deeds.

The book and page number, as referenced in the Norfolk Registry of Deeds, is 2968/322. On October 4, 1950, James W. and Carribelle Payson conveyed the Site or a portion of the Site to the Town of Millis. On September 15, 1922, Abbie L Davis, conveyed the Site or a portion of the Site to James W. and Carribelle Payson.

No other information regarding the ownership of the Site prior to 1922 was readily available. Ownership information is provided for Site History informational purposes only. No legal representation is implied from the information provided in this section.

3.2 Documented History

Sovereign conducted research of historical sources to develop a history of previous use(s) of the Site area, surrounding area and to identify the likelihood of past uses that may have led to recognized environmental conditions (RECs) associated with the Site. As required by the ASTM standards, the first developed use of the property, or historical use back to 1940, was investigated by reviewing available Sanborn maps, aerial photographs, and city directories, where available. Property uses for the surrounding area were also identified during the course of this task.

3.2.1 Aerial Photography

Sovereign personnel reviewed aerial photographs available from the MassGIS website, from www.historicaerials.com, and EDR. Historical aerials of the Site are available from 1957 through 2010. An overview of the observations from these aerial photographs are present below, and available copies aerial photographs are presented in **Appendix C.**

- 1957: The aerial photograph from 1957 depicts the Site as undeveloped. Surrounding properties appear to be developed with residential and possibly commercial buildings.
- 1967: The aerial photograph from 1965 depicts the Site and surrounding area as developed. The Site is developed with two buildings in the location of the current library building that occupies the Site.
- 1969: The aerial photograph from 1969 depicts the Site and the surrounding area as developed and unchanged from the 1967 photograph.
- 1971: The aerial photograph from 1971 depicts the Site and the surrounding area as developed and unchanged from the 1967 photograph.
- 1978: The aerial photograph from 1971 depicts the Site and the surrounding area as developed and unchanged from the 1967 photograph.

- **1980:** The aerial photograph from 1980 depicts the Site and the surrounding area as developed and unchanged from the 1967 photograph.
- **1995:** The aerial photograph from 1995 depicts the Site and the surrounding area as developed. The two buildings that occupy the Site have been joined to form the current library building.
- **2001:** The aerial photograph from 2001 depicts the Site and the surrounding area as developed and unchanged from the 1995 photograph.
- **2005:** The aerial photograph from 2005 depicts the Site and the surrounding area as developed and unchanged from the 1995 photograph.
- **2006:** The aerial photograph from 2006 depicts the Site and the surrounding area as developed and unchanged from the 1995 photograph.
- **2008:** The aerial photograph from 2008 depicts the Site and the surrounding area as developed. The land adjacent to the eastern boundary of the Site, identified by the Town as Lot 74, has further developed into commercial properties that exist present day.
- **2010:** The aerial photograph from 2010 depicts the Site and the surrounding area as developed. The buildings located on the land adjacent to the eastern boundary of the Site, identified by the Town as Lot 77, have been demolished and the property is undeveloped.

3.2.2 Historical USGS Maps

Sovereign personnel reviewed the University of New Hampshire (UNH) Diamond Library Documents Department and Data Center's on-line library of Historic Maps of New England and New York to provide Historic USGS Topographic Maps. According to UNH, historic topographic maps from the Franklin, Massachusetts 15 minute Quadrangle from 1893, Hollistion, Massachusetts 7.5 minute Quadrangle from 1942 and 1953, and Medfield, Massachusetts 7.5 minute Quadrangle from 1940 and 1946 exist for the Site and the vicinity. Historical USGS information was also available through EDR. A summary of observations made from the available Historical USGS Topographic Maps are presented below, and copies of available USGS Maps are included in **Appendix C**.

- **1889:** The USGS Topographic map from 1889 depicts the Site and the surrounding area as undeveloped land.
- **1893:** The USGS Topographic map from 1893 depicts the Site as undeveloped. The surrounding area appears to have a small amount of development.
- **1915:** The USGS Topographic map from 1915 depicts the Site as undeveloped and the surrounding area as developed land.
- **1946:** The USGS Topographic map from 1946 depicts the Site as undeveloped and the surrounding area as developed land.
- **1957:** The USGS Topographic map from 1957 depicts the Site as undeveloped and the surrounding area as developed land.
- **1970:** The USGS Topographic map from 1970 depicts the Site and surrounding area as developed land.
- **1979:** The USGS Topographic map from 1979 depicts the Site and surrounding area as developed land.
- **1985:** The USGS Topographic map from 1979 depicts the Site and surrounding area as developed land.

- **1987:** The USGS Topographic map from 1979 depicts the Site and surrounding area as developed land.

3.2.3 Sanborn Fire Insurance Rate Maps

Sanborn Fire Insurance Maps from 1892 to 1956 exist for the Site and the vicinity. Observations made from the Sanborn Fire Insurance Maps are presented below, and a copy of each map is included as **Appendix D**.

- **1892:** The Sanborn Map from 1892 depicts the Site as vacant and undeveloped. The surrounding area is developed.
- **1897:** The 1897 Sanborn Map depicts the Site as undeveloped and the surrounding area developed as similar to the 1892 map.
- **1903:** The 1903 Sanborn Map depicts the Site as undeveloped and the surrounding area developed as similar to the 1892 map.
- **1910:** The 1910 Sanborn Map depicts the Site as undeveloped and the surrounding area developed as similar to the 1892 map.
- **1922:** The 1922 Sanborn Map depicts the Site as undeveloped and the surrounding area developed as similar to the 1892 map. The NY, NH & Hartford Rail Road is depicted for the first time north of the Site.
- **1933:** The 1922 Sanborn Map depicts the Site as undeveloped and the surrounding area developed. The surrounding area shows more developed then depicted in the previous Sanborn Maps.
- **1942:** The 1942 Sanborn Map depicts the Site as undeveloped and the surrounding area developed. The surrounding area shows more developed then depicted in the 1933 Sanborn Map.
- **1956:** The 1956 Sanborn Map depicts the Site as undeveloped and the surrounding area as developed.

3.3 Site Interviews

Richard Barrett - Millis Fire Chief

On March 20, 2013, Fire Chief Richard Barrett was interviewed regarding the history of property. According to Mr. Barrett the Site has no history of underground storage tanks (USTs) or hazardous substances being stored on the property which the exception of heating oil in an above ground storage tank (AST). The heating oil AST was recently inspected and is in good condition.

Tricia Perry – Library Director

On March 22, 2013, the Millis Public Library Director, Ms. Tricia Perry, was interviewed regarding the history and current condition of the property. According to Ms. Perry, the main library building was built in 1964. A small office addition was built in 1993. The building has only been used as a library and the Site was undeveloped prior to its construction in 1964. There building has a slab on grade foundation. She believes asbestos was discovered surrounding the old piping located in the concrete slab foundation during an inspection conducted by Smith and Wessel during 2011. The inspection report was not readily available during the municipal office

visits. The shed located on Site behind the library is used to store books, shelving, toilet paper, etc. According to Ms. Perry no gasoline or hazardous wastes are stored in the shed.

3.4 Previous Environmental Reports

No previous environmental reports were provided to Sovereign to review.

4.0 AGENCY REVIEW

Sovereign performed a computer database search and a limited file review at the Town of Millis to obtain current information on the environmental status of the Site and selected properties in the vicinity of the Site.

4.1 Local Agency Review

The Millis Tax Assessors' Office, Department of Health, Water and Sewer Department, Fire Department, City Clerk's Office, and Building Department were visited and/or contacted to obtain pertinent information regarding the Site and properties in the vicinity of the Site. In addition, Sovereign utilized available information on the MassGIS web page to evaluate Site conditions.

Millis Assessor's Office

Sovereign reviewed records of the Millis Tax Assessor's Office on March 20, 2013. The parcel housing the current Millis Public Library and known as Map 23, Lot 79 was identified by the Assessor's office as 37 Auburn Road, not 25 Auburn Street as previously identified through preliminary Site information. The parcel has been owned by the Town of Millis since December 1950. The property owner prior to 1950 is unknown. The parcel is improved by a 4,104 square foot library building with a brick veneer exterior which is headed with oil.

Millis City Clerk's Office

There were no records on file for the Site at the City Clerk's Office.

Millis Department of Health

Sovereign reviewed records in the Department of Health's office. There were no environmental records on file for the Site at the Department of Health's office, however, there were several records on file for multiple surrounding properties. The documents available for review at the Department of Health's office are presented below. These documents were either available in their entirety or as a notification of their availability with the MassDEP.

- Class B-1 RAO – May 21, 2007
  34-36 Exchange Street, Millis, MA
  RTN 2-16237
- Phase I Initial Site Investigation, Tier IC Classification and Phase II Scope of Work
  34-36 Exchange Street, Millis, MA
  RTN 2-16236
- Notice of Responsibility – September 25, 2007
  Intersection @ Curve Street and Exchange Street, Millis, MA
  RTN 2-16813
- Notice of Noncompliance – May 5, 2012
  34-36 Exchange Street, Millis, MA
  RTN 2-16236
- Downgradient Property Statue Opinion – May 21, 2012

34-36 Exchange Street, Millis, MA
RTN 2-16236

- Downgradient Property Statue Opinion – February 25, 2013
  961 Main Street & Centennial Place Parking Lot, Millis, MA
  RTN 2-18504

Millis Water and Sewer Department

According to the Millis Water and Sewer Department, the Site building is connected to municipal water and sewer but no connection dates or plans are available.

Millis Building Department

On March 20, 2013, records for the Site were reviewed at the Millis Building Department as part of Site assessment.

Table 1. Building Department Records – 37 Auburn Road

Date	Permit #	Purpose
12/2003	NA	Structural Support – Roof Unit
4/2011	NA	Certificate of Inspection for Main Room and Loft Area
NA	NA	Special permit application to modify October 2007 mixed use special permit.

Millis Fire Department

As part of the Site Assessment records for the Site were reviewed at the Millis Fire Department related to oil and/or hazardous materials located at 37 Auburn Road. According to the Fire Chief, Mr. Richard Barrett, no underground storage tank (UST) has ever been stored at the property. There currently is a heating oil AST in use at the Site.

Millis Board of Selectman

On April 5, 2013, information from the office of the Board of Selectman was reviewed as it pertains to the Site. Of interest was the stormwater system which is located to the east of the building at the Site. Although information was available for the construction of the Centennial Place stormwater system in 2008, specific information related to the culverted stream below the Site was not available for review.

4.2 Computer Database Search

Sovereign personnel contracted Environmental Data Resources Inc. to provide an environmental database report. The EDR Report is presented in **Appendix E.** A summary of the findings is presented in the following sections.

4.2.1 Federal Records

National Priority List Sites

The National Priorities List (NPL) is the USEPA list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under the Superfund program. No NPL sites were identified within a 0.25-mile radius of the Site.

CERCLIS Listing

The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) is a compilation by the USEPA of known or suspected uncontrolled or abandoned hazardous waste sites that the US EPA has investigated or is currently investigating for a release or threatened release of hazardous substances pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA-Superfund Act). No federal CERCLIS sites were identified within a 0.25-mile radius of the Site.

RCRA CORRACTS Facilities

Corrective Action Reports (CORRACTS) identify hazardous waste handlers with Resource Conservation Recovery Act (RCRA) corrective action activity. No RCRA CORRACTS sites were identified within a 0.25-mile radius of the Site.

RCRA non-CORRACTS TSD Facilities

The Resource Conservation and Recovery Information Systems (RCRIS) database includes selective information on sites that generate, transport, treat, store and/or dispose (TSD) of hazardous waste as defined by RCRA. There were no RCRA non- CORRACTS TSD sites identified within a 0.25-mile radius of the Site.

RCRA Generators

The RCRIS database also includes information relative to RCRA generators. According to the EDR Report, the Site is not listed as a RCRA generator, but there is one (1) RCRA Small Quantity Generator (SQG) located within a 0.25-mile radius of the Site. There is one (1) RCRA Conditionally Exempt SQG (CESQG) located within 1/8 mile of the Site. A listing of these generators are as follows:

- Alexander's Coin-Op Dry Cleaning (SQG) located approximately 0.214 miles east-northeast of the Site at 917 Main Street;
- Mobil Station (CESQG) located approximately 0.083 miles east of the Site at 972 Main Street.

ERNS

The Emergency Response Notification System (ERNS) is a national database used to collect information of reported releases of oil and hazardous substances. According to the EDR Report, the Site is not identified as an ERNS site.

4.2.2 State Records

State Listed Sites

State Listed Sites are known Oil and Hazardous Materials (OHM) sites currently regulated by the MassDEP and may include CERCLA-equivalent sites. According to the EDR Report, the Site was not identified on the State Listed Site database, and there are four (4) listed State Sites located within a 0.25-mile radius of the Site. Other properties beyond 0.25 miles that are listed with MassDEP are also provided for reference.

- The former Quality Dry Cleaners was located on the adjacent property to the east of the Site at 979 Main Street. Two (2) releases for the property have been filed with MassDEP. On October 22, 2001, a Release Notification Form (RNF) was filed with the MassDEP for the release of petroleum related contaminants of concerns (COCs) to groundwater. On October 28, 2002, a Release Notification Form (RNF) was filed with the MassDEP for the release of tetrachloroethene (PCE) to groundwater. On August 26, 2008, a class A-2 Remedial Action Outcome (RAO) was filed for the two releases at the property.
- A Mobil station is located at 972 Main Street, approximately 0.083 miles east of the Site. A Class C RAO was filed with MassDEP on May 26, 2006 and the property currently remains in Post Class C status.
- Millis Library (separate location from the Site) is located approximately 0.105 miles east of the Site at 961 Main Street. On February 24, 2012, a reportable release was filed with the MassDEP for the detection of 12 ug/L of PCE in groundwater. A Downgradient Propetry Status (DPS) was filed for the release on February 25, 2013.
- 34-36 Exchange Street is located approximately 0.164 miles northeast of the Site. On April 5, 2006, a reportable release for methylene chloride was filed with MassDEP. On April 12, 2007, a class A-2 RAO was filed for a release of methylene chloride. On May 12, 2006, a reportable release was filed with the MassDEP for the detection of 309 mg/kg of C11-C22 Aromatic hydrocarbons in soil. On May 21, 2007, a class B-1 was filed for the release. Additionally, on May 12, 2006, a reportable release was filed with the MassDEP for methyl tert butyl ether (MTBE), PCE, and trichloroethene (TCE) in groundwater at the property. A DPS was filed for the release on May 21, 2012.
- The Intersection at Curve Street and Exchange Street is located approximately 0.350 miles northeast of the Site. On November 5, 2007, a two-hour reporting condition for a release of hydraulic oil was filed with the MassDEP. The contamination has since been reduced to background.
- A Shell Service Station is located approximately 0.354 miles east-northeast of the Site at 857 Main Street. Four (4) releases petroleum related COCs have been filed with MassDEP since January 15, 1987. The property is currently in Phase V Remedy Operation Status (ROS) and COCs above applicable MassDEP groundwater standards are currently present in groundwater at the property.
- 60 Curve Street is located approximately ½-1 mile northeast of the Site. On May 6, 2008, a two-hour reporting condition for a release from an industrial transformer was sent to the MassDEP. An RAO has been filed for the reported release.
- 60 Curve Street and 1073 are located approximately ½-1 mile northeast of the Site. On January 12, 2005, a two-hour reporting condition for the release of 75-100 gallons of diesel fuel was reported to the MassDEP. On May 11, 2005, a class A-2 RAO was filed for the release of diesel fuel.
- Apple Knoll Orchard is located approximately ½-1 mile east of the Site at 36 Forest Road. On August 29, 2009, a two-hour reporting condition for the release of 100 gallons of diesel fuel was reported to the MassDEP. On October 30, 2009, a class A-2 RAO was filed for the release of diesel fuel.

- Precision Metallurgical Division is located approximately ½-1 mile west-southwest of the Site at 1360 Main Street. The property is currently a RCRA Non-generator.
- Union Street is located approximately ½-1 mile north-northeast of the Site at 261 and 267 Exchange Street. On June 28, 1999, a two hour reporting condition for the release of 235 gallons of concrete sealer stored in drums was reported to the MassDEP. On August 18, 2000, a class A-1 RAO was filed for the release.
- Millis Industries Inc. is located approximately ½-1 mile west-southwest of the Site at 1370 Main Street. On June 12, 2000, a two hour reporting condition for the release of 100 gallons of gasoline was reported to the MassDEP. On June 18, 2001, a class A-1 RAO was filed for the release of gasoline.
- 1375-1393 Main Street is located approximately ½-1 mile west-southwest of the Site. An unknown quantity of total petroleum hydrocarbons (TPH) was released at the Site and reported to the MassDEP on June 15, 199. The property is currently listed with MassDEP as a No Further Action/Tier Classified Transition site.
- Howie Oil Co. is located ½-1 mile northeast of the Site at 40 Railroad Avenue. On October 15, 1990, a two hour reporting condition for the release of an unknown amount of oil was reported to the MassDEP. A Class C RAO was filed with MassDEP for the property on March 30, 2006 and the property currently remains in Post Class C status.
- Main and Union Streets are located approximately ½-1 mile east-northeast of the Site. On March 11, 2000, a two hour reporting condition for the release of heating oil was reported to the MassDEP. On March 15, 2000, a class A-1 RAO was filed for the release.
- Millis DPW is located approximately ½-1 mile northeast of the Site at 7 Water Street. The Millis DPW has had numerous releases that have had MassDEP notification requirements. RAOs have been filed with MassDEP for all releases at the property.
- Millis Collision Center is located approximately ½-1 mile west-southwest of the Site at 1463 Main Street. On March 15, 2004, a commercial tanker released an unknown quantity of an unknown substance. An RAO has been filed with MassDEP for the release.

Registered Underground Storage Tanks

Underground Storage Tank records contain an inventory of registered USTs. The Site was not identified on the UST database, and there was one UST site identified within 1/8-mile radius of the Site.

- A Mobil station is located approximately 0.083 miles east of the Site at 972 Main Street. The property currently has two (2) 15,000-gallon double-walled gasoline tanks, a 12,000-gallon double-walled gasoline tank, and a 10,000-gallon double-walled gasoline tank in use. A 6,000-gallon, 8,000-gallon, and 10,000-gallon gasoline tanks were removed in 1990. Three (3) 10,000-gallon gasoline tanks and one (1) 10,000-gallon diesel tank were removed in 2005. The property is owned by Global Companies LCC of 404 Wyman Street, Suite 425 in Waltham, MA.

Leaking Underground Storage Tanks

Leaking Underground Storage Tank (LUST) records contain an inventory of identified leaking USTs. According to the EDR Report, the Site was not identified on the LUST database, and there were five LUST sites were identified within a 0.25-mile radius of the Site. The LUST sites are as follows:

- A Mobil station is located at 972 Main Street located approximately 0.083 miles east of the Site. A Class C RAO was filed with MassDEP on May 26, 2006 and the property currently remains in Post Class C status.

- A Shell Service Station located approximately 0.354 miles east-northeast of the Site at 857 Main Street. Four (4) releases petroleum related COCs have been filed with MassDEP since January 15, 1987. The property is currently in Phase V Remedy Operation Status (ROS) and COCs above applicable MassDEP groundwater standards are currently present in groundwater at the site and;
- Millis Service Center (former Exxon Mobil) is located approximately 0.354 mile east-northeast of the Site at 860 Main Street. A Class C RAO was filed with MassDEP on April 30, 2004 and the property currently remains in Post Class C status.

Solid Waste Facilities and Landfills

The Solid Waste Landfill and/or Solid Waste Disposal Sites (SWLFs) records typically contain an inventory of solid waste disposal facilities or landfills in the state. No SWLF sites were listed within a 0.25-mile radius of the Site.

Spill Sites

State Spill Sites is a listing of sites maintained by the MassDEP, where a reportable release of OHM has occurred. According to the EDR Report, the Site was not identified on the State Spill Sites database, and there are 5 State Spill Sites located within a 1/8-mile radius of the Site. These State Spill Sites are comprised of the State and LUST sites previously identified above.

4.2.3 Non-Geocoded Properties

According to the EDR Report, there are nine (9) non-geocoded sites within the same zip code as the Site. Sovereign personnel made reasonable attempt to locate these non-geocoded sites. Based on the review of the non-geocoded sites, the Site and the adjacent properties are not listed as a non-geocoded site.

5.0 SITE RECONNAISSANCE

5.1 Methodology and Limiting Conditions

The Site was visited by Sovereign personnel on March 20, 22, and 29 2013 to obtain a visual assessment of present Site conditions. The objective of the Site reconnaissance was to obtain information pertaining to environmental conditions at the Site. The inspection included a visual identification of all applicable Site characteristics, such as storm drains, vent pipes, evidence of leaking USTs and ASTs, soil staining, odors, unidentified drums, stressed vegetation, and indications of solid waste disposal. Site photographs are included in **Appendix A.**

This Site reconnaissance included a visual inspection only, and quantitative sampling was not conducted as part of this reconnaissance. Sampling of environmental media was beyond the Phase I ESA Scope of Work and was not conducted as part of the Site Visit.

It's important to note that during the first two Site visits, the ground was partly covered with snow. Snow was cleared from the parking area and sidewalks but covered a large portion of the grass and landscaped areas of the Site.

5.2 Overview

The Site is located at 37 Auburn Road in Millis, Massachusetts. The Site is bound by Main Street to the south, Auburn Road to the west, NY, NH & Hartford Rail Road to the north and commercial properties to the east. Commercial properties to the east of the side include a drycleaners, physician's office, acupuncture office, technical solutions business, and a hair salon. The location of the Site and pertinent Site features are illustrated on **Figures 1 and 2.**

The Site is improved by one building and a maintenance shed. The building is the current location of the Millis Public Library. It is a one-story building with a second story loft on a portion of the building. The first floor consists of a public library and small office areas. The loft area is also used as a public library. There is no below grade basement. The building foundation is slab on grade concrete.

The northern portion of the Site is paved with a small parking lot and access road to the adjoining property. Sidewalks exist leading from the parking lot, Auburn Road and Main Street to the building's main entrance. The remainder of the property is landscaped or grass covered.

There were no apparent wetland areas on-Site. Several catch basins and a drain manhole were observed east of the building running from the parking area to Main Street in a low lying area. Removal of the manhole covers revealed an apparent stream or channel within a culvert.

The building is heated by oil which is stored in an approximate 1,000-gallon AST located adjacent to the northern portion of the building. The AST is enclosed in a 280 square foot, steel, utility storage building. The utility storage building is fully enclosed with the exception of a small access door on the western facing side near the top. The utility storage building was rusted but in good condition. It is located on a rectangular concrete pad.

The storage shed is constructed of wood and is located northeast of the main building. According to the Library Director the shed is used to store books, extra shelving, toilet paper and other miscellaneous supplies. No gasoline or potentially hazardous materials are stored in the shed.

5.3 General Observations

Catch Basins: Catch basins and access manholes for an underground conduit were observed throughout the eastern portion of the Site. This conduit traverses the eastern portion of Site along a north to south axis. Observation of the catch basins revealed no visual or olfactory evidence of a release off oil or hazardous materials. Removal of the manhole covers revealed an apparent stream or channel within a culvert.

Hazardous Substances and Petroleum Products in Connection with Identified Uses: According to the Millis Fire Chief, no USTs have been located at the Site. There currently is a heating oil AST in good condition located adjacent to the building. According to the Library Director, there are no other known hazardous substances stored on Site.

Pits Ponds and Lagoons: No pits, ponds or lagoons were observed during Site reconnaissance.

Stained Soil or Pavement: Stained soil or pavement was not observed during Site reconnaissance.

Odors: No strong or pungent odors were observed during Site reconnaissance.

Storage Tanks: One AST was observed along the northern portion of the building used to hold heating oil. Access to the enclosure was not possible during the Site visits, but available viewing areas indicated that the tank appears intact and is stored in an environmentally-sound manner.

Pools of Liquid: No pools of liquid were observed during Site reconnaissance.

Drums: No drums were observed during Site reconnaissance.

Stressed Vegetation: During Site reconnaissance, the ground was partially covered with snow. However, the Site reconnaissance did not reveal the presence of any stressed or strained vegetation for the portions of the ground that were visible.

Indications of Solid Waste Disposal: Illegal dumping of solid waste was not observed at the Site.

Waste water and Septic System: A septic system or wastewater treatment was not observed during the Site reconnaissance.

Wells: No wells were observed during Site reconnaissance.

Vaults: Vaults were not observed at the Site.

Indications of PCBs: Sovereign personnel did not observe the presence of PCB containing material during the Site reconnaissance. However, without testing the presence or absence of PCBs cannot be verified.

Lead-Based Paint (LBP): Sovereign personnel did not observe the presence of peeling and/or cracking paint while conducting the Site reconnaissance at the Site. However, without testing the presence or absence of LBP cannot be verified.

Asbestos-Containing Material (ACM): Sovereign personnel did not observe the presence of suspected friable ACM while conducting the Site reconnaissance at the Site. However, without testing the presence or absence of ACM this cannot be verified. According to the Library Director, asbestos was discovered associated with old piping located within the concrete foundation during an inspection by Smith and Wessel during 2011. The inspection report was not readily available during the municipal office visits.

Mold: Sovereign personnel did not observe the presence of mold while conducting the Site reconnaissance. However, without testing the presence or absence of mold cannot be verified for the remainder of the Site buildings.

6.0 CONCLUSIONS

6.1 Summary of Findings

Conditions of the property located at 37 Auburn Road in Millis, Massachusetts were evaluated in a manner consistent with United States Environmental Protection Agency (USEPA) Standards and Practices for All Appropriate Inquiries [(AAI), 40 CFR Part 312] and guidelines established by the American Society for Testing and Materials (ASTM) *in the Standard Practice for Environmental Site Assessments:* Phase I Environmental Site Assessment Process / Designation E 1527-05 (ASTM Standard Practice E 1527-05). This investigation included a review of readily available Site historical information, a review of information provided by appropriate federal and local regulatory agencies, and a Site visit on to observe the physical Site conditions.

The Site is comprised of one parcel (Map 23, Lot 79) and is owned by the Town of Millis. The Site is improved by a single building and a maintenance shed. The Site has been owned by the Town since 1950. Ownership information prior to 1922 is unknown. According to the Millis Fire Chief, there have been no USTs or hazardous materials stored on the Site with the exception of heating oil. According to the historic documents related to the Site such as Sanborn Fire Insurance Maps and historic aerial photographs, the Site was first developed sometime after 1957.

Currently, the building is utilized as the Millis Public Library. The building has no basement. The foundation is concrete slab on grade. A 1,000-gallon heating oil AST is located adjacent to the northern exterior of the building which is housed in a 280 square foot metal utility building. No evidence of a release or potential release from this source was ascertained during the Site reconnaissance.

According to the Geographic Information System (MassGIS) Environmental Data Map included as **Figure 3**, the Site is not located within a Federal Emergency Management Agency (FEMA) 100 year flood plain. A 100 year flood zone is located approximately 2,000 feet to the west of the Site. It should be noted that wetland areas are located to the north and the south of the Site and an apparent stream or waterway traverses the Site along a north to south axis. According to the FEMA Flood Insurance Rate Map for the Norfolk County, Massachusetts Community Panel Number 25021C0161E Panel 161 of 430. July 17, 2012, the Site is located in an area designated as "Other Flood Area." Field inspections confirmed the presence of a subsurface culvert to the east of the existing building at the Site.

Sovereign performed a limited computer database search and file review of local records to obtain current information on the environmental status of the Site and selected properties in the vicinity of the Site. According to the EDR Report, the Site is not located in any of the researched databases. However, the presence of an adjoining property with a Class A-2 RAO requires additional investigation to confirm that remaining contaminants will not create a problem during the proposed redevelopment of the Site.

Sovereign has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527 at 37 Auburn Road in Millis, Massachusetts, the Site. Any exceptions to, or deletions from, this practice are described in Section 6.3 of this report. This assessment has revealed no evidence of RECs in connection with the property except for the following:

- An existing 1,000-gallon heating oil AST is located north of the library building;
- The adjacent property to the east of the Site (979 Main Street) served as a gasoline/service station from approximately 1931 to the 1980's. Two (2) releases for the property have been filed with MassDEP. A release of petroleum related COCs and PCE to groundwater. During remedial actions at the property an excavation was conducted which extended onto the Site. A Class A-2 Remedial Action Outcome (RAO) was filed for the two releases at the property. A Class A-2 RAO indicates that conditions have not been reduced to Background and contaminants may be present in soil and groundwater which is part of the delineated Area of Concern.
- A Mobil station is located at 972 Main Street located approximately 0.083 miles east and up-gradient of the Site. A Class C RAO was filed with MassDEP on May 26, 2006 and the property currently remains in Post Class C status.

6.2 Recommendations

Historic evidence of petroleum products or hazardous materials was not found on the Site. However, the adjacent property to the east of the Site has historically had petroleum related release filed with MassDEP. A Class A-2 RAO has been filed with MassDEP for the releases at the property. Based on the results of this Phase I, Sovereign recommends a Phase II ESA in the along the eastern portion of the property, to confirm if RECs exist due to past usage of the neighboring property. This Phase II ESA should include soil and groundwater sampling activities in and around each area of concern to establish the presence or absence potential contamination.

A building hazardous materials survey should be conducted prior to any demolition activities at the Site to confirm the presence of asbestos and other problem building materials.

The proposed building envelope should be evaluated considering the existing subsurface utilities at the Site. Of primary concern is the culvert and or the stormwater collection system located to the east of the existing building.

A Watershed Protection District traverses the central portion of the Site along a south to north axis. According to the July 17, 2012 FEMA Flood Insurance Rate Map for the Norfolk County, Massachusetts Community Panel Number 25021C0161E Panel 161 of 430, the Site is located in an area designated as "Other Flood Area." The local definition of the Watershed Protection District is that it is a 25-foot offset from an existing stream. Removal of the manhole covers to the east of the existing building revealed an apparent stream or channel within a culvert. Environmental permit considerations will likely be required prior to redevelopment activities at the Site.

6.3 Identification of Data Gaps

Initial Site address information was 25 Auburn Road. Town Assessors' information indicates that the Site is designated as 37 Auburn Road. That address was utilized for the purposes of this report.

Information related to the stormwater system at the Site was reviewed at the office of the Board of Selectman. Of interest was the stormwater system which is located to the east of the building at the Site. Although information was available for the construction of the Centennial Place

stormwater system in 2008, specific information related to the culverted stream below the Site was not available for review.

No other data gaps were identified.

7.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

The studies and investigations described in this report were conducted either by or under the supervision of qualified environmental personnel of Sovereign Consulting Inc. These personnel include experienced engineers and Licensed Site Professionals registered in the Commonwealth of Massachusetts. Sovereign Consulting Inc. has considerable experience in conducting the type of investigations and evaluations described throughout this report.

Mr. Thomas B. Hevner, P.E., L.S.P., Program Manager, has over 20 years of experience evaluating properties for environmental contamination throughout the Eastern United States and has a Bachelor of Science in Geology and Chemistry as well as a Master degree in Civil and Environmental Engineering. He's a Registered Professional Engineer and a Licensed Site Professional in the Commonwealth of Massachusetts.

This report summarizes the findings of the Phase I Environmental Site Assessment conducted for 37 Auburn Road (Map 23, Lot 79) in Millis, Massachusetts in accordance with the Scope of Services agreed to with the Town of Millis.

AAI Environmental Professional Declaration

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in 312.10 of 40 CFR 312, and I have the specific qualifications based on education, training, and experience to assess a property of the nature, history and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Par 312.

Thomas B. Hevner, P.E., L.S.P.
Program Manager

8.0 LIMITATIONS

This report was completed by Sovereign Consulting Inc., for the sole use of the Town of Millis, Massachusetts and/or their attorneys in connection with an assessment of Site environmental conditions. Use of the report by any other person for any other purpose is not authorized except with the prior written consent of Sovereign.

This work was undertaken to assess environmental conditions on the Site in accordance with generally accepted engineering and hydrogeological practices and to establish by way of a limited scope of work whether there is evidence that a release of oil or hazardous materials has occurred at the Site or that a threat of release exists. This report represents Sovereign's opinion relative to such evidence. No other warranty, express or implied, is made. Absolute assurance that any and all possible contamination at the Site was identified cannot be provided. Unless otherwise specified in the scope of work, Sovereign accepts no responsibility for client performance of recommendations as may be offered in this report. No attempt was made to investigate Site owner or operator compliance with federal, territory, or local laws and regulations in connection with Site usage.

The conclusions expressed by Sovereign in this report are based solely on the references cited. Observations were made under the conditions stated and represent conditions at the time of the inspection, which may not be indicative of past or future property conditions. Information provided by federal, territory, and local agencies contacted was relied upon as complete. Sovereign assumes no responsibility for the accuracy and completeness of this information.

Because certain materials are considered by public health officials as presenting significant hazards in indoor environments, and where simple observations or other evidence has allowed, Sovereign has indicated their potential presence on the Site in this report. However, unless specifically stated in the scope of work, Sovereign has not performed specific testing or analysis to determine the presence or concentration of asbestos, urea formaldehyde, lead paint, radon or polychlorinated biphenyls.

Sovereign makes no representation concerning the legal significance of its findings or the value of the property investigated. Sovereign has no contractual liabilities to third parties for the information or opinions obtained in this report. This report is not intended to satisfy the requirements of the National Contingency Plan (NCP) or the Massachusetts Contingency Plan (MCP).

All of the State and Federal environmental record sources were reviewed using an independent electronic database search company, with a limited record search performed at the local territory environmental office. No assurances can be made on the locations of identified sites as the database search company has placed them.

Should additional information become available concerning this Site or neighboring properties in the future, that information should be made available to Sovereign for review so that the conclusions presented in this report may be modified as necessary.

9.0 REFERENCES

American Society for Testing and Materials. Standard Practice for Environmental Site Assessments: Preliminary Environmental Site Assessment Process. ASTM Designation E 1527-05 published by ASTM, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428- 2959.

Town of Millis Municipal Offices (March 20 and 22, 2013):
Assessor
City Clerk
Building Department
Engineering Department
Fire Department
Health Department
Water/Sewer Department

Town of Millis Municipal Offices (April 5, 2013):
Board of Selectmen

Environmental Data Resources Inc., Milford, CT. Sovereign Consulting Project ME054, March 18, 2013.

Federal Emergency Management Act. Flood Insurance Rate Map for the Norfolk County, Massachusetts Community Panel Number 25021C0161E Panel 161 of 430. July 17, 2012.

Historical Aerials, www.historicalaerials.com 37 Auburn Street, Millis, Massachusetts. 1957 through 2010.

Norfolk Registry of Deeds, On Line Database. March 29, 2013.

University of New Hampshire Diamond Library Documents Department and Data Center – Historic Maps of New England and New York – Franklin, Holliston, and Medfield, Massachusetts Quadrangles – 1889 through 1987 USGS Topographic Maps.
http://docs.unh.edu/nhtopos.htm

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10.0 GLOSSARY

AAI	All Appropriate Inquiry
ACM	Asbestos Containing Material
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
IWPA	Interim Well Head Protection Area
LBP	Lead Based Paint
LUST	Leaking Underground Storage Tank
MassDEP	Massachusetts Department of Environmental Protection
MassGIS	Massachusetts Geographic Information System
MCP	Massachusetts Contingency Plan
MSL	Mean Sea Level
NPL	National Priority List
OHM	Oil and/or Hazardous Materials
PCBs	Polychlorinated Biphenyls
RAO	Response Action Outcome
REC	Recognized Environmental Conditions
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation Recovery Information System
RTN	Release Tracking Number
Sovereign	Sovereign Consulting Inc.
SWLFs	Solid Waste Landfill and/or Solid Waste Disposal Sites
TSD	Treat, Store, and/or Dispose
UNH	University of New Hampshire
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
UTM	Universal Transverse Mercator

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FIGURES

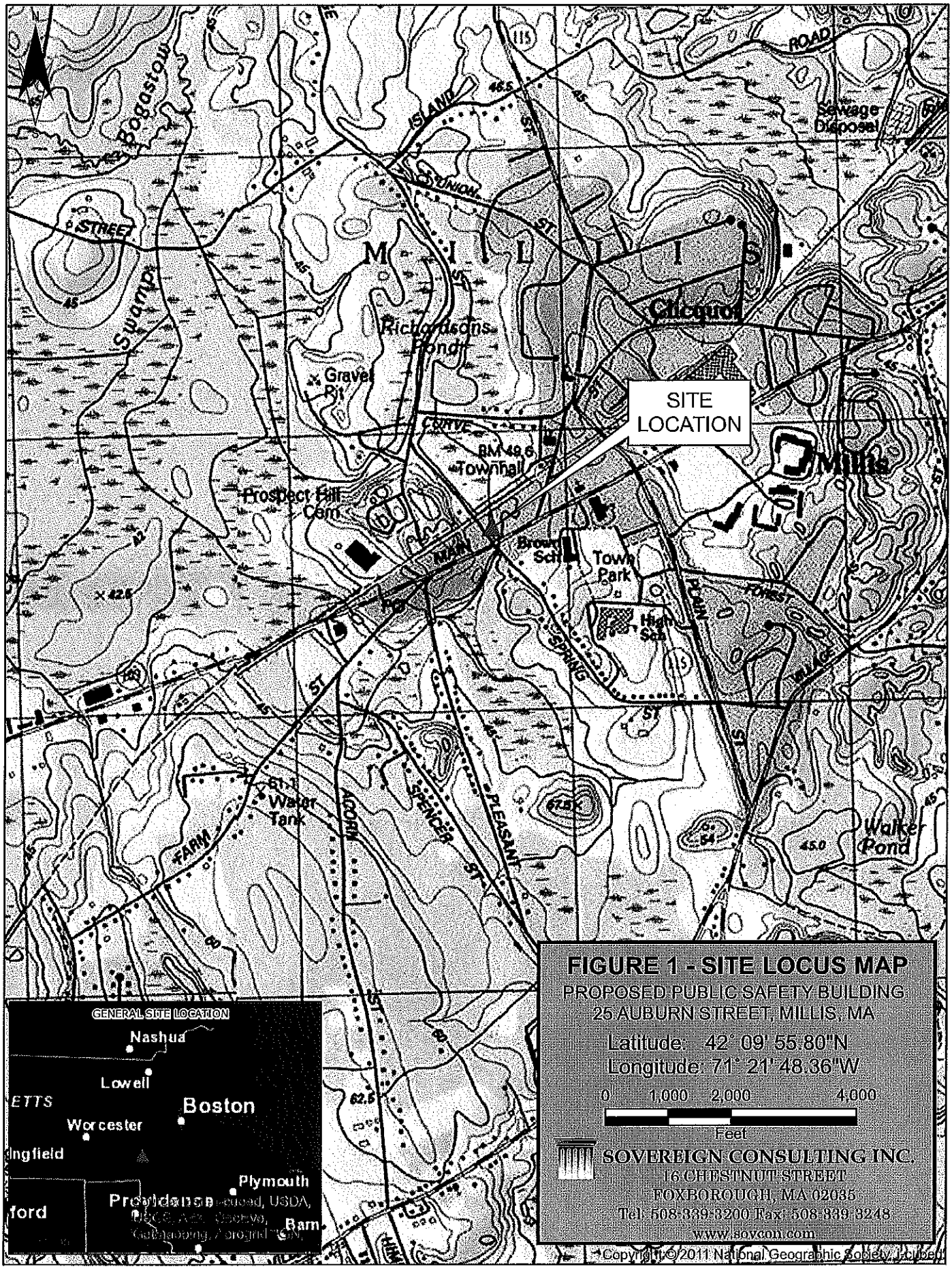


FIGURE 1 - SITE LOCUS MAP

PROPOSED PUBLIC SAFETY BUILDING
25 AUBURN STREET, MILLIS, MA

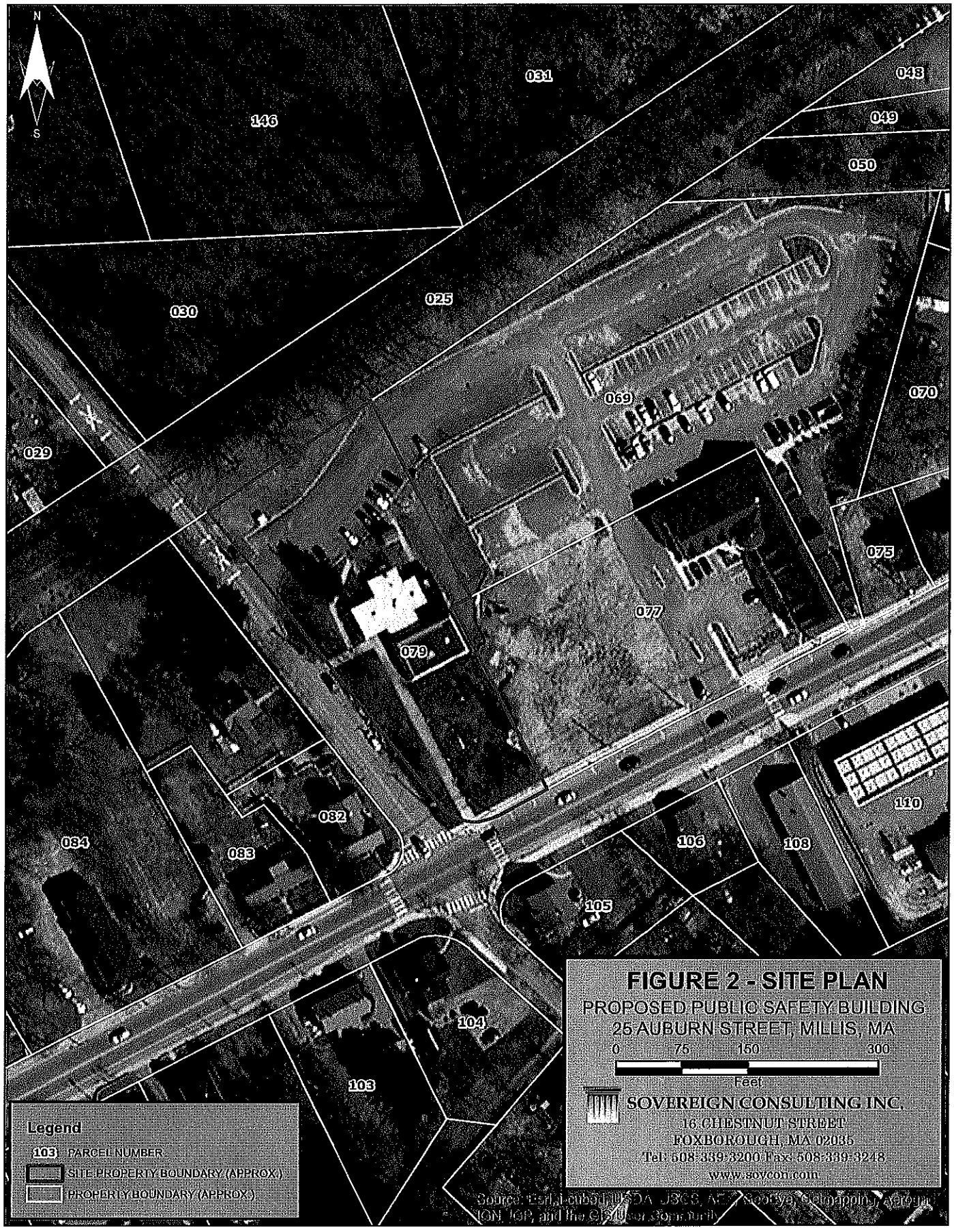
Latitude: 42° 09' 55.80"N
Longitude: 71° 21' 48.36"W

0 1,000 2,000 4,000
Feet

SOVEREIGN CONSULTING INC.
16 CHESTNUT STREET
FOXBOROUGH, MA 02035
Tel: 508-339-3200 Fax: 508-339-3248
www.sovcon.com

Contour Interval = 3m

03/18/2013 ROV



NOTES: 1) "LEVEL 3 ASSESSORS' PARCEL MAPPING" MASSGIS. APRIL 2013.
2) ASSESSORS' PARCELS ARE APPROXIMATE AND SHOULD NOT BE USED TO DETERMINE LEGAL OWNERSHIP OR BOUNDARY.

04/05/2013 ROV

MassDEP - Bureau of Waste Site Cleanup

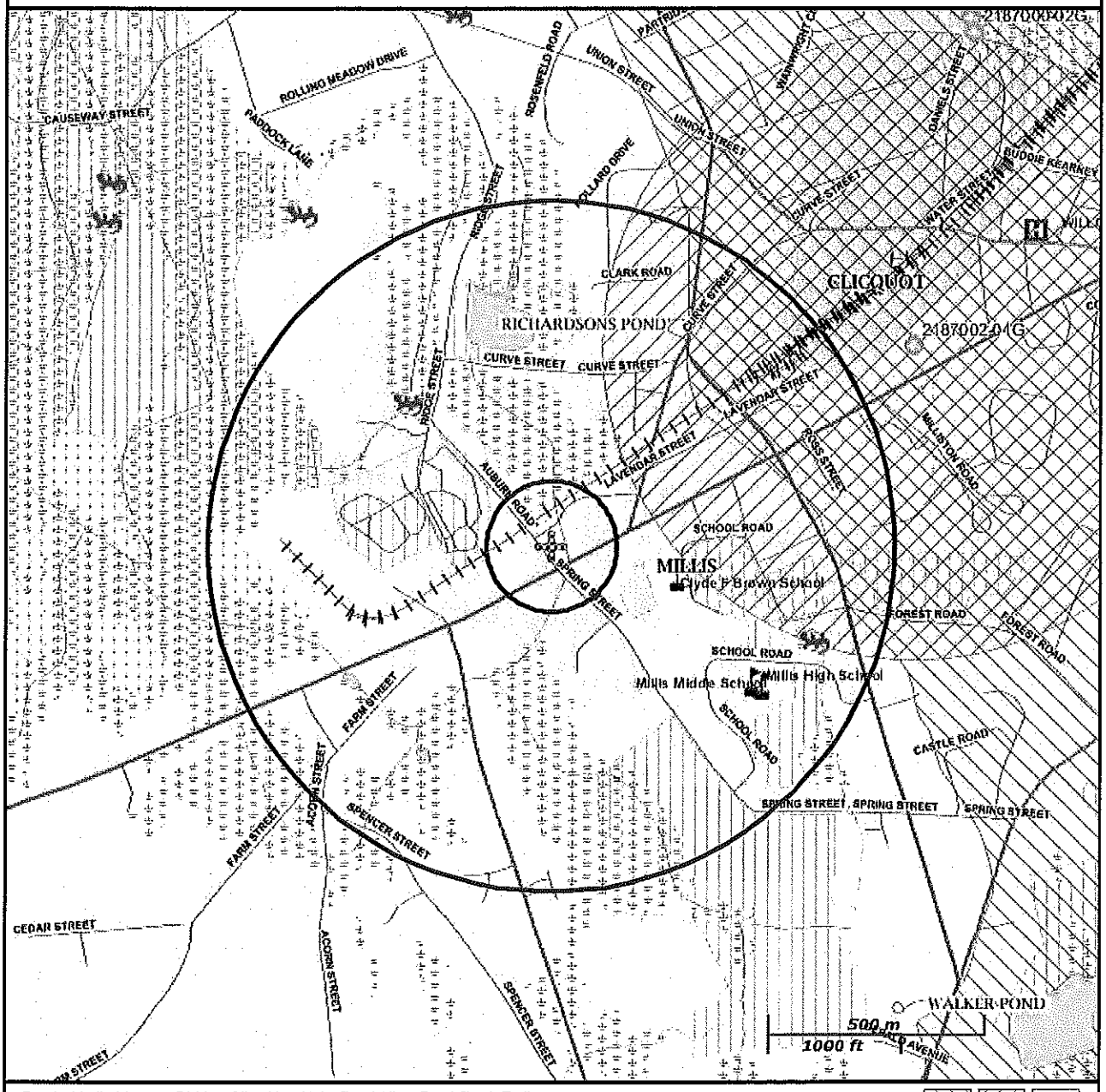
Site Information: MCP Numerical Ranking System Map: 500 feet & 0.5 Mile Radii

PROPOSED PUBLIC SAFETY BUILDING
25 AUBURN STREET MILLIS, MA

NAD83 UTM Meters:
4670863mN , 304763mE (Zone: 19)
March 18, 2013

The Information shown is the best available at the date of printing. However, it may be incomplete. The responsible party and LSP are ultimately repsponsible for ascertaining the true conditions surrounding the site. Metadata for data layers shown on this map can be found at: http://www.mass.gov/mgis/.

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail

Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct

Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam

Aquifers: Medium Yield, High Yield, EPA Sole Source

Non Potential Drinking Water Source Area: Medium, High (Yield)

PWS Protection Areas: Zone II, IWPA, Zone A

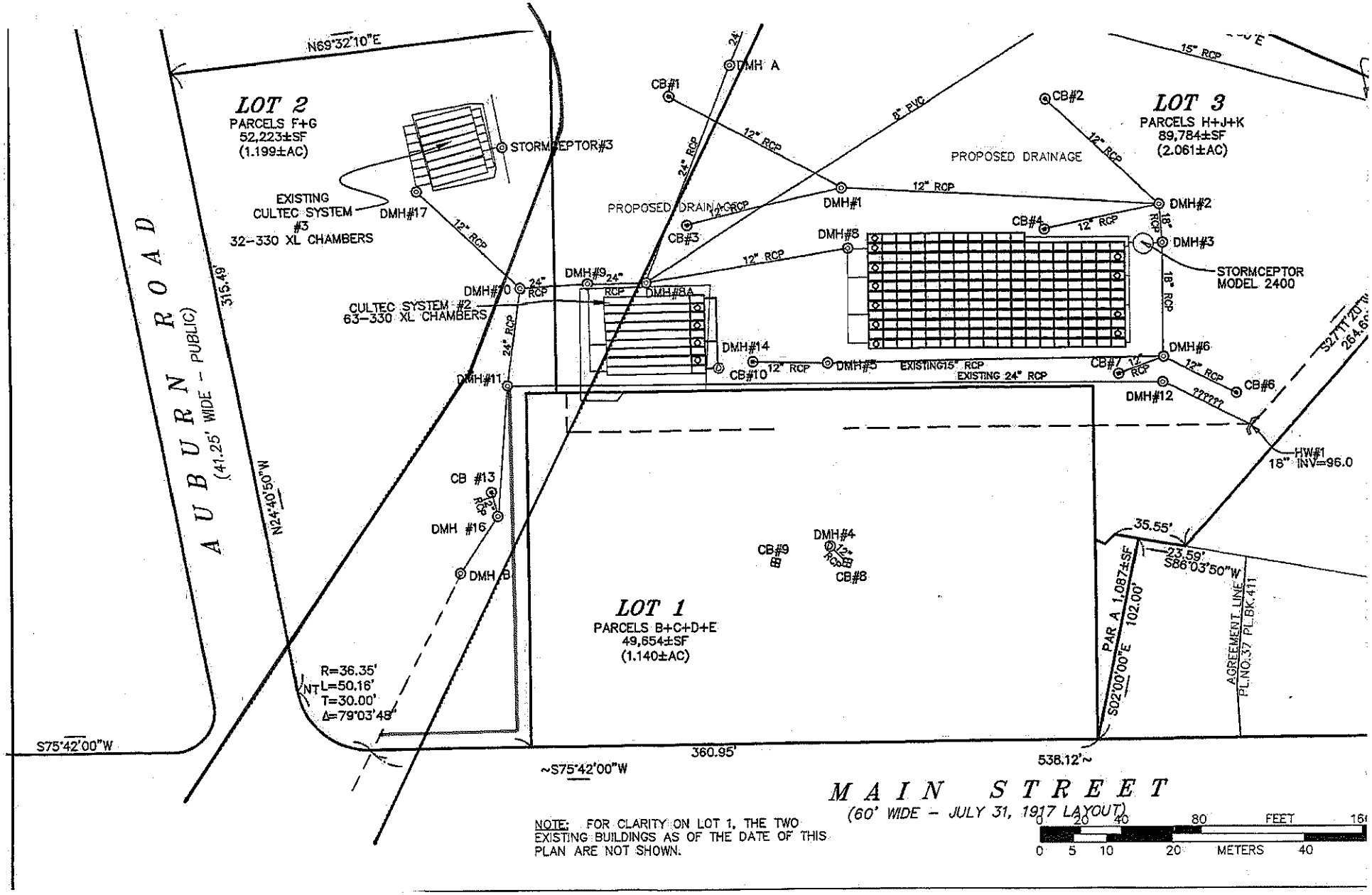
Hydrography: Open Water, PWS Reservoir, Tidal Flat

Wetlands: Freshwater, Saltwater, Cranberry Bog

FEMA 100yr Floodplain; Protected Open Space; ACEC

Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert., Potential

Solid Waste Landfill; PWS: Com.GW,SW, Emerg., Non-Com.



NOTE: FOR CLARITY ON LOT 1, THE TWO EXISTING BUILDINGS AS OF THE DATE OF THIS PLAN ARE NOT SHOWN.

Section 7 – New Police Station Cost Estimate

CONSTRUCTION COST ENGINEERING OF BOSTON

Town of Millis Police Headquaters 13 1300
Area 12,046 SF Perimeter 636 LF

12046 SF Police Stations Last Updated
Year 2013 Cost File 2013 Boston Union Average 4/2/2013 10:31:14 AM

Project Summary

Division	Total		
01 GENERAL REQUIREMENTS	***424,020***	$35.20 /SF	9.9 %
02 SITE CONSTRUCTION	***341,557***	$28.35 /SF	7.9 %
03 CONCRETE	***264,758***	$21.98 /SF	6.2 %
04 MASONRY	***399,657***	$33.18 /SF	9.3 %
05 METALS	***47,347***	$3.93 /SF	1.1 %
06 WOOD AND PLASTICS	***458,837***	$38.09 /SF	10.7 %
07 THERMAL AND MOISTURE PROTECTION	***304,765***	$25.30 /SF	7.1 %
08 DOORS AND WINDOWS	***299,582***	$24.87 /SF	7.0 %
09 FINISHES	***335,693***	$27.87 /SF	7.8 %
10 SPECIALTIES	***68,725***	$5.71 /SF	1.6 %
11 EQUIPMENT	***169,637***	$14.08 /SF	3.9 %
12 FURNISHINGS	***13,014***	$1.08 /SF	0.3 %
15 MECHANICAL	***659,217***	$54.72 /SF	15.3 %
16 ELECTRICAL	***453,171***	$37.62 /SF	10.5 %
Project	***56,713***	$4.71 /SF	1.3 %

Sub Total		4,296,693	356.69 / SF
Profit	10 %	429,669	
Bond	1 %	42,967	
Contingency	15 %	644,504	
Escalation	3 %	128,901	
Grand Total		**5,542,734**	460.13 / SF

CONSTRUCTION COST ENGINEERING OF BOSTON

Sub Division Summary

Town of Millis Police Headquaters			13 1300
Area 12,046 SF	Perimeter 636 LF		
12046 SF		Police Stations	Last Updated
Year 2013		Cost File 2013 Boston Union Average	4/2/2013 10:31:14 AM

SubDivision	Description	Total	
01 GENERAL REQUIREMENTS		**$424,020**	
01000	General Requirements	$290,166	24.09 SF
01300	Submittals	$15,388	1.28 SF
01310	Project Management & Coordination	$44,000	3.65 SF
01500	Construction Facilities & Temp Controls	$43,008	3.57 SF
01600	Material and Equipment	$19,976	1.66 SF
01700	Contract Closeout	$11,482	0.95 SF
02 SITE CONSTRUCTION		**$341,557**	
02100	Site Preparation	$7,398	0.61 SF
02200	Earthwork	$47,049	3.91 SF
02273	Erosion and Sediment Control	$9,589	0.80 SF
02500	Paving and Surfacing	$34,174	2.84 SF
02515	Exterior Stone Paving	$13,513	1.12 SF
02524	Curbs, Gutters and Walks	$28,443	2.36 SF
02600	Piped Utilities	$11,190	0.93 SF
02700	Sewage and Drainage	$159,633	13.25 SF
02800	Site Improvements and Amenities	$7,615	0.63 SF
02830	Site Concrete	$8,011	0.67 SF
02900	Landscaping	$14,941	1.24 SF

SubDivision	Description	Total	
03 CONCRETE		**$264,758**	
03000	Concrete	$48,076	3.99 SF
03100	Concrete Forms and Accessories	$1,756	0.15 SF
03200	Concrete Reinforcement	$24,240	2.01 SF
03300	Cast-In-Place Concrete	$186,365	15.47 SF
03810	Concrete Saw Cutting	$4,320	0.36 SF
04 MASONRY		**$399,657**	
04100	Masonry Accessories	$78,439	6.51 SF
04200	Masonry Units	$321,218	26.67 SF
05 METALS		**$47,347**	
05000	Metals	$2,475	0.21 SF
05100	Structural Steel	$44,872	3.73 SF
06 WOOD AND PLASTICS		**$458,837**	
06000	Wood and Plastics	$335,257	27.83 SF
06100	Rough Carpentry	$123,581	10.26 SF
07 THERMAL AND MOISTURE PROTECTION		**$304,765**	
07000	Thermal and Moisture Protection	$13,584	1.13 SF
07200	Thermal Protection, Insulation	$69,154	5.74 SF
07270	Air/Vapor Barriers	$9,859	0.82 SF
07300	Shingles, Roof Tiles, and Roof Coverin	$58,214	4.83 SF
07400	Roofing and Siding Panels	$66,818	5.55 SF
07600	Flashing and Sheet Metal	$70,475	5.85 SF
07840	Firestopping	$8,060	0.67 SF
07900	Joint Sealers	$8,603	0.71 SF

SubDivision	Description	Total		
08 DOORS AND WINDOWS			**$299,582**	
08000	Doors and Windows	$167,108		13.87 SF
08300	Specialty Doors	$4,718		0.39 SF
08400	Entrances and Storefronts	$27,041		2.24 SF
08500	Metal Windows	$100,716		8.36 SF
09 FINISHES			**$335,693**	
09000	Finishes	$123,703		10.27 SF
09200	Plaster and Gypsum Board	$108,856		9.04 SF
09300	Tile	$48,669		4.04 SF
09650	Resilient Flooring	$7,994		0.66 SF
09653	Resilient Wall Base and Accessories	$10,709		0.89 SF
09670	Resinous Flooring	$35,762		2.97 SF
10 SPECIALTIES			**$68,725**	
10000	Specialties	$68,725		5.71 SF
11 EQUIPMENT			**$169,637**	
11000	Equipment	$92,569		7.68 SF
11020	Security and Vault Equipment	$77,067		6.40 SF
12 FURNISHINGS			**$13,014**	
12000	Furnishings	$13,014		1.08 SF
15 MECHANICAL			**$659,217**	
15000	Mechanical	$659,217		54.72 SF
16 ELECTRICAL			**$453,171**	

Town of Millis Police Headquaters	13 1300

SubDivision	Description	Total	
16000	***Electrical***	***$453,171***	37.62 SF

Project ***$56,713***

17000	***Communications***	***$56,713***	4.71 SF

Sub Total		4,296,693	356.69 / SF
Profit	10 %	429,669	
Bond	1 %	42,967	
Contingency	15 %	644,504	
Escalation	3 %	128,901	
Grand Total		**5,542,734**	460.13 / SF

CONSTRUCTION COST ENGINEERING OF BOSTON

Town of Millis Police Headquaters 13 1300
Area 12,046 SF Perimeter 636 LF

12046 SF Police Stations Last Updated
Year 2013 Cost File 2013 Boston Union Average 4/2/2013 10:31:14 AM

Description	Quantity	Unit	Unit Cost	Extended Cost

01 GENERAL REQUIREMENTS

01000 General Requirements

General superintendent	52	WEEK	2763.09	143,681
Asst. superintendent	26	WEEK	2201.60	57,242
Main office, general clerk	26	WEEK	1664.00	43,264
Cutting & patching, misc.	6	JOB	330.00	1,980
Permit fee $10/m	4000	JOB	11.00	44,000
01000	***General Requirements***			***290,166***

01300 Submittals

Scheduling, progress cpm	1	EA	1100.00	1,100
Scheduling, cpm, update	11	EA	275.00	3,025
Survey, 3 man crew, line & grade	2	DAY	2215.92	4,432
Additional drawings	5	JOB	275.00	1,375
Drawings, shop/product data sheets	25	SET	218.23	5,456
01300	***Submittals***			***15,388***

01310 Project Management & Coordination

Insurance, 1%	40000	JOB	1.10	44,000
01310	***Project Management & Coordination***			***44,000***

01500 Construction Facilities & Temp Controls

Temporary heat, 24 hrs day, per wk office only	117	csf	35.82	4,190
Temporary electric, power/lights	12	MONTH	440.00	5,280
Rough hardware	5	JOB	385.00	1,925
Cleaning general, site 1 hour/day	250	HR	42.48	10,620

01 GENERAL REQUIREMENTS

Description	Quantity	Unit	Unit Cost	Extended Cost
Office trailer, furnished, 36'x8'	12	MONTH	264.00	3,168
Storage trailer, 28'x10'	12	MONTH	110.00	1,320
Project sign, 4' x 8' x 1 7/8"	1	EA	1033.57	1,034
Barrier, plywood on 2"x4"frame 4'	100	LF	24.03	2,403
Temporary fire, protection	6	JOB	550.00	3,300
Telephone, general clerk use	12	MONTH	275.00	3,300
Telephone,dedicated f/fax	12	MONTH	275.00	3,300
Owners rep trailer	12	MONTH	264.00	3,168
01500	***Construction Facilities & Temp Controls***			***43,008***

01600 Material and Equipment

Toilet, portable chemical, rent	24	MONTH	99.00	2,376
Equipment rentals, misc	4	JOB	4400.00	17,600
01600	***Material and Equipment***			***19,976***

01700 Contract Closeout

Clean-up, final	0.5	WEEK	6796.80	3,398
Punchlist, survey/check	2	WEEK	4041.60	8,083
01700	***Contract Closeout***			***11,482***

02 SITE CONSTRUCTION

02100 Site Preparation

Strip & stockpile loam	100	CY	4.40	440
Clear & grub, and grade site work area	1	ACRE	6957.50	6,958
02100	***Site Preparation***			***7,398***

02200 Earthwork

Excavation, structural w/hyd. exvtr	376	CY	15.86	5,965
Excavation, trench,4'deep,w/backhoe	100	CY	12.48	1,248
Grading, fine,3 passes w/mtr grader	1000	SY	1.32	1,324
Hand excavation, trench under slab	20	CY	55.00	1,100
Fill, gravel,12"deep,under flr slab	12046	SF	1.19	14,291
Fill, gravel,12"deep,under apron slab	300	SF	1.19	356
Excavation, hyd.execav.1.5cy60cy/hr	1680	CY	4.96	8,329
Grading, finish by hand sog	12046	SF	0.68	8,187
Excavation, trench,,w/backhoe	250	CY	12.48	3,120

02 SITE CONSTRUCTION

Description	Quantity	Unit	Unit Cost	Extended Cost
Backfill, compaction, vib/plate 6"	250	CY	12.52	3,130
02200 Earthwork				***47,049***

02273 Erosion and Sediment Control

Erosion control, silt fence, mirafi	800	SY	3.96	3,169
Erosion con., hay bales,stake/remov	800	LF	4.06	3,251
Filter fabric, mirafi	800	SY	3.96	3,169
02273 Erosion and Sediment Control				***9,589***

02500 Paving and Surfacing

Paint, stripping and hp symbols	100	SF	4.88	488
Bollards, 8" pipe w/cement 6'6"	12	EA	172.04	2,064
Basecourse, bank run gravel,12"deep	1000	SY	5.48	5,476
Bitum., paving, wearing course 1.5"	1000	SY	8.00	8,002
Paint, parking stall,white	20	STALL	6.63	133
Sidewalk, concrete 4"	1000	SF	5.81	5,813
Bitum., paving, binder course 2" dbl for H.D.	1000	SY	11.00	11,001
Bollards, 8" pipe w/cement 6-'6" for Island	2	EA	364.54	729
Basecourse, bank run gravel, 8"deep sidewalks	110	SY	4.25	468
02500 Paving and Surfacing				***34,174***

02515 Exterior Stone Paving

Pavers, granite 2" rumple strip 6' wide	200	SF	36.62	7,323
Pavers, fieldstone 2"	200	SF	30.95	6,190
02515 Exterior Stone Paving				***13,513***

02524 Curbs, Gutters and Walks

Curbs, granite split face st.5"x16" slope edging	1000	LF	26.88	26,879
Curbs, granite split face st.6"x18"	50	LF	31.28	1,564
02524 Curbs, Gutters and Walks				***28,443***

02600 Piped Utilities

Pipe, ductile iron, 4"diam. cl250	100	LF	26.26	2,626
Tapping sleeves & valves	1	EA	385.00	385
Pipe, ductile iron, 6"diam. cl250	100	LF	40.90	4,090

02 SITE CONSTRUCTION

Description	Quantity	Unit	Unit Cost	Extended Cost
Pipe, ductile iron, 8"diam. cl250	100	LF	40.90	4,090
02600	***Piped Utilities***			***11,190***

02700 Sewage and Drainage

ALLOWANCE FOR STORM & SEWER THIS SECTION	0	EA	0.00	0
Manhole & c. basin, precast,4'id8'd	10	EA	2278.35	22,784
Frames & covers, heavy traffic 36"	10	EA	924.74	9,247
Drainage pipe, d.i. 8"dia	100	LF	40.90	4,090
Drainage pipe, d.i., 12" dia	100	LF	63.55	6,355
Sewage pipe, pvc, 6"dia.	100	LF	10.66	1,066
Pipe, flared ends	2	EA	770.00	1,540
Stormsepter 5000 gal	1	EA	8250.00	8,250
Outlet structures	1	EA	2750.00	2,750
Drainagepipe, ductile iron, 10"dia	100	LF	52.65	5,265
Inverts, single channel, brick	10	EA	656.23	6,562
Drainage pipe, ductile iron, 18" dia	100	LF	89.71	8,971
Drainage pipe, ductile iron, 15" dia	100	LF	75.62	7,562
Ductile iron, 6"dia roof drain	100	LF	29.13	2,913
Pipe, plastic, cpvc	100	LF	31.18	3,118
Stormtech units sc-740	50	EA	572.45	28,622
Leaching 3/4" -2" filter stone,washed	200	CY	22.00	4,400
Manhole,4'id 8'dp relocation	3	EA	4587.30	13,762
Frames & covers, heavy traffic 36" relocate	3	EA	924.74	2,774
Inverts, single channel, brick relocate	3	EA	656.23	1,969
Pipe, rein.concrete, 24"dia.,class 3 relocate	300	LF	58.78	17,633
02700	***Sewage and Drainage***			***159,633***

02800 Site Improvements and Amenities

Fence, around generator pad	50	LF	41.32	2,066
Fence, gate	2	EA	361.06	722
Guard rail, WOOD	100	LF	17.58	1,758
Parking barriers, precast 8"x13"x6' curb stop	20	EA	56.58	1,132
Benches, fiberglass 8'	2	EA	969.06	1,938
02800	***Site Improvements and Amenities***			***7,615***

02830 Site Concrete

Conc. emergency generator pad/xfmr	10	CY	180.12	1,801

02 SITE CONSTRUCTION

Description	Quantity	Unit	Unit Cost	Extended Cost
Concrete in place, ground slab, 12" apron	300	SF	7.05	2,116
Field stone wall, 2' wide	100	SFFACE	40.94	4,094
02830 Site Concrete				***8,011***

02900 Landscaping

Topsoil, spread w/loader hand dress	100	CY	18.22	1,822
Trees allowance	20	EA	385.00	7,700
Shrubs 2' high	25	EA	44.00	1,100
Seeding, turf mix, push spreader	50	MSF	86.39	4,320
02900 Landscaping				***14,941***

03 CONCRETE

03000 Concrete

Layout	80	hr	174.50	13,960
Set anchor bolts & base plates	160	ea	161.66	25,866
Misc materials, tools, supplies	1	ls	8250.00	8,250
03000 Concrete				***48,076***

03100 Concrete Forms and Accessories

Expansion joint, bit.fiber, 1/2"x6"	636	LF	2.76	1,756
03100 Concrete Forms and Accessories				***1,756***

03200 Concrete Reinforcement

Reinforcing, 100#/cy	12.7	TON	1128.05	14,326
Welded wire fabric, 6x6-w1.4xw1.4 office	109.35	CSF	73.75	8,064
Welded wire fabric, 6x6-w2.9xw2.9 garage	11.11	CSF	100.13	1,112
Welded wire fabric, 6x6-w1.4xw1.4 sidewalks	10	CSF	73.75	737
03200 Concrete Reinforcement				***24,240***

03300 Cast-in-Place Concrete

Conc. fixed platforms	4	EA	770.00	3,080
Finishing, broom finish sidewalks	1000	SF	1.48	1,485
Finishing floor, steeltrowel	12046	SF	1.60	19,316

03 CONCRETE

Description	Quantity	Unit	Unit Cost	Extended Cost
Concrete, housekeeping pads	4	EA	220.00	880
Concrete, sealer, hardener&dustprf garage	1111	SF	0.52	578
Concrete in place, strlpfoot,36"x12	78.6	CY	321.98	25,308
Concrete in place, spread footing	17	CY	440.64	7,491
Concrete in place, grade wall 16"x4'	110.2	CY	516.40	56,907
Concrete in place, ground slab, 4" office	10935	SF	4.02	43,930
Concrete in place, ground slab, 6" garage	1111	SF	4.89	5,432
Concrete in place, thickened slab f/cmu,24"x12	65	CY	337.82	21,958
03300	***Cast-In-Place Concrete***			***186,365***

03810 Concrete Saw Cutting

Saw cut, conc slab, 1"	1875	LF	2.17	4,065
Saw cut, asphalt, to 3" deep	200	LF	1.28	255
03810	***Concrete Saw Cutting***			***4,320***

04 MASONRY

04100 Masonry Accessories

Install hm frames in cmu partitions	38	ea	191.09	7,262
Control joint, pvc 8" wall	165	LF	5.53	913
Staging, 2 use per month	20000	SF	1.32	26,305
Forklift, w/ operator	30	DAY	1113.50	33,405
Mortar Dropping Collection Device 1"	636	LF	2.71	1,722
Weep Vent Inserts	318	EA	1.45	462
Lintels, steel angles, plain	5000	LB	1.67	8,370
04100	***Masonry Accessories***			***78,439***

04200 Masonry Units

Cmu, back up, 8"thick	8132	SF	12.81	104,177
Cmu, bond beam, 8"thick 4' oc vert. bu	1908	LF	15.67	29,907
Cmu, bond beam, 8"thick 4' oc vert. partitions	2628	LF	15.67	41,192
Cmu, partition, 8" thick	10950	SF	13.33	145,943
04200	***Masonry Units***			***321,218***

05 METALS

Description	Quantity	Unit	Unit Cost	Extended Cost
05 METALS				
05000 Metals				
Steel brackets for casework - allow	1	ls	2475.00	2,475
05000 Metals				***2,475***
05100 Structural Steel				
Fabricate columns & beams misc	10	tn	1650.00	16,500
Erect steel	10	tn	1016.90	10,169
Furnish galvanized lintels	16	ea	131.44	2,103
Supports for coiling doors	3	ea	2171.90	6,516
Steel channel overhead door frames	3	ea	3194.91	9,585
05100 Structural Steel				***44,872***
06 WOOD AND PLASTICS				
06000 Wood and Plastics				
Air infiltration barrier	8132	sf	1.62	13,147
In wall blocking	1	ls	3061.66	3,062
Metal hurricane ties & anchor bolts - allowance	1	ls	3850.00	3,850
Pvc watertable trim & board	429	lf	14.20	6,092
Pvc 6" corner board	319	lf	25.56	8,155
Pvc 1'-2" frieze board at eaves	252	lf	10.65	2,683
Azek small crown mold at	701	lf	10.65	7,464
Pvc 6" door trim	74	lf	9.21	681
Pvc 4" window jamb trim (104 each)	491	lf	15.33	7,529
Azek window crosshead-windows (51 each)	192	lf	61.35	11,779
Pvc 3" apron board (51 each)	191	lf	40.90	7,812
Pvc 2" sill board (51 each)	204	lf	40.90	8,343
Azex window crosshead - doors (3 each)	13	lf	42.47	552
Pvc 8" fascia board	488	lf	10.65	5,196
Pvc 1'-2" vented soffit board	476	lf	15.98	7,608
Pvc 10" frieze board at gables/widows	286	lf	10.65	3,045
Azex window crosshead - overhead doors (2 each)	26	lf	28.31	736

06 WOOD AND PLASTICS

Description	Quantity	Unit	Unit Cost	Extended Cost
Pvc 6" soffit board - widows	55	lf	10.65	586
Pvc 14" corner board - entry vest	37	lf	28.41	1,051
Azek large crown mold at ent./vest	96	lf	10.65	1,022
Azek medium crown mold at ent./vest	135	lf	10.66	1,439
Pvc 10" fascia board at ent/vest	90	lf	10.65	958
Pvc 2'-3" frieze board at entry vest	78	lf	15.98	1,247
Azek 3" bed mold at ent vest/permit ent	78	lf	10.65	831
Melton columns - 1'4" x 10'-0	8	ea	572.88	4,583
Pvc 10" soffit board - entry vest gable	90	lf	15.98	1,438
Pvc 6" fascia board at ent/vest	42	lf	10.65	447
Pvc 2" accent trim at entry vest gable end	96	lf	15.98	1,534
Azex 12" door pilasters - entry vest	20	lf	28.64	573
Pvc 4" fascia at door canopy	111	lf	8.95	994
Pvc 8" fascia board at door canopy/permit entry	41	lf	8.95	367
Pvc 6" soffit board - door canopy	47	lf	8.95	421
Pvc 4" soffit board - door canopy	41	lf	8.95	367
Azex canopy brackets - door canopy	6	ea	286.44	1,719
Upper cabinets	151	lf	190.83	28,816
Base cabinets with p-lam tops	348	lf	289.63	100,790
Mailroom 223 mail slots	1	ls	1100.00	1,100
Window trim	51	ea	173.22	8,834
Wainscot paneling - 4'	385	sf	21.24	8,176
Wood base	969	lf	9.18	8,899
Countertop only - p-lam	229	lf	67.92	15,553
Vanities - solid surface	89	lf	135.83	12,089
Waiting area 226 casework	13	lf	271.66	3,532
Closet shelving	13	lf	37.94	493
Countertop - epoxy resin	59	lf	163.33	9,637
Countertop - stainless	40	lf	95.42	3,817
Window sills & aprons - solid surface	51	ea	113.83	5,805
Exterior paneling -	490	sf	21.24	10,405
06000	***Wood and Plastics***			***335,257***

06100 Rough Carpentry

Sheathing, roof, 3/4" cdx plywood	17424	SF	2.43	42,425
Roof truss, wood,40' span	62	EA	476.84	29,564
Roof truss, wood,76' span	56	EA	564.84	31,631
Sheathing, wall, 5/8" ext plywood	8132	SF	2.45	19,960
06100	***Rough Carpentry***			***123,581***

07 THERMAL AND MOISTURE PROTECTION

Description	Quantity	Unit	Unit Cost	Extended Cost

07 THERMAL AND MOISTURE PROTECTION

07000 Thermal and Moisture Protection

1/2" rigid insulation under pvc clapboards	8132	sf	1.67	13,584
07000	***Thermal and Moisture Protection***			***13,584***

07200 Thermal Protection, Insulation

Spray cellulose insulation - exterior walls	8132	sf	3.08	25,018
Spray cellulose insulation - truss botton chord	12046	sf	3.08	37,059
Rigid insulation perimeter under slab	2540	sf	1.39	3,539
Rigid insulation at foundation walls	2540	sf	1.39	3,539
07200	***Thermal Protection, Insulation***			***69,154***

07270 Air/Vapor Barriers

Ice & water, shield f/eaves, valley	17424	SF	0.57	9,859
07270	***Air/Vapor Barriers***			***9,859***

07300 Shingles, Roof Tiles, and Roof Coverings

Shingles, asphalt, prem c, 300-385	174.24	SQ	334.10	58,214
07300	***Shingles, Roof Tiles, and Roof Coverings***			***58,214***

07400 Roofing and Siding Panels

6" clapboards, hardi board	8132	SF	8.22	66,818
07400	***Roofing and Siding Panels***			***66,818***

07600 Flashing and Sheet Metal

Downspouts - copper	10	ea	925.67	9,257
Gutters - copper	636	lf	93.34	59,361
Ridge vent - sub	226	lf	8.21	1,856
07600	***Flashing and Sheet Metal***			***70,475***

07840 Firestopping

07 THERMAL AND MOISTURE PROTECTION

Description	Quantity	Unit	Unit Cost	Extended Cost
Miscellaneous firestopping	12046	sf	0.67	8,060
07840 Firestopping				***8,060***

07900 Joint Sealers

Misc exterior joint sealants	12046	sf	0.36	4,301
Misc interior joint sealants	12046	sf	0.36	4,301
07900 Joint Sealers				***8,603***

08 DOORS AND WINDOWS

08000 Doors and Windows

Furnish hm frame & install	52	ea	422.08	21,948
Furnish hm door & install	8	ea	449.58	3,597
Furnish hm door with vision panel & install	3	ea	477.08	1,431
Furnish wood door & install	20	ea	436.66	8,733
Furnish wood doors with vision panel(s)	23	ea	447.66	10,296
Furnish wood doors 5 - bullet resistant	1	ea	951.38	951
Furnish egress hardware & install	3	ea	935.00	2,805
Furnish basic hardware & install	52	ea	629.72	32,745
Unload & distribute doors & hardware	52	ea	134.72	7,005
Full height mirrors in physical training 115	7	ea	1216.96	8,519
Fiberglass clad wood windows - type win-1 - marvin -	28	ea	1034.75	28,973
Fiberglass clad wood windows - type win-2/3 - marvin	23	ea	737.40	16,960
Mirror finish - type win-3 - allowance	8	ea	165.00	1,320
Fiberglass clad wood windows - type win-1/2/3 -	51	ea	427.90	21,823
08000 Doors and Windows				***167,108***

08300 Specialty Doors

Overhead door, steel 24ga.10' x 12' h	2	EA	2359.14	4,718
08300 Specialty Doors				***4,718***

08400 Entrances and Storefronts

Interior storefront doors, 1-2	4	ea	3093.92	12,376
Interior aluminum storefront, 2-2a	240	sf	61.10	14,665

08 DOORS AND WINDOWS

Description	Quantity	Unit	Unit Cost	Extended Cost
08400 Entrances and Storefronts				***27,041***

08500 Metal Windows

Aluminum window	1372	SF	53.72	73,702
Bullet glass in frame admin area	200	sf	135.07	27,013
08500 Metal Windows				***100,716***

09 FINISHES

09000 Finishes

Gwb ceilings/soffits - no framing	342	sf	10.54	3,604
Type g-1 partition - no framing	1608	sf	4.29	6,898
Exterior backup partition -	8132	sf	4.29	34,886
Bullet resistent panels	750	sf	30.93	23,194
Acoustical ceilings 2x2	2510	sf	3.79	9,524
Sealed concrete conc	1547	sf	1.23	1,910
Carpet cpt-1	153.22	sy	38.50	5,899
Paint gwb ceilings	342	sf	0.65	222
Paint all walls	44000	sf	0.65	28,556
Paint doors	52	ea	74.25	3,861
Paint hm frames	52	ea	99.00	5,148
09000 Finishes				***123,703***

09200 Plaster and Gypsum Board

Furring, walls, 3/4"galvanized,16"o.c.	8132	SF	3.27	26,557
Part.gwb, hi-impact 5/8", w/m.stud.sgl	7000	SF	8.58	60,046
Drywall, hi impact, 5/8" on walls t&f	8132	SF	2.74	22,253
09200 Plaster and Gypsum Board				***108,856***

09300 Tile

Ceramic tile	585	sf	16.47	9,637
Ceramic wall tile	2400	sf	14.18	34,043
Tile base	400	lf	12.47	4,989
09300 Tile				***48,669***

09650 Resilient Flooring

09 FINISHES

Description	Quantity	Unit	Unit Cost	Extended Cost
Vct flooring vct, vct-1	830	sf	3.42	2,838
Sheet vinyl flooring svt-2	585	sf	8.81	5,157
09650 Resilient Flooring				***7,994***

09653 Resilient Wall Base and Accessories

Resilient base b, b-1, b-2	2741	lf	3.91	10,709
09653 Resilient Wall Base and Accessories				***10,709***

09670 Resinous Flooring

Epoxy floors ep	2100	sf	14.62	30,698
Epoxy cove base eb	402	lf	12.60	5,064
09670 Resinous Flooring				***35,762***

10 SPECIALTIES

10000 Specialties

Fixed marker boards - 6' x 4'	4	ea	498.30	1,993
Tackboards - 6' x 4'	6	ea	498.30	2,990
Manually operated projection screen	2	ea	605.00	1,210
Louvers - l1	16	sf	93.50	1,496
Signage	1	ls	6128.10	6,128
Evidence lockers	2	ea	302.50	605
Wardrobe lockers	42	ea	302.50	12,705
Prisoner lockers	5	ea	412.50	2,063
Wall protection sheet wp-1	1588	sf	8.80	13,974
Crash ralls	148	lf	18.57	2,748
Fire extinguishers	10	ea	385.00	3,850
Wire mesh partitions	12	lf	168.30	2,020
Hc toilet compartments, baked enamel	4	ea	990.00	3,960
Standard toilet compartments, baked enamel	1	ea	825.00	825
Wall hung urinal screens, baked enamel	1	ea	275.00	275
Coat/robe hooks	5	ea	42.08	210
Grab bars	12	ea	195.80	2,350
Toilet paper holders	12	ea	195.80	2,350
Framed mirrors, single sinks	11	ea	267.30	2,940
Soap dispensers	11	ea	106.70	1,174
Paper towel dispenser	11	ea	195.80	2,154

10 SPECIALTIES

Description	Quantity	Unit	Unit Cost	Extended Cost
Sanitary napkin dispenser	6	ea	117.70	706
10000 Specialties				***68,725***

11 EQUIPMENT

11000 Equipment

Detention equipment - sub	1	ls	75900.00	75,900
Detention equipment - sub	437	sf	27.50	12,018
Refrigerator/freezer - ge #gbsc0hbxww	2	ea	1193.50	2,387
Undercounter refridgerator - u-line 29r-w (k-10)	1	ea	1150.60	1,151
Microwave unit - under mount - ge#jnm1541dmww	1	ea	291.50	292
Microwave unit - counter top - ge #je1460dmww	1	ea	198.00	198
Dishwasher - ge #gida696pss	1	ea	624.80	625
11000 Equipment				***92,569***

11020 Security and Vault Equipment

High density storage files	1	allow	77067.36	77,067
11020 Security and Vault Equipment				***77,067***

12 FURNISHINGS

12000 Furnishings

Walk off mats wom	170	sf	46.56	7,916
Exterior vertical louvers blinds - sub	1	ls	4840.00	4,840
Black out window shades - conf rm 227 - sub	1	ls	258.50	259
12000 Furnishings				***13,014***

15 MECHANICAL

15000 Mechanical

Fire protection - sub	12046	sf	4.95	59,628
Plumbing - sub	12046	sf	8.85	106,667
Hvac - sub	12046	sf	40.92	492,922

15 MECHANICAL

Description	Quantity	Unit	Unit Cost	Extended Cost
15000 Mechanical				***659,217***

16 ELECTRICAL

16000 Electrical

Electrical - sub	12046	sf	37.62	453,171
16000 Electrical				***453,171***

Project

17000 Communications

Electrical - sub	12046	sf	4.71	56,713
17000 Communications				***56,713***

Sub Total		4,296,693	356.69 / SF
Profit	10 %	429,669	
Bond	1 %	42,967	
Contingency	15 %	644,504	
Escalation	3 %	128,901	
Grand Total		**5,542,734**	460.13 / SF

Section 8 – Fire Station Renovation Cost Estimate

CONSTRUCTION COST ENGINEERING OF BOSTON

Town of Millis Fire Station Renovation Estimate 13 1310

1ST Floor 7,991 SF
2nd Floor 1,663 SF

9654 SF Fire Stations Last Updated

Year 2013 Cost File 2013 Boston Union Average 4/5/2013 11:19:53 AM

Project Summary

Division	Total		
01 GENERAL REQUIREMENTS	***254,026***	$26.31 /SF	15.0 %
02 SITE CONSTRUCTION	***87,659***	$9.08 /SF	5.2 %
03 CONCRETE	***7,134***	$0.74 /SF	0.4 %
04 MASONRY	***42,472***	$4.40 /SF	2.5 %
05 METALS	***20,483***	$2.12 /SF	1.2 %
06 WOOD AND PLASTICS	***80,076***	$8.29 /SF	4.7 %
07 THERMAL AND MOISTURE PROTECTION	***95,013***	$9.84 /SF	5.6 %
08 DOORS AND WINDOWS	***56,194***	$5.82 /SF	3.3 %
09 FINISHES	***135,229***	$14.01 /SF	8.0 %
10 SPECIALTIES	***32,783***	$3.40 /SF	1.9 %
11 EQUIPMENT	***41,250***	$4.27 /SF	2.4 %
12 FURNISHINGS	***4,819***	$0.50 /SF	0.3 %
15 MECHANICAL	***439,199***	$45.49 /SF	26.0 %
16 ELECTRICAL	***392,918***	$40.70 /SF	23.3 %

Sub Total		1,689,254	174.98 / SF
Profit	10 %	168,925	
Bond	1 %	16,893	
Contingency	15 %	253,388	
Escalation	9 %	152,033	
Grand Total		**2,280,493**	236.22 / SF

CONSTRUCTION COST ENGINEERING OF BOSTON

Sub Division Summary

Town of Millis Fire Station Renovation Estimate			13 1310
1ST Floor 7,991 SF 2nd Floor 1,663 SF			
9654 SF	Fire Stations		Last Updated
Year 2013	Cost File	2013 Boston Union Average	4/5/2013 11:19:53 AM

SubDivision	Description	Total	
01 GENERAL REQUIREMENTS		**$254,026**	
01000	General Requirements	$191,882	19.88 SF
01300	Submittals	$8,746	0.91 SF
01500	Construction Facilities & Temp Controls	$37,566	3.89 SF
01600	Material and Equipment	$6,776	0.70 SF
01700	Contract Closeout	$9,056	0.94 SF
02 SITE CONSTRUCTION		**$87,659**	
02050	Demolition	$11,027	1.14 SF
02070	Selective Demolition	$11,686	1.21 SF
02080	Asbestos Abatement	$25,420	2.63 SF
02200	Earthwork	$3,530	0.37 SF
02500	Paving and Surfacing	$9,742	1.01 SF
02610	Water Supply System	$6,255	0.65 SF
02800	Site Improvements and Amenities	$20,000	2.07 SF
03 CONCRETE		**$7,134**	
03200	Concrete Reinforcement	$2,031	0.21 SF
03300	Cast-in-Place Concrete	$5,103	0.53 SF
04 MASONRY		**$42,472**	

SubDivision	Description	Total		
04100	Masonry Accessories	$12,133		1.26 SF
04200	Masonry Units	$30,338		3.14 SF
05 METALS			**$20,483**	
05100	Structural Steel	$9,483		0.98 SF
05500	Metal Fabrications	$11,000		1.14 SF
06 WOOD AND PLASTICS			**$80,076**	
06100	Rough Carpentry	$20,605		2.13 SF
06400	Architectural Woodwork	$59,471		6.16 SF
07 THERMAL AND MOISTURE PROTECTION			**$95,013**	
07100	Dampproofing and Waterproofing	$21,519		2.23 SF
07200	Thermal Protection, Insulation	$13,768		1.43 SF
07300	Shingles, Roof Tiles, and Roof Coverin	$7,782		0.81 SF
07400	Roofing and Siding Panels	$23,472		2.43 SF
07500	Membrane Roofing	$13,529		1.40 SF
07600	Flashing and Sheet Metal	$8,119		0.84 SF
07900	Joint Sealers	$6,824		0.71 SF
08 DOORS AND WINDOWS			**$56,194**	
08100	Metal Doors and Frames	$7,666		0.79 SF
08200	Wood and Plastic Doors	$5,523		0.57 SF
08400	Entrances and Storefronts	$11,355		1.18 SF
08500	Metal Windows	$3,948		0.41 SF
08700	Hardware	$17,470		1.81 SF
08800	Glazing	$10,232		1.06 SF
09 FINISHES			**$135,229**	
09100	Metal Support Assemblies	$7,613		0.79 SF

SubDivision	Description	Total		
09200	*Plaster and Gypsum Board*	*$33,282*		3.45 SF
09300	*Tile*	*$35,810*		3.71 SF
09500	*Ceilings*	*$8,455*		0.88 SF
09600	*Flooring*	*$28,526*		2.95 SF
09900	*Paints and Coatings*	*$21,543*		2.23 SF
10 SPECIALTIES			***$32,783***	
10100	*Visual Display Boards*	*$8,720*		0.90 SF
10200	*Louvers and Vents*	*$103*		0.01 SF
10400	*Pedestrian Control Devices*	*$11,550*		1.20 SF
10500	*Lockers*	*$2,610*		0.27 SF
10520	*Fire Protection Specialties*	*$1,086*		0.11 SF
10800	*Toilet, Bath, and Laundry Accessories*	*$8,714*		0.90 SF
11 EQUIPMENT			***$41,250***	
11000	*Equipment*	*$19,250*		1.99 SF
11450	*Residential Equipment*	*$22,000*		2.28 SF
12 FURNISHINGS			***$4,819***	
12500	*Window Treatment*	*$4,819*		0.50 SF
15 MECHANICAL			***$439,199***	
15300	*Fire Protection*	*$53,039*		5.49 SF
15400	*Plumbing Fixtures and Equipment*	*$173,772*		18.00 SF
15500	*Heat-Generation Equipment, HVAC*	*$212,388*		22.00 SF
16 ELECTRICAL			***$392,918***	
16000	*Electrical*	*$392,918*		40.70 SF

SubDivision	Description		Total	
Sub Total			1,689,254	174.98 / SF
Profit	10	%	168,925	
Bond	1	%	16,893	
Contingency	15	%	253,388	
Escalation	9	%	152,033	
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CONSTRUCTION COST ENGINEERING OF BOSTON

Town of Millis Fire Station Renovation Estimate 13 1310

1ST Floor 7,991 SF
2nd Floor 1,663 SF

9654 SF Fire Stations Last Updated

Year 2013 Cost File 2013 Boston Union Average 4/5/2013 11:19:53 AM

Description	Quantity	Unit	Unit Cost	Extended Cost

01 GENERAL REQUIREMENTS

01000 General Requirements

General superintendent	32	WEEK	3256.96	104,223
Asst. superintendent	16	WEEK	2803.20	44,851
Main office, general clerk	16	WEEK	2634.24	42,148
Cutting & patching, misc.	2	JOB	330.00	660
01000	***General Requirements***			***191,882***

01300 Submittals

Scheduling, progress cpm	1	EA	1100.00	1,100
Scheduling, cpm, update	7	EA	275.00	1,925
Additional drawings	5	JOB	275.00	1,375
Drawings, shop/product data sheets	25	SET	173.85	4,346
01300	***Submittals***			***8,746***

01500 Construction Facilities & Temp Controls

Rough hardware	1	JOB	385.00	385
Cleaning general, site	160	HR	35.04	5,606
Office trailer, furnished, 36'x8'	8	MONTH	264.00	2,112
Storage trailer, 28'x10'	8	MONTH	110.00	880
Project sign, 4' x 8' x 1 7/8"	1	EA	888.93	889
Barrier, plywood on 2"x4"frame 4'	100	LF	20.03	2,003
Temporary fire, protection	1	JOB	550.00	550
Telephone, general clerk use	16	MONTH	275.00	4,400
Telephone,dedicated f/fax	16	MONTH	275.00	4,400
Owners rep trailer	8	MONTH	264.00	2,112
Temp fence, chain link 8' high	800	LF	16.94	13,556

01 GENERAL REQUIREMENTS

Description	Quantity	Unit	Unit Cost	Extended Cost
Fence, chain link 4' gate	2	EA	336.71	673
01500	***Construction Facilities & Temp Controls***			***37,566***

01600 Material and Equipment

Toilet, portable chemical, rent 3ea10	24	MONTH	99.00	2,376
Equipment rentals, misc	1	JOB	4400.00	4,400
01600	***Material and Equipment***			***6,776***

01700 Contract Closeout

Clean-up, final	0.5	WEEK	5350.40	2,675
Punchlist, survey/check	2	WEEK	3190.40	6,381
01700	***Contract Closeout***			***9,056***

02 SITE CONSTRUCTION

02050 Demolition

Demo bldg interior gutting, not incl Appr. Bay 2784 sf	6870	SF	1.61	11,027
02050	***Demolition***			***11,027***

02070 Selective Demolition

Saw cut, conc slab, per 4" deep	310	LF	3.73	1,156
Demo roof, substraits	6238	SF	1.69	10,530
02070	***Selective Demolition***			***11,686***

02080 Asbestos Abatement

Asbestos removal, industrial hygen.	10	DAY	651.39	6,514
Asbestos removal, vat floors	3500	SF	2.70	9,453
Asbestos removal, ceilings acoust.	3500	SF	2.70	9,453
02080	***Asbestos Abatement***			***25,420***

02200 Earthwork

Excavation, trench,,w/backhoe	150	CY	9.80	1,469
Backfill, w/dozer, vibrating roller	150	CY	13.74	2,060
02200	***Earthwork***			***3,530***

02 SITE CONSTRUCTION

Description	Quantity	Unit	Unit Cost	Extended Cost
02500 Paving and Surfacing				
Bitum., paving, driveway	335	SY	29.08	9,742
02500 Paving and Surfacing				***9,742***
02610 Water Supply System				
Pipe, ductile iron, 4"diam. Cl250	100	LF	25.95	2,595
Pipe, ductile iron, 8"diam. cl250	100	LF	36.59	3,659
02610 Water Supply System				***6,255***
02800 Site Improvements and Amenities				
Site Improvements	1	total	20000.00	20,000
02800 Site Improvements and Amenities				***20,000***

03 CONCRETE

03200 Concrete Reinforcement				
Reinforcing, dowels,#5 x 18" long @12" oc	155	EA	11.43	1,772
Welded wire fabric, 6x6-w2.9xw2.9	3.1	CSF	83.53	259
03200 Concrete Reinforcement				***2,031***
03300 Cast-in-Place Concrete				
Finishing floor, steeltrowel	310	SF	1.18	367
Concrete in place, ground slab, 5"	310	SF	4.11	1,274
CIP, thickened slab f/CMU footings	11.5	CY	301.08	3,462
03300 Cast-in-Place Concrete				***5,103***

04 MASONRY

04100 Masonry Accessories				
Lintels, steel angles, galv.	500	LB	1.60	800
Control joint, pvc 4" wall	40	LF	3.75	150
Grouting, cmu cores, 8" thick	1000	SF	4.39	4,391
Grouting, door frames	5	OPNG	70.94	355

04 MASONRY

Description	Quantity	Unit	Unit Cost	Extended Cost
Staging, 2 use per month	1700	SF	1.13	1,928
Forklift, w/ operator	5	DAY	901.95	4,510
04100 Masonry Accessories				***12,133***

04200 Masonry Units

Cmu, partition, 8" thick	1550	SF	13.02	20,186
Cmu, bond beam, 8"thick 4' oc vert.	465	LF	13.78	6,407
Cmu, partition, 8" thick infill	126	SF	29.72	3,745
04200 Masonry Units				***30,338***

05 METALS

05100 Structural Steel

Structural steel connections	2	TON	3124.47	6,249
Seismic plates	1	TON	3234.47	3,234
05100 Structural Steel				***9,483***

05500 Metal Fabrications

Misc metals, allowance	1	LS	11000.00	11,000
05500 Metal Fabrications				***11,000***

06 WOOD AND PLASTICS

06100 Rough Carpentry

Labor only, carpenter	20	DAY	638.08	12,762
Blocking, wood 2"x4"	2	MBF	3921.72	7,843
06100 Rough Carpentry				***20,605***

06400 Architectural Woodwork

Corian, counter top	50	LF	54.00	2,700
Wood veneer kitchen wall cabinets	48	LF	189.50	9,096
Wood veneer kitchen base cabinets	40	LF	244.50	9,780
Wardrobes	24	EA	173.00	4,152
Allowance, millwork	1	LSUM	16500.00	16,500
Hardwood window sill	160	LF	6.50	1,040

06 WOOD AND PLASTICS

Description	Quantity	Unit	Unit Cost	Extended Cost
Shelving	190	SFFACE	15.80	3,003
Reception desk	40	LF	330.00	13,200
06400 Architectural Woodwork				***59,471***

07 THERMAL AND MOISTURE PROTECTION

07100 Dampproofing and Waterproofing

Building paper, asphalt, 2 ply #15	19	SQ	20.19	384
Vapor barrier, polyethylene,.010"t	43.38	SQ	21.65	939
Ice & water shield	1900	SF	0.52	988
Air barrier, peel & stick w.p. membrane	11459	SF	1.68	19,209
07100 Dampproofing and Waterproofing				***21,519***

07200 Thermal Protection, Insulation

Roof deck insul, 5"	4338	SF	3.17	13,768
07200 Thermal Protection, Insulation				***13,768***

07300 Shingles, Roof Tiles, and Roof Coverings

Ridge, asphalt	50	LF	26.35	1,318
Hip, asphalt	50	LF	26.35	1,318
Shingles, asphalt, prem c, 300-385	19	SQ	270.87	5,146
07300 Shingles, Roof Tiles, and Roof Coverings				***7,782***

07400 Roofing and Siding Panels

Synthetic wood soffits 16" wide	800	SF	16.30	13,040
Synthetic wood facia	640	LF	16.30	10,432
07400 Roofing and Siding Panels				***23,472***

07500 Membrane Roofing

Membrane, epdm,55 mil, flat	4338	SF	2.83	12,258
Membrane, walkway pads	450	SF	2.83	1,272
07500 Membrane Roofing				***13,529***

07600 Flashing and Sheet Metal

Gutters, alum. 6", box .027"	406	LF	6.99	2,838

07 THERMAL AND MOISTURE PROTECTION

Description	Quantity	Unit	Unit Cost	Extended Cost
Downspouts, alum enam, .024" 3"x4"	320	LF	6.74	2,157
Flashing, copper 16 oz. sheets	200	SF	9.79	1,958
Flashing, valleys	200	SF	5.84	1,167
07600 Flashing and Sheet Metal				***8,119***

07900 Joint Sealers

Caulking, backer rod polyeth. 1/2"	1000	LF	1.72	1,723
Caulking, butyl 1/2"x1/2" 77lf/gal	1000	LF	3.38	3,378
Acoustical caulking	1000	LF	1.72	1,723
07900 Joint Sealers				***6,824***

08 DOORS AND WINDOWS

08100 Metal Doors and Frames

H.m. frame	23	EA	165.52	3,807
Ext.h.m. door, 1-3/4", 3'-0" x7'-2"	7	EA	392.59	2,748
H.m. door, 1-3/4" 20g, 3'-0" x7'-2"	5	EA	222.09	1,110
08100 Metal Doors and Frames				***7,666***

08200 Wood and Plastic Doors

Wood door, sc	18	EA	306.84	5,523
08200 Wood and Plastic Doors				***5,523***

08400 Entrances and Storefronts

Storefront, vestibule	280	SF	28.84	8,075
Aluminum doors, entrance	2	ea	1640.00	3,280
08400 Entrances and Storefronts				***11,355***

08500 Metal Windows

Metal window,	70	SF	56.39	3,948
08500 Metal Windows				***3,948***

08700 Hardware

Finish hardware, exterior	2	SET	1091.58	2,183
Finish hardware	25	SET	539.36	13,484

08 DOORS AND WINDOWS

Description	Quantity	Unit	Unit Cost	Extended Cost
Threshold, metal	23	EA	78.38	1,803
08700 Hardware				***17,470***

08800 Glazing

Borrowed lights, tempered, 1/2"	140	SF	44.66	6,252
Mirror, exercise wall	120	SF	33.17	3,981
08800 Glazing				***10,232***

09 FINISHES

09100 Metal Support Assemblies

Suspension system, grid, 24"o.c.	6989	SF	1.09	7,613
09100 Metal Support Assemblies				***7,613***

09200 Plaster and Gypsum Board

Gwb ceilings	2989	SF	1.41	4,214
Part. drywall, 5/8" w/mstud 2f	2980	SF	6.73	20,055
Drywall, gypsum, 5/8" on ceil soffits	661	SF	6.68	4,413
Partition, chase wall	600	SF	7.67	4,600
09200 Plaster and Gypsum Board				***33,282***

09300 Tile

Ceramic tile, cove base,4-1/2"sq,ts	510	LF	21.38	10,905
Ceramic tile, floor, 3"sq., thinset	400	SF	10.80	4,320
Lobby tile, porcelian	525	SF	10.65	5,593
Ceramic tile,wainscott walls	1000	SF	10.44	10,443
Quarry tile	300	SF	11.27	3,382
Quarry tile, base	90	LF	12.96	1,167
09300 Tile				***35,810***

09500 Ceilings

Ceiling boards, 5/8"t 2'x2'	2989	SF	1.92	5,732
Sound attenuation, blanket 3"	2215	SF	1.23	2,723
09500 Ceilings				***8,455***

09 FINISHES

Description	Quantity	Unit	Unit Cost	Extended Cost
09600 Flooring				
Resilient, rubber floor	820	SF	4.71	3,862
Rubber cove base, 4"	2926	LF	2.76	8,086
Carpet, tile	40	SY	31.00	1,240
Carpet	210	SY	28.25	5,933
Resilient, linoleum	700	SF	4.53	3,174
Stair treads, rubber 12" wide 1/4"	112	LF	12.56	1,407
Stair risers, rubber 7" high 1/8"	112	LF	5.21	584
Sports floor	440	SF	9.64	4,240
09600 Flooring				***28,526***
09900 Paints and Coatings				
Paint, int door/frame 2coat,w/brush	16	EA	67.77	1,084
Paint, drywall ceilings	1000	SF	0.81	815
Paint, stairways, oil, 2c w/brush	2	FLT	653.30	1,307
Paint, extdoor&fram 3x7,primer+2cts	4	EA	115.71	463
Paint, Inter.wall primer+2 cts brsh	10000	SF	1.46	14,574
Paint, misc metals	1	TOTAL	3300.00	3,300
09900 Paints and Coatings				***21,543***

10 SPECIALTIES

10100 Visual Display Boards				
Markerboards/tackboards	800	SF	10.90	8,720
10100 Visual Display Boards				***8,720***
10200 Louvers and Vents				
Louvers, l1 1'-4"x1'-8"	1	EA	103.40	103
10200 Louvers and Vents				***103***
10400 Pedestrian Control Devices				
Signage, building exterior	1	LSUM	8800.00	8,800
Signage, building interior	1	LSUM	2750.00	2,750
10400 Pedestrian Control Devices				***11,550***

10 SPECIALTIES

Description	Quantity	Unit	Unit Cost	Extended Cost
10500 Lockers				
Lockers, geargrid	30	OPNG	87.00	2,610
10500 Lockers				***2,610***
10520 Fire Protection Specialties				
Fire extinguisher, all purpose, 10#	4	EA	70.77	283
Fire extinguisher, cabinet, steel	4	EA	200.76	803
10520 Fire Protection Specialties				***1,086***
10800 Toilet, Bath, and Laundry Accessories				
Bathroom accessories	1	LSUM	8713.92	8,714
10800 Toilet, Bath, and Laundry Accessories				***8,714***

11 EQUIPMENT

11000 Equipment				
Firemans pole	1	EA	19250.00	19,250
11000 Equipment				***19,250***
11450 Residential Equipment				
Kitchen equipment	1	TOTAL	22000.00	22,000
11450 Residential Equipment				***22,000***

12 FURNISHINGS

12500 Window Treatment				
Entrance mat, recessed floor grill	2	EA	523.00	1,046
Blinds	645	SF	5.85	3,773
12500 Window Treatment				***4,819***

15 MECHANICAL

15 MECHANICAL

Description	Quantity	Unit	Unit Cost	Extended Cost
15300 Fire Protection				
Sprinkler system, wet	9654	SF	5.49	53,039
15300 Fire Protection				***53,039***
15400 Plumbing Fixtures and Equipment				
Plumbing	9654	SF	18.00	173,772
15400 Plumbing Fixtures and Equipment				***173,772***
15500 Heat-Generation Equipment, HVAC				
H.v.a.c.	9654	SF	22.00	212,388
15500 Heat-Generation Equipment, HVAC				***212,388***

16 ELECTRICAL

16000 Electrical				
Electrical	9654	SF	40.70	392,918
16000 Electrical				***392,918***

Sub Total		1,689,254	174.98 / SF
Profit	10 %	168,925	
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Section 9 – New Police Station Conceptual Design

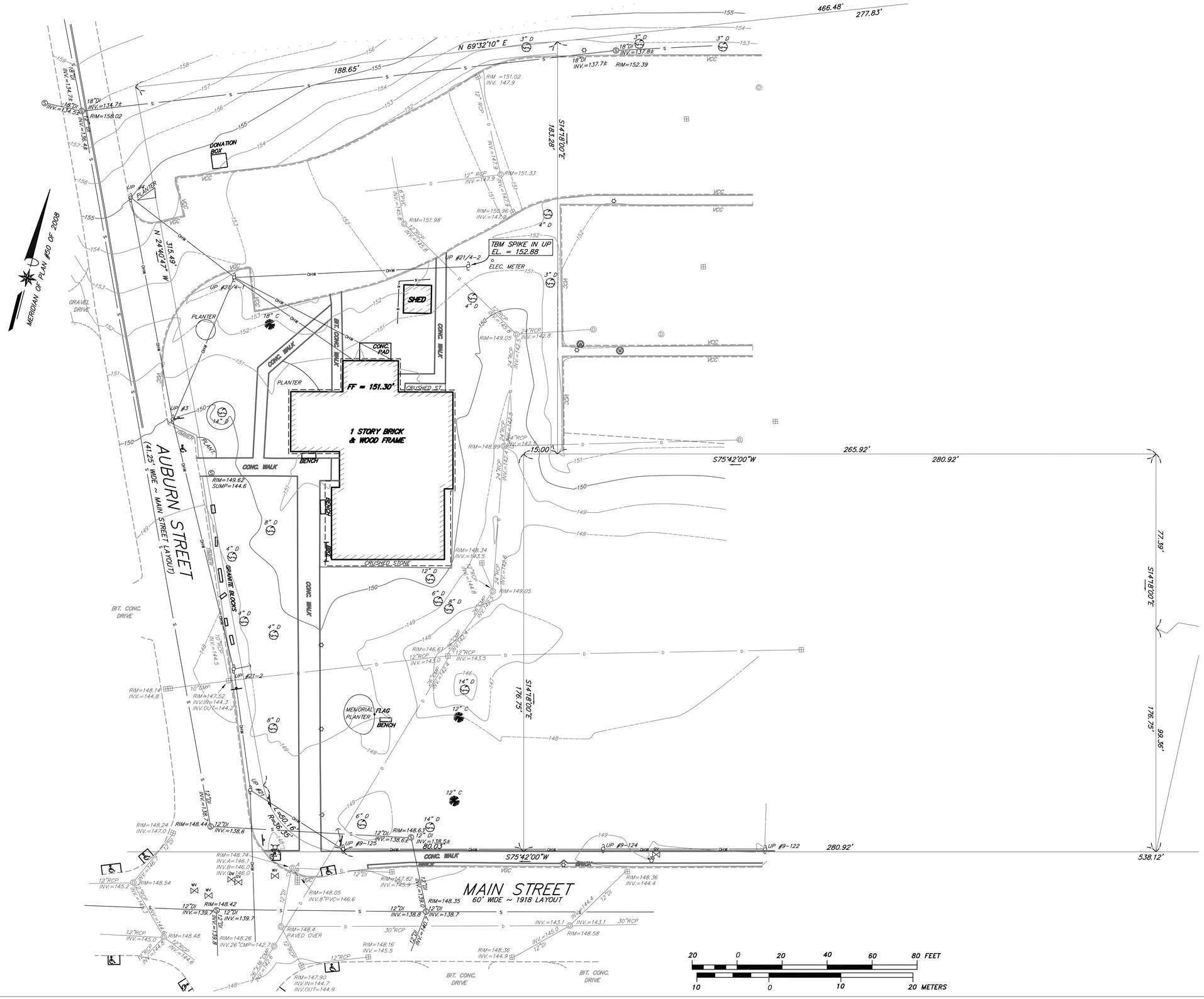
MILLIS POLICE DEPARTMENT NEW POLICE STATION

MAIN STREET
MILLIS, MA 02054

RENDERED FRONT LEFT VIEW

MGI # 19416.00
DATE: 04/24/13

CDR MAGUIRE



ZONING INFORMATION:

DISTRICT: MILLIS CENTER ECONOMIC OPPORTUNITY (MIXED USE)

MINIMUM FRONTAGE: 120'

MIMIMUM AREA: 30,000 SQ. FT.

SETBACKS: Front MIN. 5' TO 15' MAX.
Side 0'
Rear 25'

LOCUS REFERENCE:

ASSESSORS MAP 23, BLOCK 079, PARCEL 11.
TOWN OF MILLIS
BOOK 9044, PAGE 711

PLAN REFERENCES:

1.) PLAN # 50 OF 2008, PLAN BOOK 582.

NOTES:

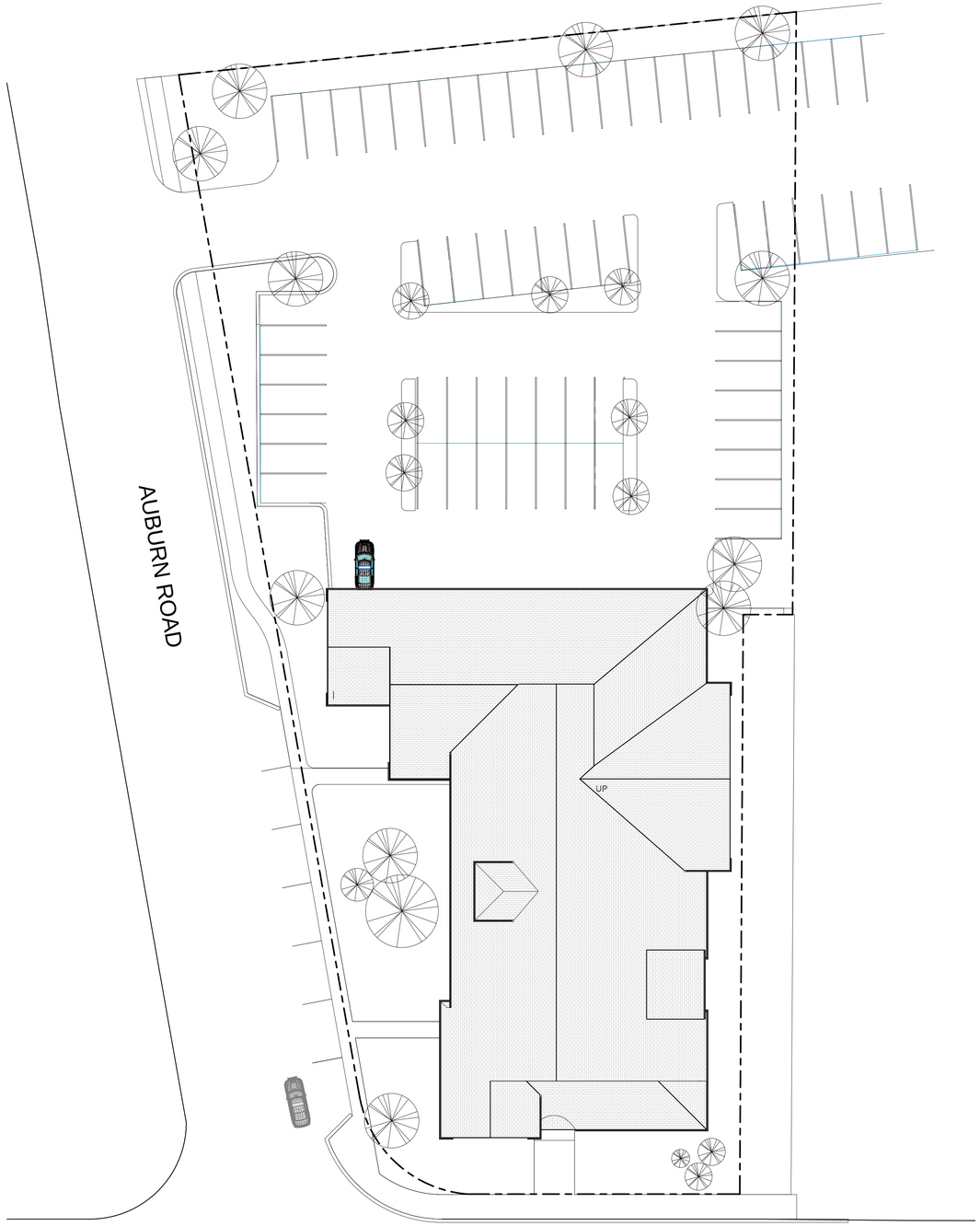
1.) ELEVATIONS SHOWN ARE BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (N.A.V.D. 1988).

Plan of Land
Main Street & Auburn Road
Millis, Massachusetts
Prepared For
CDR Maguire

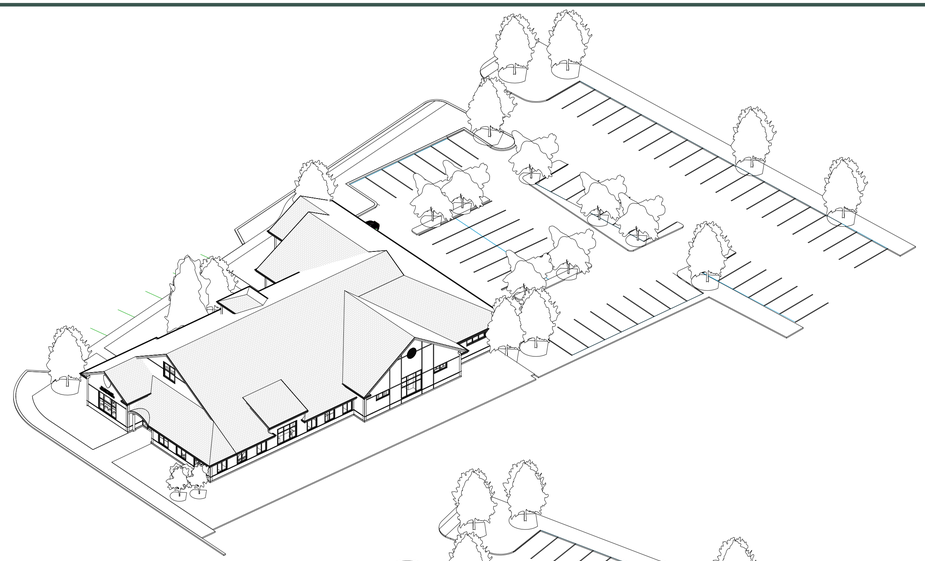
SCALE: 1" = 20' DATE: APRIL 18, 2013

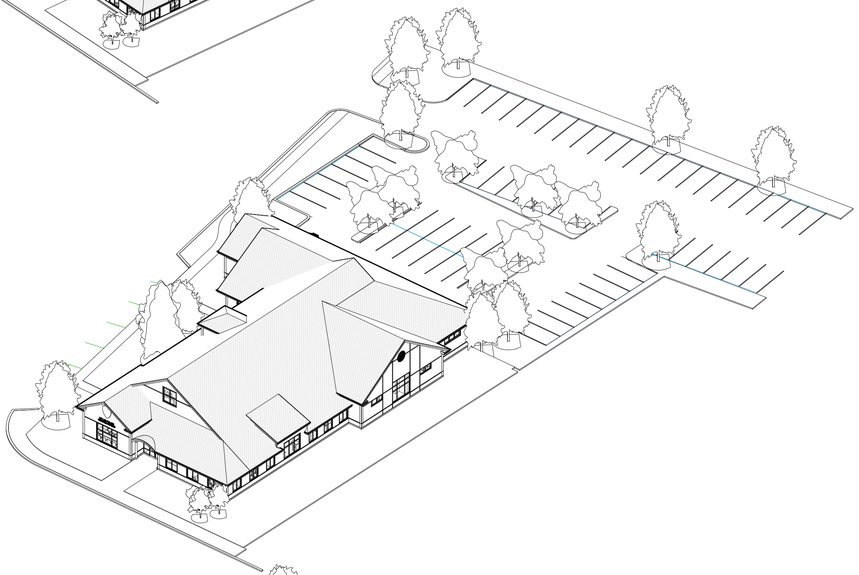
PLACES
Site Consultants, Inc.
PLANNING LANDSCAPE ARCHITECTURE CIVIL ENGINEERING SURVEYING
694 MAIN STREET, SUITE 3
HOLDEN, MA 01520-1862
508.829.0333 Fax 508.829.0904
EMAIL places@verizon.net

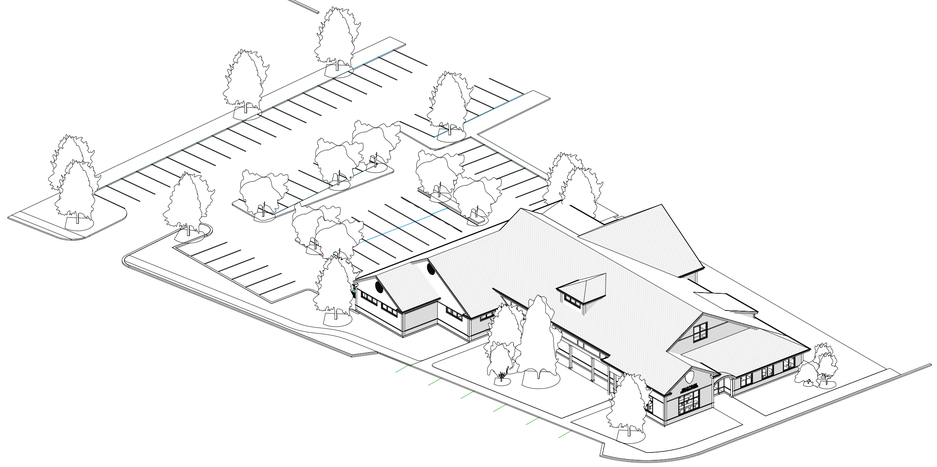
PROJECT No.: 13-6802 PLAN No. 6802



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







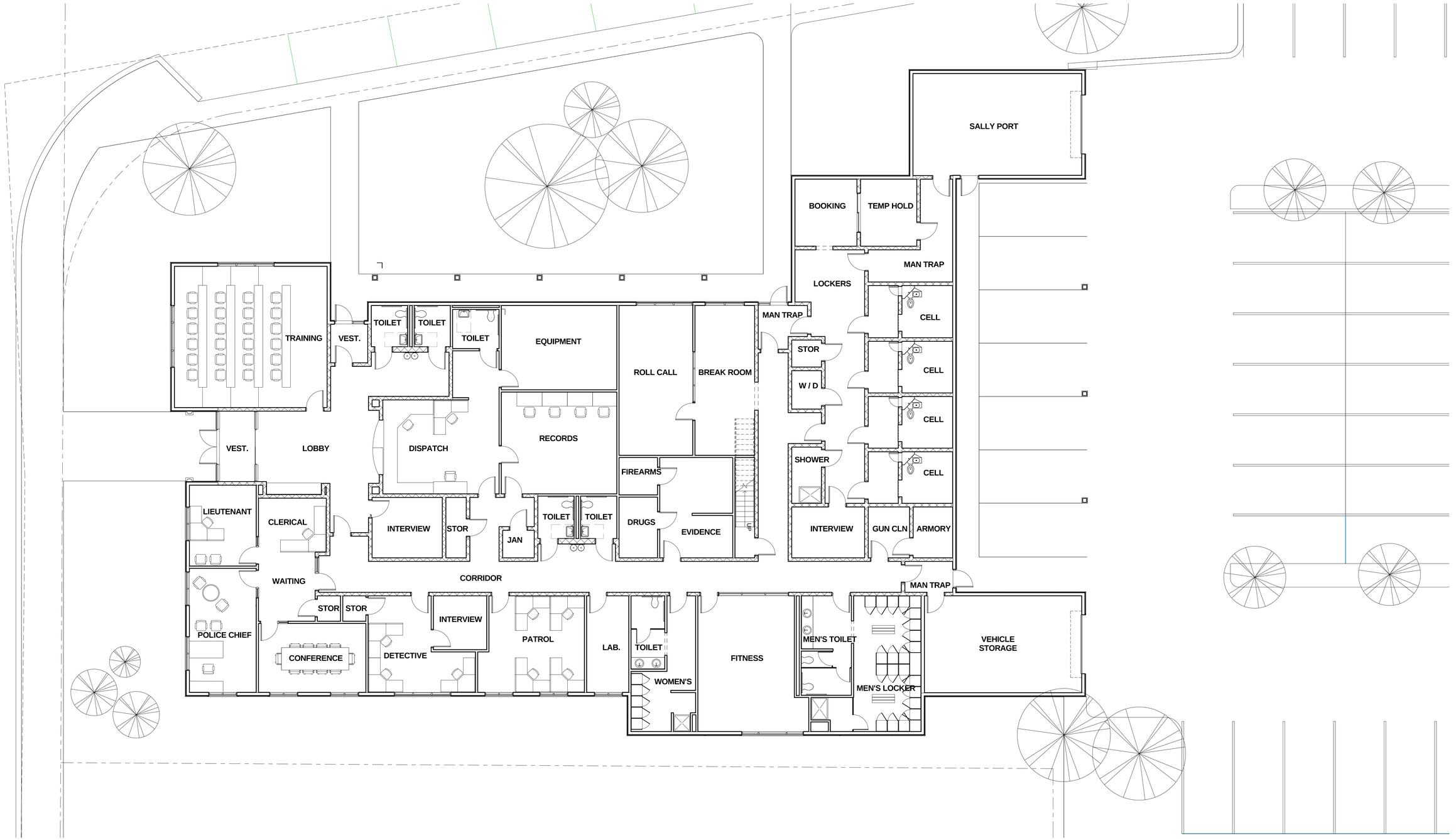
MILLIS POLICE DEPARTMENT NEW POLICE STATION

MAIN STREET
MILLIS, MA 02054

SITE PLAN AND AERIALS

MGI # 19416.00
DATE: 04/02/13

CDR MAGUIRE



MILLIS POLICE DEPARTMENT NEW POLICE STATION

MAIN STREET
MILLIS, MA 02054

FLOOR PLANS

MGI # 19416.00
DATE: 04/02/13

CDR MAGUIRE

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

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

MILLIS POLICE DEPARTMENT NEW POLICE STATION

MAIN STREET
MILLIS, MA 02054

EXTERIOR ELEVATIONS

MGI # 19416.00
DATE: 04/02/13

CDR MAGUIRE

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

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

MILLIS POLICE DEPARTMENT NEW POLICE STATION

MAIN STREET
MILLIS, MA 02054

EXTERIOR ELEVATIONS

MGI # 19416.00
DATE: 04/02/13

CDR MAGUIRE

MILLIS POLICE DEPARTMENT NEW POLICE STATION

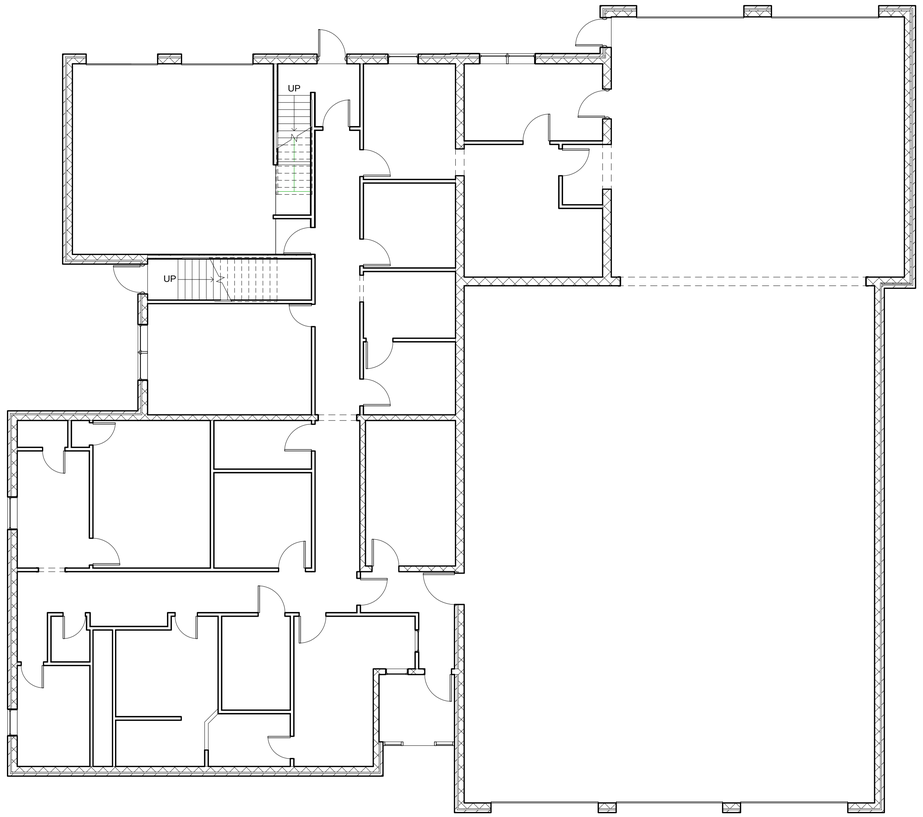
MAIN STREET
MILLIS, MA 02054

RENDERED VIEWS

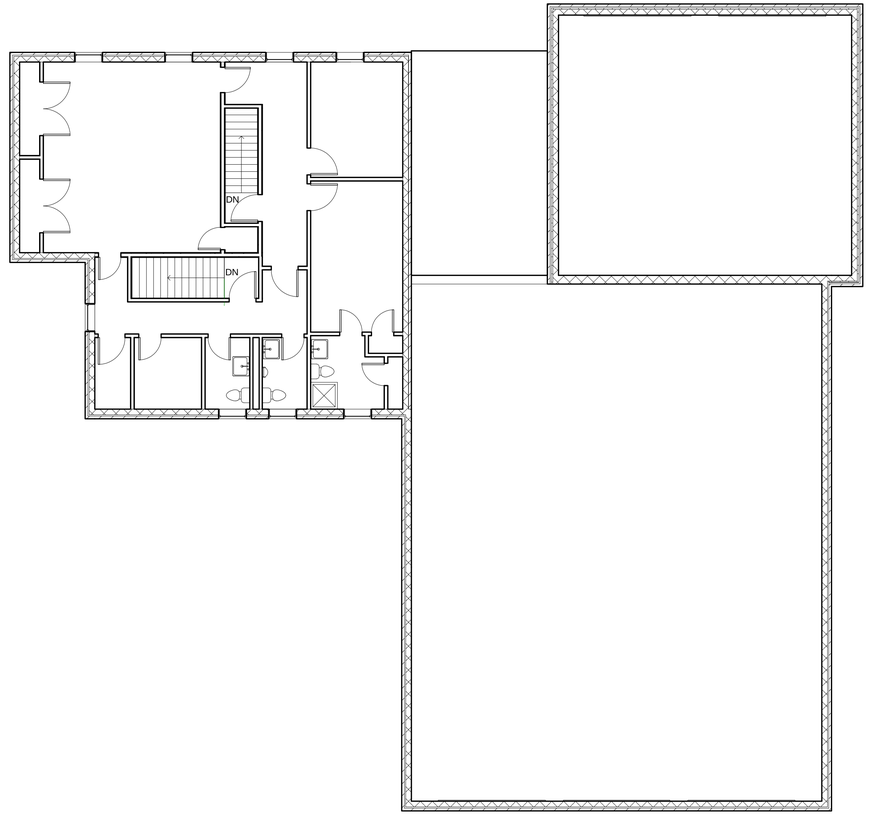
MGI # 19416.00
DATE: 04/24/13

CDR MAGUIRE

Section 10 – Fire Station Renovation Design



1 **FIRST FLOOR PLAN**
SCALE: 1/8" = 1'-0"



2 **SECOND FLOOR PLAN**
SCALE: 1/8" = 1'-0"

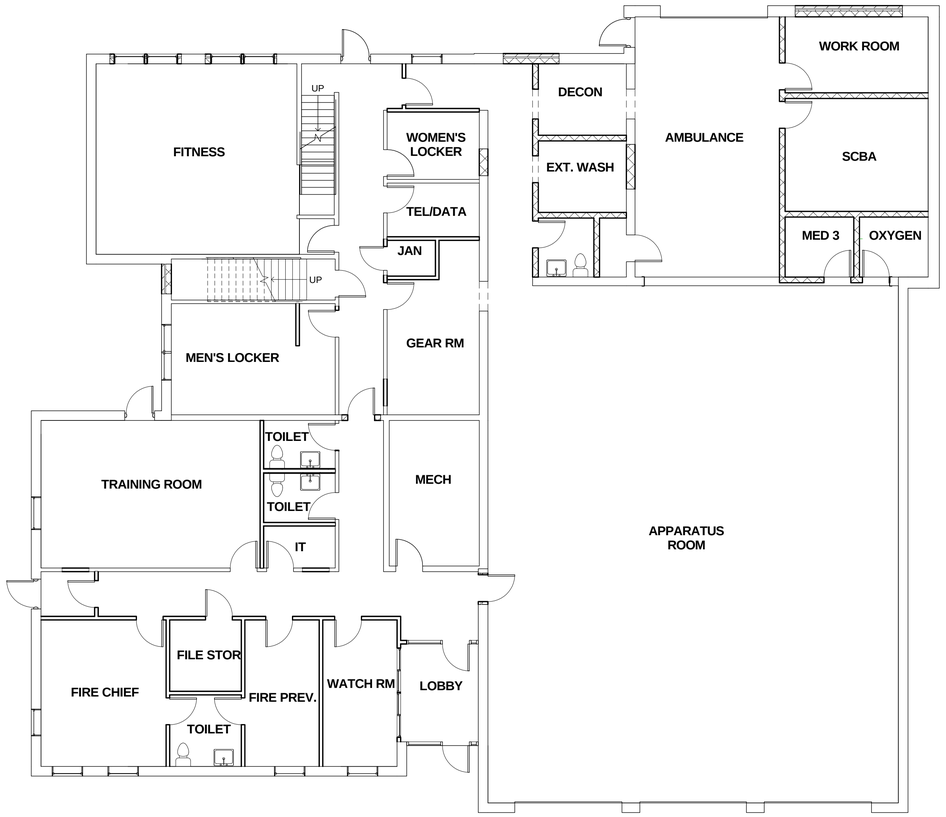
MILLIS POLICE & FIRE STATION

885 MAIN STREET
MILLIS, MA 02054

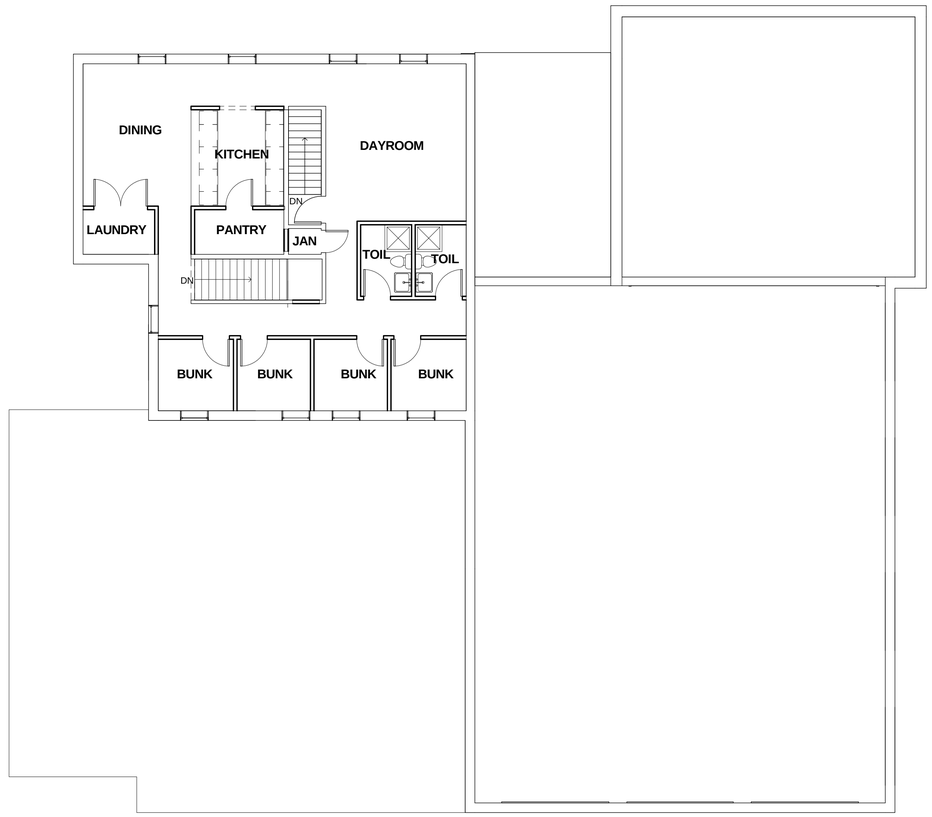
EXISTING FLOOR PLANS

MGI # 19416.00
DATE: 04/02/13

CDR MAGUIRE



1 **FIRST FLOOR PLAN**
SCALE: 1/8" = 1'-0"



2 **SECOND FLOOR PLAN**
SCALE: 1/8" = 1'-0"

MILLIS FIRE STATION RENOVATION

885 MAIN STREET
MILLIS, MA 02054

FIRE STATION FLOOR PLANS

MGI # 19416.00
DATE: 04/02/13

CDR MAGUIRE