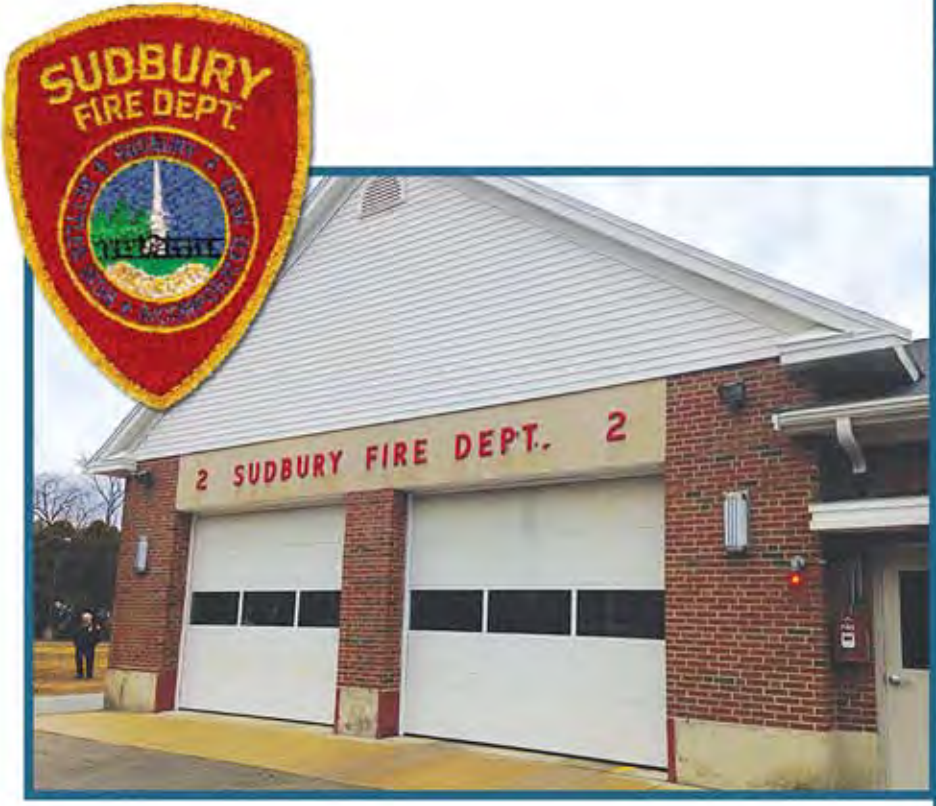
Sudbury Fire Station #2 Feasibility Study



Sudbury, Massachusetts
April 21, 2016

KAESTLE BOOS
associates, inc

ARCHITECTURE
LANDSCAPE ARCHITECTURE
INTERIOR DESIGN
STRUCTURAL ENGINEERING

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– EXISTING CONDITIONS ANALYSIS –

SITE

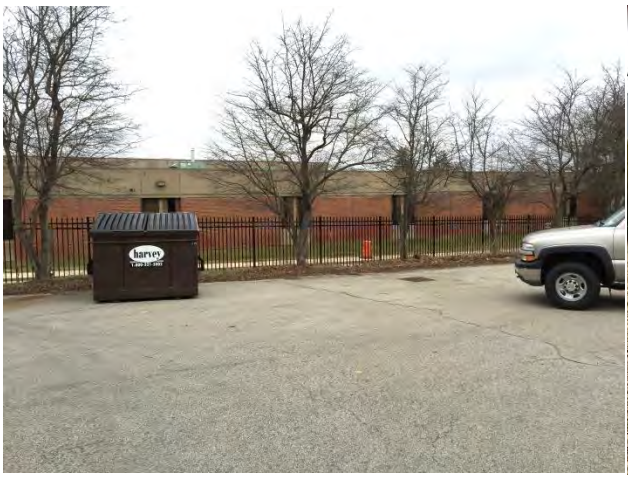
SITE OVERVIEW

The existing Sudbury Station #2 is on a lot that is 26,873 sf. (.62 acres) located at 540 Boston Post Road. The site and the neighboring westerly parcel are relatively flat while the east parcel slopes away from the building and the rear parcel is separated by a 4' embankment that slopes away from the site. Approximately half of the site is either paved or occupied by the fire station. The rear lot line is separated from the old Raytheon complex by a decorative metal fence.

The fire station falls in a LID 1 zone. The zoning setbacks for this parcel would normally be 125' from the street and 50' from side and rear lot lines. However, due to this being a municipal use, the project would be exempt from any zoning review.

An asphalt sidewalk about 4' wide fronts Boston Post Road. Utility poles, water lines and gas lines are all located on the north (fire station) side of the road and might have to be reconfigured for any new fire house apron configuration. A hydrant and a traffic signal are located on the road between the apron and the old Raytheon entrance. Another hydrant is located along the entrance road to the old Raytheon compound. Other site amenities include a flagpole, some temporary site signage and a trash dumpster located behind the station.

The asphalt around the fire station is spider cracked and should be replaced. The concrete aprons appear to be in good condition. There is some site drainage in the rear of the lot, though it appears that he drainage bypasses these basins and drains down the slope to the adjacent property to the north. The curb along the rear of the lot that is meant to control the drainage had deteriorated and no longer fulfills its function.



Drainage and dumpster, rear of property

Traffic light, and utility pole

The landscape for the parcel and the western parcel is mostly lawn with three large specimen trees and a clump of arborvitaes, with some evergreen shrubs of no outstanding quality. A row of decorative ornamental trees separated the Raytheon compound from the fire station on the fire station's northern property line. The lawn area on the western parcel appears to have been irrigated though it is not clear whether the system still works.

Vegetation on the rear of the properties.

View of Old Raytheon entrance road.

Existing Conditions Site plan.

– EXISTING CONDITIONS ANALYSIS –

ARCHITECTURAL

BUILDING OVERVIEW

This Architectural Existing Facilities Evaluation of the town of Sudbury's Fire Department Station #2 building includes an assessment of both the construction finishes and function of interior elements. General observations common to most areas of the facility are discussed and issues regarding individual spaces are further detailed, as necessary, in the following reports provided by consultants with expertise in Mechanical, Electric, Plumbing, and Fire Protection engineering disciplines. Also, although a review of the facility with regard to the Building Code is provided in a separate section of this Study, there are references to specific Code conditions are included in this section, as well as in sections by other engineering disciplines. Selective demolition of the exterior envelope or interior elements in these buildings was not performed; comments and issues presented in this assessment are the result of visual observation only and document research.

The current Station #2 was constructed in 1960 as new 3,300 sf new construction and consists of a one story slab on grade building; with the mechanical systems located in a mechanical room at the rear corner of the building. The building is essentially divided into two uses: fire fighter living spaces (bunk room, kitchen, dayroom...) and fire equipment related spaces (two apparatus bays, gear & hose storage, mechanics shop…).

According to original construction documents provided by the town and onsite observations, the building is constructed of double wyth masonry bearing wall (concrete masonry unit with brick veneer), with no insulation in the walls. The original roof structure was a low sloped steel frame and metal deck with tar and gravel roofing. The roof was changed to a sloped roof in 1997with the addition of prefabricated roof trusses and asphalt shingles. In the current code, this load bearing masonry construction with a steel framed roof is considered to be Type II-B (Roman numeral 2 – B) and is discussed further in the Code Analysis section of this Study.

EXTERIOR ENVELOPE

Exterior Walls

The original exterior walls are un-insulated multi-wyth masonry bearing walls – brick veneer with CMU backup. In 1997 when the sloped roof was installed, vinyl siding was added to the gable ends and the wood eves and rakes were clad in prefinished aluminum cladding.

The brick is generally in good condition with the exception of minor cracking observed in a number of locations.


The condition of the siding and trim is generally in good condition.

The gutters appear to be of the residential seamless prefinished aluminum type and appear to be in good condition. The gutters are connected to iron down spouts (which are inside the building) with prefinished residential style down spouts. It is unknown if the down spouts are tied into a storm water drainage system drywells.


Exterior Doors

The entrance doors are hollow metal with insulated glass vision panels in hollow metal frames. Doors and frames are painted and are generally in good condition. The hardware, seals and caulking all appear to be in good condition. None of the doors have been outfitted with a "crash-bars"; though most of the doors are equipped with lever handles.

The apparatus bay doors appear to be prefinished insulated metal type with one row of vision panels. The doors are starting showing wear but appear to be in fair to good condition.

Exterior Windows

The windows are aluminum replacement double/single hung units with insulated glass and insect screens, set into existing masonry openings. The windows were recently installed (within the last few years) and are in excellent condition. As no weep holes were observed, at many of the window heads, spawling mortar was observed. This is an indication that water is getting into the wall and not weeping out properly causing the steel to rust and cracking the mortar. Eventually this condition will require the removal of the brick, scrapping and repainting of the steel lintel, installation of head flashing and replacement of the brick...

Roof

As previously noted the sloped shingled roof was installed in 1997. It remains in good condition, however it is 19 years old and nearing the end of its expected life span. It was also noted the original tar and gravel roof was left in place. It should be tested to ensure there are no asbestos containing materials present.

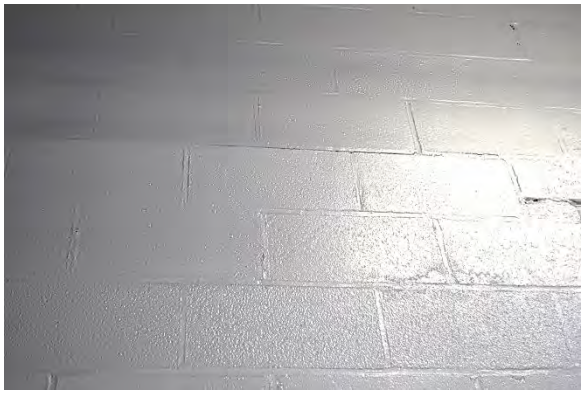
The small flat roofed canopy roof over the main entrance is too small to protect pedestrians from falling ice and snow coming off the high roof. It should be removed and replaced with a larger canopy in order

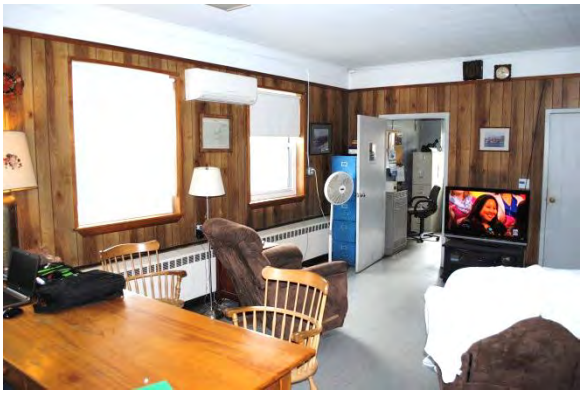
to offer greater protection. Additionally, snow guards should be added above the entrances to protect pedestrians from sliding ice and snow.

BUILDING COMPONENTS

Interior Walls

The interior masonry walls are generally in good condition but need minor repairs and repainting. The wood paneling is dated and needs to be repainted





Interior Doors

Most interior doors and frames are painted hollow metal (36" wide). Most of the doors have been outfitted with ADA compliant lever-style handles. Most of the doors, frames and hardware are in good condition.

Ceilings Systems

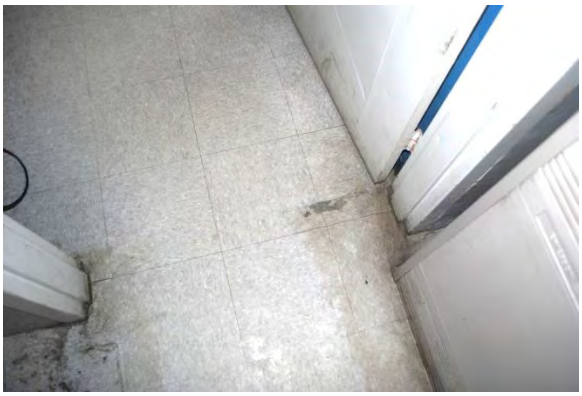
There are two predominant ceiling types in the building: painted exposed steel and metal deck (apparatus bays) and 12"x12" ceiling tiles on furring (fire fighters living spaces). In general, the exposed steel could use a fresh coat of paint, while the ceiling tiles are in very good condition.

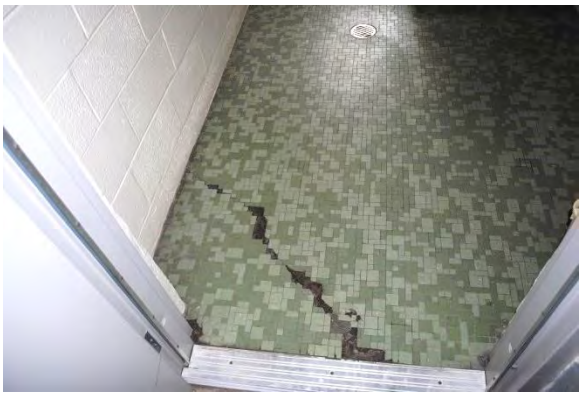
The lighting seems inadequate in general and the light fixtures are in poor condition. Refer to the electrical section of this report for more information.

Floors Finishes

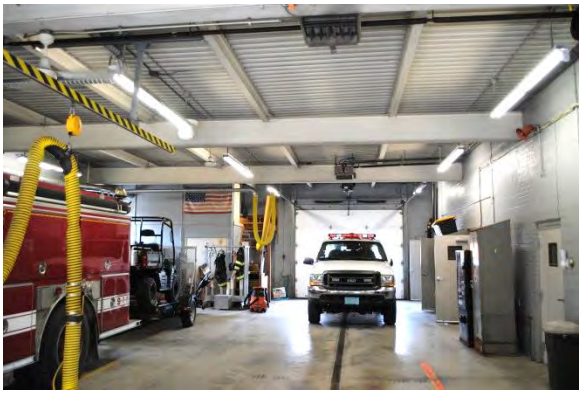
The flooring materials in the building are a combination of vinyl composite tile (VCT), ceramic tile and exposed concrete. The vast majority of the finish flooring is VCT, which is utilized in the corridors, work rooms, bunk rooms, kitchen and day room. In general, the VCT is in poor condition and near the end of its useful life and needs be replaced.

Ceramic tile, located in the toilet room, appears to be in fair poor condition, showing obvious signs of wear.





The exposed concrete floor in the apparatus bays has painted stripes to help guide the apparatus. Most of the paint has worn off and needs to be repainted. It was noted that the original apparatus bay floor contained radiant heat pipes that failed and was replaced in 1997. As part of the replacement the trench drains were also replaced. It is unknown at this time where the trench drains drain.



Signage, Miscellaneous Accessories and Equipment
The room signage is nonexistent. Any addition or renovation would require the installation signage with braille to comply with ADA.

A fire extinguisher was located near the front door. Additional extinguishers should be provided.

Window treatments in the building consist of manually operated roll up blinds. All appear to be recently installed and are in very good condition.

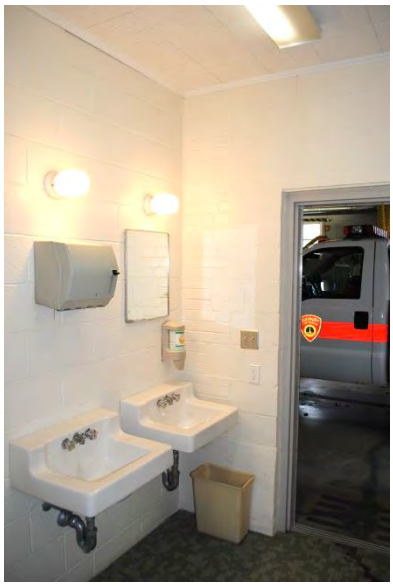
Kitchen/Day Room
The kitchen has wood paneled walls, with vinyl composition tile flooring and acoustical tile ceiling with surface mounted lights. The wood paneling is dated, but in good condition. The VCT flooring needs to be replaced or/refinished and the ceiling is in excellent condition. The cabinets and counter tops exhibit excessive wear and should be replaced. Appliances appear to be older but are in good to fair condition. There is no exhaust hood over the stove, to vent cooking odors.

Toilet/Shower Room
The toilet/shower room is painted cmu walls, with tile flooring and acoustical tile ceiling. With the exception of the ceramic tile floor, all finishes are in very good condition.

The shower compartment is a wall mounted stainless steel unit. It is exhibiting rust at its base. There is also one toilet and two sinks in the room.

The fixtures do not meet ADA requirements. The sinks do not have insulated drain piping or approved lever style faucets handles and thus are non-complaint. The toilets do not have grab bars and or clearances. Additionally there are no separate toilet/shower facilities for male and female use.

Our recommendation would be to execute a total renovation of these spaces. The fixtures, partitions and accessories should be replaced with new.



Hazardous Materials

It is our recommendation that a comprehensive survey of hazardous materials be conducted as vinyl asbestos tile flooring was observed in the attic areas. The scope of the survey should include asbestos, lead paint, mercury and PBC's.

PROGRAM COMPONENTS

Communications Center

The communications center does not comply with NFPA 1221 which sets the design standard for emergency communications centers. This code requires two-hour fire separation from the remainder of the building, protection against civil unrest and an isolated air handling system among many other requirements. Neither an isolated air handling system nor two-hour fire separation assemblies were observed. Additionally, this room appears to be used for a variety of other programmatic functions including report preparation and multi-purpose room. These functions are not conducive to providing an appropriate environment for dispatchers to communicate with citizens in emergency circumstances.

Bunk Rooms

There is one (1) bunk room... It has painted cmu walls, acoustical tile ceiling with surface mounted lights and VCT floor tile. There are six personal lockers in the room, with an additional four located out on the apparatus bay wall. All the finishes, are in very good condition, with the exception of the VCT flooring which needs to be replaced/refinished.

Head End Room

The stations computer network head equipment is located in communications room. The space is not secured nor is it climate or dust controlled.

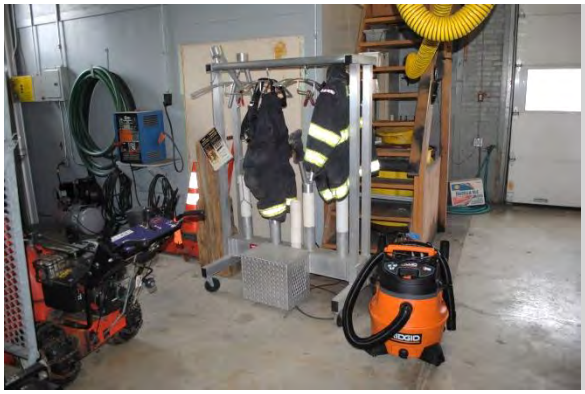
Apparatus Bays

The apparatus bays utilize painted cmu walls, painted exposed ceiling and exposed concrete floors. All of the finishes are in good condition. The overhead door openings are too narrow & short (10'x 12') and barely allow passage of the current apparatus. The circulation space around the apparatus is too narrow per recognized fire station facility design standards.

The apparatus doors are insulated metal clad pre-finished sectional overhead doors, and are in good condition.

The vehicle exhaust system (Plymovent) was installed within the last 10 years and is in excellent condition.

Additionally the bays house the turnout gear lockers, decontamination area, laundry, hose/supply storage and work areas. All of these spaces should be in their own spaces



Storage Facilities

There appears to be inadequate storage facilities for archival records, training materials, department equipment, and supplies.

– EXISTING CONDITIONS ANALYSIS –

SYSTEMS NARRATIVE REPORT

B | E | R

BUILDING ENGINEERING RESOURCES, INC.

SYSTEMS NARRATIVE REPORT

DATE: March 21, 2016

RE: **Sudbury Fire Sub Station – Sudbury, MA**

PERFORMED BY: Geraldo Alba – Mechanical
Marc Plante – Electrical
Angel Rey Vega – Plumbing/Fire Protection

PREPARED FOR: Kaestle Boos Associates, Inc

I. MECHANICAL

1. Apparatus Bays:
   - The vehicles bays will be heated by six (4) gas fired unit heaters. There will be no air conditioning in the main apparatus bay. The storage rooms, work rooms and miscellaneous spaces may be heated via electric heaters, gas infrared heaters or by heat pump units from the main variable refrigerant flow system. A CO/NO2 gas detection system shall be provided and connected to a high air flow exhaust fan and an intake air ventilator (with no heat). The system will be activated on a high level of CO/NO2. A vehicle exhaust system typical to a Plymovent system, shall be installed, or similar type exhaust fans and duct systems, to serve the various vehicles in the apparatus bays. This system should be provided and contracted by the Owner directly since it is a proprietary system and may conflict with filed sub bid regulations.

     Add Alternate: The heating of the spaces will be provided by a radiant floor heating system consisting of approximately six to eight "zones" of temperature control. Two new hot water heating boilers shall be provided, each with a minimum heating capacity of 200 MBH. Pending final calculations the boilers will be selected to match the actual heating requirements of the spaces. The boilers shall be gas-fired high-efficiency condensing type to provide maximum performance at minimal operational costs. Two inline hot or floor mounted hot water pumps shall be provided to distribute the heating hot water to the various radiant heating zones.

Combustion air and flue exhaust vents will be required for each of the boilers. These two components can be provided through side-wall penetrations, roof penetrations, or a combination of both.

2. Main Offices/Business/and Sleeping Areas:
   - Provide a 20.0 ton Variable Refrigerant Flow (VRF) system to heat and cool the building with one outdoor concrete pad mounted condensing unit, controls, condensate piping and all required appurtenances for a complete operational system recommended by the equipment manufacturer. Refrigerant piping shall be type ACR and shall be piped to each indoor air handling unit.

   - The indoor air handling units shall be ceiling concealed type with ducted supply and return. Each unit shall be provided with a condensate pump piped to the nearest janitor's sink. Install piping per code. Provide a thermostat for each air handling unit. System shall consist of approximately 8 zones.

   - Provide a 1200 CFM sensible and latent type energy recovery unit to ventilate and exhaust the building. The unit shall be located on the flat section of the roof. The unit will exhaust all toilet rooms, locker rooms and storage rooms. The unit will also provide ventilation to all occupied space. The unit will have a gas fired heater to temper the air.

   - Furnish and install control components for a complete operational system of all equipment. The system shall include all power, transformers, thermostats, sensors, controllers, dampers, actuators, wiring, and other accessories required for a complete installation. System shall include all hardware to operate as specified. Controls shall be provided by the Variable Refrigerant Flow (VRF) system manufacturer and shall be capable of being monitored and controlled by a desktop computer via the Web with graphics. The VRF controller shall control and monitor the energy recovery system. All other equipment listed shall be standalone type.

II. ELECTRICAL

1. Lighting:
   - The majority of lighting within the Fire Station will be LED type fixtures. Within offices, 2 x 4 and/or 2 x 2 recessed LED direct/indirect fixtures will be utilized. Corridors will be specified with recessed LED downlight fixtures. Storage, Mechanical, Apparatus Bays, and Electrical Rooms will be lit via surface mounted LED type fixtures. Specialty type LED fixtures (indirect/direct, sconces) will be specified for the Day Room. LED parking lot lighting will be provided. All fixtures specified will be high efficiency type.

- To take advantage of the Utility Company Energy Savings Incentive Program, occupancy sensors will be utilized to automatically turn on/off all fixtures. All Mechanical/Electrical Rooms will utilize standard toggle switches.

2. Power:
   - Power will be delivered to the site at a utilization voltage of 120/208 volts, 3 phase, 4 wire. It is estimated that the service size will be 400 amps. Metering will be in compliance with local utility company requirements. The main Electric Room will house the building power disconnect switch and all normal power panelboards.

   - General purpose, 20 amp duplex receptacles will be located throughout the building in locations required by furniture and equipment placement. Power will be provided to all HVAC, all kitchen, fire-fighting and EMS equipment. Disconnect switches will be provided, where required by code, in conjunction with appropriately sized conduits and conductors.

3. Emergency Power:
   - Emergency power for this building will be supplied by an on-site diesel generator. The generator will be sized as necessary to back up the entire facility. It will be housed within a weatherproof, sound attenuated enclosure with an integral skid-base mounted fuel tank. All areas/equipment will be connected to the generator including the Radio equipment, HVAC equipment, lighting throughout the building, overhead doors and all low voltage (CCTV and Security) systems. Emergency power will be distributed from a panelboard located within a separate and dedicated 2-hour rated Emergency Electric Room. Housed within this room will be the main emergency panelboards and automatic transfer switches. These switches will signal the generator to come on line in the event of the loss of normal power. Per code requirements, the generator will be functional within ten seconds of normal power loss. Life Safety and Stand-by loads will be segregated on their own dedicated transfer switches.

4. Low Voltage:
   - Various low voltage systems integral to the operation and safety of the Fire Station will be furnished and installed. These systems include Fire Alarm, Closed Circuit Television (CCTV), Paging, Security and Electronic Access Systems, Telephone/Data, Community Area Television (CATV/cable) and station alerting system.

   - Closed circuit TV cameras will be furnished on the exterior of the building and other required areas. All monitors associated with the CCTV System will be located within the Dispatch/Radio console and will include continuous recording at all screens.

- The Fire Alarm system will consist of initiating devices including manual pull stations, smoke/heat detectors, carbon monoxide and HVAC duct smoke detectors. Notification appliances will consist of combination horn/strobe and strobe only appliances. All devices and appliances will be located per code. The Fire Alarm system will be connected to the local fire department via a UL approved central station connection.

- Telephone and data raceways and category 6 (cat6) cabling will be provided at all outlet locations and will be terminated on rack mounted patch panel(s) located in the IT room. Additionally, a plywood backboard will be provided within the main Telephone Room. This board will serve as the interface between the building and the local service provider.

- The Security and Electronic Access System will monitor all doors and Secure areas. Door control will consist of door strikes controlled by "Card Readers" and/or "Request to Exit" equipment. Access to areas will be determined by clearance levels as programmed onto the cards. Programming shall be user-friendly, which will allow changes to be made by the Dispatch Administrator. A central computer, which records all activity, will be located within a secure area accessible by only designated individuals.

- CATV (cable) outlets will be furnished in those areas designated to receive such service. Work and equipment will be coordinated with the local cable TV provider to ensure a compatible installation.

- A Station Alerting System will be provided. The system will provide dispatch acknowledgement, bunkroom zone alerting via lights and tones, station automation and control, remote monitoring, custom alert tones by type of alert, and incident display board with count-down timer.

III. PLUMBING

1. Domestic Water:
   - A new 4-inch domestic water service shall be brought into the building from the street main. The domestic water service shall consist of a water meter and 4-inch copper supply main. The new service shall be separated into two 2½-inch supply lines once inside the building. Both 2½-inch supply lines shall be protected with a reduced pressure backflow preventer. One supply line shall supply each plumbing fixture requiring domestic water. The second supply line shall supply the 2½-inch hose valves located around the Apparatus Bays.

   - Hot water shall be generated by a high efficiency gas fired water heating system located in the Mechanical Room. The system shall feed each fixture that requires hot water and shall have a continuous hot water return line back to the water

heating system. A master mixing valve shall be located adjacent to the water heaters to ensure hot water temperatures are set at 120°F.

- Tempered water shall be provided off of the 120°F loop for any emergency showers required. The emergency shower and dedicated mixing valve shall be similar to Guardian.

- A reduced pressure backflow preventer will be installed within the Mechanical Room to provide non-potable make-up water to any mechanical equipment, and if necessary, metered water to the irrigation system.

- All aboveground domestic water piping shall be Type L copper tube with wrought copper fittings and 95/5 solder. All buried domestic water piping shall be Type K copper with cast brass fittings and silver solder joints. All domestic water piping shall be covered with molded fiberglass insulation with vapor barrier all service jacket and PVC fittings.

2. Sanitary System:
   - A new 6-inch gravity sanitary waste line shall collect all sanitary and waste piping from plumbing fixtures within the building. The new 6-inch sanitary waste line shall be coordinated and brought to the street sanitary main as indicated in the Site Utility Plans.

   - A new 6-inch gravity garage waste system shall be provided at the Apparatus Bays that will service trench/floor drains located in these areas. The 6-inch garage waste shall be piped through a Massachusetts approved gasoline, oil and sand interceptor that shall be coordinated with the Site Utility Plans.

   - All buried sanitary and garage waste piping shall be service weight bell and spigot cast iron with neoprene resilient gaskets. Buried sanitary and garage waste piping through foundation wall service weight bell and spigot cast iron with lead and oakum joints. All above floor sanitary waste piping shall be cast iron with stainless steel mechanical couplings. All above floor sanitary waste piping 2-inches and smaller shall be Type DWV hard drawn seamless copper with wrought copper drainage fitting joints with 95/5 solder.

3. Vent System:
   - Each plumbing fixture tied to the sanitary waste and garage waste systems shall be properly vented and piped to atmosphere. Garage venting and sanitary venting shall run independently through the roof.

   - All buried sanitary vent piping shall be service weight bell and spigot cast iron with neoprene resilient gaskets. All above floor sanitary vent piping shall be cast iron with stainless steel mechanical couplings. All above floor sanitary vent

piping 2-inches and smaller shall be Type DWV hard drawn seamless copper with wrought copper drainage fitting joints with 95/5 solder.

4. Storm System:
   - Storm water shall be collected by a combination of external gutters and downspouts and an internal roof drainage system. Internal storm drainage piping shall be collected and run down to a new underground storm drainage main exiting the building.

   - All buried internal storm drainage piping shall be service weight bell and spigot cast iron with neoprene resilient gaskets. Buried internal storm drainage piping through foundation wall service weight bell and spigot cast iron with lead and oakum joints. All above floor internal storm drainage piping shall be hubless cast iron with stainless steel mechanical couplings.

   - The 4"cast iron boots shall be provided for external downspouts and tied into on-site drainage as indicated in the Civil Drawings.

5. Natural Gas System:
   - A new natural gas service shall be brought to the building. A meter shall be located on the exterior of the building. The gas system shall be piped to the new water heating system and all required HVAC and kitchen equipment. Gas system pressure shall be low pressure within the building.

6. Plumbing Fixtures and Equipment:
   - New plumbing fixtures shall consist of wall mounted flush valve water closets, counter mounted and wall hung lavatories, wall hung flush valve urinals, shower enclosures, a wall mounted electric water cooler, counter mounted stainless steel sinks, floor mounted pot sinks, a combination emergency shower and eyewash, wall hydrants, hose bibbs and floor drains.

   - All new flush valves and faucets shall be manual low-flow type fixtures. MAAB compliant, ADA compliant and barrier-free plumbing fixtures shall be installed as required by code

IV. FIRE PROTECTION

1. Wet Sprinkler System:
   - A new 6-inch fire protection line shall be brought into the new building and run up to the Mechanical Room. A horizontal double check valve assembly and wet alarm check valve assembly shall be installed along with floor-zone control valve assemblies for each floor level. A dry system with dry alarm check valve assembly shall be installed and rise up to protect the unheated attic spaces. Dry systems will not be utilized at the apparatus or auxiliary bay. The temperature at

all spaces shall be kept to a minimum of 40°F to prevent sprinkler pipe from freezing.

- The building shall be fully sprinklered based on the current edition NFPA 13 and Massachusetts Building and Fire Codes.

- Sprinklers in common spaces with ceilings shall be quick response, chrome and recessed type. Sprinklers in common areas with no ceilings shall be quick response bronze, upright type. Mechanical areas and any other areas subject to damage shall have cages on sprinklers.

- General and attic areas shall be designed based on light hazard occupancies. Apparatus Bay, Storage and Mechanical areas shall be designed based on Ordinary Hazard Group 1 or Group 2 occupancies. Hazardous Storage and Vehicle Storage area densities shall be coordinated with NFPA 13.

- Sprinkler spacing in light hazard occupancies shall be 225 square feet per sprinkler. Sprinkler spacing in the unheated attic areas shall be 130 square feet per sprinkler. Sprinkler spacing in Ordinary Hazard occupancies shall be 130 square feet per sprinkler maximum.

- Seismic requirements shall be based on NFPA 13 and Massachusetts Building and Fire Code requirements.

- A hydrant flow test has not been performed to date. Current flow information is not available at this time. An allowance for an in-line vertical fire pump should be carried at this time. Pump shall be based on a 750 gpm, 50 psi pump system with controllers.

– SPACE NEEDS –

Sudbury Fire Station 2 Study

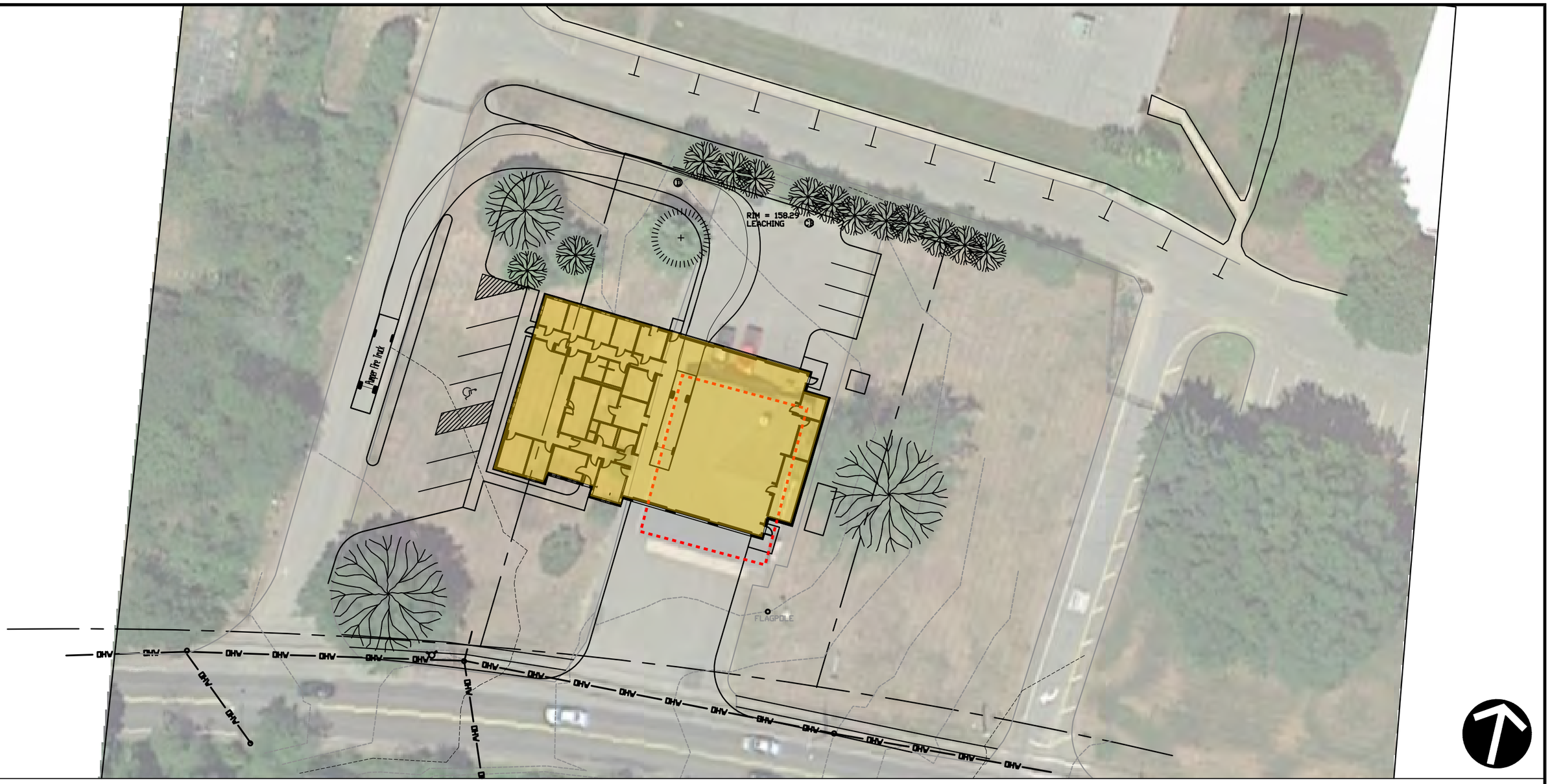
Space Needs Program

April, 2016

Area/Room Title	No.Occ.	No.Rms.	Rm. Area	Subtotal	Total
Public Area					
Vestibule / Entry Passage	0	1	50 sf	50 sf	
First Aid	3	1	150 sf	150 sf	
Public Toilet	0	1	55 sf	55 sf	
Public Total:					**255 sf**
Apparatus Storage					
Apparatus Bays	0	3	1280 sf	3840 sf	
Mechanic's Work Bench	0	1	60 sf	60 sf	
Parts Storage	0	1	125 sf	125 sf	
Hose Storage	0	1	80 sf	80 sf	
Toilet	0	1	55 sf	55 sf	
Apparatus Bays Total:					**4,160 sf**
Firematic Support Facilities					
Bunker Gear Storage	20	1	60 sf	60 sf	
Decon / Laundry (incl. shower)	0	1	120 sf	120 sf	
EMS Supplies and Prep.	0	1	130 sf	130 sf	
EMS Storage	0	1	120 sf	120 sf	
Firematic Support Facilities Total:					**430 sf**
Firefighters' Facilities					
Bunk Rooms	2	4	110 sf	440 sf	
Toilet / shower	0	2	70 sf	140 sf	
Day Room	0	1	380 sf	380 sf	
Kitchen	0	1	150 sf	150 sf	
Fitness	0	1	250 sf	250 sf	
Laundry Alcove	0	1	50 sf	50 sf	
Staff Facilities Total:					**1,410 sf**
Administrative Spaces					
Admin Office	1	1	120 sf	120 sf	
EMS Office	1	1	160 sf	160 sf	
Administrative Spaces Total:					**280 sf**
Building Services					
Custodial Closet	0	1	15 sf	30 sf	
Mechanical Room	0	1	120 sf	120 sf	
Sprinkler Equipment	0	1	60 sf	80 sf	
Electrical Room	0	1	20 sf	20 sf	
Emergency Generator (outside)	0	1	300 sf		
Building Services Total:					**250 sf**
Total Net Program Area					**6,785 sf**
Net to Gross Adjustment					**1,915 sf**
Total Gross Area :					**8,700 sf**

– CONCEPTUAL DESIGN –

SITE PLAN



SITE PLAN

SCALE: 1" = 40'

SUDBURY FIRE #2

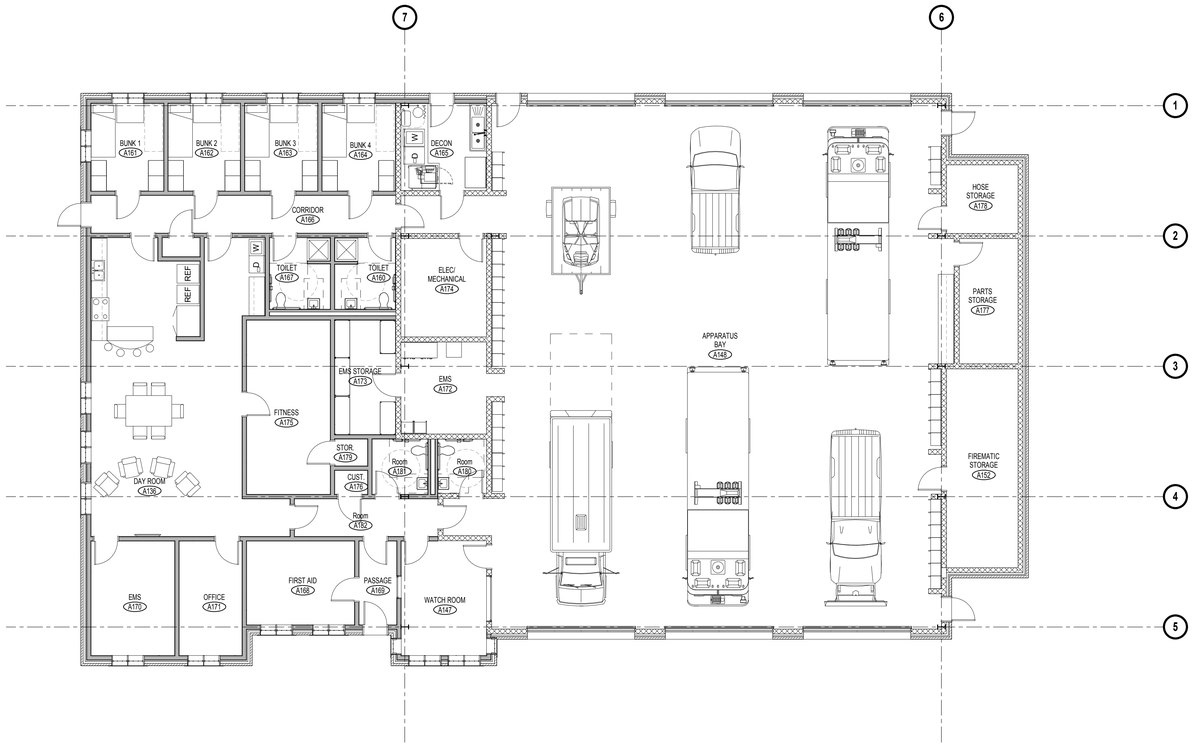
SUDBURY, MASSACHUSETTS

FEBRUARY 23, 2016

KAESTLE BOOS associates, inc

– CONCEPTUAL DESIGN –

FLOOR PLAN



KAESTLE BOOS
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ISSUE DATE

DATE	DESCRIPTION
07/13/10	

REVISIONS

DATE	DESCRIPTION

FOR ALL ABBREVIATIONS, SYMBOL LEGENDS, AND GENERAL NOTES SEE SHEET R0.01

KEY PLAN

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

SUDBURY FIRE SUB STATION

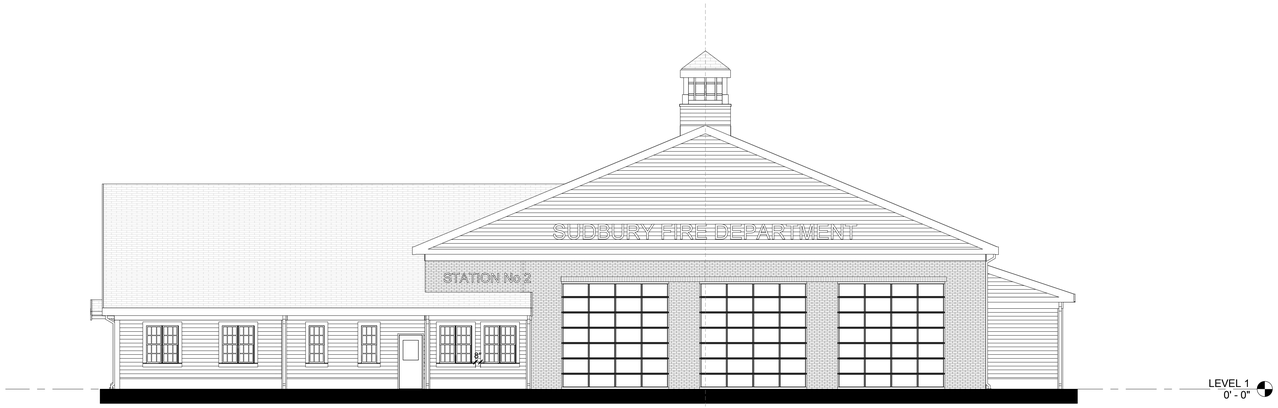
PROJECT NO.:
DRAWN BY: YM

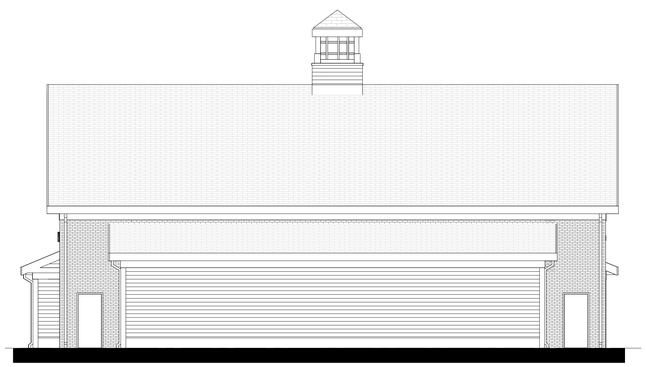
MAIN LEVEL FLOOR PLAN

DRAWING NO.:
A1.01

– CONCEPTUAL DESIGN –

ELEVATIONS





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07/15/10	

REVISIONS

DATE	DESCRIPTION

FOR ALL ABBREVIATIONS, SYMBOL LEGENDS, AND GENERAL NOTES SEE SHEET R0.01

KEY PLAN

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

SUDBURY FIRE DEPARTMENT STATION No. 2

AREA 8755.33

PROJECT NO.: DRAWN BY: YM

EXTERIOR ELEVATIONS I

DRAWING NO.:
A5.01

– CONCEPTUAL DESIGN –

PERSPECTIVE

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ISSUE DATE

DATE	DESCRIPTION
07/13/10	

REVISIONS

DATE	DESCRIPTION

FOR ALL ABBREVIATIONS, SYMBOL LEGENDS, AND GENERAL NOTES SEE SHEET R0.01

KEY PLAN

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

SUDBURY FIRE SUB STATION

PROJECT NO.: DRAWN BY: YM

PERSPECTIVE

DRAWING NO.:
A0.01

– COST –

CONCEPTUAL COST ESTIMATE

DAEDALUS

Sudbury Fire Sub Station
Sudbury, MA

March 23, 2016

Conceptual Estimate

Design Architect:

Kaestle Boos Associates, Inc.

325 Foxborough Boulevard, Suite 100

Foxborough, MA 02035

(508) 549-9906

Cost Estimator:

Daedalus Projects Incorporated

112 South Street

Boston, MA 02111

(617) 451-2717

INTRODUCTION

Project Description:

- This project is a new fire sub station building in Sudbury, MA
- Sitework has been included.

Project Particulars:

- Progress print drawings dated February 11, 2016 from by Kaestle Boos Associates Inc.

Project Assumptions:

- The project will be built by a GC
- Our costs assume that there will be competitive bidding in all trades and sub-trades i.e. at least three bids per trade or sub-trade
- Unit rates are based on current dollars (prevailing wage rates)
- Design Contingency is an allowance for unforeseen design issues, design detail development and specification clarifications
- General Conditions and Requirements value covers Construction Manager's site office overhead and on-site supervision
- Fee markup is calculated on a percentage basis
- Escalation has been included

Construction Cost Estimate Exclusions:

- Design fees and other soft costs
- Interest expense
- Owner's project administration
- Construction of temporary facilities
- Printing and advertising
- Specialties, loose furnishings, fixtures and equipment beyond what is noted
- LEED Commissioning
- Site or existing condition surveys and investigations
- Hazardous materials survey, report and abatement

Sudbury Fire Sub Station
Sudbury, MA
8,756 GSF

MAIN SUMMARY

DESCRIPTION			TOTAL	COST/SF
Sitework Cost			$496,832	$56.74
Building Demolition			$12,000	$1.37
Hazardous Material Abatement			N.I.C.	
Fire Sub Station		8,756 GSF	$2,746,358	$313.65
Trade Cost Subtotal		**8,756 GSF**	**$3,255,190**	**$371.77**
Design Contingency	10.00%		$325,519	$37.18
Trade Cost Total			**$3,580,709**	**$408.94**
Mark-ups (on Direct Trade Costs Subtotal)				
General Conditions and Requirements	8.00%	$3,580,709	$286,457	$32.72
Insurance	1.00%	$3,867,166	$38,672	$4.42
Bonds	1.00%	$3,905,837	$39,058	$4.46
Permit	1.50%	$3,944,896	N.I.C.	
Fee	3.00%	$3,944,896	$118,347	$13.52
Estimate Construction Cost Subtotal			**$4,063,243**	**$464.05**
Escalation to Fall 2016	1.50%	$4,063,243	$60,949	$6.96
ECC Total, including Escalation			**$4,124,192**	**$471.01**

SITE DEVELOPMENT SUMMARY

ELEMENT	TOTAL
02 41 00 Demolition	$20,172
02-EXISTING CONDITIONS TOTAL	**$20,172**
31 10 00 Site Clearing	$42,292
31 20 00 Earth Moving	$18,009
31 23 19 Dewatering and Drainage	$3,500
31 25 00 Erosion and Sedimentation Controls	$7,910
32-EXTERIOR IMPROVEMENTS	**$71,711**
32 00 00 Paving	$102,480
32 30 00 Site Improvements	$68,900
32 31 13 Fences and Gates	$0
32 90 00 Plants	$39,470
32-EXTERIOR IMPROVEMENTS	**$210,850**
33 10 00 Water Distribution	$28,100
33 30 00 Sanitary Sewerage	$27,000
33 40 00 Storm Drainage	$60,000
33 50 00 Gas Service	$4,000
33 70 00 Electrical Utilities	$75,000
33-UTILITIES	**$194,100**
Site Development Subtotal	**$496,832**

SITE DEVELOPMENT DETAILS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
6	**02-SITEWORK**				
7					
8	***02 41 00 Demolition***				
9	Saw cut existing pavement; allow	**121**	LF	$10.00	$1,210
10	R & D existing pavement	**9,209**	SF	$1.00	$9,209
11	R & D sidewalk	**275**	SF	$1.50	$413
12	R & D existing building foundation	**124**	LF	$35.00	$4,340
13	Miscellaneous demolition other than above	**1**	AL	$5,000.00	$5,000
14	***02 41 00 Demolition Total***				**$20,172**
15					
16					
17	**31-EARTHWORK**				
18					
19	***31 10 00 Site Clearing***				
20	Site clearing	**1**	ACRE	$4,000.00	$4,000
21	Protect existing tree	**1**	AL	$4,250.00	$4,250
22	Removal trees/shrubs	**1**	AL	$1,050.00	$1,050
23	Construction fence ; allow	**791**	LF	$12.00	$9,492
24	Double construction gate	**2**	EA	$2,500.00	$5,000
25	Temporary construction entrance	**2**	LS	$7,000.00	$14,000
26	Temp signs	**1**	LS	$1,500.00	$1,500
27	Allow for wash down/re-fueling	**1,500**	SF	$2.00	$3,000
28	***31 10 00 Site Clearing Total***				**$42,292**
29					
30	***31 20 00 Earth Moving***				
31	Remove & stockpile topsoil; allow	**494**	CY	$9.00	$4,442
32	Cuts and fills of Apparatus and concrete pad	**32**	CY	$10.00	$320
33	Cuts and fills of parking lot	**614**	CY	$10.00	$6,138
34	Cuts and fills of sidewalk	**49**	CY	$10.00	$485
35	Cuts and fills of paver	**10**	CY	$10.00	$96
36	Cuts and fills - site	**725**	CY	$9.00	$6,527
37	**31 20 00 Earth Moving TOTAL**				**$18,009**
38					
39	***31 23 19 Dewatering and Drainage***				
40	Dewatering; allow	**1**	LS	$3,500.00	$3,500
41	***31 23 19 Dewatering and Drainage Total***				**$3,500**
42					
43	***31 25 00 Erosion and Sedimentation Controls***				
44	Install and maintain perimeter erosion control; allow	**791**	LF	$10.00	$7,910
45	***31 25 00 Erosion and Sedimentation Controls Total***				**$7,910**
46					
47					
48					

SITE DEVELOPMENT DETAILS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
49	**32-EXTERIOR IMPROVEMENTS**				
50					
51	***32 00 00 Paving***				
52	*32 00 00 Asphalt Paving*				
53	Asphalt concrete pavement -roadway and parking lot	**11,049**	SF	$2.75	$30,385
54	Patching existing pavement at street ; allow	**1,200**	SF	$6.00	$7,200
55	Gravel base	**450**	CY	$30.00	$13,500
56	*32 13 13 Concrete Paving*				
57	Fire Apparatus - 8" reinforced concrete slab	**576**	SF	$10.00	$5,760
58	Concrete sidewalk	**1,048**	SF	$6.00	$6,288
59	Curb cut allowance	**1**	EA	$380.00	$380
60	Reinforce concrete pad allowance	**140**	SF	$10.00	$1,400
61	Generator pad				See Electrical
62	Transformer pad				See Electrical
63	Gravel base	**51**	CY	$30.00	$1,530
64	*32 16 00 Curbs and Gutters*				
65	Curb allowance	**1,075**	LF	$28.00	$30,100
66	*32 14 00 Unit Pavers*				
67	Unit pavers; allow	**120**	SF	$15.00	$1,800
68	*32 17 23 Pavement Markings*				
69	Pavement making	**56**	SF	$2.00	$112
70	Parking stall painting allowance	**10**	EA	$45.00	$450
71	Parking stall painting; HC	**1**	EA	$75.00	$75
72	Misc. marking	**1**	LS	$3,500.00	$3,500
73	***32 00 00 Paving Total***				**$102,480**
74					
75	***32 30 00 Site Improvements***				
76	Trash / Recycle Receptacles allowance	**1**	EA	$1,000.00	$1,000
77	Bike Racks allowance	**1**	AL	$1,500.00	$1,500
78	Galvanized steel bollard; allow	**6**	EA	$500.00	$3,000
79	Decorative Fire sign	**1**	EA	$15,000.00	$15,000
80	Aluminum flagpole	**1**	LS	$7,500.00	$7,500
81	Traffic sign allowance	**1**	LS	$3,500.00	$3,500
82	Benches; allow	**2**	EA	$1,200.00	$2,400
83	Misc. site improvement other than above; allow	**1**	LS	$35,000.00	$35,000
84	***32 30 00 Site Improvements Total***				**$68,900**
85					
86	***32 31 13 Fences and Gates***				
87	No work shown in this section				$0
88	**32 31 13 Fences and Gates TOTAL**				**$0**
89					
90	***32 90 00 Plants***				
91	*32 92 10 Soil Preparation for Lawn Establishment*				

SITE DEVELOPMENT DETAILS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
92	Repeal topsoil	**494**	CY	$9.00	$4,442
93	Topsoil import allowance	**111**	CY	$25.00	$2,778
94	Mulch; allow	**10**	CY	$40.00	$397
95	*32 92 20 Turf and Grasses*				
96	Lawn allowance	**19,582**	SF	$0.35	$6,854
97	*32 93 00 Plants*				
98	Planting; allow	**1**	LS	$25,000.00	$25,000
99	**32 90 00 Plants TOTAL**				**$39,470**
100					
101					
102	**33-UTILITIES**				
103					
104	***33 10 00 Water Distribution***				
105	4" T, S,& G; allow	**1**	EA	$3,600.00	$3,600
106	6" T, S,& G; allow	**1**	EA	$4,000.00	$4,000
107	4" gate; allow	**1**	EA	$1,400.00	$1,400
108	6" gate; allow	**1**	EA	$1,200.00	$1,200
109	Hydrant & gate; allow	**1**	EA	$2,500.00	$2,500
110	4" CLDI excavation and install (material, install, and excavation	**50**	LF	$60.00	$3,000
111	6" CLDI excavation and install (material, install, and excavation	**160**	LF	$70.00	$11,200
112	6"x4" Tee; allow	**1**	EA	$200.00	$200
113	Thrust blocks	**1**	LS	$1,000.00	$1,000
114	***33 10 00 Water Distribution Total***				**$28,100**
115					
116	***33 30 00 Sanitary Sewerage***				
117	Connect to existing sewer pipe	**1**	EA	$2,000.00	$2,000
118	SMH; allow	**1**	EA	$4,000.00	$4,000
119	Gas oil interceptor; allow	**1**	EA	$15,000.00	$15,000
120	6" PVC; allow	**120**	LF	$50.00	$6,000
121	***33 30 00 Sanitary Sewerage Total***				**$27,000**
122					
123	***33 40 00 Storm Drainage***				
124	Storm drainage; allow	**1**	AL	$60,000.00	$60,000
125	***33 40 00 Storm Drainage Total***				**$60,000**
126					
127	***33 50 00 Gas Service***				
128	New service line				By Gas Co.
129	Trenching and backfill for new service line; allow	**100**	LF	$40.00	$4,000
130	***33 50 00 Gas Service Total***				**$4,000**
131					
132	***33 70 00 Electrical Utilities***				
133	Site electrical; allow	**1**	AL	$75,000.00	$75,000
134	***33 70 00 Electrical Utilities Total***				**$75,000**

Sudbury Fire Sub Station
Sudbury, MA
8,756 GSF

BUILDING SUMMARY

ELEMENT	TOTAL	COST/SF
03 00 00 Cast-In-Place Concrete	$203,551	$23.25
03-CONCRETE TOTAL	**$203,551**	**$23.25**
04 01 00 Maintenance of Masonry	$211,921	$24.20
04-MASONRY TOTAL	**$211,921**	**$24.20**
05 10 00 Structural Steel Framing	$228,900	$26.14
05 30 00 Metal Decking	$33,190	$3.79
05 40 00 Cold Formed Metal Framing	$26,753	$3.06
05 50 00 Metal Fabrications	$63,240	$7.22
05-METALS TOTAL	**$352,082**	**$40.21**
06 10 00 Rough Carpentry	$119,595	$13.66
06 20 00 Finish Carpentry	$69,344	$7.92
06-WOOD AND PLASTICS TOTAL	**$188,939**	**$21.58**
07 10 00 Dampproofing and Waterproofing	$37,596	$4.29
07 20 00 Insulation	$35,550	$4.06
07 40 00 Roofing and Siding Panels	$105,952	$12.10
07 46 00 Siding	$138,539	$15.82
07 80 00 Firestopping & Fireproofing	$3,065	$0.35
07 92 00 Joint Sealants	$13,134	$1.50
07-THERMAL AND MOISTURE TOTAL	**$333,836**	**$38.13**
08 10 00 Doors & Frames	$59,025	$6.74
08 3 1 00 Access Doors & Panels	$1,400	$0.16
08 33 23 Coiling and Overhead Doors	$57,000	$6.51
08 50 00 Windows	$22,270	$2.54
08 80 00 Glazing	$5,430	$0.62
08-DOORS AND WINDOWS TOTAL	**$145,125**	**$16.57**
09 21 00 Plaster and Gypsum Board Assemblies	$62,073	$7.09
09 30 00 Tile	$20,532	$2.34
09 51 00 ACT	$13,175	$1.50
09 65 13 Resilient Flooring and Base	$20,386	$2.33
09 68 13 Tile Carpeting	$3,625	$0.41
09 67 23 Resinous Flooring	$37,026	$4.23

Sudbury Fire Sub Station
Sudbury, MA
8,756 GSF

BUILDING SUMMARY

ELEMENT	TOTAL	COST/SF
09 90 00 Painting	$35,856	$4.10
09-FINISHES TOTAL	**$192,673**	**$22.00**
10 00 00 Specialties	$41,662	$4.76
10 28 13 Toilet Accessories	$2,600	$0.30
10-SPECIALTIES TOTAL	**$44,262**	**$5.06**
11 31 00 Residential Appliances	$7,850	$0.90
11-EQUIPMENT TOTAL	**$7,850**	**$0.90**
12 20 00 Window Treatments	$2,358	$0.27
12 48 13 Entrance Floor Mats	$1,750	$0.20
12-FURNISHINGS TOTAL	**$4,108**	**$0.20**
21 00 00 Fire Protection	$54,725	$6.25
22 00 00 Plumbing	$140,096	$16.00
23 00 00 HVAC	$367,752	$42.00
21, 22, 23 - MECHANICAL TOTAL	**$562,573**	**$64.25**
26 00 00 Electrical	$437,800	$50.00
26-ELECTRICAL TOTAL	**$437,800**	**$50.00**
31 00 00 Earthwork	$61,640	$7.04
31-EARTHWORK TOTAL	**$61,640**	**$7.04**
Building Subtotal	**$2,746,358**	**$313.65**

BUILDING DIRECT TRADE COSTS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
8	**03-CONCRETE**				
9					
10	***03 00 00 Cast-In-Place Concrete***				
11	*Footings*				
12	*Continuous footings (2' x 1')*	*305*	*lf*		
13	Concrete; material	**24**	CY	$125.00	$2,968
14	Concrete; place	**24**	CY	$85.00	$2,018
15	Reinforcement (65#/cy)	**1,543**	LB	$1.10	$1,698
16	Keyways	**305**	LF	$2.00	$611
17	Formwork	**611**	SF	$8.00	$4,884
18					
19	*Spread footings; assume 6' x 6' x 2' on 24x24 grid*	*36*	*ea*		
20	Concrete; material	**101**	CY	$125.00	$12,600
21	Concrete; place	**101**	CY	$85.00	$8,568
22	Reinforcement (75#/cy)	**7,560**	LB	$1.10	$8,316
23	Formwork	**3,024**	SF	$10.00	$30,240
24					
25	*Foundations*				
26	*Foundation walls- 4' x 12"*	*405*	*lf*		
27	Concrete; material	**60**	CY	$125.00	$7,500
28	Concrete; place	**60**	CY	$85.00	$5,100
29	Reinforcement (150#/cy)	**9,000**	LB	$1.10	$9,900
30	Formwork	**3,240**	SF	$12.00	$38,880
31					
32	*Slab on Grade; 4" thick*	*4,567*	*sf*		
33	Concrete; material	**59**	CY	$125.00	$7,326
34	Concrete; place & finish	**4,567**	SF	$2.50	$11,418
35	WWF	**4,567**	SF	$0.50	$2,284
36					
37	*Slab on Grade; 6" thick@ Apparatus Bay*	*4,189*	*sf*		
38	Concrete; material	**95**	CY	$125.00	$11,879
39	Concrete; place & finish	**4,189**	SF	$2.50	$10,473
40	WWF	**4,189**	SF	$0.50	$2,095
41					
42	*Miscellaneous*				
43	Vapor barrier under slab	**8,756**	SF	$0.50	$4,378
44	Barrier one	**154**	CY	$60.00	$9,218
45	Allow for equipment pads	**1**	LS	$1,500.00	$1,500
46	Concrete accessories	**1**	LS	$9,700.00	$9,700
47	***03 00 00 Cast-In-Place Concrete Total***				**$203,551**
48					
49					

BUILDING DIRECT TRADE COSTS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
50	**04-MASONRY**				
51					
52	***04 01 00 Maintenance of Masonry***				
53	Scaffolding	**7,581**	SF	$3.50	$26,534
54	Brick exterior façade	**1,452**	SF	$35.00	$50,820
55	CMU backup wall	**1,897**	SF	$22.00	$41,734
56	*Interior:*				
57	8" CMU wall	**3,289**	SF	$22.00	$72,358
58	Bond beam allowance	**455**	LF	$45.00	$20,475
59	***04 01 00 Maintenance of Masonry Total***				**$211,921**
60					
61					
62	**05-METALS**				
63					
64	***05 10 00 Structural Steel Framing***				
65	WF structural steel	**53**	TNS	$3,400.00	$180,200
66	WF structural steel column	**13**	TNS	$3,400.00	$44,200
67	Base plates	**36**	EA	$125.00	$4,500
68	***05 10 00 Structural Steel Framing Total***				**$228,900**
69					
70	***05 30 00 Metal Decking***				
71	Roof deck	**9,483**	SF	$3.50	$33,190
72	***05 30 00 Metal Decking Total***				**$33,190**
73					
74	***05 40 00 Cold Formed Metal Framing***				
75	Light gage metal wall framing	**3,567**	SF	$7.50	$26,753
76	***05 40 00 Cold Formed Metal Framing Total***				**$26,753**
77					
78	***05 50 00 Metal Fabrications***				
79	Metal framing for coiling doors	**6**	SET	$1,200.00	$7,200
80	Galv. lintel angle for coiling doors open	**88**	LF	$140.00	$12,348
81	Lintel angle for exterior door and window open	**84**	LF	$120.00	$10,080
82	Miscellaneous exterior metals	**3,349**	SF	$3.50	$11,722
83	Miscellaneous interior metals	**8,756**	SF	$2.50	$21,890
84	***05 50 00 Metal Fabrications Total***				**$63,240**
85					
86					
87	**06-WOOD AND PLASTICS**				
88					
89	***06 10 00 Rough Carpentry***				
90	Plywood sheathing @ exterior wall	**5,464**	SF	$3.50	$19,124

BUILDING DIRECT TRADE COSTS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
91	Install doors and frames	**29**	EA	$275.00	$7,975
92	Plywood roof Sheathing	**9,483**	SF	$3.50	$33,190
93	Plywood wall sheathing	**5,464**	SF	$2.50	$13,660
94	Cupola	**1**	EA	$15,000.00	$15,000
95	Rough carpentry / blocking	**8,756**	SF	$3.50	$30,646
96	***06 10 00 Rough Carpentry Total***				**$119,595**
97					
98	***06 20 00 Finish Carpentry***				
99	Base cabinets w/c/top at kitchen	**11**	LF	$360.00	$3,960
100	Wall cabinet at kitchen	**14**	LF	$180.00	$2,520
101	Tall cabinet at kitchen	**1**	EA	$650.00	$650
102	Dayroom	**1**	EA	$2,700.00	$2,700
103	First Aid	**1**	EA	$3,240.00	$3,240
104	RMS storage	**1**	EA	$3,500.00	$3,500
105	EMS	**1**	EA	$2,250.00	$2,250
106	Decon	**1**	EA	$1,000.00	$1,000
107	Apparatus bay	**1**	EA	$6,500.00	$6,500
108	Storage shelf	**1**	AL	$8,000.00	$8,000
109	Miscellaneous standing and running trim	**8,756**	SF	$4.00	$35,024
110	***06 20 00 Finish Carpentry Total***				**$69,344**
111					
112					
113	**07-THERMAL AND MOISTURE**				
114					
115	***07 10 00 Dampproofing and Waterproofing***				
116	*07 11 13 Bituminous Dampproofing*				
117	Dampproofing to foundation walls	**1,620**	SF	$5.50	$8,910
118	*07 27 26 Fluid-Applied Membrane Air Barriers*				
119	Air/vapor barrier to exterior walls	**5,464**	SF	$5.25	$28,686
120	***07 10 00 Dampproofing and Waterproofing Total***				**$37,596**
121					
122	***07 20 00 Insulation***				
123	Rigid insulation under slab on grade	**8,756**	SF	$2.50	$21,890
124	Rigid insulation at exterior walls	**5,464**	SF	$2.50	$13,660
125	***07 20 00 Insulation Total***				**$35,550**
126					
127	***07 40 00 Roofing and Siding Panels***				
128	Asphalt roofing system	**9,483**	SF	$8.00	$75,862
129	Flashing; allow	**1**	AL	$6,000.00	$6,000
130	Aluminum gutter; allow	**285**	LF	$34.00	$9,690
131	Aluminum downspout	**1**	AL	$4,900.00	$4,900
132	Snow guards	**1**	AL	$5,000.00	$5,000

BUILDING DIRECT TRADE COSTS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
133	Allow for roof accessories	**1**	AL	$4,500.00	$4,500
134	***07 40 00 Roofing and Siding Panels Total***				**$105,952**
135					
136	***07 46 00 Siding***				
137	Exterior siding	**4,012**	SF	$30.00	$120,360
138	Horizontal fascia	**520**	LF	$18.00	$9,360
139	Trim	**279**	LF	$15.00	$4,185
140	Window trim	**280**	LF	$12.00	$3,360
141	Conner trim	**91**	LF	$14.00	$1,274
142	***07 46 00 Siding Total***				**$138,539**
143					
144	***07 80 00 Firestopping & Fireproofing***				
145	Fire proof steel and deck	**9,483**	SF	$2.10	N.I.C.
146	Through floor penetration firestopping	**8,756**	SF	$0.35	$3,065
147	***07 80 00 Firestopping & Fireproofing Total***				**$3,065**
148					
149	***07 92 00 Joint Sealants***				
150	Caulking and sealants	**8,756**	SF	$1.50	$13,134
151	***07 92 00 Joint Sealants Total***				**$13,134**
152					
153					
154	**08-DOORS AND WINDOWS**				
155					
156	***08 10 00 Doors & Frames***				
157	*Exterior door and frames:*				
158	Exterior single door and frame	**6**	EA	$3,500.00	$21,000
159	*Interior door and frames:*				
160	Interior single doors	**29**	EA	$350.00	$10,150
161	*Frames*				
162	Interior doors frame	**29**	EA	$225.00	$6,525
163	Hardware sets	**29**	EA	$650.00	$18,850
164	Premium for power operation	**1**	EA	$2,500.00	$2,500
165	***08 10 00 Doors & Frames Total***				**$59,025**
166					
167	***08 3 1 00 Access Doors & Panels***				
168	Access doors	**4**	EA	$350.00	$1,400
169	***08 3 1 00 Access Doors & Panels Total***				**$1,400**
170					
171	***08 33 23 Coiling and Overhead Doors***				
172	13'-4" x 14'-0"; Apparatus bay	**6**	EA	$9,500.00	$57,000
173	***08 33 23 Coiling and Overhead DoorsTotal***				**$57,000**

BUILDING DIRECT TRADE COSTS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
174					
175	***08 50 00 Windows***				
176	Windows	**262**	SF	$85.00	$22,270
177	***08 50 00 WindowsTotal***				**$22,270**
178					
179	***08 80 00 Glazing***				
180	Interior windows	**41**	SF	$60.00	$2,430
181	Glazing at fitness	**1**	AL	$2,100.00	$2,100
182	Door glazing	**1**	AL	$900.00	$900
183	***08 80 00 Glazing Total***				**$5,430**
184					
185					
186	**09-FINISHES**				
187					
188	***09 21 00 Plaster and Gypsum Board Assemblies***				
189	Interior of exterior walls	**3,567**	SF	$3.50	$12,485
190	Standard partition w/ sound insulation; 3-5/8" Metal stud	**3,240**	SF	$9.50	$30,780
191	Standard partition w/out sound insulation; 3-5/8" Metal stud	**250**	SF	$8.50	$2,125
192	Plumbing chase partition	**240**	SF	$10.50	$2,520
193	Allow for soffits	**1**	AL	$3,500.00	$3,500
194	GWB ceiling at bedroom	**725**	SF	$11.00	$7,975
195	GWB ceiling at bathroom	**224**	SF	$12.00	$2,688
196	***09 21 00 Plaster and Gypsum Board Assemblies Total***				**$62,073**
197					
198	***09 30 00 Tile***				
199	Porcelain tile flooring @ Kitchen	**175**	SF	$25.00	$4,375
200	Porcelain tile base @ Kitchen	**46**	LF	$15.00	$690
201	Ceramic floor tile at bathroom	**224**	SF	$18.00	$4,032
202	Ceramic wall tile	**509**	SF	$18.00	$9,153
203	Ceramic base	**113**	LF	$14.00	$1,582
204	Granite thresholds	**4**	EA	$175.00	$700
205	***09 30 00 Tile Total***				**$20,532**
206					
207	***09 51 00 ACT***				
208	Acoustical ceiling tile; allow	**2,635**	SF	$5.00	$13,175
209	***09 51 00 ACT Total***				**$13,175**
210					
211	***09 65 13 Resilient Flooring and Base***				
212	Athletic flooring @ fitness	**248**	SF	$15.00	$3,720
213	Rubber tile @ corridors, first aid, day room and EMS	**1,604**	SF	$6.50	$10,426
214	VCT @ stor. rooms	**608**	SF	$5.00	$3,040
215	Rubber base	**1**	AL	$3,200.00	$3,200

BUILDING DIRECT TRADE COSTS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
216	***09 65 13 Resilient Flooring and Base Total***				**$20,386**
217					
218	***09 68 13 Tile Carpeting***				
219	Carpet at bedroom and office	**725**	SF	$5.00	$3,625
220	***09 68 13 Tile Carpeting Total***				**$3,625**
221					
222	***09 67 23 Resinous Flooring***				
223	Poured resinous flooring system at apparatus bay	**4,114**	SF	$9.00	$37,026
224	***09 67 23 Resinous Flooring Total***				**$37,026**
225					
226	***09 90 00 Painting***				
227	Sealed concrete floor @ at Ele/ Mechanical	**146**	SF	$2.00	$292
228	GWB walls	**6,341**	SF	$1.00	$6,341
229	CMU walls	**7,204**	SF	$1.25	$9,005
230	Premium for epoxy wall paint; allow	**1**	AL	$2,000.00	$2,000
231	GWB ceilings	**949**	SF	$1.75	$1,661
232	Exposed ceiling; at apparatus bay	**4,260**	SF	$1.75	$7,455
233	Paint HM doors and frames	**29**	EA	$125.00	$3,625
234	Miscellaneous exterior painting	**1**	LS	$1,100.00	$1,100
235	Miscellaneous interior painting	**8,756**	SF	$0.50	$4,378
236	***09 90 00 Painting Total***				**$35,856**
237					
238					
239	**10-SPECIALTIES**				
240					
241	***10 00 00 Specialties***				
242	*10 11 00 Visual Display Boards*				
243	Markerboard/Tackboard allowance	**1**	AL	$500.00	$500
244	*10 14 00 Signage*				
245	Interior building signage	**8,756**	SF	$0.50	$4,378
246	Exterior signage	**1**	LS	$1,500.00	$1,500
247	*10 26 00 Wall and Corner Guards*				
248	Corner guards allowance	**14**	EA	$75.00	$1,050
249	*10 51 00 Lockers*				
250	Bunk lockers	**8**	EA	$950.00	$7,600
251	lockers at apparatus bay	**36**	EA	$350.00	$12,600
252	*10 44 13 Fire Extinguisher Cabinets*				
253	Fire extinguisher cabinets	**2**	EA	$450.00	$900
254	Miscellaneous specialties	**8,756**	SF	$1.50	$13,134
255	***10 00 00 Specialties Total***				**$41,662**
256					
257					

BUILDING DIRECT TRADE COSTS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
258	***10 28 13 Toilet Accessories***				
259	Bathrooms	**4**	EA	$650.00	$2,600
260	***10 28 13 Toilet Accessories Total***				**$2,600**
261					
262					
263	**11-EQUIPMENT**				
264					
265	**11 31 00 Residential Appliances**				
266	Dryer	**2**	EA	$1,100.00	$2,200
267	Washer	**2**	EA	$1,100.00	$2,200
268	Microwave	**1**	EA	$350.00	$350
269	Refrigerator	**2**	EA	$1,200.00	$2,400
270	Installation	**7**	EA	$100.00	$700
271	***11 31 00 Residential Appliances Total***				**$7,850**
272					
273					
274	**12-FURNISHINGS**				
275					
276	***12 20 00 Window Treatments***				
277	Manual roller shades	**262**	SF	$9.00	$2,358
278	***12 20 00 Window Treatments Total***				**$2,358**
279					
280	**12 48 13 Entrance Floor Mats**				
281	Walk-off mat; allow	**50**	SF	$35.00	$1,750
282	***12 48 13 Entrance Floor MatsTotal***				**$1,750**
283					
284					
285	**21, 22, 23 - MECHANICAL**				
286					
287	***21 00 00 Fire Protection***				
288	Sprinkler coverage	**8,756**	SF	$6.25	$54,725
289	***21 00 00 Fire Protection Total***				**$54,725**
290					
291	***22 00 00 Plumbing***				
292	Plumbing	**8,756**	SF	$16.00	$140,096
293	***22 00 00 Plumbing Total***				**$140,096**
294					
295	***23 00 00 HVAC***				
296	HVAC	**8,756**	SF	$42.00	$367,752
297	***23 00 00 HVAC Total***				**$367,752**
298					

BUILDING DIRECT TRADE COSTS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
299	**26-ELECTRICAL**				
300					
301	***26 00 00 Electrical***				
302	Electrical	**8,756**	SF	$50.00	$437,800
303	***26 00 00 Electrical Total***				**$437,800**
304					
305					
306	**31-EARTHWORK**				
307					
308	***31 00 00 Earthwork***				
309	Rough and fine grade for new slab	**8,756**	SF	$1.50	$13,134
310	Bulk excavation	**486**	CY	$11.00	$5,351
311	Gravel base	**357**	CY	$30.00	$10,710
312	*Exterior strip footings:*	*305*	*LF*		
313	Excavation	**254**	CY	$11.00	$2,798
314	*Isolated footings:*	*36*	*EA*		
315	Excavation	**128**	CY	$11.00	$1,408
316	Backfill with imported fill	**198**	CY	$25.00	$4,946
317	Perimeter drain system	**425**	LF	$18.00	$7,655
318	Soil export	**869**	CY	$18.00	$15,639
319	***31 00 00 Earthwork Total***				**$61,640**

– COST –

OPINION OF PROBABLE COST

Sudbury Fire Station 2 Study

April 1, 2016

Conceptual Opinion of Probable Costs

Description			Subtotals	Totals	Comments
Construction Costs					
Building Demolition			$12,000		
Hazmat Abatement			N.I.C.		
Sitework			$496,800		
New Building Construction		8,760 SF	$2,938,800		
		Subtotal:	$3,447,600		
Concept Level Estimating Contingency	@	10.0%	$344,800		
		Subtotal Direct Construction Costs:	**$3,792,400**		
General Conditions & Overhead	@	8.00%	$303,400		
Insurance	@	1.00%	$41,000		
Bonds	@	1.00%	$41,400		
GC Fee (Profit)	@	3.00%	$125,300		
Permit Fee	@	1.50%	Waived		
Escalation (bid 2nd Quarter of 2017)	@	4.20%	$180,700		
		Subtotal Construction Cost:	**$4,484,200**		
Owner's Indirect Costs					
Land Survey			$5,000		*(incorp. additional land)*
Geotechnical investigation			$7,500		
Arch.& Eng.Fees (10%)			$448,400		
Project Management (4.25%)			$190,600		
Firematic Equipment			$25,000		*Allowance*
Furniture & Furnishings			$70,000		*$8/SF*
Communications Equipment			$50,000		
Network & Computers			$20,000		
Utility Backcharge			$25,000		*Allowance*
Moving			$10,000		
Bid Doc Reproduction / Miscellaneous			$5,000		*Assume OnLine Service*
Legal/Advertising			$5,000		
Material Testing			$25,000		
Owner's Contingency (10% of all costs)			$537,100		
		Subtotal Indirect Costs:	**$1,423,600**		
		Total Project Cost:	**$5,907,800**		

– APPENDIX –

EXISTING CONDITIONS PLAN

DEED REFERENCE:
BOOK 9668; PAGE 218

PLAN REFERENCE:
PLAN # 1370 OF 1960
1901 STATE HIGHWAY LAYOUT

VERTICAL DATUM:
NAD 1983 SEE EXISTING CONDITIONS PLAN
FROM VHB DATED OCTOBER 28,2015

LEGEND

000	Existing Contour
■ S.B./CTR.BK.	Center-Back Of Stone Bound
■ C.B./D.H. (K06-000)	Concrete Bound Drill Hole Assessors' Map & Parcel I.D.

K07-0013
BPR Sudbury Development LLC
Bk 66564 Pg 354
528 Boston Post Road

C.B.D.H (Fnd)

Line of 6" Trees

DMH
Rim=159.04

S68° 28' 43"E 135.00'

Edge of Pavement

Catch Basin
Rim=158.29
(Leeching)

C.B.D.H (Fnd)

N

1901 STATE LAYOUT

Test Pit
Elev.=159.15
Ground Water Elev=155.15

S21° 31' 23"W 210.00'

DMH
Rim=159.26

Edge of Pavement

Edge of Pavement

Concrete

Generator

K07-0012
Town of Sudbury
Fire Station #2
Bk 9668 Pg 219
540 Boston Post Road

Concrete

S21° 31' 17"W 187.41'

K07-0013
BPR Sudbury Development LLC
Bk 66564 Pg 354
528 Boston Post Road

K06-0602
Anne Stone
Bk 50662 Pg 74
554 Boston Post Road

K07-0013
BPR Sudbury Development LLC
Bk 66564 Pg 354
528 Boston Post Road

Westerly Exit Driveway

S.B. CTR Bk (Fnd)
(Held for Position)

C.B.D.H (Fnd)

UPole #100

Guy Wire

Flag Pole

Bituminous Concrete Walkway

T.B.M.
Bonnet Bolt Hydrant
Elev.=163.14

UPole #99

L=136.91'
R=2047.55'

S.B. CTR Bk (Fnd)

UPole w/Light

BOSTON POST ROAD RTE 20
(1901 STATE HIGHWAY LAYOUT)
(50 FEET WIDE)

Bituminous Concrete Walkway

UPole #98

T.B.M.
Mag in UPole #98
Elev.=157.92

Center Driveway

FEET
0 10 20 40 80
0 5 10 20
METERS

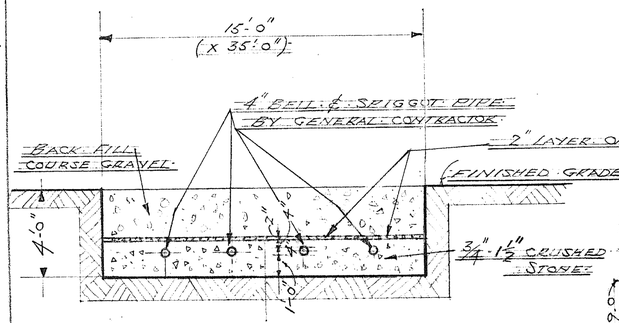
EXISTING CONDITION PLAN
SUDBURY FIRE STATION NO. 2
540 BOSTON POST ROAD SUDBURY, MASSACHUSETTS

TOWN OF SUDBURY ENGINEERING DEPARTMENT
DATE: DECEMBER 30, 2009 SCALE: 1 IN.=20 FT
REV. FEBRUARY 11, 2016 NAD 1983 DATUM

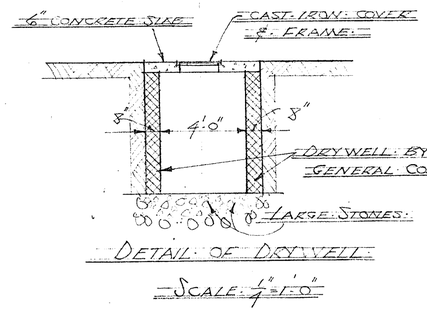
– APPENDIX –

ORIGINAL DRAWINGS

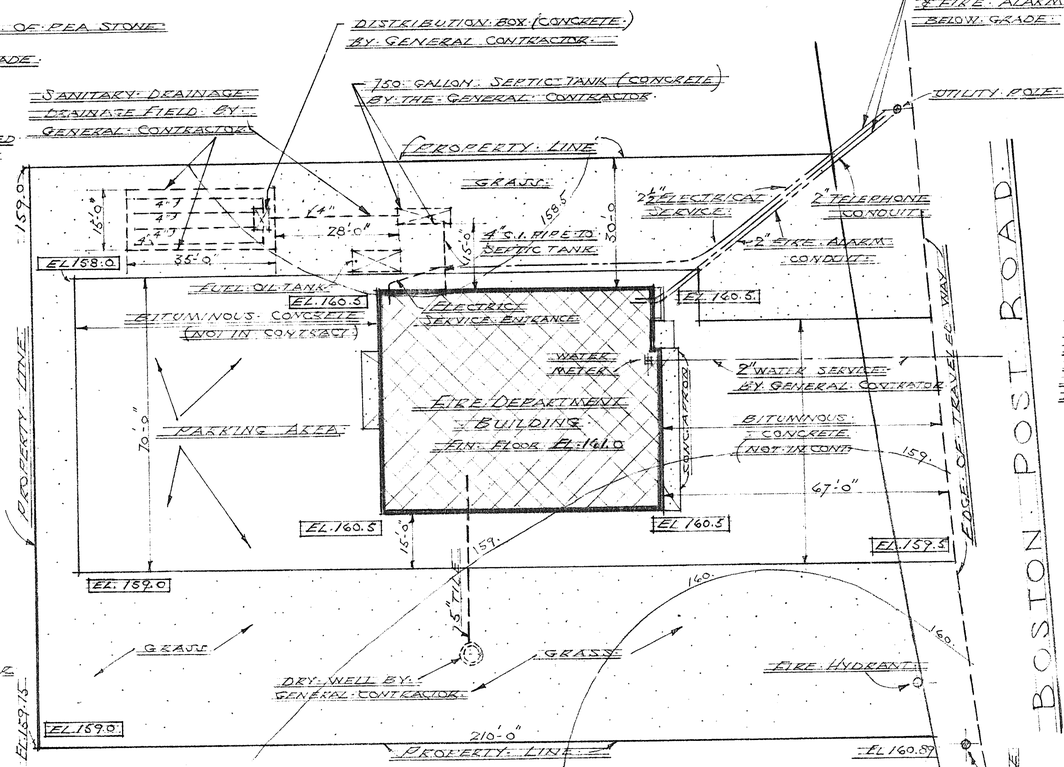
Town of Sudbury



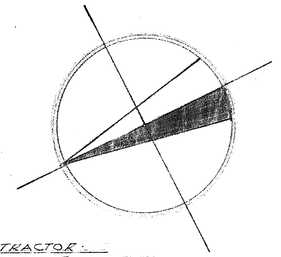
SECTION THRU DRAINAGE FIELD
(35'-0" x 15'-0")
DRAINAGE FIELD BY
THE GENERAL CONTRACTOR
SCALE 1/4" = 1'-0"



DETAIL OF DRYWELL
SCALE 1/4" = 1'-0"



PLOT PLAN
SCALE 1" = 20'-0"



NOTE:
GENERAL CONTRACTOR
TO DO ALL TRENCH EXCAVATION
AND BACK FILLING FOR ALL
UNDER GRADE SERVICES
WATER, TELEPHONE, ELECTRIC,
FIRE ALARM, ROOF WATER, AND
ALL SANITARY SEWERAGE WORK

NEW GRADES INDICATED THUS EL 100.0
PRESENT GRADES INDICATED THUS 160.0

FIRE STATIONS #2 & #3

FIRE DEPARTMENT BUILDING
FOR TOWN OF
SUDBURY MASSACHUSETTS
DRAWING NO. 1

REGISTERED ARCHITECT
FREDERICK H. CHANDLER
No. 665
WORCESTER, MASS.
COMMONWEALTH OF MASSACHUSETTS

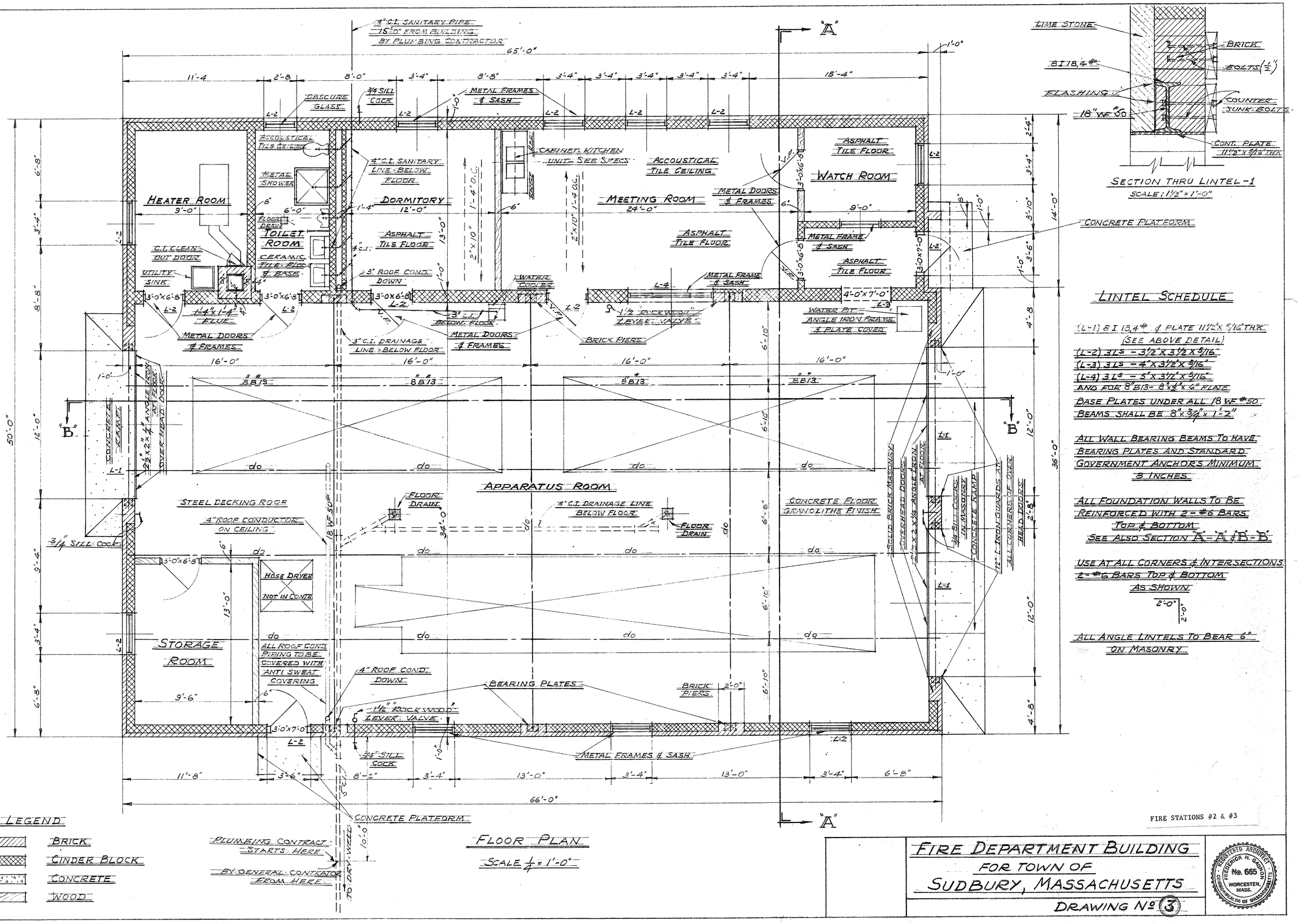

ELECTRIC SERVICE ENTRANCE
4" C.I. SANITARY PIPE TO SEPTIC TANK 15'-0" FROM BUILDING BY PLUMBING CONTRACTOR
65'-0"
"A"
TELEPHONE SERV. ENTRANCE
4" C.I. SANITARY LINE BELOW FLOOR
3/4" COLDWATER SUPPLY LINE - BELOW FLOOR COPPER TUBING - TYPE "K"
3" C.I. PIPE
3" ROOFWATER DRAINAGE - DOWN
WATER COOLER ABOVE
UNEXCAVATED
CONCRETE SLAB OVER - 3000 P.S.I.
FIRE ALARM ENTRANCE
COURSE GRAVEL FILL
1" COLDWATER SUPPLY LINE - BELOW FLOOR COPPER TUBING - TYPE "K"
WATER SERV. ENTRANCE
1 1/2" COLDWATER SUPPLY LINE - BELOW FLOOR COPPER TUBING - TYPE "K"
3/4" COLDWATER SUPPLY LINE - BELOW FLOOR COPPER TUBING - TYPE "K"
"B"
50'-0"
CONCRETE SLAB OVER 3000 P.S.I.
UNEXCAVATED
4" C.I. DRAINAGE LINE BELOW FLOOR
FLOOR SLAB REINFORCING FABRIC SHALL BE "PITTSBURGH" WELDED WIRE #8 GAUGE - 6"x6" MESH
5" C.I. DRAINAGE LINE BELOW FLOOR
1" PERIMETER INSULATION
TO DRY WELL
11'-0"
4'-10"
50'-2"
66'-0"
36'-0"
SECTION 1 - 1
6" CONCRETE SLAB
TOP OF CONCRETE
2500 P.S.I. CONCRETE
2-#6 BARS - TOP & BOTTOM - CONTINUOUS
COURSE GRAVEL
SECTION 2 - 2
6" CONCRETE SLAB 3000 P.S.I. MIX
2500 P.S.I. CONCRETE
2-#6 BARS - TOP & BOTTOM - CONTINUOUS
COURSE GRAVEL
LEGEND
BRICK
CINDER BLOCK
CONCRETE
WOOD
PLUMBING CONTRACT STARTS HERE
FOUNDATION PLAN
SCALE 1/4" = 1'-0"

FIRE STATIONS #2 & #3

ALL FOUNDATION WALLS TO BE REINFORCED WITH 2-#6 BARS CONTINUOUS TOP & BOTTOM. USE AT ALL CORNERS & INTERSECTIONS 2-#6 BARS - TOP & BOTTOM - LIKE THIS

FIRE DEPARTMENT BUILDING
FOR TOWN OF
SUDBURY, MASSACHUSETTS

DRAWING No. 2



LEGEND

- BRICK
- CINDER BLOCK
- CONCRETE
- WOOD

PLUMBING CONTRACT STARTS HERE

BY GENERAL CONTRACTOR FROM HERE

FLOOR PLAN

SCALE 1/4 = 1'-0"

SECTION THRU LINTEL-1

SCALE: 1½" = 1'-0"

CONCRETE PLATFORM

LINTEL SCHEDULE

(L-1) 8 I 13.4# & PLATE 11½" x 5/16" THK
(SEE ABOVE DETAIL)
(L-2) 3 LS - 3½" x 3½" x 5/16"
(L-3) 3 LS - 4" x 3½" x 5/16"
(L-4) 3 LS - 5" x 3½" x 5/16"
AND FOR 8" B13 - 8½" x ¾" x 6" PLATE

BASE PLATES UNDER ALL 18 WF #50 BEAMS SHALL BE 8" x ¾" x 1'-2"

ALL WALL BEARING BEAMS TO HAVE BEARING PLATES AND STANDARD GOVERNMENT ANCHORS MINIMUM 8 INCHES

ALL FOUNDATION WALLS TO BE REINFORCED WITH 2 - #6 BARS TOP & BOTTOM SEE ALSO SECTION "A-A" "B-B"

USE AT ALL CORNERS & INTERSECTIONS 2 - #6 BARS TOP & BOTTOM AS SHOWN

2'-0" 2'-0"

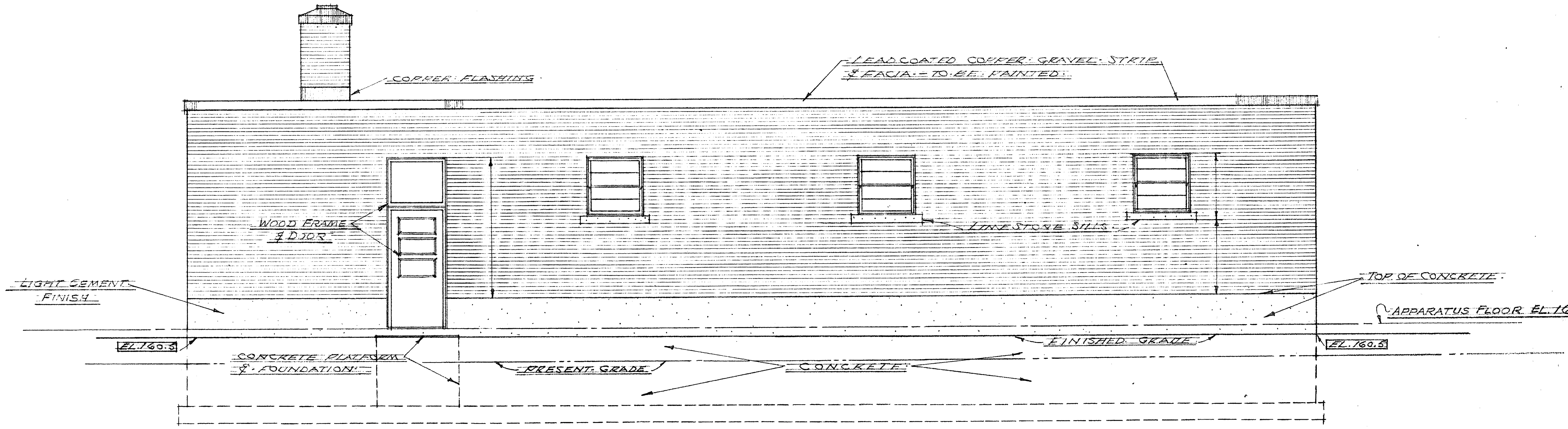
ALL ANGLE LINTELS TO BEAR 6" ON MASONRY

FIRE STATIONS #2 & #3

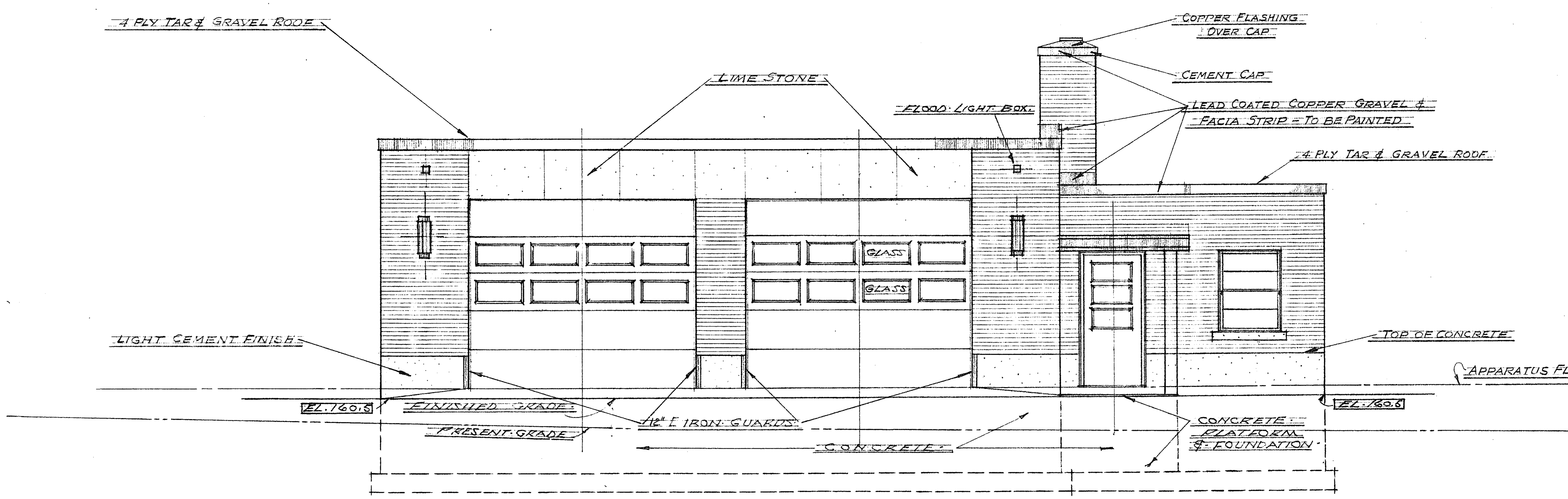
FIRE DEPARTMENT BUILDING
FOR TOWN OF
SUDBURY, MASSACHUSETTS

DRAWING No 3

REGISTERED ARCHITECT FREDERICK R. GAGNON No. 665 WORCESTER, MASS. COMMONWEALTH OF MASSACHUSETTS



WEST ELEVATION



PROVIDE SLEEVES IN FOUNDATION WALL FOR WATER, TELEPHONE AND FIRE ALARM SERVICES.

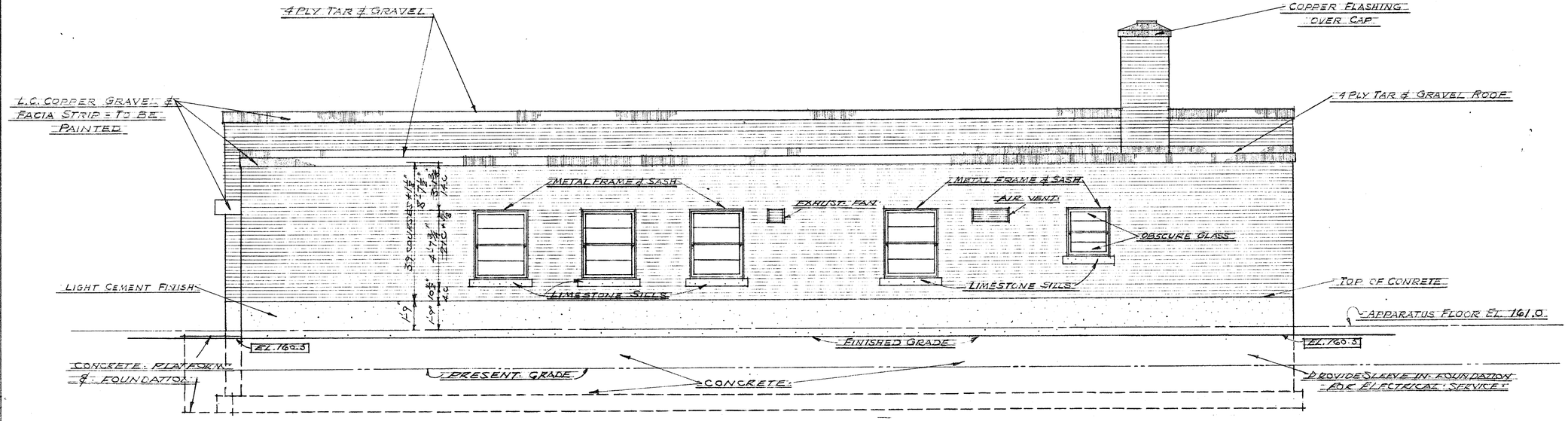
SOUTH ELEVATION

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

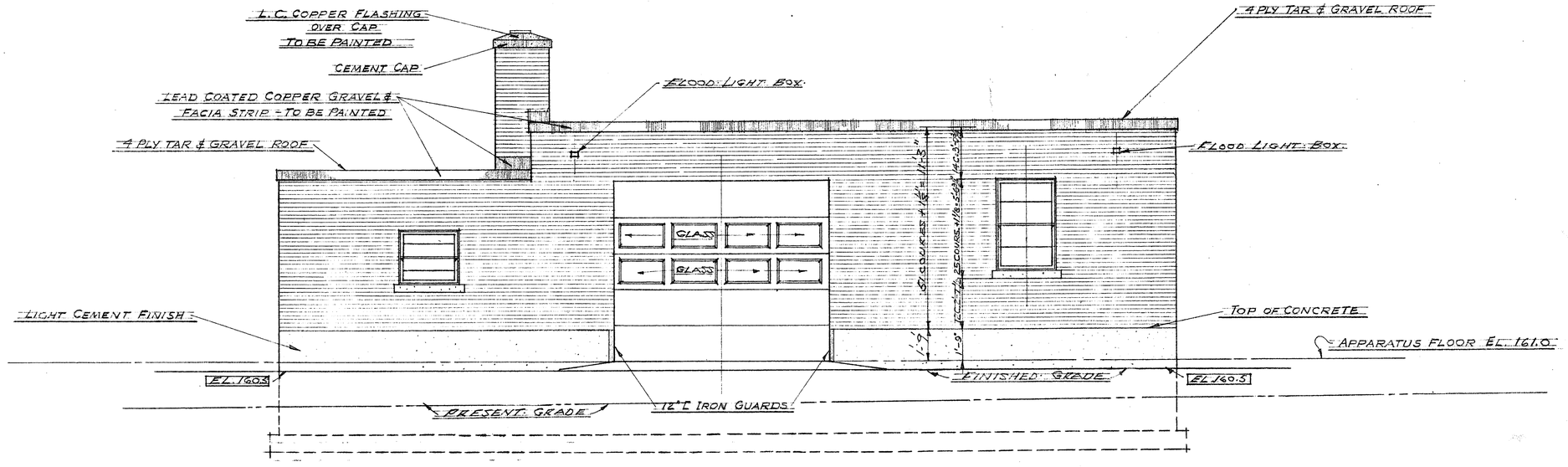
FIRE STATIONS #2 & #3

FIRE DEPARTMENT BUILDING
FOR TOWN OF
SUDBURY MASSACHUSETTS

DRAWING NO 4



EAST ELAVATION



NORTH ELEVATION

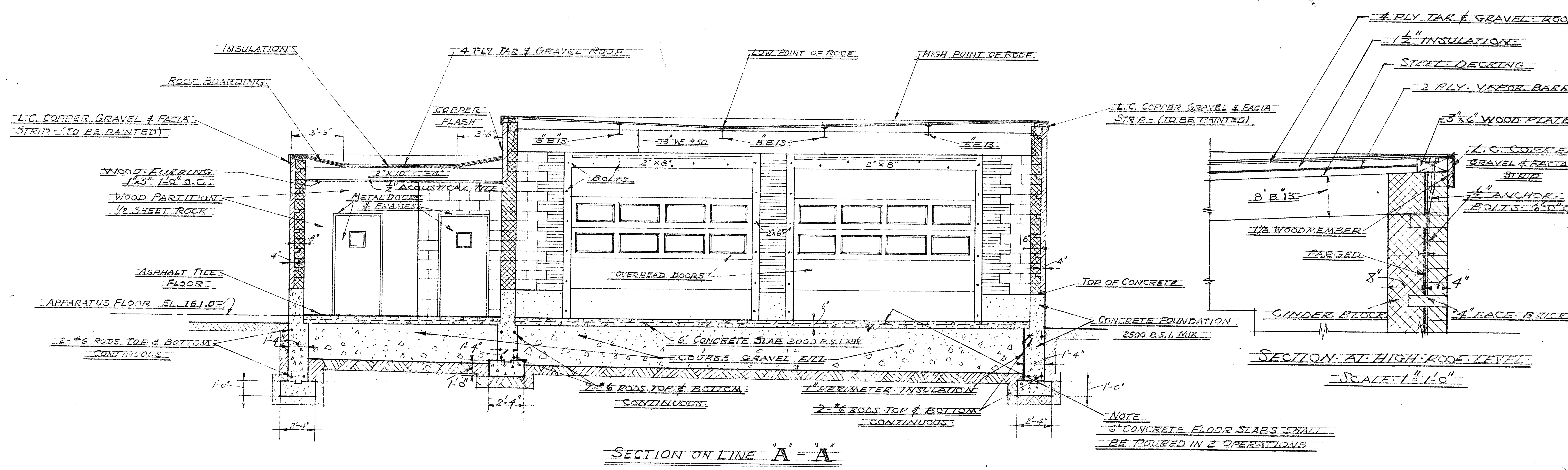
SCALE : 1/4" = 1'-0"

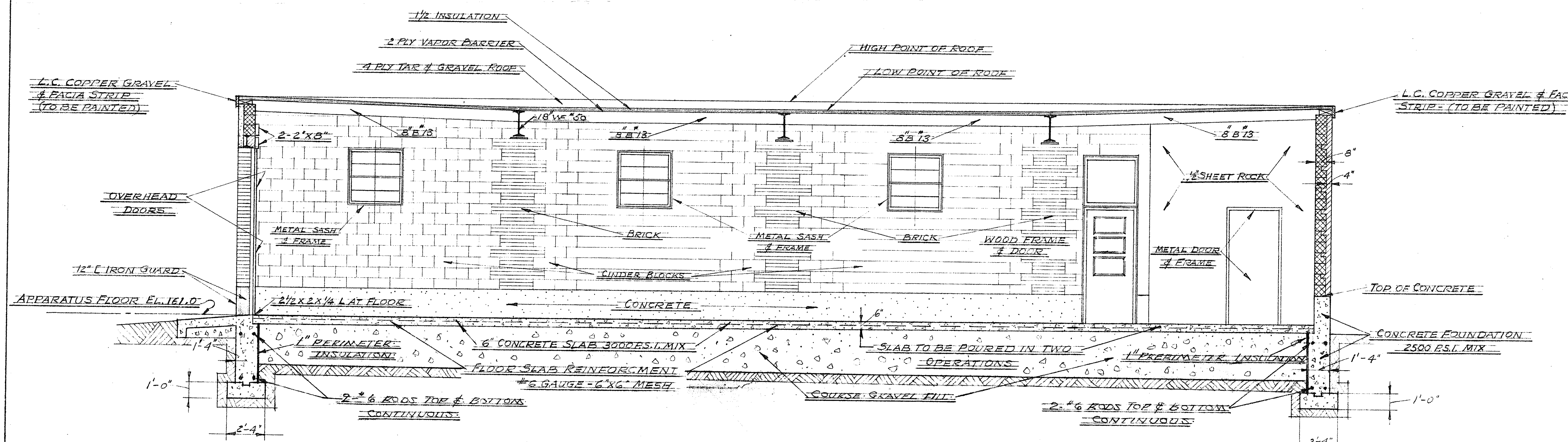
FIRE STATIONS #2 & #3

FIRE DEPARTMENT BUILDING
FOR TOWN OF
SUDBURY, MASSACHUSETTS

DRAWING No. 5

REGISTERED ARCHITECT FREDERICK H. GAGNON No. 665 WORCESTER, MASS. COMMONWEALTH OF MASSACHUSETTS





SECTION ON LINE "B" "B"

SCALE: 1/4 = 1'-0"

LEGEND

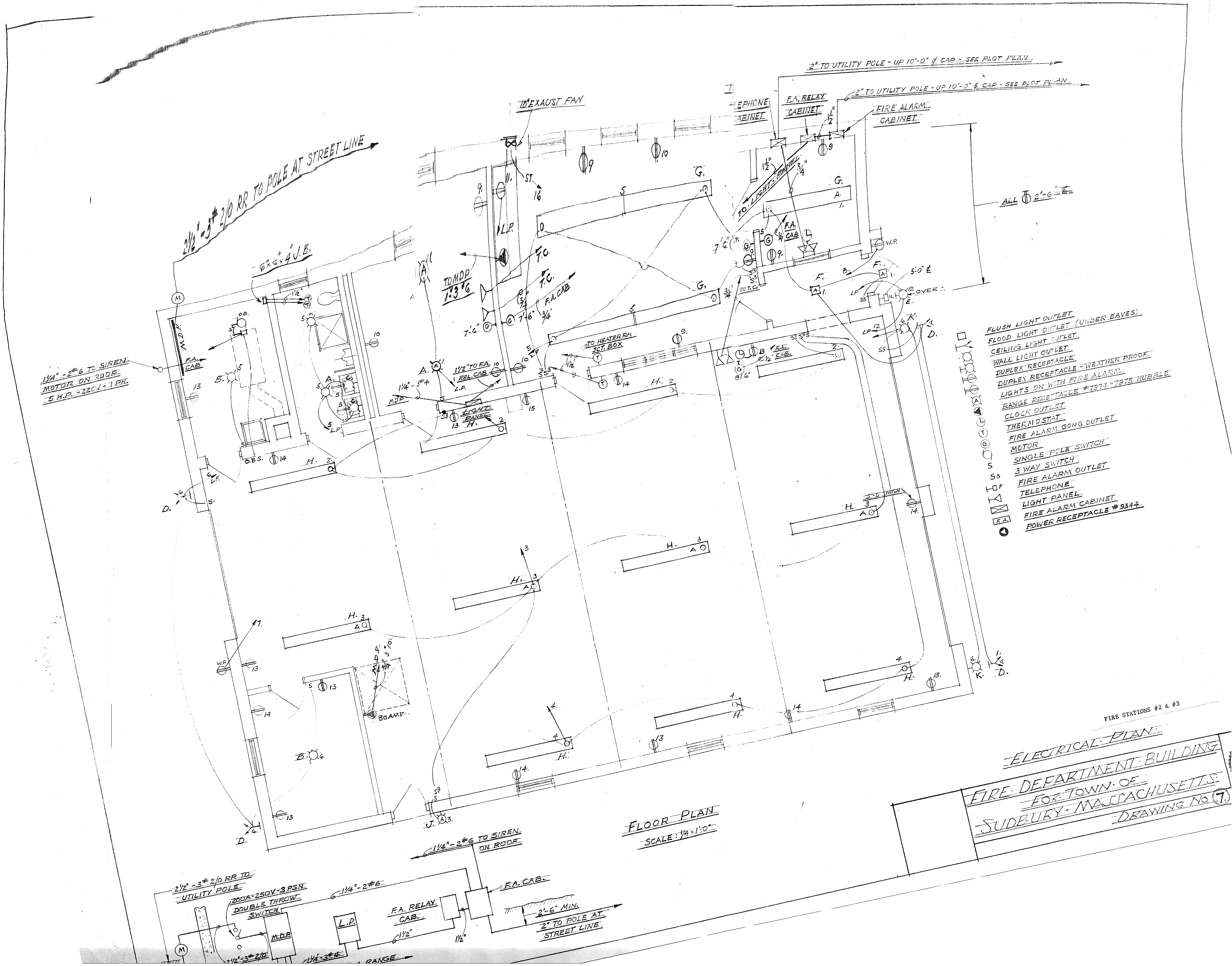
- BRICK
- CINDER BLOCK
- CONCRETE
- WOOD

FIRE STATIONS #2 & #3

FIRE DEPARTMENT BUILDING
FOR TOWN OF
SUDBURY, MASSACHUSETTS

DRAWING No 6

REGISTERED ARCHITECT FREDERICK H. GAGNON No. 665 WORCESTER, MASS. COMMONWEALTH OF MASSACHUSETTS


FIRE STATIONS #2 & #3
ELECTRICAL PLAN
FIRE DEPARTMENT BUILDING
FOR TOWN OF
SUDBURY, MASSACHUSETTS
DRAWING No 7
FLOOR PLAN
SCALE: 1/4"=1'-0"
2" TO UTILITY POLE - UP 10'-0" & CAP - SEE PLOT PLAN
TELEPHONE CABINET
F.A. RELAY CABINET
FIRE ALARM CABINET
10" EXHAUST FAN
2 1/2" - 3#2/0 RR TO POLE AT STREET LINE
6"x6"x4" J.B.
TO MDP 1-3#6
1 1/4" - 2#6 TO SIREN MOTOR ON ROOF 5 H.P. - 220V - 1 PH.
TO LIGHT PANEL
TO HEATER RM JCT. BOX
1 1/2" TO F.A. REL. CAB
LIGHT PANEL
ALL 2'-6" ℄
30 AMP
FLUSH LIGHT OUTLET
FLOOD LIGHT OUTLET (UNDER EAVES)
CEILING LIGHT OUTLET
WALL LIGHT OUTLET
DUPLEX RECEPTACLE
DUPLEX RECEPTACLE - WEATHER PROOF
LIGHTS ON WITH FIRE ALARM
RANGE RECEPTACLE #7971-7975 HUBBLE
CLOCK OUTLET
THERMOSTAT
FIRE ALARM GONG OUTLET
MOTOR
SINGLE POLE SWITCH
3 WAY SWITCH
FIRE ALARM OUTLET
TELEPHONE
LIGHT PANEL
FIRE ALARM CABINET
POWER RECEPTACLE #9344
1 1/4" - 2#6 TO SIREN ON ROOF
2 1/2" - 3#2/0 RR TO UTILITY POLE
200A-250V-3PSN DOUBLE THROW SWITCH
M.D.P.
L.P.
F.A. RELAY CAB.
F.A. CAB.
2'-6" MIN.
2" TO POLE AT STREET LINE
RANGE

FLOOR PLAN

SCALE ¼"=1'-0"

NOTE

All Heating Element Ratings Based On 190°F Entering Water - 20°F Drop.
Element Lengths Called For Are Active Fin Lengths.
Radiant Floor Panels Fabricated Of 1" Rayduct or Jolduct Steel Pipe.
Minimum Concrete Coverage Over All Piping In Slab, 2 Inches.
All Floor Panels To Be Serpentine Type.

DETAIL OF TYPICAL PANEL RETURN

SYMBOLS

- Circulator
- Gate Valve
- Globe Valve
- Check Valve
- Motorized Proportioning Valve
- Pressure Reducing Valve
- Air Eliminator
- Curb Cock
- Thermostat
- Thermometer.

FIRE STATIONS #2 & #3

HEATING PLAN.

CLIFFORD W. GREENE
No. 5365

FIRE DEPARTMENT BUILDING.
FOR TOWN OF
SUDBURY MASSACHUSETTS.

DRAWING Nº 8