

MEP/FP Conceptual Narrative	
Project Name:	Danville Police Station
Project Location:	Danville, NH
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Executive Summary

Yeaton Associates, Inc. has been engaged by Stone River Architects to develop the MEP/FP systems for the proposed Police Station in Danville, NH. The proposed single story, 4,800 Sq. Ft. (+/-) Police Station shall include two Garage Bays, Sallyport, Booking Room, Holding Cells, Conference/Training Room, Dispatch, Men's & Women's Locker Rooms and Administrative offices. The goal is to install a cost effective MEP/FP system while meeting or exceeding prevailing code and operational requirements for the project.

This narrative presents the mechanical, electrical, plumbing and fire protection systems for the Town of Danville's new Police Station.

All new construction elements and systems will conform to the following:

- The New Hampshire State Building Code
- NH State Fire Code
- IBC 2015 (International Building Code), with NH Amendments
- IECC 2015 (International Energy Conservation Code), with NH Amendments
- IMC 2015 (International Mechanical Code), with NH Amendments
- IPC 2015 (International Plumbing Code), with NH Amendments
- NEC 2017 (National Electrical Code)
- NFPA Standards
- ASHRAE Standards
- Local Authorities Having Jurisdiction (AHJ)
- All Other Applicable Codes and Standards



Proposed Mechanical, Plumbing and Fire Protection

❖ Fire Protection System

Provide a 100% NFPA-13 approved fire protection system with both wet and dry sprinkler coverage. A dry zone of sprinkler pipe shall be run to serve the cold attic space with individual sprinkler heads. All of the occupied spaces shall be served by a wet sprinkler zone with individual sprinkler heads. The Holding Cells shall have vandal proof/hang proof sidewall sprinkler heads. No standpipes are required in the proposed layout. A hydrant flow test is not available for this site and shall be conducted by the Sprinkler Contractor for the proposed design to ensure sufficient pressure and flow are available without the need of a fire pump.

Fire Protection Piping:

- 2" NPS and below shall be galvanized schedule 40 pipe with threaded joints
- 2-1/2" NPS and above shall be schedule 10 galvanized steel pipe with mechanical roll grove fittings and mechanical joints.

❖ Plumbing Systems

Plumbing fixtures are proposed as follows:

- Toilets will be floor mounted vitreous china, low flow 1.28 gallons per flush (GPF) with manual flush valves and ADA compliant where applicable.
- Urinals will be vitreous china, 1/8 GPF, and ADA compliant where applicable.
- Lavatories will be vitreous china with sensor faucets with low flow aerators and will be ADA compliant where applicable.
- Showers will be of the single insert type, with a hand held spray head and fixed shower head.
- Water cooler will be ADA compliant Hi/Lo with a bottle filling station.
- Emergency eye wash station with tempered water and drain services will be provided for the Sallyport.
- The Holding Cells will be equipped with combination toilet/lav penial fixtures with remote flush activation.

Building water entrance will be a 2" entrance with a water meter. The meter shall be furnished by local water utility. Water entrance is proposed to be a 6" line entering the building in the Mech. Room, splitting prior to entering the building into separate domestic and sprinkler entrances.

Domestic hot water to be generated by one (1) HTP Phoenix PH-199-119 high efficiency LP gas fired domestic water heater with hot water recirculation and pump. Water heater shall be direct vented, with CPVC venting and PVC combustion air terminating either sidewall or above the roof. The condensate neutralizer drainage piping shall be Sch. 40 PVC. All domestic hot, cold and recirculation piping shall be hard copper, type L, with soldered fittings. Pro-press fittings may be acceptable pending Owner review. Valves and specialties shall be lead free construction.

All condensate drainage piping for all air conditioning equipment will be Sch. 40 PVC.

Exterior hose bibbs are to be installed at main entryways and exterior walls near the Sallyport and overhead garage doors. A single interior hose bibb will be provided to serve both the Sallyport and garage bays.

The Sallyport and Garage Bay floors shall be sloped to the exterior overhead doors eliminating the need of floor drain(s).



Floor drains with trap primers shall be installed at the Mech. Room, all Toilet Rooms, Locker Rooms and Holding Rooms (Cells).

A dishwasher is to be installed in the Break Room, and is anticipated to be residential grade. Water temperature boosting is not currently required. There will also be a stainless steel double basin sink including a manual faucet, hose sprayer and baskets.

LP Gas contract for the Plumbing Contractor will begin at the second stage regulator located outside Mech. Room. Location and quantity of LP gas tanks are still to be coordinated. Gas shall be piped using schedule steel 40 screwed tubing to the boiler and domestic hot water heater.

Sanitary piping will exit the building by a 4" line heading out to a designed underground septic system. All underground sanitary piping is proposed to be schedule 40 cast iron of the hub and spigot type. Above ground sanitary waste and venting shall be cast iron with no hub fittings.

There is no roof drainage proposed for this project.

❖ Heating, Cooling, and Ventilation Systems

The building shall be heated by a high efficiency, LP gas fired boiler equal to HTP Elite EP-220, with 220 MBH input capacity. Boiler shall be direct vented through the either sidewall or roof using CPVC venting and PVC combustion air for materials. Two (2) inline hot water circulation pumps shall push 160°F water to hydronic terminals through insulated piping. Pumps are estimated to handle 40 GPM and shall be equal to Taco 1915e ECM High Efficiency Circulators. Water temperatures will vary based on outdoor air temperature, with the temperature increasing as outdoor temperatures fall in the winter.

Hydronic terminals shall be fin-tube radiation equal to Vulcan Linovector. Fin-tube radiation is proposed to be used around the perimeter of the occupied spaces, including both Men's & Women's Locker Rooms with each space having its own thermostat for temperature control. Miscellaneous hydronic cabinet heaters will be used for heating vestibules and entryways.

Additional, quick response heat in the Sallyport and Garage Bays shall be provided by hot water unit heaters. The hot water unit heaters will provide ample heat in the winter months and quickly warm the space after overhead doors are opened.

All of the occupied spaces shall be shall be heated and cooled using a Variable Refrigerant Flow (VRF) system. The system shall provide simultaneous heating or cooling as required by the individual spaces requirements. The system will consist of one 8-ton outdoor heat pump equal to Trane/Mitsubishi R2 Series, branch controller and all associated refrigerant piping to serve indoor fan coils. The indoor fan coil units will be either ceiling cassette units or concealed ceiling mounted ducted fan coil units.

Code compliant ventilation air and exhaust air for the building will be provided by an indoor Energy Recovery Unit (ERU) with high efficiency enthalpy (sensible and latent energy transfer) with a fixed plate core and rated for approximately 900 CFM for both supply and exhaust air. There will be a duct mounted hot water heating coil to temper the ventilation air leaving the ERU. The ERU will be located in the Attic Mechanical Space with outdoor intake and exhaust air ducted to louvers in either gable ends or dormers. The ventilation supply air from the ERU shall be ducted to the individual indoor fan coil units as mentioned above.

The Break Room will be furnished with an electric stove. It is anticipated that a microwave with integral exhaust fan will be mounted above the stove and ducted to the exterior wall.



The Sallyport and Garage Bays will be exhausted by a sidewall mounted exhaust fan with an associated wall sleeve, louver and automatic control damper (ACD) to address the carbon monoxide (CO) in the space. The exhaust fan and associated air intake wall sleeve control dampers will provide the code compliant .75 CFM/SF of exhaust.

Alternate Systems

All of the occupied spaces will be served by in-slab radiant heat with associated manifolds, approximately four (4) based on exposures. The manifolds shall be served from the previously described LP gas fired boiler plant. The Sallyport and Garage Bays shall not be served by the radiant in-slab heat and will be heated as described below.

Miscellaneous hydronic cabinet heaters will be used for heating vestibules and entryways. Quick response heat in the Sallyport and Garage Bays shall be provided by hot water unit heaters. The hot water unit heaters will provide ample heat in the winter months and quickly warm the space after overhead doors are opened.

All of the occupied spaces will be ventilated and cooled by split system air handler equal to 7.5-ton Trane model TWE. The indoor air handling unit will be located in an Attic Mechanical Space with outdoor intake and exhaust air ducted to louvers in either gable ends or dormers. Furnished with a supply fan and a refrigerant based direct expansion coil for cooling, the air handler is proposed to run during occupied hours, pushing supply air through insulated galvanized ductwork to each space. Ducted, uninsulated return air will be installed to bring air from each space to the air handler. An air cooled condensing unit located outside on grade and piped to the air handler and provide cooling via insulated refrigerant lines.

General exhaust will provided by an inline exhaust fan located in the Attic Mechanical Space. Uninsulated galvanized ductwork will run from Men's & Women's Locker Rooms, Toilet Rooms and Holding Cells to the fan, and be pushed outside through a louver located in either gable ends or dormers. The general exhaust fan will be equal to Greenheck model VG, with a variable speed motor.

The Break Room will be furnished with an electric stove. It is anticipated that a microwave with integral exhaust fan will be mounted above the stove and ducted to the exterior wall.

The Sallyport and Garage Bays will be exhausted by a sidewall mounted exhaust fan with an associated wall sleeve, louver and automatic control damper (ACD) to address the carbon monoxide (CO) in the space. The exhaust fan and associated air intake wall sleeve control dampers will provide the code compliant .75 CFM/SF of exhaust.

Mechanical ductwork shall be:

- Exposed ductwork shall be round spiral ductwork constructed in accordance with the recommendations of the ASHRAE Guide and SMACNA Guide (Current Edition).
- Concealed ductwork shall be rectangular or round made of galvanized steel and constructed in accordance with the recommendations of the ASHRAE Guide and SMACNA Guide (Current Edition)
- Flexible ductwork shall be fiberglass cloth fabric liner with insulation for supply (heating & cooling) and uninsulated for return & exhaust applications. Installed flex duct lengths no greater than 5'-0" and shall not pass through any fire rated assemblies. Flexible ductwork shall only be allowed in concealed locations.
- Fire dampers shall be dynamic Type B, low leakage out-of-airstream with UL 555 rating ns installed where required.
- Access doors shall be double cam style and installed where required.



Mechanical piping shall be:

- Hydronic Piping: 2" NPS and smaller shall be Type L Copper with soldered or mechanical joints.
- Hydronic Piping: 2-1/2" NPS and larger shall be schedule 40 steel grooved with mechanical joints.
- Refrigerant piping shall be ACR copper utilizing industry standard joining and hanging methods.
- Boiler condensate neutralizer drainage piping shall be Sch. 40 PVC.

❖ **Integrated Automation System**

Furnish and install a stand-alone direct digital controls (DDC) system to address the various HVAC systems indicated above. A web based browser system using BACnet protocol shall allow the viewing and control of equipment setpoints, room temperature setpoints and occupancy schedules. System shall be equal to Trane Concierge, and provide Owner with a touch pad screen for viewing/control.



Proposed Electrical

❖ General Distributed Normal and Standby Power Systems

Provide a new 400 ampere, 3 phase, 4 wire, 120/208 volt permanent electrical service. Provide underground service entrance wiring from a new sited utility riser pole, with pole mounted, utility owned transformers.

Provide a new three phase building mounted, self-contained 400 ampere, Trans-S meter socket in accordance with utility metering requirements. Provide an outdoor wall mounted main service entrance rated, enclosed 400 ampere circuit breaker.

The indoor electrical distribution system shall be provided with a 400 ampere 4 pole, automatic, SE Rated transfer switch, and a 400 ampere main distribution panel MDP, to serve large 3 phase mechanical equipment loads, 208 volt single phase branch circuits and a feeder breakers for downstream lighting and plug-load panels Provide two new 150 ampere, 42 circuit, 120/208 volt, three phase four wire panelboard to serve 120 volt lighting and plug loads. Surge Suppression will be provided for the Transfer Switch, main distribution panel and all plug load/lighting panelboards.

The building will be provided with a whole house standby generator sized at 100 KW, and fueled by propane with a dedicated fuel supply sized to provide 24 hours of run time at 75% load. Generator shall be installed to meet NEC Article 701, Legally Required Standby Power System.

All work under this section shall fully comply with requirements, rules and regulations of agencies having jurisdiction.

Code references: NFPA 70, 101, 110. IBC

❖ General Lighting & Emergency Lighting Systems

Lighting fixtures for the new building shall be provided as energy efficient LED type lighting fixtures, including lay-in ceiling types, wall mounted over mirror bath room lights, utility strip lights and sally port ceiling suspended products.

Provide conventional and digital lighting controls to meet energy conservation codes, including dimmable combination occupancy sensor wall stations for offices, conferenced rooms, dispatch and similar locations.

General illumination levels will be provided at no less than 35 dimmable, foot-candles average maintained, for offices, conference rooms, and similar occupancies. 50 foot-candles will be provided for specific room occupancies including but not limited to: sally port, booking and evidence areas. Corridors and similar non-public spaces will be provided with 20 foot-candles average maintained.

Emergency Lighting will be provided for all the components of the path of egress from the building, including but not limited to: egress corridors, egress access and path to the public way in accordance with Life Safety Code. Emergency lighting will be provided and installed as emergency battery powered product, consisting of a combination of self-contained wall or ceiling mounted 12 volt emergency battery units with integral lighting heads, and central battery units providing 12 volt power to remote emergency lighting heads. Exit signs will be provided as self-contained LED, and will be located to identify the path of egress to the public way. Consideration will be given to providing self-contained integral battery systems with the LED lighting fixture. Design will also include the use of remote line voltage output, battery powered inverters where deemed appropriate.



The building mounted exterior lighting systems shall be installed as LED, with photocells. Three wall mounted area lights are planned. Pole mounted area lighting shall be provided for the parking areas, five 20 foot solutions are planned.

❖ **General Building Wiring**

Provide convenience receptacles throughout the interior building, with no area less than 40 feet from a receptacle.

20 ampere dedicated receptacles and circuits for refrigeration equipment associated with break room, dispatch, server closets and similar occupancies.

Provide GFCI outlets for bathrooms and locations adjacent to the sinks

All receptacles with-in 6 feet of a sink shall be GFCI protected

Provide exterior weatherproof, GFCI receptacles for service areas and at HVAC locations as required.

Provide equipment power connections for owner provided equipment

Provide power and receptacles for miscellaneous equipment, including but not limited to: Flat Screen TV's and Wireless Access Points, door access equipment, electrical door strikes.

Branch circuit wiring for gas fired hot water systems, unit heaters, ground mounted air cooled condensing units, attic mounted HVAC units and other mechanical equipment

Branch circuit power wiring for Building Automation System panel(s).

Building wiring will be provided as conductors in conduit for exposed wiring and homerun wiring from panel-board to first outlet box. Wiring concealed in non-cmu walls and above lay-in ceilings shall be installed as MC Cable, with a full sized green insulated, equipment grounding conductor. Wiring shall be #12 minimum. Conduit shall be minimum 3/4". All feeder and branch circuit wiring shall be installed as copper.

Provide power and wiring to support up to four motorized overhead doors and controls.

❖ **Telecommunications**

Provide CAT 6 data outlets and cabling for offices, dispatch, conference rooms and similar areas. Provide a minimum of two data cables and jacks for each faceplate, cabled and terminated in a wall mounted patch panel cabinet in a dedicated IT closet. Provide two CAT 6 voice cables and jacks for the office areas and similar locations, cabled back to the IT Closet for phone system equipment provided by the owners. Data and Voice jacks shall be installed on the same faceplate.

Provide RG6 TV cabling, jacks and fittings for break room, dispatch and conference room, cabled back the IT Closet with slack for connection utility based media system provided by the owner.

All telecommunications wiring shall be installed in conduit for exposed and installed as PVC jacketed CMR cable for concealed wiring above lay-in ceilings and in non-cmu walls.

❖ **Fire Alarm System**

Provide a new addressable fire alarm system for the facility with photoelectric smokes in common corridors and stairs, heats in mechanical spaces and strobe/horn-audible/visual notification devices in all normally occupied areas. As the building is fully sprinklered with fire protection, the scope of spot detection will be limited to those areas described in this section.