



## **Vlachos Associates, Inc.**

### **Existing Conditions Report and Recommendations for Proposed New/ Renovated Municipality Facility.**

The following is based on site visits and observations of our 12/06/2018 and 04/26/2019 walkthroughs, information provided by the Owner, and Forte Architecture + Design drawings, documents and other information.

## **Existing MEP Systems Assessment**

### **Electrical Existing Conditions:**

Existing electrical service to the main building is provided by overhead lines that run to two service disconnects. One service is 100amp, three phase, the other is 150amp, single phase. The service appears to be sufficient for the existing loads in the building, but will require an upgrade based on the anticipated future loads.

The electrical distribution is outdated. Many panel locations are not code compliant with regards to mounting heights, connected loads, and for proper clearance. Many subpanels and disconnects are fed from other panels which appear to exceed the connected load of the distribution system. These issues should also be addressed with a renovation.

A fuel pump station is remotely located and fed from the building. Though the fueling station is not part of the proposed scope, it was observed that neither a remote emergency power-off button - nor a Fire Suppression system, were present. This should be added to be code compliant.

Out-buildings for salt and sand storage are fed from another overhead service. This supplies power for lighting and minor equipment

The existing generator supplies 24KVA of power to back-up the 100amp services. This natural gas fueled generator and automatic transfer switch appear to be in good serviceable condition.

Some wiring observed is no longer compliant for this application. Non-metallic wiring and wiring not protected in conduit or metal clad is not current code-compliant. Non-metallic wiring can easily be damaged given the activities of a maintenance building. Metal clad or metal conduit should be used in this application. Maintenance receptacles and office receptacles were lacking in number, and were not always at code-required locations. Plug in power strips were observed – these also are not compliant. All equipment should be provided matching receptacles under the National Electric Code.

Site Lighting appears to be HPS (High Pressure Sodium) type from service poles. The fixtures looked to be in good serviceable condition but are not dark sky compliant.

Interior lighting is typically older, inefficient fluorescent fixtures.



### **Fire Alarm Existing conditions:**

The existing system appears to only monitor heat detection and manual pulls stations, providing protection for the building occupants. For notification, horn strobes are installed to alert the occupants of an incident. Devices were lacking in number and often obscured by equipment.

### **HVAC Existing conditions:**

The building currently utilizes 4, older gas-fired unit heaters as it's heating source. There are also a few "strips" of electric baseboard. There are no ventilation or cooling systems in the building, lacking also is a code-required carbon monoxide exhaust system that must be installed in a service garage. We understand that the building is not expected to be a "repair/service shop", so such CO systems will not be necessary.

All of the systems are older and should be replaced as the building is renovated/upgraded. As noted above, the systems also lack modern, code-required ventilation. There is a rudimentary roof ventilation system that opens a small part of the roof when activated by a switch. These two "clamshell openings are not nearly adequate to meet code. The control of all the systems is not automatic and no energy savings strategies such as night setback are installed.

### **Plumbing/Fire Protection Existing Conditions**

The current building is not protected with a sprinkler system.

The current gas service that enters the building is a 2" low pressure gas line. Currently gas feeds the existing HVAC Heating units in the service bays as well as the standby generator. Current gas supply piping will need to be engineered to determine if the anticipated additional gas demand to the new facility can be supported by the existing service.

The current water supply to the building is 1" and enters in the vehicle garage area. The current piping is plastic piping (ABS). The water meter is located at the floor. There is no backflow preventer present on the water service. The current water supply is in fair condition, and could remain to serve the proposed building program.

Plumbing piping systems including waste, vent, water piping are original to the building. Systems are showing signs of failure including pipe cracks on waste piping and electrolysis on water piping. Waste and vent piping (cast iron) is cracking, piping leaks have occurred and have been patched. There is some evidence of more updated piping in some areas where replacement was done due to failure.

Domestic water piping after the meter is original copper piping. Original water shut off valves appear not to be functioning properly which, based on the age of the valves, would be anticipated. Under any type of proposed building upgrade the entire water piping system will need to be removed back to the meter and re-piped to all new plumbing fixtures. A 30 gallon Electric water heater serves the current



building plumbing fixtures. The water heater is in fair condition but should be replaced under the proposed scope of work.

Plumbing fixtures in the building are original. Existing plumbing fixtures in the bathrooms include a floor mounted tank type toilet, a wall hung type urinal with flush valve, and wall mounted china sinks with individual CW/HW faucets. ADA toilet facilities are not present in the building. In general the fixtures, while functioning, are not water saving devices and are original. All existing plumbing fixtures will be removed.

Building roof drainage is collected by exterior gutters and is discharged to grade by exterior downspouts. Although the gutter system appears to be generally intact and functioning, some gutters are damaged and should be replaced.

The current building includes a trench drain in the vehicle garage area. It appears that this drain is not piped to any structure and presently is not functioning. Debris (sand, oil, dirt) collected in this drain system is periodically cleaned and removed. This trench drain installation is in violation of the MA State Plumbing Code. Trench drains in garage type areas are required to be piped to an exterior buried tight tank.



## RECOMMENDATIONS/ OUTLINE DESCRIPTION OF WORK:

### Phase I Electrical Work

A new 600amp 208v three phase service would be provided to support the total buildout of the site for all phases of construction. This would provide sufficient power to serve the out buildings and the fuel station as well. New power should be installed to allow existing building and site functions to remain in full operation at all times during construction.

To promote survivability of service, we recommend a new pad-mounted transformer be installed adjacent to the gate. The underground conduit runs would bank together with tel/com to the utility room in the new command center in the phase one work. The out-buildings could be served underground as well from the main building to make the total facility more survivable.

Operational savings will be realized by the upgrade to LED Fixtures and possibly implementing sensors that would turn the fixtures on only when activity is detected in the existing building upgrade. Savings will be realized by upgrading to LED strip lighting with occupancy sensing in non-service areas. Costs for energy-efficient fixtures and controls could be subject to rebates to the Owner

The building is currently lacking emergency egress lighting and illuminated Exit signs. In the event of power loss, emergency lighting must light the egress paths to the exit signs and out to 10' from the building. As a first-responder facility, it is proposed that all lighting and power be fully backed-up with emergency power provided by a new generator. The generator will be sized to power the entire facility for a period of up to 30 days in the event of a power outage.

In order to ensure operational safety at all times, proper site lighting should be considered to either replace and/ or augment existing lighting. Existing pole lighting will be removed as utility poles conductors will be relocated underground. Under phase 1 work, we recommend at a minimum (3) new light poles on the outer reaches of the site; dark sky compliant fixtures, as well as (2) building mounted area flood lights. Additional light poles can be added at phase 2 work. Refer to the preliminary site plan for total light pole locations/ quantities proposed. All fixtures should be LED, to reduce operational maintenance costs.

An upgrade to the Fire Alarm system would begin under Phase I to an addressable system with devices mounted to the bottom of the joists. Areas outside of the shop would have smoke detection, and ducted HVAC in the administration/ employee areas would have internal smoke detection to shunt the fresh air flow in the case of alarm signal.



### **Phase II Electrical work:**

Dedicated distribution to the existing shed would be designed to provide power for lighting, heating, ventilation and selective power outlets for convenience or plug in of light equipment for cleaning or maintenance.. Additional building-mounted LED fixtures could provide support for night operations and supplement proposed light pole/area lighting. This would reduce the requirement for pole mounted fixtures and reduce the maintenance cost associated with replacing the bulbs.

Interior lighting should be LED with occupancy sensors and/ or circuited to allow for low usage during times of inactivity. These fixtures as well as daylight controls would also be subject to cost rebates to the Owner.

### **Solar Power Considerations:**

The IECC 2015 requires that new service be designed with provisions for an alternative energy source connection. This could be wind, solar or other forms of power generation. At a minimum, the facility should be designed to be 'solar ready' and to be in compliance with requirements of the current energy code.

Consideration should be given to take advantage of the phase II roof for solar generation and offset operation costs, however this would need to be subject to further engineering and cost analysis. New roof designs should take into account solar panel system loading or other requirements as part of their calculations.

A solar system could be designed generate power to eliminate annual electric utility cost. Small inverters at the panels would collect energy and feed to a dedicated meter. The daytime generation would need to offset the 24 hour day power usage. For safety in a power outage the solar system would automatically be disconnected from the grid. If the solar system were to remain active, the charge be running backwards through the power line could endanger line workers and energize downed lines.

### **Phase 1 HVAC Work:**

The work involved in Phase 1 includes removing existing interior construction in the existing shed building to create a single open space for use a vehicle and small equipment storage. This area will be partially conditioned space (heating and ventilation only).

In order to provide code-mandated ventilation and building heat in the renovated storage building, we recommend gas-fired, heating only ventilation air-handlers. These units should be located within the building envelope/ suspended below the roof or mounted high on the interior wall(s) to maximize longevity, operational effectiveness and protection from severe weather conditions.



## **Phase 2 HVAC Work**

Phase II of the project will include the construction of a new, open vehicle storage garage and single story administration/ employee building. The vehicle garage will be partially conditioned (heat and ventilation only); the employee and administrative areas will be fully-conditioned space.

In order to provide code-mandated ventilation and building heat for the vehicle garage, we recommend gas-fired, heating only ventilation air-handlers. These units should be located within the building envelope/ suspended below the roof or mounted high on the interior wall(s) to maximize longevity, operational effectiveness and protection from severe weather conditions. .

We understand that the vehicle storage garage will not house service and repair operations, and therefore a carbon monoxide control system of sensors and fans is not required.

Also to be constructed as part of Phase II will be an approximate 2,400 sf single story structure containing employee administration and support areas, including offices, meeting rooms, and toilet/ changing facilities. In order to provide fully conditioned (cooling and heating) to this part of the building, we recommend a rooftop gas-fired, DX cooling packaged unit . The rooftop unit will be a nominal 5-ton system.

New exhaust systems will be required for the toilet rooms and shower.

All new ductwork is proposed to be located above a dropped ceiling within fully-conditioned space.

## **Phase 1 Plumbing Work**

To facilitate the proposed Phase 1 work, new plumbing scope will be as follows. New 1" domestic water supply piping and new gas piping should be piped from their current meter locations in the existing building to the proposed addition. A new 1" backflow preventer will be required to be installed at the existing water service location after the meter (to meet code) and prior to extending to the new plumbing fixtures. New gas piping will be required to connect new HVAC heating units at both the new addition (Phase 1) and the existing building (Phase2). Gas piping will also serve the new gas fired generator. It is likely that the existing gas service to the building will need to be upsized to accept the proposed gas demand for this project, however this is subject to final calculations/ design of systems and equipment selection.

New sanitary and vent piping systems will be required to be piped to the new Toilet Rooms, Shower and Break Room. New sanitary piping to fixtures will be collected and piped under slab to the exterior with a new 4 " sanitary drain. Locations should be determined based on the proposed renovation areas and to avoid disruption to existing areas/ areas of DPW operation(s) during construction. . New vent piping from new plumbing fixtures to be collected and extended up through the new roof. New floor drains will be provided at each toilet room and shower room. The existing septic system and pump chamber should be reviewed for condition and capacity to determine scope requirements if necessary to accommodate new plumbing fixtures.



A new trench drain (heavy duty stainless steel 10" wide) will be required at any new or existing Vehicle Equipment/Vehicle Storage areas. Trench drains will be installed the width of the building at the center and will be piped independently to a new exterior 3000 gallon oil interceptor (tight) tank. Vents from the tight tank will need to be piped back into the building and up thru the roof. The interceptor will be sized to accommodate all existing and new trench drains

A new Gas fired On Demand hot water heater will be provided and installed in the Laundry Room. All plumbing fixtures requiring hot water will be piped from this heater. As an option a 60 gallon electric water heater can be provided in lieu of gas type unit.

New plumbing fixtures should include vitreous china fixtures, (low flow toilets 1.6gpf) automatic hands free faucets to maximize water conservation

Floor drains and hose bibbs to be installed in all new toilet rooms.

Sinks in Lunch Rooms, and, Break Rooms to be stainless steel drop in sinks with gooseneck faucets and wrist blade handles.

New housekeeping janitor sinks will be floor mounted with wall mounted faucets surrounded by FRP splash guards.

Drinking fountains where installed will be ADA single unit electric type and will include a bottle filler.

Provide ADA fiberglass shower and shower valve where shown on drawings.

Laundry unit will be equipped with a hot water/cold water and drain connection box.

Hose stations will be provided around the existing Vehicle /Equipment Garage areas. Hose stations to be located at each exterior overhead door as well additional interior locations around the garage areas.

Exterior wall hydrants will be located around the existing and new building perimeter walls. Wall hydrants to be located every 100 feet.

All new water piping to be insulated with fiberglass insulation.

New eye wash stations should be provided at the existing Vehicle/Equipment Garage area. Eyewash stations should be piped from a dedicated supply and return tepid water piping system. A dedicated water heater will be required for this system. Final locations to be determined during the design phase. Eyewash stations for Phase 1 and 2 will be piped from the same system.

## **Phase II Plumbing Work**

To facilitate the proposed Phase 2 work, new gas piping will be required to connect new HVAC heating units in the existing building. Gas piping will connect to a valved connection provided in Phase 1 work.



A new trench drain (heavy duty stainless steel 10" wide) will be required to be installed in the Vehicle/ Equipment Storage area. The trench drain will be installed the full length of the building at the center will be piped independently to the exterior of the building to the tight tank provided in Phase 1.

Hose stations will be provided around the new Vehicle Storage areas. Hose stations to be located at each exterior (one at front, 1 at back), as well additional interior locations (2) around the Vehicle Storage areas. Exterior wall hydrants will be located at the building perimeter. Wall hydrants to be located every 100 feet.

All new water piping to be insulated with fiberglass insulation.

New eye wash stations should be provided at the new Vehicle /Equipment Garage area. Eyewash stations should be piped from a dedicated supply and return tepid water piping system. Final locations to be determined during the design phase. Eyewash stations for Phase 2 will be piped from the same system as Phase 1.

## **FIRE PROTECTION**

### **Phase 1 Fire Protection**

The proposed work in Phase 1 includes renovating the existing building for use as enclosed vehicle and equipment storage. There are no sprinklers currently in the existing building. Sprinklers are not required in this phase if a 2-hr fire separation is provided and considering there is no change in of this portion of the building, however we recommend that the entire combined facility be sprinklered.

### **Phase 2 Fire Protection**

The new building will be required to be sprinklered. In order to design a new sprinkler system for this project a hydrant flow test will be required to determine existing pressure and water flow from the municipality.

The new sprinkler system will require a 6" fire service, 6" backflow preventer, main alarm valve and fire dept. connection at grade. These fire protection components can be located in a dedicated room or can be located in the Vehicle Storage area at the exterior wall. A new single zone wet sprinkler riser will be extended from the sprinkler valve up throughout the building. Sprinkler protection will include design densities for office areas light hazard (168 /sq. ft.) and Vehicle/Equipment Garage areas ordinary hazard (130 sq.ft.) occupancies. The sprinkler system should be sized to provide sprinkler protection to the existing building to be completed under Phase 2 work.