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**Mark Zall, AIA, Associate**  
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Re: Kensington Fire Station Facility Evaluation Report

Mark,

The attached is the Facility Evaluation Report for Kensington Fire Station. The following document is based upon a review of the available as-built drawings and our site visit conducted on July 13<sup>th</sup>, 2016. If you should have any questions, please don't hesitate to call. Thank you.

Sincerely,

Jay Takacs LEED AP, Principal

## **Kensington Fire Station Facility Evaluation Report - Summary**

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### *Heating, Ventilating and Air Conditioning (HVAC) Systems*

*The following is based upon review of the existing as-built documents and our site visit conducted on July 13<sup>th</sup>, 2016.*

The primary HVAC systems consist of three gas-fired furnaces located within a closet with associated roof mounted air-cooled condensing units. In general the equipment is at the end of its useful lifespan and the insulation on the refrigerant piping is deteriorating. The furnace closet is also too small for the amount of equipment located within it. Equipment is approximately twenty-five years old.

Outdoor air ventilation is being provided by a common outdoor air intake located within the exterior furnace closet and extending up through the roof to a common gravity air intake. Each furnace is provided with a built-up two-position economizer. Dampers are not accessible for maintenance due to original construction constraints.

In addition to the three furnaces, there are four separate ductless split-systems throughout the building which have been added after the original design. Each one serves an independent office with associated thermostat and condensate drainage piping. While the interior units are in good shape, the exterior mounted condensing units are showing wear and tear and are likely to require ongoing maintenance.

Lastly, there is a gas-fired unit heater within the apparatus bay. When the trucks are parked in the apparatus bay under normal conditions, the back end of the truck directly contacts the unit heater, causing the heater to have limited capability to distribute tempered air within the apparatus bay.

### ***HVAC Controls***

The HVAC controls throughout the building are antiquated and there is no consistency throughout the control system. Each furnace unit is provided with a separate stand-alone manufacturer's thermostat all from various manufactures. Only one of the furnaces is provided with a programmable thermostat (minimum code requirement). The other two are provided with mercury driven thermostats which do not provide any programming and are 100% manual and not in compliance with current Title 24 requirements.

### ***Plumbing Systems***

The domestic water plumbing systems throughout the building consist of a single 2" main domestic water line. In general, the fixtures are not ADA compliant and should be replaced as part of any upgrade for the facility. Hot water systems are gas-fired and near the end of their expected lifespan. The water heater is located in the same closet as the furnaces and is not properly strapped for seismic restraint as required by code. The water heater is a minimum 80% efficient. While this is the minimum efficiency allowed by Title 24, it is very common to provide condensing water heaters which provide 94% efficient burners.

The restrooms throughout the building are not ADA compliant and are in need of new fixtures and clearances.

The sanitary sewer system is served by a single 4" line entering the building through the front (south) elevation. The apparatus bay is not provided with any oil and/or sand protection (sand/oil separator).

## **Option #1 – Remodel & Addition**

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The option of adding on additional square footage to the building and remodeling the existing building proves to be problematic from an HVAC perspective. The existing furnace closet houses three furnaces and a gas-fired water heater that is approximately 50 square feet in size. In addition, the furnace closet is located on the exterior at the rear of the facility. This space would be compromised by the addition of new square footage towards the rear.

Adequate code clearance is not provided for any of the pieces of equipment and the water heater is strapped to a vertical section of exhaust ductwork which is not code compliant. The water heater is required to be strapped at one-third intervals against a wall with properly sized blocking.

Recommendations would be to provide a much larger closet, approximately 100 square feet in order to accommodate new furnaces, economizers and water heater. This would correspond with new air-cooled condensing units located on the roof.

Additional HVAC requirements for the smaller offices would include a variable refrigerant system throughout the building, allowing the system to be sourced from a single heat pump located on the roof distributing to several separate zones. The addition of a multi-zone system would require the addition of a dedicated outside air unit to provide for minimum Title 24 requirements for outdoor air ventilation.

It is recommended that the furnace closet be located on an exterior wall in order to take advantage of outdoor air intakes and flue discharge. Presently, there are two-position economizers for each unit. The recommended solution would be to provide fully modulating economizers to take advantage of “free-cooling” allowing the economizer to operate on temperate days without energizing the electrically powered condensing units. This is especially important given the mild Kensington climate.

The apparatus bay should have the unit heater removed and replaced with a gas-fired infrared heater above the trucks allowing for more space for parking and access.

The plumbing systems are largely non-ADA compliant and restrooms and sinks should be renovated to provide larger rooms to accommodate current ADA requirements.

It is also recommended to replace all existing controls with new direct digital controls matching the City of Kensington’s standards.

## **Option #2 – New Building at Existing Site**

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The option of a new building on the existing site presents many of the space constraints detailed in Option #1.

The benefit of a new building on the existing site is the flexibility for the HVAC systems. Given the nature of the building and its several zones, we would recommend a variable refrigerant flow (VRF) system for the entire building with the exception of the apparatus bay in addition to a dedicated outside air system to provide minimum Title 24 required outdoor air ventilation.

It was noted on site that the electrical services was 120/240, single phase. With this voltage and phase, a VRF is not feasible as the equipment is not available in that voltage. This would require an electrical service upgrade to a minimum of 208v, three-phase equipment.

Without the change in electrical service, we would recommend the HVAC options noted in Option #1 if the intended goal was to remain at the existing site.

## **Option #3 – New Building at New Site**

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The benefit of a new building on a new site is the flexibility for the HVAC systems. Given the nature of the building and its several zones, we would recommend a variable refrigerant flow (VRF) system for the entire building with the exception of the apparatus bay.

This would also require a dedicated outside air unit for minimum Title 24 outdoor air ventilation. The system could be integrated with the standard control system for the Town allowing for remote monitoring and control of the new system.

Largely the benefit of a new building on a new site is the factor of ground-up construction allowing for maximum flexibility and planning through the design phase.

END.