



Memorandum

TO: Kevin J. Jackson, Village Manager

FROM: Rob Sproule, Public Works Director *RFS*

FOR: Village President and Board of Trustees

DATE: August 30, 2022

SUBJECT: Fire Station II Boiler Replacement Update

The purpose of this memo is to provide the board an update on Resolution 22-191:

A Resolution Approving an Independent Contractor Agreement with Comprehensive Construction Solutions, LLC to Replace the Boiler System at the North Fire Station in an Amount Not to Exceed \$40,293.75 and Authorizing its Execution

This item is scheduled for further discussion by the Village Board on September 6, 2022 as Resolution 22-216. This memo is intended to give Village Trustees an update on the additional information requested by the Board as part of the initial discussion of this item that occurred on July 18, 2022 (Resolution 22-168).

Background

The existing boiler system at the North Fire Station has far exceeded its intended life cycle. Supply lines have historically had frequent leaks and the gas supply line to the boiler creates excessive flames/flare-up when the boiler turns on creating potentially unsafe conditions.

Proposed replacement of the boiler has been deferred for a number of years most recently because of budgetary constraints associated with COVID-19. Replacement of the boiler was presented and budgeted for as part of the Fiscal Year 2022 Capital Budget. Proposed budget amounts were based on an in-kind replacement with options for geo-thermal expansion to be proposed as part of a future Capital Improvement Project. Design and bidding for the installation of the new boiler system proceeded with that understanding.

The Village Board chose to table the resolution proposed on July 18, 2022 to approve a contract for the purchase and installation of the gas fire boiler with the request for staff to present options on the feasibility and cost of transitioning to electric heat in alignment with the Village Climate Ready Oak Park Plan Goal: EN03 – Set a goal to transition natural gas units in all existing buildings across the Village to electric units. Include language in all projects with Village involvement or funds addressing building energy use.

Update

In response to the Board's request, staff took a number of steps to collect information to assist the Village Board in making an informed decision on proposed HVAC system improvement at Fire Station II. Following the meeting, staff immediately reengaged the Mechanical Engineering firm that designed the original replacement, Clark Dietz, Inc., and amended their contract to provide consulting services for alternatives including full electric heat and geothermal options (report and memo attached).

Staff also provided access to the facility and spoke with Citizen Experts in the field. One resident and Engineer, Mark Nuusbaum, provided a report and recommendations related to the potential for geothermal after a site visit with staff (report attached). Staff also attempted to engage ComEd, the electricity provider for the building to determine feasibility and cost of a service upgrade for the facility. At the time of this memo, that process is still ongoing.

After review of the reports, conversations with our consultants, and input from staff and citizen experts, staff can provide the following options:

Proceed with a Natural Gas Fire Boiler

The least costly approach to providing heating for Fire Station II is to replace the existing gas-fired hydronic boiler in-kind with a new boiler. If the Board desired to move forward with that option, there still exists an opportunity to install the system prior to the 2022-2023 heating seasons, although this cannot be guaranteed. Based on conversations with our Mechanical Engineer and Citizen Expert Mark Nuusbaum, the system could be downsized to a smaller unit as the unit specified was based on future ventilation requirements in the apparatus bay that could be addressed through different heating measures in the future. This would result in better efficiency and further savings now. This system would be an energy star rated high efficiency (95%) boiler. If so directed by the Board, the system could be connected to a geothermal heat pump system in the future to minimize the environmental impact of the system. Through the Village's franchise agreement with NICOR, the Village does not pay for natural gas. Replacement with an in-kind natural gas boiler would mean the Village would continue to not pay for heating cost of the facility during the life-cycle of this system.

Transition to Electric Heat

If the Board desires to prioritize a transition to electric systems in alignment with the Village Climate Ready Oak Park Plan, there are two basic options available. Both options present different up-front costs along with different long-term obligations and benefits.

While both options present a different price-point related to a transition to electric heat, there are a number of items that are similar to both projects:

- Electric Heat requires a significant Service Upgrade to the Facility
The existing electric service at Fire Station II does not have the capacity to accommodate an upgrade to electric heat.

The facility will require an upgrade to a 3-phase 400-amp service to accommodate this upgrade. Village Staff have reached out to ComEd multiple times to determine if the existing grid in the vicinity of the station can accommodate this upgrade. It is still unclear at this time if it can. Depending on the proximity of the required ComEd services, there will be costs to bring the necessary electricity to the facility. Until we get more detail from ComEd, staff estimate a wide range cost of (\$20K - \$50K) to upgrade the electric.

- The Village does not currently pay heating costs at Fire Station II
Per our franchise agreement with NICOR the Village does not pay for its natural gas use. The Village's franchise agreement with ComEd excludes the use of electricity for heating cost. A transition to electric heat for Fire Station II will require the installation of a meter and new annual operating cost to cover the cost of heating for the facility. The actual heating cost will vary depending on the final option selected, but general estimates based on the cost of heating at our other facilities and the age of the building puts the cost around \$1k to \$2.5k per month during the heating season.
- Upgrading to Electric Heat recommends replacement of the entire HVAC system and triggers Code Upgrades
The proposed replacement of the boiler in-kind with another gas-fire boiler is a simple replacement that requires minimal additional work to accommodate the change. Discussions with our mechanical engineer and citizen experts informs us that the existing system does not lend itself to a straight transition to electric and in order to maximize the benefits associated with a transition to electric, the Village should look at the system holistically and plan on a complete replacement of the current system. The costs for this vary based on the system selected but, in both cases, trigger code upgrades and installation of ventilation in the apparatus bay. Cost of ventilation upgraded to the apparatus bay are estimated at \$35k.
- Upgrade to Electric Heat triggers an upgrade to the Backup Generator for the Facility
The current back-up generator does not have the capacity to provide the electricity needed to power electric heat in an emergency regardless of the final selection. The final selection on size would be determined after the proposed system is designed and load could be determined, but staff estimate a cost of approximately \$20k - \$30k to purchase and install a generator with the necessary capacity to provide heat and electricity to the facility in case of a power failure during winter months.
- Fire Station II is an aging Facility and could be reaching the end of its useful life as a Fire Station
Fire Station II was built in the early twentieth century and originally designed to accommodate horse drawn fire wagons. Improvements have been made to the facility in the past to accommodate fire engines and ambulances, but despite this work, the facility can no longer accommodate two emergency

response vehicles. Overtime, the size and weight of fire engines and ambulances has increased significantly. Currently there is only a single fire engine housed at the facility as an ambulance no longer fits in the second bay based on changes that were required for the facility. In order to accommodate the most recent generations of fire engine, structural changes were made to the facility to accommodate its weight. While the current fire engine has a useful life of 10 more years, it is unclear if future fire engines, especially considering a possible transition to electric vehicles in the future, would fit in the apparatus bay. Future use of the facility may need to be considered at some point in the near future.

- The Fire Station II Apparatus Bay must be provided separate Heat through the addition of Electric Heaters

With a transition to electric heat, the Village must look at the living quarters and apparatus bay as two separate systems. This is due to two situations. There is not a need to provide air conditioning services during the summer to the apparatus bay and the significant changes in temperature that occur when the garage door is opened during winter hours. In both proposed scenarios for electrification, the apparatus bay would likely be provided heat with the same equipment, suspended electric unit heaters.

- A transition to electric heat comes with a significant cost increase over replacement with a gas-fired boiler but there are opportunities to recoup cost through possible grants, rebates, and incentives.
 - The actual value of incentives cannot be determined until project design is complete. Most incentives in these cases are tied to the equipment selected. Staff would investigate opportunities to maximize incentives but typically do not include possible rebates in the budgeting process as they are estimates and may not be guaranteed. Most incentives are also in the form of rebates, so the Village will need to front the cost of the project and then be refunded at completion.

If the Board so desires to replace the gas fired boiler at Fire Station II with a non-combustion system, there are two general paths forward. The general costs presented are estimates but present two separate price points with different expenses and benefits associated. The two general options are: All Electric HVAC and Geothermal System.

All Electric System (\$150k - \$200k)

One option is replacement of the current HVAC system with a new all electricity-based system. This system replaces the existing systems used at the Fire Station and would be designed around the use of air source heat pumps for the living quarters and electric heating units to service the apparatus bay. The general budget estimate includes the possible costs identified above, some of which are included in the report and some of which are not, and therefore exceed the costs identified in the report provided. Of the two electric options, this system has the lower up-front cost, but could result in higher electricity costs over time.

Geothermal System (\$350k - \$400k)

The second option in the path forward with electrification is the installation of a geothermal well and loop system behind the facility in the parking lot. This system would be connected to a water source heat pump system and would service the sleeping and living quarters of the fire station. Electric heating units would be installed to service the apparatus bay. The general budget estimate includes the possible costs identified above, some of which are included in the report and some of which are not, and therefore exceed the costs identified in the reports and memo provided. This project presents a much higher up-front cost but would reduce electricity use over time and therefore present the most climate friendly option. If the project was in place long enough, the system could pay for itself in time.

Conclusion

Staff present these general options to help inform the Board on the costs and benefits associated with the proposed improvements to the HVAC system at Fire Station II. If the Board's preference is to move forward with electrification of the HVAC system over direct replacement with a gas-fired boiler, staff would recommend a vote of "No" on the resolution and give staff direction on the proposed electric alternative option. Staff would utilize the funds proposed for construction of the 2022 project to begin engineering services on the preferred option. The 2023 Fiscal Year Building Improvement Plan would present the proposed budget costs associated with construction and staff would move forward with installation in 2023. Staff and an Engineer from Clark Dietz, Inc. will be available at the September 6, 2022 Village Board Meeting to answer any questions you have on the project and options. Please feel free to contact me with any questions or clarification that is desired prior to the Board meeting as well.

If you have any questions, please contact Rob Sproule, Public Works Director, at (708) 358-5700 or rsroule@oak-park.us.

Attachments

Clark Dietz: Village of Oak Park – North Fire Station HVAC Upgrade Feasibility Study
Clark Dietz: Oak Park Fire Station 2 Full HVAC Upgrade Memo
Architectural Consulting Engineers: VOP Fire Station #2 – Boiler Replacement Review

cc: Lisa Shelly, Deputy Village Manager
Ahmad Zayyad, Deputy Village Manager
Ken Crowley, Interim Assistant Public Works Director
All Department Heads
Christina M. Waters, Village Clerk