Weston & Sampson

MEMORANDUM

TO: Village of Tuxedo Park

FROM: Jeffery Budrow, PE & Daniel Tenney, AIA

DATE: December 15, 2020

SUBJECT: Preliminary Engineering Evaluation – Department of Public Works Building

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INTRODUCTION

The Village of Tuxedo Park has retained Weston & Sampson PE, LS, LA, PC to perform a brief evaluation of the Village's Department of Public Works Facility located at 77 Wee Wah Road on the west shore of Wee Wah Lake. The scope if this evaluation is not intended to be comprehensive, but rather an overview of the condition of the structure and a discussion of critical needs to be undertaken by the Village.

On November 15, 2020, a walk through was conducted by Dan Tenney, AIA and Jeff Budrow, PE from Weston & Sampson, accompanied by Jeff Voss in his role as Superintendent of the Department of Public works. The team conducted a brief physical inspection, to evaluate the functional condition of the building as well as to assess overall suitability of the facility to serve the Village's needs now and in the future. There were no existing drawings of the structure, so any conclusions drawn about the structure are based on visual observation only.

This Preliminary Engineering Report addresses the following topics:

- General Description
- Summary of Findings
- Recommendations

BACKGROUND

Weston & Sampson had previously provided a Feasibility Study and Master Plan to the Village on this same facility in December 2010. That report concluded the following:

- The existing DPW facility is undersized to support current operations
- The building is not ADA compliant
- The facility lacks a separate salt storage structure
- The facility lacks proper vehicle washing facilities
- The undersized building lacks the capacity to safely store vehicles and equipment
- The building has limited public accessibility
- There are poor and/or unsafe working conditions, including inadequate ventilation, lighting, and code deficiencies.

The 2010 report concluded that the Village would best be served with a new facility ranging in size from 17,600 SF to 20,800 (more than double the size of the existing facility) at a cost in 2010 dollars of $5.3 to $6.8 million, including soft costs. Those figures are now 10 years out of date and the cost of construction has increased substantially in that time.

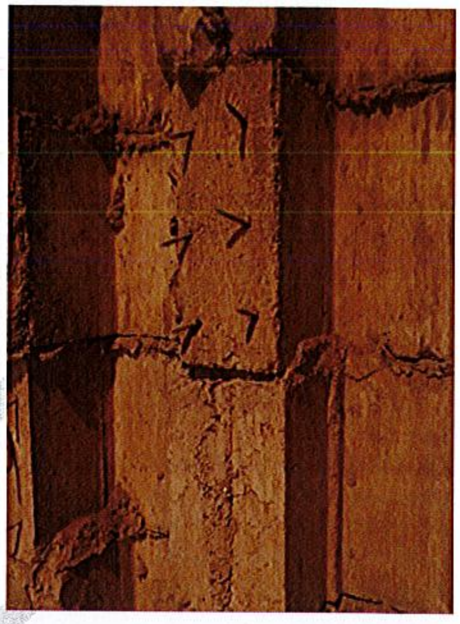
provision of adequate signage, and emergency lighting, etc. A comprehensive review of storage of flammable and/or hazardous materials should be made for the interior as well as the exterior of the building, particularly given its close proximity to the lake and the larger environmental risk of spills.

2. Salt Storage: the end of the building where the salt is stored is deteriorating far faster than the rest of the building, as evidenced by the corrosion of the steel structural members and the spalling of the concrete roof deck. It is recommended that the Village develop an alternate location outside of the building to store salt, preferably in a covered, secure location. Prefabricated tensioned fabric structures are an inexpensive solution to storing salt that we have used in a number of locations and it would appear that there is adequate space on the site to accommodate a new structure of this type.

3. Vehicle maintenance and administrative space: the current facility lacks any reasonable space for maintaining full sized vehicles, and the facilities for staff (lunchroom, training room, locker, and shower facilities) are effectively non-existent. Consideration should be given to constructing a new facility to address these space issues, consisting of a single or double mechanic's bay, with staff facilities included under the same roof. This building might be a smaller fraction of the size of the full replacement facility that was recommended in our 2010 report, but could still address the most urgent needs of the operational program.

4. Vehicle wash facility: The vehicle maintenance and staff facility described above could also include a modern vehicle wash facility, preferably in a dedicated wash bay, since the high moisture and corrosive environment of the wash bay is incompatible with the tools and equipment found in vehicle maintenance and storage areas. Municipalities that have wash facilities report that equipment lasts longer and requires less service when it is washed and stored, especially when deicing salts are involved. Presently, there is no dedicated place for vehicle washing and when performed outdoors the runoff immediately impacts Wee Wah Lake. A new dedicated wash facility would have a closed loop collection system which would discharge to the wastewater treatment plant for treatment. The new wash bay would also be available for heated vehicle storage space when not in use.

Building Structure



Foundation: Little is known about the foundation which supports the masonry walls or the interior columns. However, based on observations, there are no significant settlements or deflections in the subsurface elements. Care should be taken to keep roof and site runoff away from the foundation to preclude the acceleration of freeze/thaw deterioration.

Superstructure: The existing superstructure (walls) are comprised of a single wythe concrete block with open cores facing the interior. The blocks have a horizontal laying length of approximately 24", a vertical course height of approximately 10", and a thickness of approximately 10". The walls are visibly unreinforced, and the blocks appear to have been cast with a wooden nailer block embedded by placing the block in the bottom of the form with nails cast into the block itself. This block provided a place to nail the interior wooden timbers that originally faced the icehouse, but in modern times the timbers are mostly gone, as are many of the blocks, leaving only the embedded nails protruding as a constant hazard to anyone working near the exterior walls. The upper sections of the exterior walls are topped with a hollow core terracotta block to provide natural ventilation – precluding a controllable building envelope.

The original building had a series of transverse interior walls of similar construction, most of which have been opened up to allow vehicle passage from one bay to the next. These walls would have provided substantial diaphragm strength to resist lateral loading in the original building, but in their modified state they should be considered far less effective in resisting loads. Apart from some inserted lintels, there appears to be no attempt by the modifiers of the building to replace any lateral strength that was lost.

Exterior walls show some level of distress including cracking and settlement of lintels over openings.

Interior columns of riveted steel support the roof at regular intervals. These show surface corrosion, but appear to be intact. The bases of the columns are encased in a robust concrete jacket to resist vehicle impact, a modification that likely took place when the icehouse was converted to DPW use. The presence of the jacket reduces the effective length of the column adding some load carrying capacity to the system over the original design, although it is impossible to determine if this is significant or not.

Roof Structure: The roof structure is a lattice of steel beams embedded in flat-plate concrete roof deck, presumably with some level of reinforcement in the concrete (although none was visible). The concrete deck appears to be approximately 8" thick, based on observations at the skylights.

Roof Membrane: the roof membrane was not able to be observed during our inspection, nor were we able to witness any roof pitch or drainage infrastructure. The building has regular scuppers and/or downspouts at the edges, indicating a roof pitch from center to edge, but this was not confirmed. The roof has reportedly had maintenance work done and shows no obvious signs of active leaks, however the presence of calcium deposits (small stalactites) on the inside of the roof points to some level of moisture penetration over the building's long life.

Salt Storage: one bay of the building has been converted to salt storage, and the steel structural elements in this area exhibit deterioration far beyond the rest of the structure.

Conclusion: the building superstructure, although it exhibits corrosion of main elements and cracks in the exterior walls, seems solid and unlikely to change anytime in the near future. The interior storage of salt is causing a rapid deterioration of the adjacent structural elements and needs to be addressed immediately.

Given the unreinforced nature of the building and the modification of the interior diaphragm walls, it is unlikely that this building can meet any of the modern seismic codes. Any major renovation of the building that triggers a code review will be complicated by the need for forensic structural analysis and the design of design of retrofitting to meet seismic codes. This would likely involve all elements of the superstructure as well as foundations and soil conditions

<u>BUILDING SYSTEMS</u>

MEP: There are limited mechanical, electrical, or plumbing (MEP) systems in the building, and no fire protection system is present. Heat exists only in selected areas of the building, including the mechanics shop and the staff area on the second floor (served by a single natural gas-fired furnace), plus one remote garage bay (served by a separate natural gas-fired furnace) that reportedly is seldom used. Lighting throughout the building is inadequate, consisting of widely spaced fixtures with limited output. We did not assess the capacity of the electrical system, although the natural gas-fired emergency generator appears to be well oversized.

Fire Alarms: A manual-pull fire alarm system is present, but its extent, connectivity, and operational status were not confirmed. Not all exit doors are equipped with pull stations.

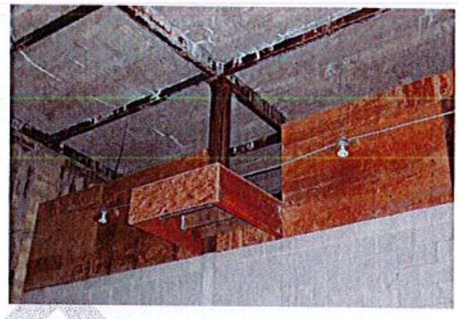
Security: No intrusion alarms, access control devices, surveillance cameras or other security system components were observed.

<u>CODE REVIEW</u>

Our walk though was not intended to support an exhaustive code compliance review, but the following apparent items of concern were noted:

Construction Type and Occupancy: The original construction of the icehouse was composed of load-bearing concrete block with an interior steel frame and a composite steel and concrete roof assembly. With most of the original interior wood planking now missing, this generally would be classified as Type 2B Non-combustible, Unprotected. However, the exposed wood-framed enclosure of the shop area and the mezzanine areas above it in effect downgrade the overall structure to Type 5B, Combustible, Unprotected. Under the current NYS Building Code, a Type 5B building used for the storage or repair of commercial vehicles (S-1 Moderate Hazard Storage) without an automatic fire protection system would be limited to 9,000 GSF in area. The existing building is approximately 7,500 GSF and falls within this limit. In addition, any S-1 occupancy of 5,000 SF or more would be required to have an automatic fire protection system under current Code, and the building exceeds this minimum.

Regardless, the building should be generally considered "grandfathered" and effectively exempt from these limitations unless significant alterations are undertaken.



Mezzanine occupancy and egress: The enclosed mezzanine above the shop area has a single means of egress and, the mezzanine above the shop area would be limited to a maximum occupancy of 10 persons under current Code. The smaller storage platform above the interior garage space is not considered occupiable space due to access and headroom limitations.

Stairs and railings: The stairs, railings and guards leading to the staff areas on the mezzanine are not in compliance with current Code dimensional requirements (rise/run/width), intermediate landing, and closed riser requirements. There are no separate guardrails or safety devices at the storage platform or at the open portion of the mezzanine. The short run of interior stairs between the shop area and the restroom/office level is also dimensionally non-conforming and lacks compliant handrails. OSHA regulations may also apply to these and other building elements but have not been specifically identified here.

Exposed combustible plastic insulation: Exposed plastic foam insulation at the exterior walls of the shop do not conform to current code – such materials must be protected with a non-combustible barrier.

Accessibility: The site and building are generally inaccessible under current ADA guidelines. This includes accessible site access, parking, routes, doorways, internal circulation, toilet facilities, staff areas, switches, controls, and other devices, etc.

Building egress: Deficiencies were noted in the following areas:

- Paths of egress – marking, freedom from obstructions
- Egress components – Doors and hardware
- Egress lighting and exit signs: No illuminated exit signs or standalone emergency lighting were noted. It is not known if the generator is configured for automatic emergency operation and, if so, whether or not normal egress path lighting is supported.

Hazardous and Combustible Materials Storage: A Combustible storage cabinet is provided in the work area.

Energy efficiency – building envelope: There is no thermal insulation at the exterior walls, except as noted above in the shop area. The underside of the roof is similarly uninsulated, although rigid board insulation may be present in the roof membrane assembly – this was not directly observed. The upper sections of the exterior walls contain open terracotta "cells" which allow air circulation but preclude effective heating of the open garage space, the energy performance of the enclosed shop, office, mezzanine, and internal garage areas is assumed to be marginal.

CONCLUSIONS AND RECOMMENDATIONS

General: It is our understanding that the Village does not intend to consider the complete replacement of the DPW facility at this time, although our previous report from 2010 laid the groundwork for such a project. That report identified the need for a new facility ranging in size from 17,600 to 20,800 SF and a cost (in 2010 dollars) of $5.3 to $6.8 million. That amount will likely have doubled in 2021 dollars.

A more feasible approach will be to identify the highest priority needs and budget accordingly for a phased approach to make improvements that will have the highest impact to the Village. Those recommendations, in order of highest to lowest priority are as follows:

1. Code and Safety Issues: Review the building in more detail for code and life safety related issues and immediately correct any critical non-conforming conditions. This would generally include repair and replacement of existing doors and hardware, and upgrade of interior lighting to a higher standard,

provision of adequate signage, and emergency lighting, etc. A comprehensive review of storage of flammable and/or hazardous materials should be made for the interior as well as the exterior of the building, particularly given its close proximity to the lake and the larger environmental risk of spills.

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