AGENDA

City of Clyde Hill
Council Study Session

Special Meeting
Tuesday, August 1, 2017 - 6:00 PM
Clyde Hill City Hall

Page

1. CALL TO ORDER

2. ROLL CALL

3. STUDY ITEMS

3 - 23 3.1. Update of Property Evaluation on Fire Station #5
Clyde Hill Facilities Assessment

4. ADJOURN

COUGHLINPORTERLUNDEEN
STRUCTURAL CIVIL SEISMIC ENGINEERING

November 1, 2016

Brian Harris
TCA Architecture & Planning
6211 Roosevelt Way NE
Seattle, WA 98115

RE Clyde Hill
City Hall and Maintenance Building Existing Conditions Review

Dear Brian:

This is a letter outlining our findings from our existing conditions review and ASCE 31-03 Tier 1 evaluation of Clyde Hill City Hall and Maintenance Building in Clyde Hill, Washington. We performed a site visit on October 5, 2016 and reviewed available existing documents. We reviewed the following documents:

- "Clyde Hill Street Maintenance Building", Architectural drawings dated November 21, 1975.
- "Clyde Hill Town Hall", Architectural and Structural drawings dated April 9, 1984.
- "Town of Clyde Hill Town Hall Addition", Architectural and Structural drawings dated December 20, 1995.

BUILDING DESCRIPTION

City Hall Building

The City Hall building is a single story building originally constructed in 1985 with an addition in 1996. The building is generally "L" shaped in plan with maximum plan dimensions of approximately 105 feet in each direction.

The original building is a combination of brick masonry and wood stud framed walls. The roof consists of plywood sheathing supported by engineered wood joists and sawn lumber joists spaced at 16" on-center. The joists are supported by brick masonry and wood stud walls. The ground floor consists of plywood sheathing supported by wood joists over a crawl space. The wood joists span to concrete stem walls. The foundation system consists of conventional strip footings below the masonry and wood bearing walls.

The addition wraps around the west, south, and east side of the original building. The walls of the addition are all wood stud framed. The roof consists of plywood sheathing supported by 2x12 joists at 16" on-center. The joists are supported by wood stud walls and glue-laminated beams. Built-up stud posts support the beams. The ground floor consists of a reinforced concrete slab-on-grade. The foundation system consists of conventional reinforced concrete spread footings beneath the posts and continuous strip footings below the bearing walls.

Maintenance Building

The Maintenance building is a single story brick masonry building constructed in 1976. The building is rectangalur in shape with plan dimensions of approximately 24' x 42'. The roof consists of plywood sheathing supported by 2x framing joists spaced at 16" on-center. The joists are typically supported by the brick masonry walls. There is single glue-laminated beam that spans in the north/south direction of the maintenance area that support the joists spanning in the east/west direction. Steel pipe columns that are embedded in the masonry walls support the glue-laminated beam. The foundation system consists of conventional strip footings below the masonry bearing walls.

SEISMIC EVALUATION

Introduction

Both buildings were evaluated for general conformance to the requirements of the American Society of Civil Engineers document *Seismic Evaluation of Existing Buildings* (ASCE 31-03), an approved national standard that uses a performance based design methodology for evaluating existing buildings. ASCE 31-03 recommends the use of seismic forces that vary depending on the expected level of performance for the structure.

The City Hall building was evaluated to an Immediate Occupancy (IO) performance level due to the fact that the Police Station occupies part of the building. Immediate Occupancy performance level aims for a very low risk level for life-threatening injury. In addition, the damage level to the structure is low enough such that only minor repairs are necessary and the building can remain operational following the design seismic event.

The Maintenance building was evaluated to a Life-Safety performance level. Life-Safety performance level allows for significant damage to both structural and non-structural components during a design earthquake. Substantial damage may be sustained by the building while still providing life-safety protection for the occupants and the ability to egress.

ASCE 31-03 offers three different levels of analysis or tiers, to determine a structure's adequacy. We performed a Tier 1 analysis on both buildings, which is a screening approach that contains a set of conservative evaluation statement that help guide the engineer towards areas of concern.

The evaluation of non-structural items to an Immediate Occupancy performance level was not performed. Non-structural items include, but are not limited to, utilities, fire suppression piping, mechanical and electrical equipment, computer equipment, ceilings, partitions, building contents, hazardous material storage, glazing and stairs. All of these items may have significant impacts for the immediate occupancy of the building following a major earthquake.

City Hall Lateral Force Resisting System

In general for the City Hall building the brick masonry walls, wood stud shear walls, and flexible plywood sheathing diaphragms act as the primary elements of the lateral-force-resisting system. The plywood sheathing diaphragms transfer the earthquake forces to the brick masonry walls and wood stud shear walls parallel to the earthquake. The walls then transfer the earthquake forces directly into the footings. In turn, the forces on the footings are resisted by friction and bearing pressure against the surrounding soils.

Maintenance Building Lateral Force Resisting System

In general for the Maintenance building the brick masonry walls around the perimeter and flexible plywood sheathing diaphragms act as the primary elements of the lateral-force-resisting system. The plywood sheathing diaphragms transfer the earthquake forces to the brick masonry walls parallel to the earthquake. The walls then transfer the earthquake forces directly into the footings. In turn, the forces on the footings are resisted by friction and bearing pressure against the surrounding soils.

Seismic Evaluation of the Buildings

Below is a list of seismic deficiencies determined by site observation, document review, and the ASCE 31-03 Tier 1 analysis. Along with the deficiencies are general recommendations of possible ways to mitigate the deficiencies. See the attached plans for additional clarification of the deficiencies. Additional analysis is required to determine the specific fix for each deficiency.

City Hall Building

1. The distribution of interior wood shear walls is not adequate to resist the seismic forces.
   RECOMMENDATION: Approximately 50 to 70 feet of wood shear walls should be added to the building. Existing walls can be converted to shear walls by removing the gypsum wallboard and replacing it with plywood sheathing. The walls need to be anchored to the slab and connected to the roof diaphragm for a complete load path. Some foundation work could be required at the wall ends to accommodate wall holdown anchorage.

2. It appears from review of the existing drawings that the ends of the shear walls do not have holdown anchors to prevent the shear walls overturning during a seismic event. The overturning is a greater risk for walls with large height to width ratios.
   RECOMMENDATION: Add holdown anchors at the shear walls with large height to width ratios. Assume approximately 10 to 16 holdown anchors need to be added. Some foundation work could be required to accommodate the anchorage of the holdown anchors.

3. The roof diaphragm has many steps creating load path issues for the seismic forces.
   RECOMMENDATION: Add additional connections and strut beams at roof steps to tie the building together better and distribute loads during a seismic event.

4. There are two large skylights in the lobby and corridor area which creates a big discontinuity in the roof diaphragm. This creates a risk for the seismic loads to not be transferred to shear walls and also is risk for the building to be damaged from moving separately during a seismic event.
   RECOMMENDATION: Add strut beams across the opening to transfer seismic forces between the two sides and keep the two sides of the building tied together.

Maintenance Building

5. Out-of-plane brick masonry anchorage to the roof is deficient on all sides. The wall anchorage is required to prevent the masonry walls from pulling away from the roof.
   RECOMMENDATION: Add strap anchors to connect the brick masonry walls to the roof at approximately 4' on-center.

6. There are no roof cross ties at the high roof in the east/west direction which reduces the factor of safety of the masonry walls pulling away from the roof.
   RECOMMENDATION: Splice the 2x joist ends together where they bear on the glue-laminated beam.

7. Around the three skylights there is no reinforcement around the openings. There are high seismic stresses around these openings.
   RECOMMENDATION: Add light gage straps over the sheathing on all sides of the skylights and extend approximately 2 feet past the openings.

Sincerely,
COUGHLIN PORTER LUNDEEN, INC.

Michael A. Armstrong

Mike Armstrong, P.E., S.E.
Project Manager

Enclosure

Photo 1: City Hall - Partial North Elevation


Photo 2: City Hall - Partial North Elevation

Photo 3: City Hall - West Elevation

Photo 4: City Hall - Partial East Elevation

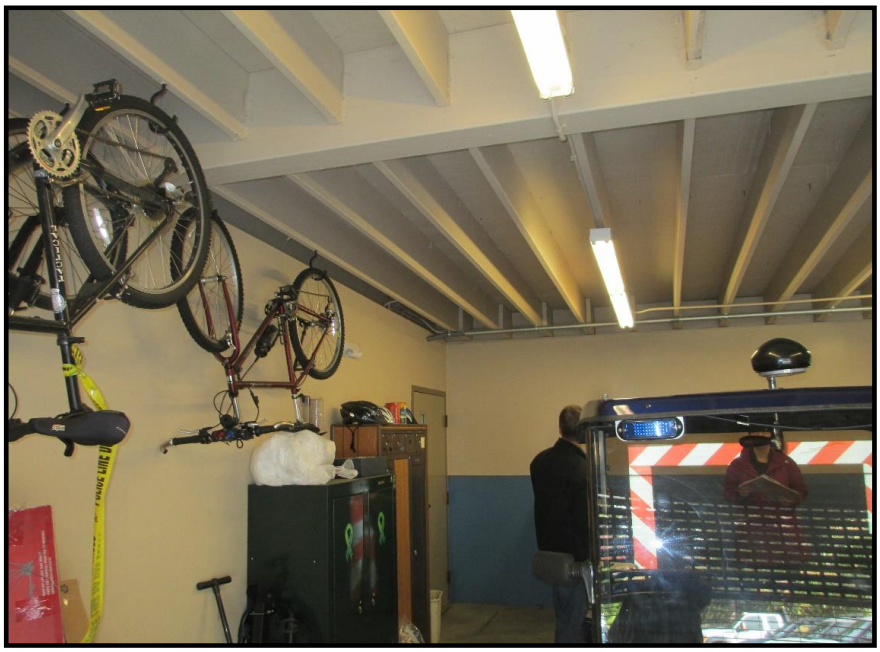

Photo 5: City Hall – Sally Port Roof Framing

Photo 6: City Hall – Lobby Skylight

Photo 7: City Hall – Corridor Skylight

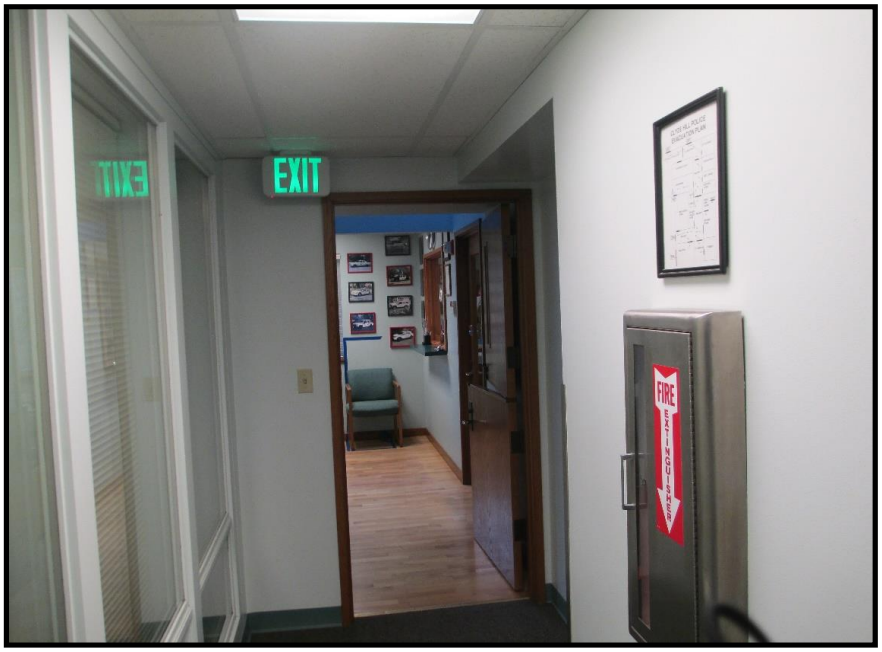

Photo 8: City Hall – Typical Interior

Photo 9: Maintenance Building - North Elevation

Photo 10: Maintenance Building - East Elevation

Photo 11: City Hall – Exposed Roof Framing

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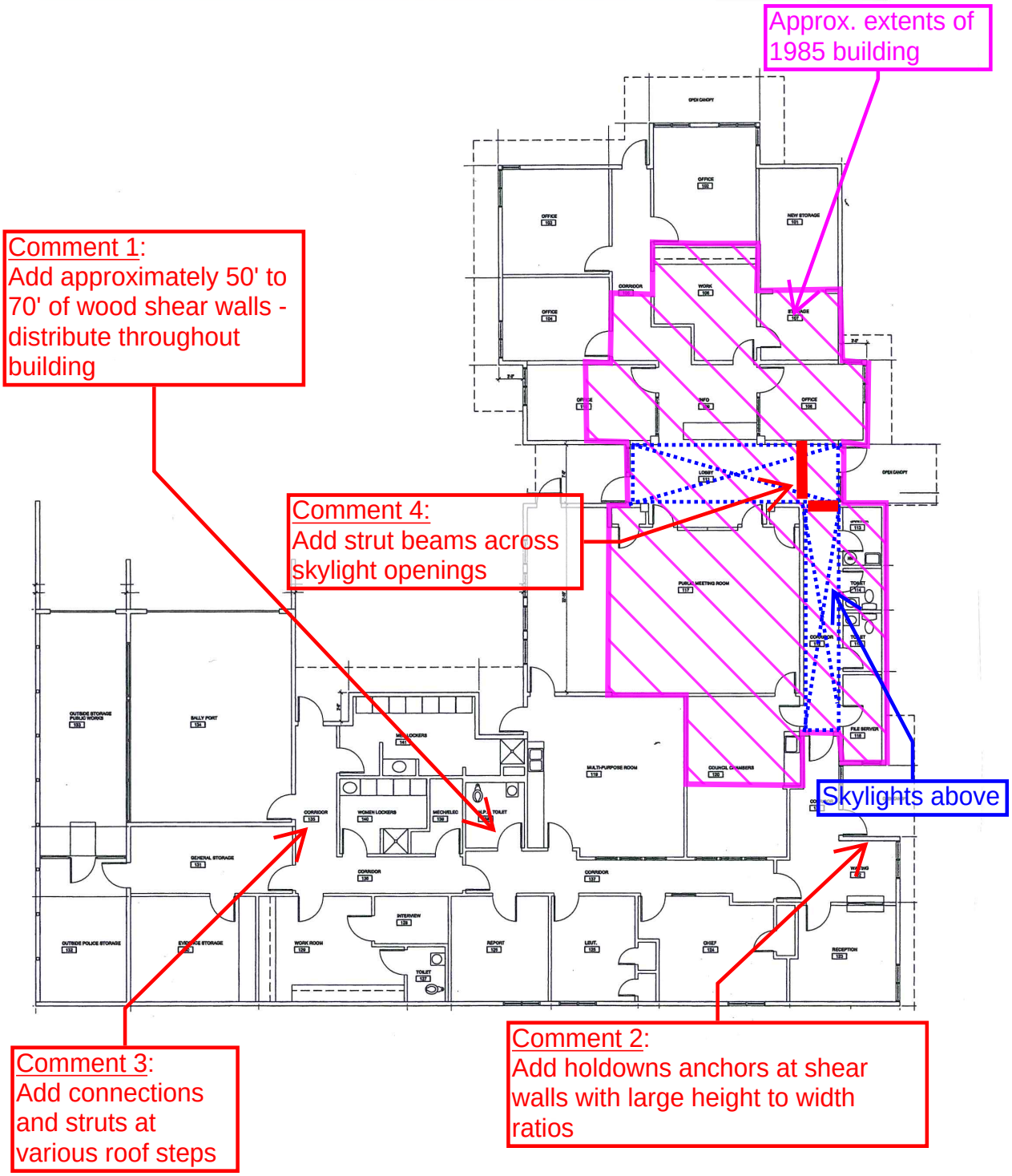

City Hall Floor Plan
Seismic Recommendations

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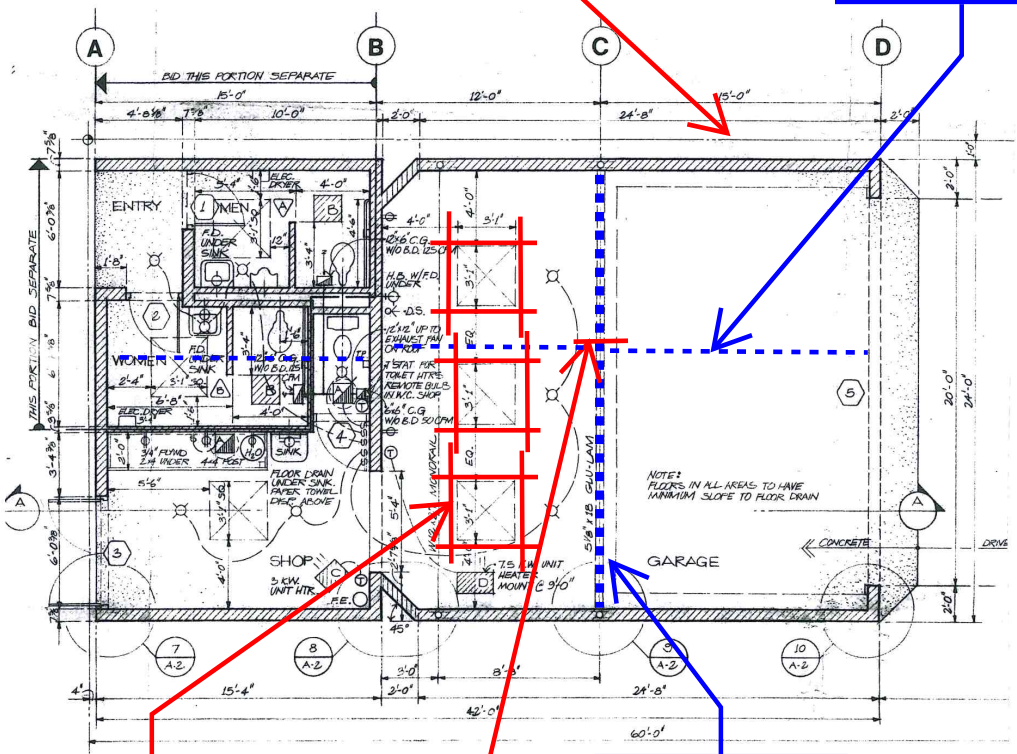
Comment 5:
Add roof out-of-plane strap anchors at 4' on-center around all walls

2x roof joists at 16" o.c.



Comment 7:
Strap around skylights

GL beam above

Comment 6:
Strap roof joists together

Maintenance Building Floor Plan
Seismic Recommendations

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Seattle, WA 98109
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Clyde Hill City Hall

Mechanical Systems Survey

October 17, 2016

We visited the Clyde Hill City Hall on Wednesday October 5, 2016 to evaluate the existing mechanical system's usable life and review feasibility of potential remodels. The following is our report of the existing conditions and our recommended improvements.

EXISTING SYSTEMS

A. **Utilities:**
1. Domestic Water – Municipal 1-1/2" water service from NE 24th St. Building shut-off valve and backflow prevention is located in Storage 113. Water pressure is 55 psi. No drain is present for the backflow preventer.
2. Natural Gas – A utility service gas meter is located on the Northeast corner of the building. Gas piping distribution is located exposed on the roof and is heavily rusted.

B. **Fire Sprinklers:** The building does not have a sprinkler system.

C. **Plumbing:**
1. Public Restrooms (Toilet 114 & 115)
   a. Water closets: China, tank type flush, in good condition. One ADA restroom with grab bars.
   b. Lavatories: China, vanity mounted with dual lever handle faucet, in good condition.

2. Police Department Personnel Restroom 138:
   a. Water closet: China, valve type flush, in good condition with ADA grab bars. The flush valve is not ADA compliant.
   b. Lavatory: China, counter mounted with dual lever handle faucet, in good condition with partial ADA trap insulation protection. Protection is not installed on the hot water stop.

c. Floor Drain: Round, bronze grate, in good condition.

3. Police Department Holding Restroom:
   a. Water closet/ lavatory: Stainless steel combination prison style, push button valve flush, metered push button faucet, in good condition.

4. Police Department Holding Room:
   a. Floor Drain: Round, bronze grate, in good condition.

5. Police Department Women's Lockers 140:
   a. Lavatory: China, counter mounted with single lever handle faucet, in good condition.
   b. Shower: Single piece ADA fiberglass enclosure with glass door, single handle mixing valve, hand spray, grab bars and folding seat, in good condition.
   c. Floor Drain: Round, bronze grate, in good condition.

6. Police Department Men's Lockers 141:
   a. Lavatory: China, counter mounted with dual lever handle faucet, in good condition.
   b. Shower: Single piece ADA fiberglass enclosure with glass door, single handle mixing valve, hand spray, grab bars and folding seat, in good condition.
   c. Floor Drain: Round, bronze grate, in good condition.

7. Kitchen/Multi-Purpose 119:
   a. Sink: Stainless steel, double bowl kitchen sink, dual lever handle gooseneck faucet, in good condition.
   b. An under-counter dishwasher is located next to the sink.

8. Storage/Janitor Closet 113:
   a. Utility Sink: China, wall mount with service faucet, stainless steel rim guard and hose connection, in fair condition.

9. Exterior: The freeze-proof hose bib located adjacent to the Police Department rear door leaks water when the valve is closed.

10. Piping: The domestic water service piping is copper, in good condition.

11. Domestic hot water:
    a. Police Department water heater (located in Mech/Elec 139): 40-gallon electric tank with expansion tank, in good condition.

b. City Hall water heater (located in Storage/Janitor 113): 40-gallon electric tank, no expansion tank, in fair condition. This water heater is at the end of its useful life.

D. **Heating, Ventilation and Air Conditioning (HVAC):**

1. HVAC Systems: The building has four package rooftop, gas heat, electric DX cooling units. Two units serve the police department, split between the north and south portions of their area. These units are 20 years old and at the end of their useful life. A third system serves the city hall public meeting room and council chambers. This unit is new and in good condition. The fourth system serves the west side of city hall. This unit is 20 years old and at the end of its useful life.

2. Ventilation: All four rooftop units have outdoor air intake capabilities.

3. Zoning: With only four building HVAC zones, thermal comfort is limited. This is particularly evident in the Police Department Waiting/Reception area which does not have thermostat control. Also in the City Hall Lobby which is not directly conditioned.

4. Conditioned Space: The Police Department currently uses an unconditioned storage space as a fitness room. This space also lacks proper ventilation.

5. Exhaust:
   a. The public restrooms each have an exhaust fan.
   b. The Police Department restroom and locker rooms are exhausted by a roof mounted fan.
   c. The Police Department Holding restroom is exhausted by a roof mounted fan.
   d. Storage/Janitor Closet 113 has no exhaust.
   e. Kitchen/Multi-Purpose 119 has no exhaust.
   f. The Police Department Sally Port (garage) has a grated door but no exhaust.

MECHANICAL IMPROVEMENT RECOMMENDATIONS

A. Noted Deficiencies:

1. Provide drainage for water service backflow preventer.
2. Treat and paint rusted gas piping on roof or replace with new.

3. Correct water closet flush valve installation in Police Department Personnel Restroom 138. The valve handle needs to be reversed to the wide side of the room to be ADA compliant.
4. Replace leaking exterior hose bibb.
5. Plan for maintenance replacement of the City Hall water heater.
6. Plan for maintenance replacement of the three old HVAC rooftop units.
7. Add exhaust to Storage/Janitor Closet 113.
8. Add exhaust to Kitchen/Multi-Purpose 119.
9. Add exhaust to Police Department Sally Port.

B. Future Improvements:

1. Although it is possible to replace the existing rooftop units with new (See item 5 above), to extend the life of the building, the entire HVAC system concept should be considered and addressed. We recommend replacement of the HVAC system with a new one capable of providing better comfort, air quality and additional HVAC zones.
2. We recommend adding fire sprinklers as is good practice for a municipal building.
3. We recommend providing dedicated building space for Police Department fitness with new heating, cooling and ventilation.

BY: James Whigham, P.E.

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Clyde Hill Maintenance Garage

Mechanical Systems Survey

October 17, 2016

We visited the Clyde Hill Maintenance Garage on Wednesday October 5, 2016 to evaluate the existing mechanical system's usable life and review feasibility of potential remodels. The following is our report of the existing conditions and our recommended improvements.

EXISTING SYSTEMS

A. **Utilities:**
   1. Domestic Water – Municipal water service.
   2. Natural Gas – Utility gas service.

B. **Fire Sprinklers:** The building does not have a sprinkler system.

C. **Plumbing:**
   1. Restroom (Interior)
      a. Water closet: China, tank type flush, in good condition. Installation is not ADA compliant.

   2. Public Park Restrooms (Exterior):
      a. Water closets: Wall mount, china, valve type flush, in good condition. Installation is not ADA compliant.
      b. Lavatory: China, wall mounted with metered push button faucet, in poor condition. Installation is not ADA compliant.
      c. Floor Drain: Round, bronze grate, in fair condition.

   3. Shop:
      a. Utility Sink: China, wall mount with service faucet, stainless steel rim guard and hose connection, in fair condition.

4. Piping: The domestic water service piping is copper, in good condition.

5. Compressed Air: Vertical 80-gallon tank with 6.5 hp mounted compressor. ¾" copper distribution piping to two quick connect air outlets in garage. System is in good condition.

6. Domestic hot water: Not evaluated.

D. **Heating and Ventilation:**

1. The building is not air conditioned.

2. Heating: The garage is heated by a natural gas unit heater, in fair condition. The shop is heated by an electric unit heater, in fair condition. The public restrooms are heated by electric ceiling heaters in poor condition.

3. Ventilation: No outside air ventilation is present.

4. Exhaust:
   a. The garage has no exhaust.
   b. The interior and exterior restrooms have exhaust, condition unknown.

MECHANICAL IMPROVEMENT RECOMMENDATIONS

A. Noted Deficiencies:

1. Replace Public Restroom Lavatories.
2. Replace Public Restroom electric heaters.
3. Add exhaust to garage.

B. Future Improvements:

1. Revise Restroom and Public Restrooms to be ADA compliant.

BY: James Whigham, P.E.

CASE ENGINEERING
Consulting Electrical Engineers

November 8, 2016

Brian Harris
TCA Architecture
6211 Roosevelt Way NE
Seattle, WA 98115

Project: Clyde Hill Maintenance Garage

Subject: Electrical Conditions Assessment Report

The following observations were made on Wednesday, October 5, 2016:

The facility consists of a single-story building with restroom, shop and maintenance garage functions.

Building Electrical Service and distribution:

1. The electrical service to the building consists of a 100 amp, 120/240 volt, 1-phase, 3-wire panelboard located on the West wall of the garage area. The source for the 100A feeder to the building was not found. There are no other panels in the building.

2. The service voltage to the building is 120/240 volts, 1-phase, 3-wire.

3. The panel has two interlocked 100A/2P circuit breakers to allow a portable generator to be connected in the event of a loss of normal power. A ceiling-mounted generator receptacle on a drop is located in the center of the garage area for connection of the portable generator.

4. The electrical panel was manufactured by Reliance Electric and is in fair condition. The panel is surface-mounted on a brick wall and has four available spaces for additional circuit breakers.

5. The receptacles throughout the building are grounding type and are generally in working condition.

6. The feeders and branch circuits were routed in a conduit system. The original conduit is concealed in the walls except on the brick walls where surface-mounted raceway was used. The circuiting added after the original construction was routed in surface mounted conduit.

7. There is miscellaneous equipment in the working space about the panels that should be moved.

Electrical Issues

1. The electrical panel is in fair condition but does not require immediate replacement. However, the panel is obsolete and replacement breaker could be difficult to find.

2. Most of the lighting fixtures in the facility use T-12 lamps and ballasts which are inefficient. If a remodel project is done to the building, changing the fixtures to LED technology is suggested.

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Phone: 425-402-9400 Fax: 425-402-9402

3. All lighting is controlled by manual switches. Wallbox occupancy sensors can be used in certain areas to automatically shut off lights with minimal cost impact.

4. If a major remodel is performed, the latest Washington State Energy Code requires automatic shutoff of all lights. LED technology simplifies the control systems and helps with lighting power allowance requirements.

Conclusion

1. Condition – The electrical equipment appears to be in fair, working condition and has been installed with standard industry practices. There are no major code violations with the existing distribution system.

2. With scheduled maintenance, including infrared testing, correcting lug torque and exercising the breakers, the life of the static equipment (panelboards and switchgear) should be equal to the life of the building, assuming that overloading situations do not occur.

CASE ENGINEERING
Consulting Electrical Engineers

November 8, 2016

Brian Harris
TCA Architecture
6211 Roosevelt Way NE
Seattle, WA 98115

Project: Clyde Hill Town Hall

Subject: Electrical Conditions Assessment Report

The following observations were made at the facility located at 9605 NE 24th Street in Clyde Hill, Washington on Wednesday, October 5, 2016:

The facility consists of a single-story building with city hall and police station functions.

Building Electrical Service/Distribution

1. The electrical service for the building originates from a pole-mounted PSE transformer on the North side of NE 24th Street. The service is routed south under NE 24th street to the building via a PSE handhole. The service to the building appears to be the only service originating from the transformer.

2. The electrical service to the building consists of a 400 amp, 120/240 volt, 1-phase, 3-wire switchboard located in an existing electrical room/janitor closet. The switchboard is fed via a feed-through meter mounted to the West exterior wall in the planter area.

3. The entire electrical service is backed up by a optional standby generator located on the adjacent fire station property. The existing generator is diesel and rated at 150 kW/187.5 kVA, 208Y/120 volt, 3-phase, 4-wire. The model number is MQ Power #MOP150IV. The generator was installed in 2007 and is in good condition. The generator is rated optional standby (NEC 702), so the life safety systems (exit and egress lighting) require their own battery backup. The generator also feeds the fire station.

4. The automatic transfer switch is service-entrance rated and is located adjacent to the meter on the West exterior wall. The transfer switch was installed after the service switchboard. The generator feeder is routed up the exterior wall and across the roof to the East, and then underground to the generator.

5. The panel feeders are copper according to the record drawings.

6. The main switchboard was manufactured by Square D and is in good condition. The branch circuit panels were manufactured by Siemens and are in fair condition.

7. The service switchboard (Panel DP1) is 120/240 volt, 1-phase, 3-wire. The main service disconnect is a 400A/2P circuit breaker. There are (2) 200A-2P circuit breakers feeding branch circuit panels,

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(5) 50A-2P circuit breakers feeding mechanical units and (1) 60A-2P circuit breaker feeding the hot water tank. There are several spaces for additional circuit breakers.

8. The conduit and wiring throughout the building was generally installed per code and is in good condition. The feeders and branch circuits were routed in a conduit system. The original conduit is concealed in the walls except on the brick walls where surface-mounted raceway was used. The circuiting added after the original construction was routed in surface mounted conduit.

9. The receptacles throughout the building are grounding type and are generally in working condition. A spot check indicated that they are properly wired.

10. The lighting fixtures utilize fluorescent T8 lamps for the administrative and storage areas. Compact fluorescent and incandescent lamps are used in the public meeting area and corridors. The fixtures are generally in fair condition.

11. The existing fire alarm system components ares manufactured by Wheelock and appear to be in fair condition.

12. The working space about the panels is adequate.

<u>Electrical Issues</u>

1. The main electrical service is in good condition and would not need to be replaced (if the capacity is adequate for the future use). The service is single-phase, which could limit the mechanical system possibilities.

2. The main service switchboard contains a single main circuit breaker which allows the installation of additional subfeed circuit breakers if needed for new panels or photovoltaic arrays.

3. Most of the lighting fixtures in the facility use T-8 or incandescent lamps. If a remodel project is done to the building, changing the fixtures to LED technology is suggested. Even if a remodel does not happen, PSE should be contacted to check on possible rebates.

4. The electrical equipment appears to be in good, working condition and has been installed with standard industry practices. There are no evident code violations with the existing work. With scheduled maintenance, including infrared testing, correcting lug torque and exercising the breakers, the life of the static equipment (panelboards and switchgear) should be equal to the life of the building, assuming that overloading situations do not occur.

5. Most lighting is controlled by manual switches. Wallbox occupancy sensors can be used in certain areas to automatically shut off lights with minimal cost impact.

6. If a major remodel is performed, the latest Washington State Energy Code requires automatic shutoff of all lights and automatic dimming of lighting in daylighting zones based on ambient daylighting. LED technology simplifies the control systems and helps with lighting power allowance requirements.