TOLOVANA
ARCHITECTS

CITY OF CANNON BEACH

CITY HALL BUILDING SYSTEMS ANALYSIS

April 3, 2018

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PURPOSE STATEMENT

Tolovana Architect, LLC has been retained by the City of Cannon Beach to provide an analysis of the existing City Hall for purposes of determining the feasibility of future improvements.

This report addresses the analysis of existing building equipment and conditions including the structural, mechanical and electrical design, ADA compliance, and building envelope conditions.

Tolovana Architect has retained structural, mechanical and electrical engineering consultants as well as local contractors to assist in this analysis and their findings are incorporated in this report. We have also contacted several private individuals with a first-hand recollection of the history of City Hall for background information.

BUILDING HISTORY

An article from the October 20, 1969 issue of the Daily Astorian announced the relocation of the city offices, police department, street department, and city offices to the former Erickson Building Supplies building. The new building was described as a "more suitable location for city meetings and a large area to store all city vehicles, equipment, pipe, and supplies". This article with photos is included as EXHIBIT A. The City initially shared the office space with a regional planning agency and eventually took sole possession of the building.

Historical aerial photographs included in EXHIBIT B show the building as it existed in 1958 and 1967.
These photos are evidence of the phased construction of the building with the retail portion likely at the north side of the building and building material storage to the south.
As the need arose, the city council chambers were eventually expanded to the south and police station to the east.

ARCHITECTURAL EVALUATION

The existing city hall building is located in a C-1 Limited Commercial Zone. Based on the City's current zoning code, any future improvements need to be approved as a conditional use if the cost is over 50% of the $1,466,130 valuation.

The property is adjacent to a residential zone to the south. Chapter 17.66 of the municipal code would require a variance from the required setback of 20 feet for any remodel project that exceeds the 50% valuation threshold.

The current building also extends approximately 24" beyond the south property line, based on the most recent survey from HLB / Otak. This extension beyond the property line would need to be resolved with the adjacent property owner upon a major remodel or expansion.

The existing city hall property is classified by both FEMA's existing and proposed maps in the 'X' zone which is out of the regulatory floodplain.

The building envelop is generally in fair condition. The roofing is a traditional built up asphalt roof which has been extended with the various building expansions over the history of the building. Its serviceable life is not known without further investigation. A detail to add the cedar shingle siding at the perimeter of the building was found in the City's records and included as EXHIBIT C. It shows evidence of unreinforced hollow clay tile wall construction, a material that is highly unstable in event of a earthquake. The glass roof covering and vestibule outside of the city council chambers, and canopy outside of the police station were likely added at this same time. Due to lack of ventilation, it is suspected that the west vestibule has mold issues.

A modular building was added inside under a covered area on the east side of the building to provide additional office space, now occupied by Mark Barnes and Alton Butler.

In 2014, an interior remodel of the lunch and breakrooms was completed. During the remodel, a large portion of the existing floor slab was removed, exposing a variety of sand , gravel and sawdust fill. An east-west utility trench was uncovered, likely related to a prior use of the building. Unexpected replumbing of the underfloor drain lines were required as part of the work. The extent of the work was expanded considerably due to these unforeseen conditions.

In 2016, a minor remodel was performed of the IT office to better accommodate the file server and windows on the north wall were replaced.

The most noticeable deficiency in the building is evidenced by the variations in floor levels and settlement of the exterior wall at the northwest corner. This is a result of a combination of unstable soil conditions and deficiency in construction methods of the time the building was constructed.

Building security is limited to a separation counter at the north building entrance and a control desk at the police department. Only in the last year has a door been added to the hallway leading to the administrative office area in an attempt to control public access to administrative offices. The two rear doors from the east parking lot are not controlled for access. In light of recent increases in public building security, it would be advisable to have greater control between the public and staff areas.

Access to the building for the disabled is less that fully compliant with ADA standards. The only ADA parking space is located on the east side of the building, far away from the north and west public entrances. Ideally, the ADA parking for the building would be on the west side, as close as possible to the City Council entrance vestibule. Additionally, while not technically non-compliant with the ADA, the various floor levels throughout the building create a challenge for disabled users.

The public restrooms adjacent to the Council chambers have recently been brought into compliance.

STRUCTURAL EVALUATION

As part of a design for a replacement City Hall in 2011, a soil report was authorized for the site of the current city hall building. The findings of the report indicated a layer of clay over buried wood debris and dense sand, with siltstone bedrock at approximately 100 feet in depth. As a result, the recommendations for the new building structure at that time included deep pier foundations and structural slabs that would support the new building in a manner that would resist earthquake loading independent from the adjacent ground.

Based on the age of the existing structure and the known construction methods and materials of the time, the existing building structure is not adequate to meet current building codes based on both the site conditions and building code requirements for an essential facility. Upgrading the building to fully meet current codes is not realistically achievable without effectively replacing the basic structure of the building.

As part of this evaluation, Rick Amadeo ,P.E. was retained to investigate the existing building structure. His findings are included in EXHIBIT D.

MECHANICAL EVALUATION

The mechanical systems currently serving the building reflect the phased construction of City Hall as it evolved. The building has a furnace serving the police department and north offices, a rooftop air handler for the City Council Chambers, and a radiant heater for the open office area of Public Works.

The current HVAC systems lack any seismic bracing. The existing furnace utilize flex ductwork extensively without metal ducting, which is more energy efficient.

As part of this evaluation, Dale Johnson, P.E. of P&L Johnson was retained to investigate the existing mechanical systems. His findings are included in EXHIBIT E.

Based on input from Samir Mokashi, P.E. of Code Consultants Unlimited, the mechanical systems for an essential facility are required to have seismic bracing on all mechanical units and distribution ducting.

ELECTRICAL EVALUATION

The electrical system currently serving the building has evolved over the history of the building like other aspects of the facility. It is served by PP&L with a 400 amp service and according to their records draws considerably less that capacity the majority of the year. The electrical service is currently at its capacity for circuits however, so any expansion or remodel of the building would require additional panel(s). The existing electrical service is located in the central portion of the open office area in the middle of the building and should be located in a dedicated room for security.

An approx. 125 KW emergency generator was added within the last 10 years. The generator is in good condition, having been serviced on a regular basis with the City's other backup generators. This system is of adequate capacity and meets the requirements of City Hall as an essential facility.

As part of this report, Samir Mokashi, P.E. of Code Unlimited was consulted on the electrical service evaluation. He noted that the main electrical criteria for an essential facility is an emergency generator, which is met by the existing system.

EXHIBIT A

The Daily Astorian, Astoria, Oregon, Monday, October 20, 1969

Cannon Beach City Hall, Old (upper) and New (lower)

Cannon Beach City Hall Moved to New Location

By SHIRLIE MALSTEAD
Of The Daily Astorian

CANNON BEACH — The Cannon Beach city office, police department, street department and all the city facilities have been moved and located in a new building at 163 East Division Street. The offices were moved last week and are now open.

The city purchased the 100 by 100 foot cement block constructed building and 225 by 100 piece of ground for $40,000 from D. L. Erickson recently.

The need for more space for all departments within the city has become apparent in the past few years and storage space for accumulating records, supplies, and city equipment has been a major problem. The new building will provide a more suitable location for all city meetings, a large area to store all city vehicles, equipment, pipe and supplies.

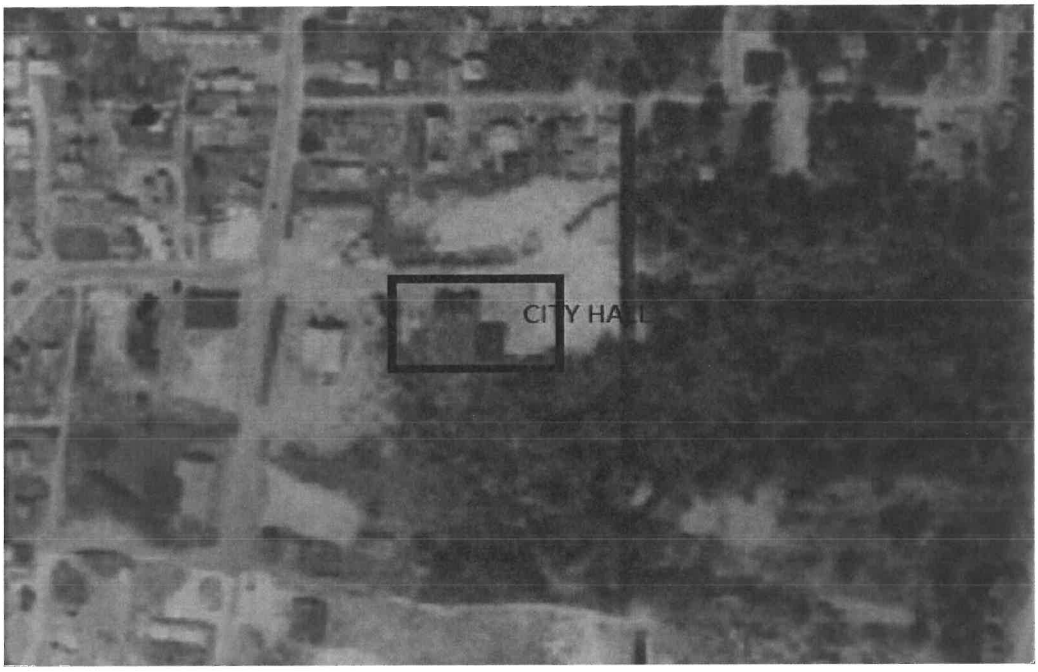
Cannon Beach became an incorporated city on Dec. 9, 1955 and at the first city election, Feb. 24, 1956 conducted by the county court, five councilmen were elected. Dr. J. S. Sargent was elected the first mayor, with D. L. Erickson, Robert Rittenbach, Walter White, and Chris Eisasser serving as the first city council. Kent Marshall was appointed the first city recorder, but because of illness as forced to resign and Charles Carr was appointed to fill the office.

Mrs. Mae McCoy was appointed city treasurer at this time and Gerald Cox was selected to act as city recorder following the resignation of Carr and held this position until January 1960, when Mrs. McCoy was appointed city recorder.

D. L. Erickson served as second mayor of Cannon Beach until January of 1963 when Gerald R. Gower, present mayor was elected.

The city rented its first office space from D. G. Frisbie in October of 1958 for $10 a month and prior to this time all business was conducted from the private homes of those serving as recorder and treasurer. In May of 1961 office space was rented in the Moore building on Hemlock Street and has been the city hall up to this time.

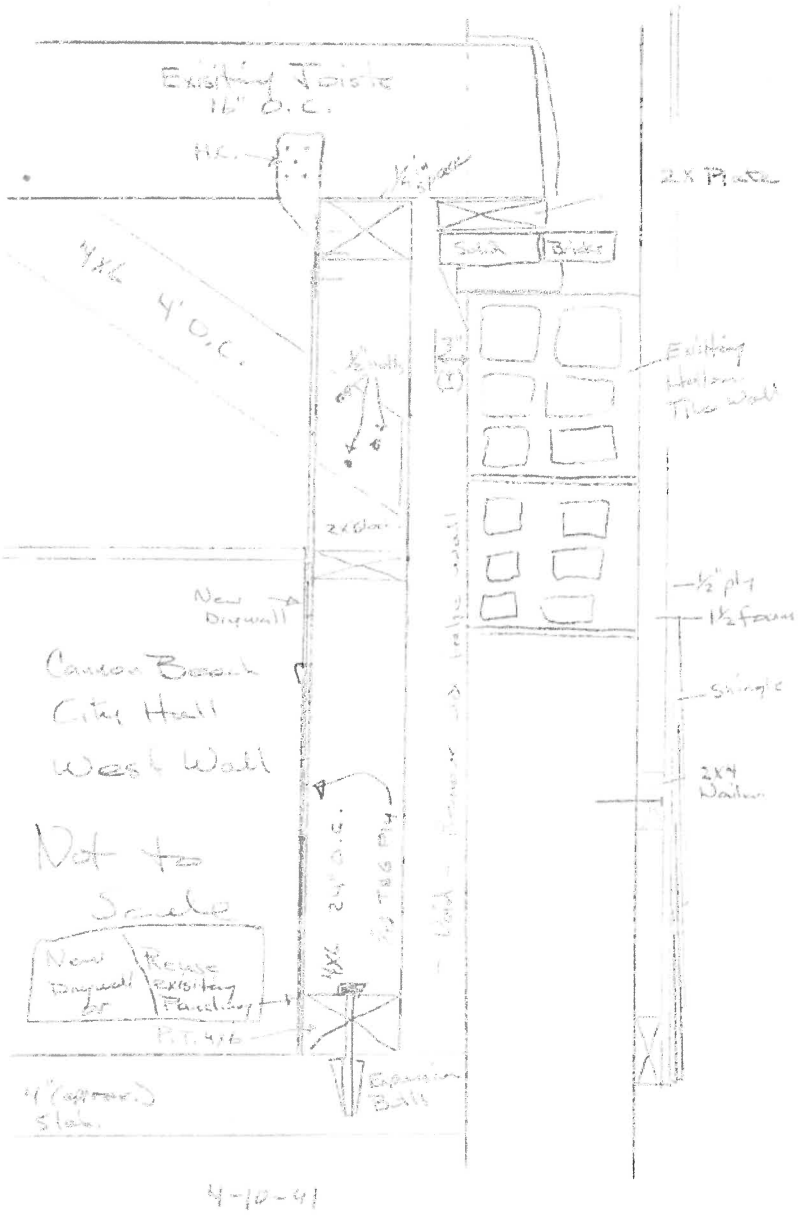
EXHIBIT B



1958 AERIAL PHOTO

1967 AERIAL PHOTO

EXHIBIT C



1991 CONSTRUCTION DETAIL

EXHIBIT D

AMODEO

STRUCTURAL ENGINEERING

April 1, 2018

Mr. David Vonada
Tolovana Architects LLC
368 Elk Creek Rd., Suite 408
Cannon Beach, Oregon 97110

Ref: Cannon Beach City Hall – Cannon Beach, OR
ASE Project #18146
General Structural Assessment

Dear David,

As requested, ASE has completed this General Structural Assessment of the Cannon Beach City Hall at 163 E. Gower Street, in Cannon Beach, Oregon. It is our understanding that the purpose of this report is to provide a general understanding of the state of the structure, specifically related to its long-term use as an essential facility serving the City of Cannon Beach and its residents, including the surrounding areas of Clatsop County.

Existing Condition: As-built information concerning the structure is limited, as original drawings do not exist. Based on information gathered during our site visit of March 14, 2018, which included attendees from Tolovana Architects, we were able to obtain the following information: The existing building is a single-level wood-framed structure of about 9,000 square feet, estimated to be originally constructed circa 1950's. It is located on a flat site a block east of Hemlock Street at an elevation of 33' above sea level. From the City of Cannon Beach photographic archives, it appears that the original building was "L-shaped" in plan until around 1965, when it was infilled at the northeast corner to become approximately square in plan. The structure appears to have remained approximately the same size and shape for the last 50 years. We understand that this building may have originally been used as a lumber service facility, which was likely open on multiple sides, and that would explain the large floor-to-roof dimension, which was utilized in (2) locations as loft storage: at the northwest side and at the south. A modular unit is located inside the footprint of the building at the east side.

In May of 2011, Chinook GeoServices provided the City of Cannon Beach with a site-specific geotechnical report, which included subsurface soil testing and also foundation and slab recommendations. It revealed that the structure was placed over an area backfilled with sawdust, decomposed wood debris and other poor organic subgrade materials. Additional aspects of their report will be discussed further in this assessment letter.

Due to the variety and orientation of load-bearing walls, posts, roof framing and infill walls (including masonry), we have concluded that this structure was likely built in a piecemeal fashion. Rough sawn lumber appears to be the structure with 3x12 rafters, wood studs and T&G decking used for the roof diaphragm. Post and beams carry the vertical load, while concealed wood sheathing is anticipated for the existing lateral resisting system.

Other sources of information include an internet search, the DOGAMI Tsunami Map of Cannon Beach, USGS resources and our previous experience in the local area. Codes referenced for our assessment included the ASCE7-10 (Design loads for buildings), ASCE41-13 (Seismic assessment of existing buildings), NDS (Wood framing design), ACI (Concrete design), the 2013 Snow Load Analysis for Oregon, the IEBC (Existing Building Code), FEMA 154 and the 2014 OSSC (Oregon building code). As the purpose of this report is to be a general structural assessment, no extensive inspection, material testing or data collection was conducted.

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Considering the age of the structure, the type of construction (wood-framing) and the harsh exposed environment of the site (90" of annual rain and sustained wind loads, due to being close to the Pacific Ocean on the northern Oregon Coast), the structural members are in relatively good condition. Our site observation, although limited to the members exposed to view, did not reveal any locations of significant damage, distress, deterioration, dryrot or excessive deflection. Long-term foundation settlement or differential settlement was not obvious. The storage area framing appears to have been constructed with a negligible amount of structural design, as the framing is inconsistent and does exhibit some locations of excess flexibility and deflection.

Code Considerations: This building was built before 1974, which is the year Oregon first adopted a statewide building code, and therefore will not meet current code requirements. Structurally, the current building code has design criteria (load and capacity) and detailing criteria (connections, anchors, etc.) that provide the strength, stiffness and ductility needed to create a robust structure suitable for the various loads expected in the life of the structure. For this structure, these loads are snow load, wind lateral load and seismic lateral load. The amount of these loads that a building is designed to support is based on its risk category - the higher the risk category, the higher the loads. As an emergency operation facility, preparedness and communication center, and also a police station, the Cannon Beach City Hall is considered the highest risk category (Essential Facility), which is risk category IV (see Oregon Building Code table below for description).

TABLE 1604.5
RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: • Agricultural facilities. • Certain temporary facilities. • Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: • Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. • Buildings and other structures containing elementary school, secondary school or day care facilities with an occupant load greater than 250. • Buildings and other structures containing adult education facilities, such as colleges and universities, with an occupant load greater than 500. • Group I-2 occupancies with an occupant load of 50 or more resident care recipients but not having surgery or emergency treatment facilities. • Group I-3 occupancies. • Any other occupancy with an occupant load greater than 5,000[a]. • Power-generating stations, water treatment facilities for potable water, waste water treatment facilities and other public utility facilities not included in Risk Category IV. • Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *Fire Code*; and Are sufficient to pose a threat to the public if released [b].
IV	Buildings and other structures designated as essential facilities, including but not limited to: • Group I-2 occupancies having surgery or emergency treatment facilities. • Fire, rescue, ambulance and police stations and emergency vehicle garages. • Designated earthquake, hurricane or other emergency shelters. • Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. • Power-generating stations and other public utility facilities required as emergency backup facilities for Risk Category IV structures. • Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *Fire Code*; and Are sufficient to pose a threat to the public if released [b]. • Aviation control towers, air traffic control centers and emergency aircraft hangars. • Buildings and other structures having critical national defense functions. • Water storage facilities and pump structures required to maintain water pressure for fire suppression.

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As an essential facility, it is required to be designed to resist 20% more snow than a typical building, along with 15% higher wind forces and 50% higher seismic forces. In summary, a properly designed essential structure is intended to be robust enough to have minimal or no damage after a code-level wind and seismic event, and be able to be used immediately afterwards. Note that an "Essential Facility" is the top of the pyramid for building design. These buildings are the most critical structures in the community and should be very well designed and very well constructed. All structural aspects should be clearly known in terms of adequacy and the load paths shall be relatively simple, in order to perform well during emergency situations, such as heavy snow, flooding (tsunami), windstorm or a seismic event. Any building built in Oregon pre-code (1974) and wood structures built prior to the current benchmark seismic date of 2000, are statistically unlikely to perform adequately well into the future. Additionally, design codes presume a 50 lifespan, and this structure is approximately 65 years old.

Historically, Cannon Beach averages approximately 2" of snow per year, but has been known to see the occasional big snow. The building was built prior to the 1962 Columbus Day storm and also experienced the Great Coastal Gale of 2007, both of which may have exceeded the code level 3-second gust wind of 105mph. We are not aware of any damage sustained to the building due to heavy snow or high wind events, including damage due to wind uplift on roofs or overhangs. As a light and flexible wood-framed structure, it would typically be more vulnerable to damage due to wind loading than to seismic loading. In regards to seismic loading, per USGS, the site has a high-seismicity, at a level which is approximately halfway between the value for Portland and the value for San Francisco. The maximum considered earthquake in the Cannon Beach area is a magnitude 9.0 Cascadia Subduction event, which has an expected recurrence interval of 2500 years - although recent research on the coast has revised the recurrence interval to around 350 years. Much smaller seismic events are statistically more likely, and the Northwest coast experiences around 15 earthquakes a year over a magnitude 4.0.

As seismic is often a great concern for an existing structure, it is important to understand that three main factors determine the significance of the earthquake impact to the building: the *earthquake* (type, depth, location, intensity, duration, direction of waves, etc.), the *site* (the bearing material, the presence of water, the slope of the site, the proximity to a fault, etc.) and the *building structure* (foundation type, building weight, structural system, structural flexibility, ductility of the structure, structural redundancy, etc.).

In short, this site is vulnerable to due to a tsunami hazard (being in the worst case "distant tsunami hazard"), and vulnerable to damage due to weak subgrade material, which is susceptible to lateral spreading (footings shifting during an earthquake), liquefaction and excessive settlement. This structure does not appear to have a well-constructed, nor a complete, lateral load path, and may experience significant damage due to large lateral earthquake displacement in the framing. Seismic pounding between incompatible elements and overturning of unbraced walls may also occur.

Structural Review Findings: As a reminder, this is a general structural review and not a thorough study of framing load paths, material strengths, connection quality or foundation competence. No original drawings exist, no finishes were removed, no footings were exposed and no testing was conducted. Having said that, there are still some conclusions that we can make, such as:

- The code-defined gravity loads (full snow and full storage) may overstress the structural elements of the building. It is very likely that certain aspects of the structure are inadequate to resist the full code loading, since the existing structure was constructed at various times with multiple structural members in the most cost-effective way. The storage lofts appear to be an afterthought and are not designed to accommodate code storage loading. Additionally, it is unlikely that a thorough inspection of the construction was provided at the time, especially considering the industrial use of the building.

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- The code-defined lateral loads (wind and seismic) require a complete and continuous path to the foundation, which appears not to exist. Based on a walk-through, it was not apparent what/where the direct lateral load path is via shearwalls, and if they are continuous and adequately attached to the roof diaphragm and the foundation via connections, sill anchors and hold-downs, and if chord ties and drag ties exist. Additionally, the north wall and east wall have extensive openings which weaken the structure for lateral loads in the east-west direction.
- The Chinook GeoServices geotechnical report reveals that the foundation is very susceptible to failure in a code-level seismic event, as liquefaction is a potential due to unconsolidated clays and underlying water. Liquefaction usually causes excessive settlement, lateral spreading and foundation instability.
- Concrete masonry and clay masonry walls exist which in some cases are load-bearing and are not in other cases. Their strength and their stability are life-safety issues in a seismic event. Their incompatibility in stiffness with the flexible wood-framed structure would likely cause torsional diaphragm damage and local area shear failures.

Structural Conclusions: It is our opinion that it would not be cost-effective to properly upgrade this existing structure to meet a current code category IV essential facility, as it has numerous critical flaws. The most significant may be the foundation, however, if the City of Cannon Beach decided that this structure is to be upgraded as an essential facility, we would anticipate that the following would need to completed:

- A complete as-built set of structural drawings should be developed, which defines all geometries, all member spans and spacings, all connections, and foundation locations and dimensions. Material testing should be conducted to determine all material strengths, such as wood grade, concrete strengths, steel plates, bolts and masonry reinforcing.
- Structural upgrade design which would need to comply with the current edition of the Oregon State Building Code (OSSC), and also ASCE7 and ASCE41 (Seismic Design and Retrofit of Existing Structures).
- Significant work would include an entire new foundation and slab-on-grade. A deep foundation is recommended which would likely consist of re-support of the entire structure on 24" diameter concrete piles that extend approximately 110' below grade, which support concrete gradebeams and pilecaps. Also, a structural slab is recommended (one that spans to the pilecaps, and not bearing on grade) due to the tsunami and liquefaction risks. Finally, new framing, modified framing, new plywood shearwalls, a new plywood roof diaphragm and complete lateral loads paths are required to transfer load to the foundation elements.
- Construction and special inspection is critical to ensure all existing conditions are exposed and verified in the field, in order to deal with any discrepancies between anticipated and as-built conditions.

This General Structural Assessment is intended to provide a general understanding of the 'state of the structure', specifically in relationship to its future use as an Essential Facility. No as-built structural drawings or inspection reports were provided for our review, no extensive structural investigation was performed to expose connections and the foundation and no material testing was completed. Please call if you have any questions or if we can assist you further.

Sincerely,

Richard J. Amodeo, S.E.
Principal

EXP. 12-31-2019

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USGS Design Maps Summary Report

User-Specified Input

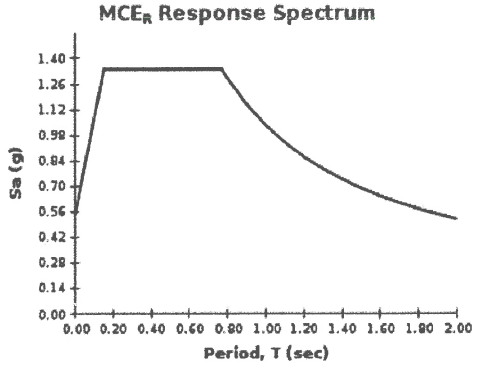
Report Title	CB City Hall - Renovation Tue November 1, 2016 16:13:27 UTC
Building Code Reference Document	2012/2015 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	45.89°N, 123.96°W
Site Soil Classification	Site Class D - "Stiff Soil"
Risk Category	I/II/III

USGS-Provided Output

S_s =	1.340 g	S_{MS} =	1.340 g	S_{DS} =	0.894 g
S_1 =	0.687 g	S_{M1} =	1.031 g	S_{D1} =	0.687 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.

MCE_R Response Spectrum



Design Response Spectrum

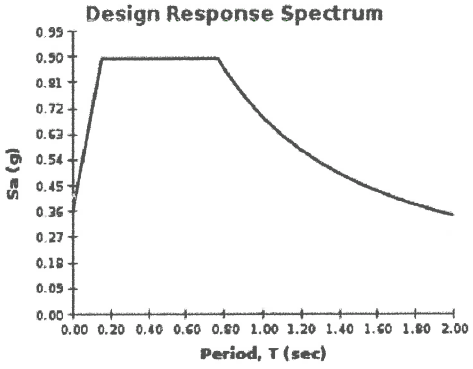


EXHIBIT E

P&L JOHNSON
MECHANICAL INC.

DESIGN * INSTALLATION * SERVICE
HEATING & COOLING * BOILERS * COMMERCIAL REFRIGERATION

To: Jay Orloff, Tolovana Architects
From: Dale Johnson, P&L-Johnson Mechanical
Date: 3-27-2018
Re: Cannon Beach City Hall

The walk-thru review of the hvac system at the Cannon Beach City Hall was done on March 15th, 2018 by Jay Orloff and Dale Johnson. The purpose was to review current conditions of the hvac system and a rough estimate of changes and repairs to bring the system up to current code including seismic standards.

Existing Conditions

The current hvac system is broken up into three separate zones on the City Hall side and two hvac units on the Police side.

The furnace (F-1) is an older horizontal natural gas located in the attic above the main city offices. The entire ducting system was completed with flexible duct in a very messy way. There is no ventilation air attached to the system and no volume dampers to balance the system. I don't see any practical way to salvage any of components. The system should be drawn out and designed for proper duct size and heat loads for the building.

The Council Chambers has a rooftop unit that supplies conditioned air to the space. The ducting is done entirely with flexible duct. The rooftop unit should be replace using a seismic curb. The ducting above the ceiling needs to be replaced with insulated steel duct and short terminations of flex duct.

Heating for the Public Works area is done by radiant tube heaters. Some areas of the radiant tubes are very close to combustible materials. There is no ventilation air in this space. I would probably remove the radiant heaters and install a furnace system for this area and a some of the spaces on the south side of the building.

There is a newer gas furnace with air conditioning for the police department offices. The furnace is located on the City Hall attic side and ducted through the wall. The unit could be reused but I would recommend replacing the system & installing new ducting to meet the seismic codes.

429 GATEWAY AVENUE * PO BOX 595 * ASTORIA, OR 97103 * PHONE 503.325.2180 * FAX 503.325.6991

SUMMARY OF FINDINGS

It is the opinion of Tolovana Architect and our consultants that the useful life of the current City Hall building has been realized. Since it was constructed for the storage and sale of building materials, the construction techniques employed were not meant for a higher occupant load or increased structural capacities of a public building. When considering the many phases of expansion over its history, the building is simply not able to be remodeled in an economic manner as compared to constructing a new facility.

Based on the poor soil conditions and higher construction standards required for essential facilities, it is both a practical difficulty and economically infeasible to upgrade all the building systems necessary for the building to serve the community as an essential facility.