# Gabriel Commons

## Property Condition Assessment

3831-3897 SW Canby St., Oregon 97216

Association of Unit Owners of Gabriel Commons
c/o Ms. Kay Brooks-Willbanks
Reserve Study Chairperson
Gabriel Commons
3831-3897 SW Canby St.
Portland, Oregon 97216

September 9, 2016
CBS Ref.: 16-045.00

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Gabriel Commons Owners Association
c/o Ms. Kay Brook-Willbanks
Reserve Study Chairperson
3831-97 SW Canby St.
Portland, Oregon 97219

Re: Property Condition Assessment
Gabriel Commons
3831-97 SW Canby St., Portland, Oregon 97216

Dear Ms. Brook-Willbanks:

Certa Building Solutions was retained by the Gabriel Commons Owners Association to conduct a property condition assessment of the commonly owned building systems and components. The objective of this assessment was to review the major building systems in order to establish a baseline of their current general condition and remaining useful service, with the intent of developing future maintenance and repair recommendations for these systems.

A record of observations was made using digital photographs. Select photographs taken during our visual review referenced throughout the report are contained in the photograph section of this report. A remaining useful life analysis is attached to this report in appendix C At the end of this report, information regarding basic building envelope principles is also provided to aid the Association's understanding of these assemblies and the issues involved. All photos taken by Certa at the time of the assessment are available for the Association's future reference.

## Scope of Assessment

The scope of our assessment work is defined by our proposal, dated August 4, 2016. This assessment included a review of the following commonly owned components or systems:

- building envelope (enclosure) systems
- attics and crawlspaces
- balconies and decks
- concrete flatwork, concrete curbs, and asphalt surfaces
- fencing
- exterior lighting
- pool, pool house, etc.
- landscaping and other site amenities

The review of the building exteriors was performed from the ground, off ladders and from the roofs and included the visual review of all 17 building exteriors. We specifically accessed10 roof surfaces, 10 attic spaces, and 10 crawlspaces. The specific locations were identified and coordinated by the Association as follows:

Attics and Crawlspaces: 3831, 3843, 3847, 3851, 3859, 3871, 3877, 3881, 3887, 3893

Roof Surfaces: 3831/33, 3839/3841, 3847/49, 3851/53, 3855/57, 3871/73, 3875/77, 3883/85, 3887/89, 3891/93

In addition to the visual observation, 9 invasive openings were performed, where siding was removed to expose the underlying assemblies. The purpose of the invasive openings was to provide a better understanding of the composition of the wall assemblies and to determine how they are performing. The specific locations were recommended by Certa, to isolate typical conditions and areas of concern. A proposal of locations was provided too, and authorized by the Association prior to commencement.

## Documents Reviewed

No documents were provided for our review prior to the assessment or during the production of this report.

## Limitations

It is a basic assumption that any correspondence, material, data, evaluations, and reports furnished by others are free of latent deficiencies or inaccuracies except for apparent variances discovered during the completion of this report. Unless specifically noted in this report, no testing, detailed analysis, or design calculations were done, nor were they within the scope of this review.

Any comments or conclusions within this report represent our opinion, and this opinion is based upon the documents provided to us, our visual review of physical conditions, and our experience.

Deficiencies reported herein are based on our visual observations that were performed from the ground, within the accessible limitations of a ladder, from the roofs and the building interiors. They do not represent a total listing of all locations with deficiencies nor do they imply that all similar locations or items to be deficient. Deficiencies existing but not recorded in this report were not apparent given the level of study undertaken.

Certa Building Solutions prepared this report for the account of the Gabriel Commons Owner's Association. The material contained within reflects the best judgment of Certa Building Solutions in light of the information available to us at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Certa Building Solutions accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based upon this report.

## Terminology

Where appropriate within this report, Certa Building Solutions evaluates the various building systems and components on their current condition using the following terminology:

- Excellent – functioning as intended; no deterioration.
- Good - functioning as intended; normal deterioration observed; no maintenance anticipated within the next five years.
- Fair - functioning as intended; normal deterioration and minor distress observed; maintenance will be required within the next five years to maintain functionality.
- Poor - not functioning as intended; significant deterioration and distress observed; maintenance and some repair required within the near term to restore functionality.
- Defective - not functioning as intended; significant deterioration and distress observed, possible damage to support structure; may present a risk to people or materials; must be dealt with without delay.

## Assessment Fieldwork

Justin Barnhart, Building Science Consultant of Certa Building Solutions conducted the on-site assessment over a period of two days on August 18th and August 31, 2015. A contractor, JR Johnson, Inc. assisted Certa Building Solutions with the assessment by removing and reinstating the siding and roofing components at locations selected by us for the exploratory work. These also provided and set up ladders and safety ropes for access. A total of nine exploratory openings and a review attic interiors, nine crawlspaces, and ten roof surfaces were made during our time on site. In addition, a general visual review of the property was also performed as part of this assessment. The weather was clear and warm on the 18th and overcast, with a bit of precipitation on the 31st. A site representative accompanied Mr. Barnhart on his attic and crawlspace review on August 18th.

## *Site Summary*

Gabriel Commons Condominiums were constructed in approximately 1974 and consist of 17 townhome-style residential buildings. 10 of these buildings have detached garages or carports and the remaining 7 buildings are constructed over an attached garage. The buildings are constructed on a gently sloping hill side and are situated around a central wooded area of mature trees. The perimeter of the property is also wooded, with mature trees and shrub under growth. A circular driving surface provides access to each building, with a single arterial road extending out to the city street. The site is located in the Northern Willamette Valley. This region of Oregon receives approximately 35-40 in. of rainfall annually. We would classify these buildings as having moderate exposure to wind-driven rain.

The buildings were originally constructed with T1-11 or cedar lap siding on their lowest elevation and cedar lap siding installed. Based on our limited invasive openings, we believe the T1-11 panel siding was installed directly to stud framing, in what is commonly referred to as single-wall construction. The lap siding was installed over either plywood sheathing or plywood sheathing. Typically, we found gypsum sheathing had been installed above and below window penetrations and plywood sheathing in the field of the wall, likely to provide sheer support to the building. Sheathing was not extended into the gables where lap siding was also installed as single-wall construction. Small targeted repairs to the siding appear to have been performed over time, and in some cases, fiber-cement lap siding has been installed.

The windows and doors are owned and maintained by the individual unit owner. Originally, aluminum windows and sliding doors were installed, along with wood-framed hollow core swing doors. Over time, some windows, sliders, and swing doors have been replaced with a variety of types and installation methods.

Many of the buildings have elevated wood decks on their back elevations, though approximately 6 of the buildings exit to grade out their back elevation. At those locations we observed a mixture of wood-framed decks and concrete patios. The elevated wood balconies on the remaining buildings appeared to originally have been cantilevered, for which one remains. The remaining elevated balconies appear to have been replaced and were now self-supporting structure that were fixed to the building with a wood ledger and supported on the outward edge by a post and beam system. All deck surfaces had open decking. The deck surfaces varied, but most were either cedar or a composite material.

The 10 buildings with detached garages are positioned directly behind the garage, which forms an inner courtyard at the front entries of the units. These courtyards were enclosed by wood framed walls connecting the garage to the dwelling. Most courtyards could be accessed by a central entrance or through garage or carport, which provided entry to the front door of the unit and a side room or bedroom. Many of these inner courtyards also had wood-framed decks with open decking. It appeared that some of these were from the original design and some had been constructed over the original concrete patios. All of the wood-framed decks appeared to have been refurbished at some point, though we were not provided a specific timeline. A relatively small percentage of the units had their original concrete patios fully exposed.

The roof surface consists of a architectural grade composition asphalt shingled roof over plywood decking. Per information provided by the client, all roof surfaces had been replaced within the last 10 years and some as recently as within the last two years. Roof surfaces consisted of two single-pitched surfaces offset by a projecting head wall at the ridge. On most buildings the roof surfaces are continuous over both units; however, where units are staggered or elevated higher than other, the roof has offsetting surfaces.

### *Health and Safety*

There were no immediate substantial health and safety issues or critical needs observed during the evaluation portion of this project.

### *Site*

The Gabriel Commons Condominiums was constructed on a gradually sloping site, that is set back approximately 250 feet from the city street, with wooded areas of mature trees located around the perimeter and in the center of the site. The site bordered a small stream on the north perimeter and backed up to a large city park at the northwest corner. The remaining perimeter area was bordered by single-family residential homes.

Refer to photos 1-3.

Mature trees shaded most of the property, including the landscaped areas, which consisted mostly of small shade-tolerant undergrowth and some areas of grass or shrubs near the sun exposed perimeters. Along the north perimeter of the property, the landscaped areas were beginning to become overgrown with invasive plant species. The trees appeared to be well maintained and pruned to prevent contact or overhanging of most of the roof surfaces. Some trees have begun to encroach on the roof surfaces and buildings, which we recommend get pruned back.

Refer to photos 3-6.

At building perimeters, the plant species and landscaping varied and appear to be maintained by the unit owner. We recommend plants be maintained in a manner that prevents contact with the building exteriors or overhangs the roof surfaces, and that irrigation does not directly spray the buildings or cause pooling water to develop along the foundation wall.

Refer to photos 7-9.

Concrete curbs, sidewalks, and flatwork exist throughout the site. Concrete curbs are the most prominent concrete feature, boarding the roads and planter beds near the road. Concrete curbs were in fair condition, with several areas in need of repair.

Refer to photos 10-12.

A small concrete stairway was provided on the west side of the property to provide access up the hill and to the pool area. Some settling had occurred and the stairway is slightly offset from the concrete landing pad at the top of stairs. A concrete path provided access from the stair to the pool area, located centrally within the property.

Refer to photos 13.

Concrete walking surface provide access to many of the buildings. These concrete surfaces extend from the driveways to the front entries, and often incorporate stairs. Generally, concrete walkways were in good condition. Maintenance or replacement of these walkways should be performed as needed.

Refer to photos 14-15.

A continuous asphalt surface formed the roadway through the complex as well as the off-street parking and driveways. The asphalt surface appeared to be well maintained. We observed one major pot-hole, marked by a cone; otherwise, we did not observe any significant deterioration of the surface. Cracks in the surface were observed, and appeared to have been previously sealed. At some locations, the cracking has redeveloped, which we recommend having sealed. The surface coat is in fair condition and likely has 1-2 years until reapplication is necessary.

Refer to photos 16-21.

A detailed evaluation of the plumbing, including supply and waste mains lines, was not performed. It is often difficult to ascertain the condition of these components as they are below grade; therefore, it is difficult to determine a replacement timeline or cost to replace. The costs we have provided are best guesses based on industry standards. Because the property is 30 years old, we recommend having an evaluation performed by a qualified individual that can provide order of magnitude pricing to perform the repair scope.

## Discussions

Generally, the landscaping, site amenities, walking and driving surfaces were in good to fair condition. Some maintenance, typical of a property of this age is needed.

The driving surfaces are in relatively good condition throughout, and appear to have been well maintenance. There were small areas requiring minor repairs to remove a potholes. Repairs can be performed by saw cutting the depressed area, preparing the surface, and patching in new asphalt. Crack sealing is recommended between seal coat applications to prevent "frost-heave" of the asphalt surfaces from occurring. Crack sealing should be performed as needed, likely on an annual or bi-annual basis.

Concrete curbs, such as the ones at Gabriel Commons, are often cast on top of the asphalt surfaces or in poorly compacted soils adjacent to asphalt surfaces, and are often not reinforced. Curbs constructed in this manner are susceptible to deterioration typical of that which was observed throughout the complex. Replacement of these curbs is often a lower priority than the driving or walking surfaces, or even the building envelope. Repairs are needed; however, they should be prioritized relative to the global community needs, and scheduled as funds are a available.

The large landscaped areas were maintained to appear somewhat natural. The larger trees provide a solid upper canopy, filtering out sunlight and, limiting what can grow below. Near exposed perimeters of the forested areas, invasive weeds are beginning to take root, which should be addressed before they become overgrown. Otherwise, the desired aesthetic is subjective, and a landscaping plan should be developed by the members of the Association or delegated to a professional. Due to the many mature trees growing on site, we do recommend consulting an arborist for maintenance advise.

## *Architectural*

Based on our observations, the exterior wall assemblies' predominately consisted of:

- Cedar lap siding and trim (exterior cladding)
- T1-11 Panel siding (exterior cladding)
- Asphaltic building paper (weather-resistive barrier)
- Plywood sheathing or paper-faced gypsum sheathing
- 2x4 or 2x6 wood studs (primary structure)
- Batt insulation in stud bays (thermal barrier)
- Painted drywall (interior finish)

Certa noted 4 distinct building types, with some slight variations within; however, to simplify descriptions of conditions we will refer to buildings based on the following types:

**Type 1 Buildings: 5 Total**

Type 1 buildings had detached garages located in front of the building, forming private courtyards at front entry. One unit contained a single garage and a carport and the other had two single car garage. The upper levels of the buildings had cedar lap siding. The lower levels had cedar lap siding, or T1-11 panels. One building appeared to have converted their carport to a garage

Refer to photos 22, 24-25.

**Type 2 Buildings: 3 Total**

Type 2 buildings had detached garages located in front of the building, forming private courtyards at front entry. Both units had a single garage and a carport. The upper levels of the building had cedar lap siding. The lower levels had cedar lap.

Refer to photos 23-25.

**Type 3 Buildings: 7 Total**

Type 3 buildings were constructed over the garages. Each unit had two single-car garages. The lower levels were clad with T1-11 panels and the upper units had cedar lap siding.

Refer to photos 26-27.

**Type 4 Buildings: 2 Total**

Type 4 buildings had detached garages located in front of the building, forming private courtyards at front entry. Both units had a single garage. The upper levels of the building had cedar lap siding. The lower levels had cedar lap siding. Type 4 buildings also had an upper and lower balcony, separated by a privacy wall that extended between both levels.

Refer to photos 28-30.

## *Exploratory Opening Results*

Nine exploratory openings were made in the exterior wall assemblies to confirm the construction and condition of the building envelope components. Detailed observations recorded at each opening are included in Appendix B, complete with identifying photographs.

The table below summarizes the results.

Exploratory Opening Summary Table

| Extent of Damage Found | Openings in Exposed Walls | % of Openings |
|---|---|---|
| No damage, no evidence of moisture | 0 | 0% |
| Evidence of moisture, but sheathing intact | 2 | 22.2% |
| Deteriorated sheathing, but framing intact or condition of framing not confirmed | 6 | 66.6% |
| Sheathing and framing deteriorated | 1 | 11.1% |
| Total Openings | 9 | 100% |

The openings revealed various levels of deterioration (moderate to severe) of the wall sheathing due to water penetration from the various details. To a lesser extent, this type of damage may impact the underlying structural framing. The openings also revealed the deteriorating condition of the original cedar lap siding, improperly installed windows, omitted through-wall flashings, and lack of a continuous underlying weather barrier.

## *Exterior Siding Assemblies*

The following are specific observations from our review:

1. Most cedar lap siding was installed as a direct applied system, over wall sheathing (either plywood sheathing or paper-faced gypsum) and intermittent asphaltic felt paper weather resistive barrier. These systems have limited drainage capabilities.

   Where exploratory openings were performed and cedar lap siding was removed, the lap siding exhibited visual indicators of prolonged moisture exposure on the back side, which included water staining and leaching of the tannins. Tannins are the naturally occurring oils within cedar that prevent wood decay. Over time, these oils are depleted by repeated wetting of the wood surfaces, which will eventually allow the wood fibers to break down. As the wood fibers break down cupping, decay, or splitting of the wood siding will begin to occur, all of which were observed.

   Refer to photos 31-32. Refer to exploratory openings 2 and 9.

2. Where cedar lap siding was installed within the gable walls or head walls, the siding is installed directly to stud sheathing. The Association has reported that this is also the case on garage walls and guard walls. Within the attic spaces, we observed consistent damage or deterioration to the weather-resistive barrier behind the siding.

   Refer to photos 33-37.

3. T1-11 siding is installed at the lower levels of many buildings within the complex, and appears to be directly applied to stud framing without the use of a fully integrated weather-resistive barrier. Horizontal material transitions and through-wall penetrations were not flashed to prevent water ingress. At wall penetrations, such as window we observe multiple installation methods, most of which do not conform with today's industry best practices, placing the wall assemblies at risk for water intrusion.

   Type 1 and Type 2 buildings had locations where a balcony or deck ledger is directly fixed to the panels without the use of flashing to prevent water ingress. Structures, such as deck ledgers, fixed directly to the panel siding can allow water to become trapped between the two materials, where it can decay the panel siding or enter through the fastener penetrations. We observed open voids in the cladding at numerous locations and water staining on the surface of the siding. Evidence of water damage on the interior side of the plywood was observed, from the crawlspace of building 39/41. Further investigation is recommended

   Refer to photos 38-40.

4. Cedar lap siding appeared to be mostly original, though there were recognizable locations where targeted repairs and replacements had been performed. In some cases, fiber-cement siding had been used to replace cedar lap siding.

   In many cases, the large fields of exposed wall surface where cedar lap was installed, lap siding was visibly cupping, splitting, or otherwise weathered. These are visual indicators that the lap siding has been exposed to prolonged periods of wetness and is nearing the end of its useful life.

   By contrast, where the cedar lap siding was installed under well protected areas, such as the carports and walkways, the lap siding was in relatively good condition.

   Refer to photos 41-48. Refer to exploratory openings 2 and 9.

5. The joinery created between the wood trims and siding, around window and doors, and at other transitions and penetrations within the cladding system are prone to water leakage, as they lack appropriate flashing. These types of joints can allow bulk water to pass the outer face of the siding. In wet climates the amount of water that can get behind the siding in this fashion can overwhelm the moisture sensitive wall assemblies

behind the siding well before the end of the expected service life. Water leakage and resultant damage is often exacerbated by poor flashing practices.

Refer to photos 49-57.

6. Lap siding was installed in vertical sections, rather than with staggered joints. Continuous vertical trim board are installed intermittently, and lap siding was installed within, and sealed to the vertical trim. Sealant joints had failed at numerous locations, providing egress to incidental moisture. Where sealant has failed along a significant length of the vertical trim, there is a high risk for water ingress. At many of the exploratory openings, we observed broad wetting patterns on the wall sheathing as a result of sealant failure.

   Refer to photos 58 - 66. Refer to exploratory openings 2 and 9.

7. Numerous discontinuities and mis-laps of the weather-resistive barrier were documented at the exploratory openings. Additionally, the weather-resistive barrier was not properly flashed around wall penetrations (i.e., windows, doors, exhaust vents, etc.) and at wall transitions and terminations (i.e., roof-to-wall transitions, parapet transitions, guard walls transitions, terminations at foundations, terminations at soffits, etc.). Water damage to the wall sheathing from leakage was documented at many of these conditions. At many of the window and door openings, a weather resistive barrier was not present and damage to the paper-faced gypsum sheathing had occurred, causing the gypsum core to de-bond from the facing paper.

   Refer to photos 67- 72. Refer to exploratory openings 1 and 9.

8. Sheet-metal flashing was generally not incorporated within the wall cladding assemblies to deflect water away from entering the wall assemblies. The top edge of horizontal trim or wall penetrations were not flashed, leaving a continuous opening along the top edge for water intrusion behind the siding or trim, should sealant fail. The wall mounted utility meters on the side of the buildings have not been flashed where they connect to the walls. This can result in water damage to the wall assemblies behind and below these meters

   Refer to photos 73-76. Refer to exploratory openings 1 and 9.

9. Paper-faced gypsum sheathing was used to sheath the walls around window and door penetrations. Paper-face gypsum is very sensitive when subjected to moisture. Both the paper facing and the food-based adhesives used in the gypsum sheathing provide an excellent food source for organic growth. Where water leakage was occurring, organic growth on the sheathing was generally present. Additionally, once the sheathing becomes too wet, it loses its structural integrity, even when it dries out. De-bonded paper and fracturing of the gypsum core was documented at the opening locations. In areas where direct water leakage was not occurring, the gypsum sheathing was still

heavily stained and discolored. This can happen gradually over time as the gypsum sheathing absorbs humidity.

Refer to photos 77-81. Refer to exploratory openings 2 and 9.

10. No means was provided to control air flow across the wall assemblies. Uncontrolled air flow increases the energy consumption of the building and can carry pollutants (i.e., soot, dust, pollen, mold spores, etc.) to the interiors across the wall assemblies on currents of air. This can also contaminate the batt insulation in the stud bays as the batts filter airborne particulates as air moves past the insulation. Furthermore, warm, moisture-laden air from the interior can be deposited as condensation on colder surfaces within the structural assemblies during the winter months with resulting damage.

    Refer to photos 82-87.

11. The framed guard walls at balconies and courtyards were not flashed to prevent water intrusion into the wall cavity. Wood caps instead of sheet-metal flashing were installed over top of the guard walls. The cedar lap siding and trim installed on most guard walls was in poor conditions. No underlying membrane or flashing was provided to protect the moisture sensitive wood framing in the event the wood caps should permit water leakage. At exploratory opening 8, we observed damaged to stud framing.

    Refer to photos 88-99.

12. The structural ledgers to support the balcony structures were poorly flashed or not flashed at all to prevent water migration behind the siding below. Water leakage, damage to wall sheathing, and water staining on wood framing to the wall below was documented at exploratory openings. The ledgers will need to be removed in order to repair the water damage to the sheathing and structure, and to properly reinstate the ledger with proper flashing elements.

    Refer to photos 100-105. Refer to exploratory openings 2, 3, 4, and 8.

13. Exhaust vent penetrations through the wall assemblies were not flashed or positively integrated with the weather-resistive barrier. Water leakage past these components and condensation from the warm exhaust is resulting in water damage to the underlying structure and surrounding trim and siding.

    Refer to photos 106-107.

14. Paint coatings appeared to have been applied within the last 3-5 years. We observed areas where paint had delaminated with the wood surfaces due to water migration behind the siding. Additionally, we observed locations where painting was applied over a wood substrate that was in poor conditions and was beginning to lose its bond.

We observed numerous sealant failures around windows, doors, and trim. High modulus sealant appears to have been applied at material transitions and wall penetrations. High modulus sealants, contains higher solid contents than a medium or low modulus sealant, and therefore have lower elasticity. These types of sealants perform well with cladding assemblies that have limited movement; however, when applied in systems that require more movement, such as wood siding, sealant failures can occur. Sealant failures can be exacerbated, when siding is repeatedly wetted, as additional expansion and contraction of the siding occurs in conjunction with the wetting and drying cycles.

Refer to photos 108-112.

## Discussions

The wood-framed wall assemblies are clad in what is commonly referred to as a "concealed-barrier" system. Concealed-barrier systems generally incorporate a water-resistant material (typically building paper or housewrap) behind the exterior siding system. Small cavities behind the cladding formed within the siding laps allow some drainage of water, provide a capillary break, and enhance drying with air movement that can occur between the backside of the siding and the weather-resistive barrier.

The success of these wall systems in resisting exterior water penetration depends on:

- Controlling the volume of water that penetrates the siding system.
- The correct lapping of the weather-resistive barrier and flashing to direct water down and out of the wall assembly.
- The size and effectiveness of the drainage plane behind the siding to shed water down to the flashing and back to the exterior.

In moderate to high exposure conditions, recent history has shown that siding systems, such as this, applied directly over top of the weather-resistive barrier do not provide adequate drainage and drying capacity to the wall assemblies. As a result, this type of assembly incurs a higher risk of deterioration due to water entry in climates with extended wetting seasons, such as found here in the Pacific Northwest.

The amount of water that penetrates past the face of the siding system via leakage paths at the interface with adjacent elements often exceeds the drainage and drying capacity of the wall assemblies due to the sheer volume of water that can penetrate past the siding system. This results in water being trapped between the siding system and weather-resistive barrier for extended periods of time. Because the weather-resistive barrier is only water resistant, as opposed to waterproof, this moisture often penetrates through to the underlying sheathing and framing, resulting in deterioration of the hidden structural components.

The problems with water intrusion are often exacerbated by improper interface details, which can allow even more water to penetrate past the siding system. In some instances, water penetrating at interface details is also provided a path directly behind the weather-resistive barrier if this material is not adequately “flashed” or “sealed” at the interface with the adjacent envelope component, as is the case with the cladding here. Over time, as the water breaks down the underlying materials, reach of the water migration behind the cladding broadens, and the extent of underlying damage is greater.

It is now well understood that a reliance on the exterior surface of the wall cladding and associated sealants to prevent all water penetration is not achievable in locations with moderate to high exposures to rainwater. Wall assemblies have experienced extensive water penetration problems and resulting deterioration when constructed in this fashion. These wall systems are appropriate only for sheltered locations or in very dry climates.

At Gabriel Commons we found broad areas where the siding and trims and underlying sheathing were deteriorated from the effects of prolonged and persistent water intrusion. To a lesser extent the structural framing has also been impacted. The potential extent of damage to the structural framing is difficult to ascertain due to the limitations of the exploratory openings performed to date. However, these types of repairs generally require broad cladding replacement. The extent of the problems was not necessarily location or detail dependent. Significant deterioration of the wall elements was observed on all of the various types of typical details and wall configurations that occur on the buildings.

Additionally, it was noted that numerous repairs had been performed around the property at various periods of time. The repairs did not necessarily adequately address the underlying cause of the water intrusion problems. Many of the repairs were crude or were simply performed as a means to provide temporary relief.

*Windows and Exterior Doors*

The following observations were made during our review of the windows and doors:

1. The aluminum-framed windows and sliding-glass doors did not have thermally broken frames. This makes these units less energy efficient than modern windows and do not meet the minimum requirements of the current code for window thermal performance. Poor thermal performance can result in condensation on the frame interiors and excessive heat loss in the winter.

   Refer to photos 113-116.

2. The windows were not flashed within their rough openings. No attempt was made in the installation to make a positive connection between the window flanges and the weather-resistive barrier. No sheet-metal flashing was provided to shed water above the window heads. Extensive damage to the surrounding wall assemblies was documented around the various windows that were included in the exploratory opening samples. We suspect the flashing conditions are similar for the sliding-glass doors as there was nothing

visually indicative of proper flashing around them as well. Refer to exploratory openings 1-6 and 9.

3. Windows and sliding glass door units replaced over time have been done so using a number of types and installation methods. We observed units that have been mounted out-board of the siding, jump-framed windows, block-style windows typical of stucco or masonry construction, and units that have had their integral mounting fins removed. Most windows that have been installed without the use of through-wall flashings. These installations do not reflect the current best practices for window installation and put the surrounding cladding assembly at risk of water related damage.

   Refer to photos 117-123.

## Discussion

When exposed to wind-driven rain, windows and exposed doors can allow leakage into the building interior. This can create significant damage and nuisance depending on how often it happens and how much water penetrates through the units. Windows and exposed doors have also been proven to be a common source of water penetration into wall systems, which has often resulted in extensive water damage to the wall structure below. Often water ingress around a window or door will not manifest itself on the interior side of the unit until significant damage has occurred to the underlying wall sheathing and structural framing. This can result in extensive and costly repairs. Typical leakage points include:

- poorly sealed joints at the perimeter between the window and door frames and the siding system,
- joints where sectional windows are coupled together,
- or joints within the window and door frames themselves.

At Gabriel Commons water damage to the wall sheathing was documented where exploratory openings were performed around the windows and sliding glass doors. More extensive damage can be expected on the elevations that face the prevailing wind-driven rain. The doors and windows that do not incorporate a flange, are particularly prone to leakage around their perimeters, as they cannot aid in shedding water. Most of the performance problems have been caused by poor flashing practices around the perimeters of the units.

Newer windows have been installed using methods that to not conform with today's standard practices. Windows are an integral part of the entire building envelope assembly and poor detailing around the new window can often impact the vertical wall cladding systems by providing a clear path for water ingress. It is imperative that the installation of a new window tie in to sound weather resistive barrier, utilizing today's standard practices.

Today’s standard practice in new construction or during major renovation is to provide an integrated flashing assembly that turns into the rough openings to provide waterproof “pans” beneath the window and door units (refer to photo). This pan flashing is meant to protect the structure below and drain the incidental water out of the wall system in the event that water leaks around the windows and doors.


Such waterproofing measures protect the wall, but do not improve the performance of the windows or doors themselves. In locations where major remedial action requires window and door removal, we generally recommend that the Client considering replacing them with new units unless they are relatively new, appropriate for the application, and of good quality. Replacement costs down the road will be substantially more expensive as the new wall assemblies will need to be prematurely disrupted to extract the aging windows at a later date., and in the mean time, an aging window may be placing the new cladding assembly at risk. Strong consideration should be given to upgrading these units to improve their performance and for aesthetics. Damaged swing doors that are also affected by the work should also be replaced. In fact, consideration should be made to at least replace the primary entrance doors with new doors that are rated to resist rainwater penetration.

Reasons to consider replacement rather than reuse the windows and doors include:

- The incremental cost of replacement, over a refurbish and reuse strategy, is often less than the purchase cost of new windows (installation costs cancel out; and potential repair costs for the existing windows often offset the cost of new windows). This difference between the two in this particular case would need to be confirmed by the Contractor.
- The use of better windows reduces the risk of water damage to sills and material below the windows and nuisance of rain penetration.
- The disruption to and handling of windows and doors during the removal and reinstallation process may increase leakage in some units.
- Windows with a more appropriate condensation resistance and improved energy efficiency can be purchased.
- Replacing the insulated glazing units (IGU) in a window costs about the same as buying new windows, especially if one considers that the IGU’s at the community have served for a significant part of their expected life. The life cycle cost of replacement is reduced relative to a refurbish and reuse strategy.
- Reused windows and doors detract from the aesthetics of a newly rehabilitated wall assembly.

### *Wood Decks, Balconies, and Concrete Patios*

The following are specific observations from our review:

1. Wood decks of different sizes, layouts, materials were constructed at unit entries and some of the back patios. Balconies, on the other hand, were generally uniform. Generally, we differentiate the decks from the balconies by their proximity to the ground and the requirement for railings as fall protection.

   Refer to photos 124-129.

2. The decking surfaces of both balconies and decks consisted of open wood decking throughout. In most cases the deck surfaces had natural cedar wood surfaces, though we did observe both composite and exotic wood species.

   Refer to photos 130-134.

3. Due to the proximity to the ground evaluation of the underlying structure of the decks was difficult to assess. We noted that many of the decks appear to have been refurbished and we assumed that the appropriate upgrades or replacement to the structures were performed. Based on limited review of the deck structures, they appeared to be constructed using pressure treated lumber and were elevated on concrete pier blocks with metal brackets.

   Refer to photos 135-136.

4. Many of the balconies appeared to be recently reconstructed, though an exact replacement history was not provided. It appears that the original balconies may have been cantilevered, which were cut off and replaced with a self-supporting structure consisting of pressure treated lumber framing, galvanized joist hangers, pressure treated posts on concrete piers. The balcony surfaces are open wood or composite decking and wood picket railings.

   Refer to photos 137-138.

5. Ledger flashing was inconsistent and often we observed open voids under the ledger flashing. Sliding glass door thresholds do not appear to be integrated with a continuous ledger flashing further complicating the flashing condition at the ledger. Were siding was removed, evidence of water intrusion was observed under the ledger. At the entry decks, the ledgers were often mounted directly to the siding, without the use of through-wall flashing. We observed evidence of water damage on the back side of the siding within the crawlspace of building 47/49.

   Refer to photos 101-103. Refer to exploratory openings 2, 3, 4, and 8.

6. Privacy walls between the balconies were often not capped with sheet metal copings and did not appear to tie directly into the walls with sheet metal flashings. In some instances, the wood cap on top of the wall is not sloped to promote drainage.

   Refer to photos 139-144.

7. Generally, the concrete patios were in good condition. Minor cases of undermining at the edges of the concrete slabs were observed. These areas should be restored to prevent settling or cracking of the concrete.

   Refer to photos 145-147.

## Discussions

Generally, the decks and patios were in good condition, though most were of varying ages and layouts. Similarly, balconies have been replaced and upgraded over time and generally, are in good condition.

Our primary concern with the balconies and decks is the attachment point at the ledger, which is vulnerable to water intrusion, and can lead to extensive damage to the vertical wall assemblies. Additionally, there does not appear to be a sub-sill membrane pan at the sliding door threshold, that is integral with the ledger. Water and, or organic debris can potentially become trapped between the ledger and wall surface. Organic debris will act like a sponge, and prolong the wall surfaces exposure to moisture. We recommend properly integrated flashing are installed above and below the ledgers to prevent further damage to the wall assemblies.

The natural wood surfaces should be treated with a UV resistant wood preservative no less than every 3 years. Though these decks may be of varying ages, it may be easier to treat them on the same schedule. There are many factors that may limit or prolong the age of the deck surfaces, such as foot traffic, exposure (both rain and UV-light), and potted plants, and we observed varying degrees of all three conditions.

Where the owner desires more potted plants, it may make more sense to have a composite deck surface and where decks are exposed to excessive UV light, it may be advisable to use a natural wood surface. Typically, we would anticipate either decking product to last 10-15 years and for the pressure treated structure to last for two surface cycles with minimal repairs.

Concrete patios were in good condition. Some minor undermining of the slab edges were observed, which are recommended to be back-filled. Replacement of concrete pads should be performed as needed.

### *Sloped Roof and Attic Observations*

The following are specific observations from our review:

1. Composition asphalt roof surfaces appeared to be in good condition throughout the property. We observed typical surface wear and minimal granular loss. The field appeared to be fee of exposed fasteners and vent flashings appeared to be properly

integrated with the roof surface. We noted minimal moss growth on north facing or tree shaded roof surface.

Refer to photos 148-153.

2. Gutter flashing and rake wall flashing was installed throughout. Gutter flashing, installed along the eaves of the roof surface was appeared to be improperly integrated with the roofing underlayment, creating a reverse lap, at one location. Reviewing other locations was difficult due to the placement of the gutter guard over the gutters.

   Refer to photos 154-156.

3. Siding was in close proximity or in contact with the roof surfaces at head and rake wall conditions. Additionally, diverter flashings are not provided where the rake wall meets the gutter. Typically, these conditions are corrected during a roof replacement. Siding appeared to be original and did not have obvious signs that it had been removed at the time the roof was replaced. Failure to remove the siding at the base of wall would prevent the installation of the roofing underlayment up the vertical wall surfaces, in accordance with current best practices.

   Refer to photos 157-159.

4. Where roof surfaces were offset on building 51/53 a valley condition was created that appears to be leaking. Further observation is recommended.

   Refer to photos 160-161.

5. We observed unsealed exposed fastener heads at head walls. Penetrations such as these create a point of access for water intrusion.

   Refer to photos 162-163.

6. Sealant applied around storm collars was fatigued or failing and should be replaced. Storm collars are located as sheet-metal vent stacks which provide exhaust for HVAC equipment.

   Refer to photo 164.

7. Gutters are covered with perforated gutter guards that prevent debris build up in the gutters. These have the tenancy to become obstructed on the surface, allowing water to flow over the gutters. Additionally, smaller debris can still build up within the gutters and will eventually require cleaning.

   Refer to photos 165-166.

8. Gutters appeared to be in good condition throughout the complex, though the downspouts are insufficient, which is likely leading gutters overflowing during elevated rain. Staining on the gutters was observed, indicating this was the occurring. In most cases we observed a single downspout for the full length of the roof surface.

Additionally, where buildings were staggered, the higher roof surface drained directly onto the roof surface below.

Refer to photos 167-170.

9. Within most attics, the insulation did not provide full coverage over the ceiling in certain areas or was installed to insufficient depth.

   Refer to photos 171-172.

10. Within the attics, the exhaust ducts were not insulated, nor were they tight-lined to the roof vents to ensure their exhaust was discharged to the interior and not into the attics. This has resulted in damage to the underside of the roof sheathing.

    Refer to photos 173-177.

11. The chimney cap on unit 73 appeared to be allowing water to enter the wall assembly below. Further investigation is recommended.

    Refer to photos 178-180.

### Discussion

Roof surfaces appear to be in good condition. A composition asphalt shingle roof such as the ones installed at Gabriel commons can be expected to have a service life of 20-25 years.

That being said, the service life of a roof surface is limited to the performance of all of its components. The issues noted at rake and head walls, the valley condition noted at building 51/53, and deterioration of the roof sheathing can limit that performance. Further evaluation is recommended to determine the appropriate necessary steps to ensuring the full life of the roof surfaces is achieved.

The condition of the roof sheathing was consistent with a building of this vintage; however, we would have expected the roof sheathing to have been replaced along with the last roof renewal. At this point, with a newer roof surface installed, special consideration should be made to ensuring attics are properly ventilated and protected from air leakage and the accumulation of warm humid air.

Sealing exposed roof fasteners is recommended near term, along with replacing sealant at storm collars. Moss growth can be chemically treated so as to not damage the roof surface. Regular removal of leaves is likely to be the majority of ongoing maintenance, due to the mature trees located on the west perimeter of the site.

Sealing the perimeter walls and adding additional attic insulation in those units that have not been upgraded will add substantial benefit to the efficiency of the heating and cooling systems below. Currently the code requires R-38, which is equivalent to 15.5 in. of blown-in fiberglass insulation.

Additional downspouts are necessary to facilitate adequate drainage of the roof assemblies. In light of ground water concerns, we recommend these downspouts are tied into the existing storm water system.

### *Crawlspace Observations*

The following are specific observations from our review:

1. Crawlspaces were observed to be dry and free of debris throughout the complex. It appears that extensive work has been performed to mitigate ground water. The crawlspaces were lined with a continuous vapor barrier and most crawlspaces were equipped with at least one sum pump.

   Refer to photos 181-182.

2. Below floor insulation was installed in most attic spaces and adequately secured to floor joists. At some locations, insulation had fallen, but this was minimal.

   Refer to photo 183.

3. Exposed water pipes were visible in the attic spaces, some of which were not insulated. Non-insolated water pipes are prone to freezing, which could lead to flooding in the crawlspaces.

### Discussion

Generally, crawlspaces were in good condition. Periodic inspection is recommended to monitor any changes in condition. We do recommend that all supply piping is insulated to prevent freezing water pipes.

## Miscellaneous Observations

1. The pool area and clubhouse located within the center of the property is enclosed by a cedar wood fence. The cedar wood fence appears to be relatively new and in good condition.
2. A concrete pool deck surrounds a oval shaped swimming pool. The concrete pool deck appeared to be in good condition.
3. Newer patio furniture is provided around the perimeter of the pool deck.
4. The pool surface consisted of a plaster pool liner and a tile band around the perimeter. We did not note any surface cracking at this time.
5. The clubhouse contained a small kitchenette with refrigerator and a sink. Additionally, two small tables and some chairs are provided.
6. Mechanical equipment for the pool was located within the clubhouse.

## Conclusions and Recommendations

The combination of our visual observations and exploratory openings suggest that after 42 years of service the building envelope components of Gabriel Commons are nearing the end of their useful service life. At this time, we recommend the Association begin the budgeting and planning process for eventual replacement of their building envelope.

With the limitations of this initial assessment, the full extent of water intrusion and the resultant damage cannot be confirmed without more extensive exploratory work, but the extent and severity of moisture deterioration appears to be associated primarily with specific elements of the construction. Specifically we noted failure of the building envelope assemblies at:

- windows and exposed doors,
- balcony ledger attachments, guard walls and privacy walls,
- exhaust vents and utility meters,
- inside and outside wall corners, miscellaneous wall transitions and details,
- and various roof transitions, terminations, penetrations,

Based on the current condition of the wall assemblies at Gabriel Commons and their performance after over 40 years in service, significant repairs will need to be made protect the buildings from further water damage. At this time, we recommend the Association begin to develop a conceptual scope of repair addresses those key details that exhibited the main performance issues for planning and pricing purposes. The scope of repair is detailed enough to be sent out to qualified contractors to obtain order of magnitude pricing for these repairs; however, it is not meant for construction. The cost information obtained from the contractors will allow the Association to identify their priorities and develop a strategy, budget and refined scope for future repairs. Certa remains available to assist the Association through this process.

END OF REPORT

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We appreciate your confidence in Certa Building Solutions and we look forward to addressing any questions or concerns that you may have regarding the contents of this document. Please do not hesitate to contact us at (503) 320-4719 if we can be of further assistance. Thank you.

Yours truly,

Justin Barnhart, RS, CEI, LEED AP
Building Science Consultant

Mark Rose
Building Science Specialist

# Building Envelope Principles

## General

The main function of the building envelope assemblies is to serve as an environmental separator between outdoor and indoor environmental conditions. As such, the building envelope should resist environmental loads that can lead to building envelope failure. The building envelope should be designed to both resist the external environmental loads such as wind loads and solar gains, but should also account for interior temperature and humidity, which are primarily controlled by the building occupants. In the Pacific Northwest climate, the building envelope should be designed to accommodate proper water management principles using durable materials. The building envelope should be resistant to mechanisms of deterioration and adjoining materials should be compatible.

## Mechanism of Deterioration

There are many mechanisms that lead to failure of the building envelope assemblies. The mechanism that needs to be primarily addressed is the management of exterior moisture. Building components must be designed with an understanding of the length of time (design service life) for which they will be expected to perform their intended function. The following describes different factors for which the building envelope should be designed to resist or accommodate, with the main focus being controlling the exterior moisture sources:

### Precipitation

In the Pacific Northwest climate, rainfall is the primary environmental factor that the building envelope will have to resist or accommodate. The building envelope will be required to minimize ingress of precipitation into its components, assemblies and interior space. There are four ways of addressing this:

- Deflection
- Drainage
- Drying
- Durability

Deflection is the first line of protection against water ingress. It includes the use of overhangs, protective flashings and wall siding to protect the interior components. The three other attributes are more directed towards the control or management of the water penetration. Drainage, in terms of wall siding systems, will include the incorporation of a cavity to provide a capillary break and to direct moisture to the exterior of the wall assembly. This cavity will also allow air-circulation, which will improve the drying potential of the wall assembly. In terms of roof systems, drainage is used to collect and control the water. Finally, the use of durable materials such as concrete, metal and pressure treated wood will also improve the resistance of the assemblies to water penetration.

## Air Leakage

Air leakage is the result of an air pressure differential across the building envelope assemblies which can cause warm moist air to be drawn from the interior to the exterior or conversely for rain water to be sucked into the interior. Both ways could potentially result in water accumulating in the wall system, either through condensation of the water vapor as the air is drawn out or through moisture deposition as liquid water is drawn in. This can be controlled by the incorporation of an air-barrier system. An air-barrier will control the flow of air through the wall assembly and thus limits the potential for heat loss and condensation due to the transfer of water vapor. The air tightness of components such as walls, windows and other exterior penetrations is essential.

## Vapor Diffusion

Vapor diffusion occurs when the vapor pressure of the interior air is different from the exterior environment, particularly during the winter months when excessive humidity and temperature differentials occur. A vapor retarder or barrier is located within the wall assembly to control the flow of water vapor and limit the potential for condensation on cold surfaces within the wall assembly. Polyethylene sheets, vapor resistant PVA primer, faced insulations, self-adhered membrane, metal backpans and glass are common materials used as vapor retarders. In the climate of the Pacific Northwest, the vapor retarder should be installed inward from the thermal insulation (on the warm side).

## Heat Transfer

Heat transfer is resisted by the use of thermal separators, such as insulation between interior and exterior spaces. It will also minimize surface condensation within the wall assembly by installing the thermal separator in the proper location within the wall assembly (i.e. exterior of the vapor barrier).

## Others

Other mechanisms of water ingress occur as a result of surface water and moisture in the ground. Wall assemblies, including those below ground level, should be protected against water present at grade. Accumulation of water against the base of building walls should be avoided.

## Interior Environment

Interior temperature and humidity conditions also play an important role in the overall performance of the building. The building owner or occupants control these conditions. The relative humidity (RH) level should be kept within certain limits so that the potential for condensation is decreased.

For human comfort levels, the RH should be maintained between roughly 30% and 60% RH. To minimize risks of interior moisture causing condensation at windows or within wall or roof assemblies, it is recommended that the RH not exceed the upper limit of 60% RH.

In the Pacific Northwest climate, the best method for keeping the interior humidity levels as low as possible is to regularly use exhaust fans to remove the interior humid air and replace it with fresh air. Bathroom and kitchen fans at residential units are key to this concept as they are in areas where significant levels of moisture are generated (cooking, showering, bathing, etc.). It is also very important to ensure that clothes dryers work as effectively as possible. This means that dryer lint traps must be cleaned regularly and that ducts and vents must be cleaned often.

An easy indication that the interior conditions have reached an unacceptable level is condensation on the windows.

Typical activities that would help reduce the interior RH are:

- Regular use of the bathroom fan while showering or bathing, and keep it running for at least one hour after you finish.
- Regular use of the kitchen fan during and after cooking.
- Regularly keep curtains, drapes and binds open to allow frequent circulation of interior air over windows.
- Opening of windows to provide natural ventilation of the home.
- Avoid placing furniture tightly against exterior walls, which may block circulating air.
- Avoiding excessive amounts of potted plants in the units.

# Appendix A: Photographs

**Photo 1**

Gabriel commons constructed on a gradually sloping site.

**Photo 2**

Buildings constructed on the hillside around wooded areas.

**Photo 3**

Typically, the downhill side of the buildings are 2 stories and the uphill sides are one story.

### Photo 4

The center of the property is heavily wooded, with large mature trees and shrub undergrowth.

### Photo 5

Toward the entrance of the property large Douglas firs are present.

### Photo 6

Along the north perimeter of the property large trees line a ravine where a small creak flows.

**Photo 7**

Landscaping around the buildings appears to be maintained by the unit owner.

**Photo 8**

Typical landscaping at the building perimeters.

**Photo 9**

Private landscaping.

**Photo 10**

As curbs have eroded, they have been replaced with CMU pavers.

**Photo 11**

Concrete curbs have deteriorated and are being replaced with CMU blocks.

**Photo 12**

Concrete curbs line the perimeter of the street and some planter beds near the street.

**Photo 13**

Concrete stain providing access to the pool area.

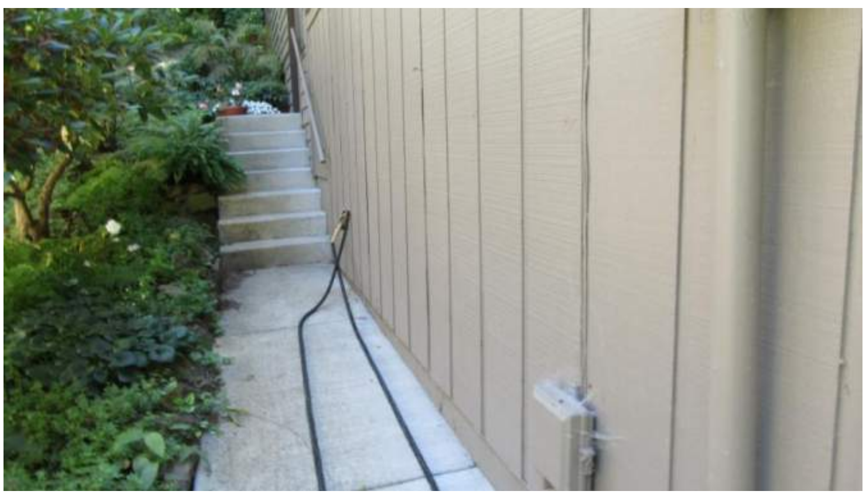


**Photo 14**

Typical concrete flatwork around building perimeters.

**Photo 15**

Typical concrete flatwork.

### Photo 16

Asphalt surface was in generally good condition. Some minor crack sealing is needed.

### Photo 17

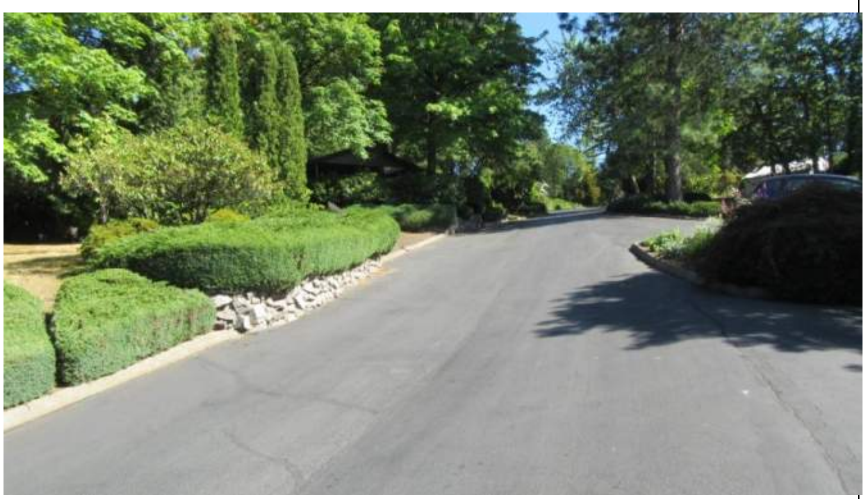
Overall of drive surface looking west toward the entrance.

### Photo 18

The drive surface looking west at the north perimeter of the property.

### Photo 19

The drive surface looking south at the northwest corner of the property.



### Photo 20

The driving surface looking east toward the entrance of the property.

### Photo 21

Looking south down the arterial drive connecting the loop to the city street.

**Photo 22**

Type 1 building.

**Photo 23**

Type 2 building.

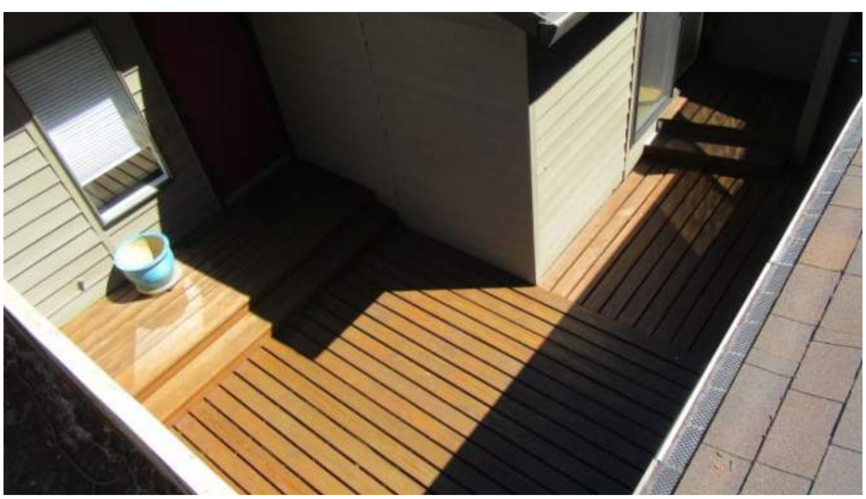


**Photo 24**

Typical courtyard formed between detached garage and the primary building for type 1 and type 2 buildings.

**Photo 25**

Typical side and rear elevation of a type 1 and type 2 building.

**Photo 26**

Type 3 building.

**Photos 27**

Rear and side elevation of the typical type 3 building.

**Photo 28**

Type 4 building.

**Photos 29**

Typical courtyard formed between the garage and primary structure at a type 4 building.

**Photo 30**

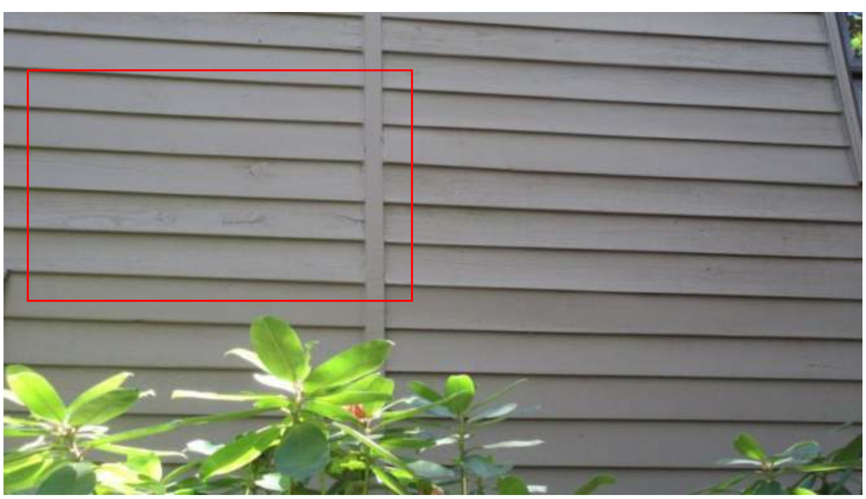
Type 4 buildings have a bottom and top level wood framed balcony.

### Photo 31

Typical cedar lap siding wall configuration.  Cupping and warping in the siding are visible by the irregularities in the surface..

### Photo 32

Cedar lap siding at the upper level and T1-11 at the lower level.



### Photo 33

Cedar lap siding has cracked, warped, and cupped as it nears the end of its useful life.

**Photo 34**

Typical head wall configuration.

**Photo 35**

Lap siding on head walls was in poor condition.

**Photo 36**

Gable walls, lap siding is installed as single-wall construction. The weather barrier was often damaged or deteriorated.

**Photo 37**

Gypsum sheathing was visible water damaged at head wall conditions throughout the complex.

**Photo 38**

On the front elevations of Type 3 buildings, the T1-11 is tucked under the projecting floor above, providing some protection.

**Photo 39**

T1-11 siding installed at the bottom level of type 1 and type 2 buildings. Often the ledger was mounted directly over the siding and was not flashed to prevent water ingress.

### Photo 40

At side walls, T1-11 siding was lapped under the lap siding above to project the leading edge.

### Photo 41

Close up of typical cedar lap siding. Lap siding was visibly cracking, warping, and cupping throughout the complex.

### Photo 42

Warping of siding is creating open voids that can allow water ingress, which will further deteriorate the cladding.

**Photo 43**

Cracked cedar siding was observed throughout the complex. Conditions like these create avenues for water intrusion.

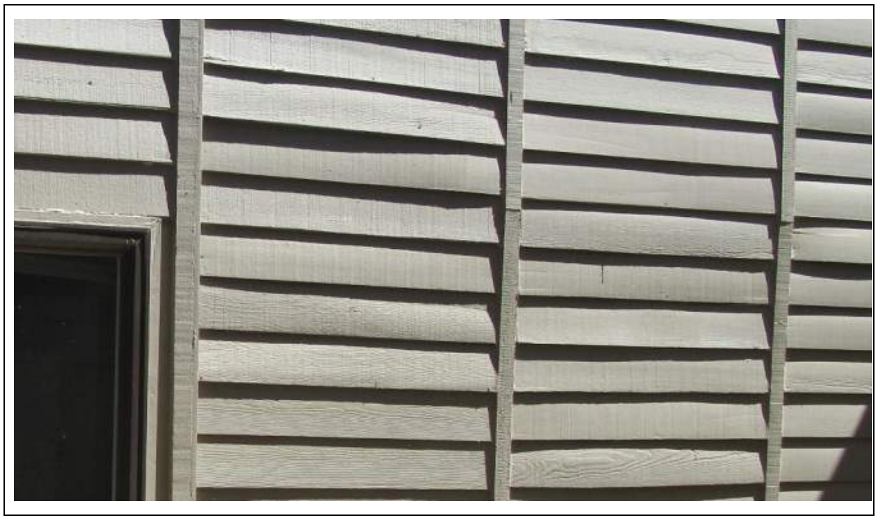


**Photo 44**

Irregularities in the wall surfaces created by aging siding.

**Photo 45**

Typical crack in the beveled cedar siding.

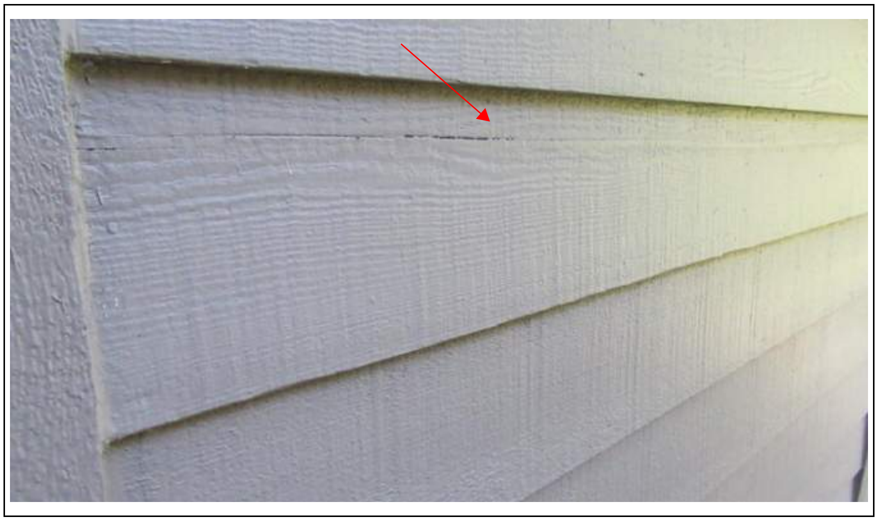


**Photo 46**

Typical crack in siding.

**Photo 47**

Damaged siding under the ledger.

**Photo 48**

Damaged siding at the base of wall.

**Photo 49**

Replacement window with brick-mold trim around perimeter. Trim is not flashed and joint sealant had failed.

**Photo 50**

Typical jump-frame window. A replacement window has been installed within the frame of the original window and sealed at the perimeter.  Sealant joints have failed, permitting water ingress.

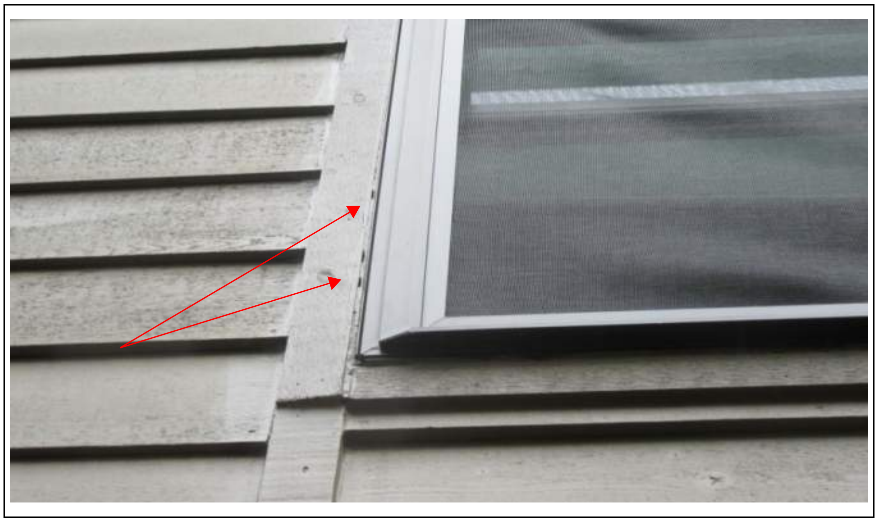


**Photo 51**

Typical joint sealant failure at window frames.  Joint sealant requires a minimum of 3/8 in. width at a ratio of 2:1 to provide adequate dimension for proper performance.

**Photo 52**

In most cases, head flashing is not provided above window heads or horizontal projecting trim.

**Photo 53**

Original aluminum window in poor condition.

**Photo 54**

Newly replaced sliding glass door does not meet today's best practices.  Sheet metal flashing is omitted and joint sealant was improperly applied.

**Photo 55**

Door openings are not flashed and are entirely sealant dependent.

**Photo 56**

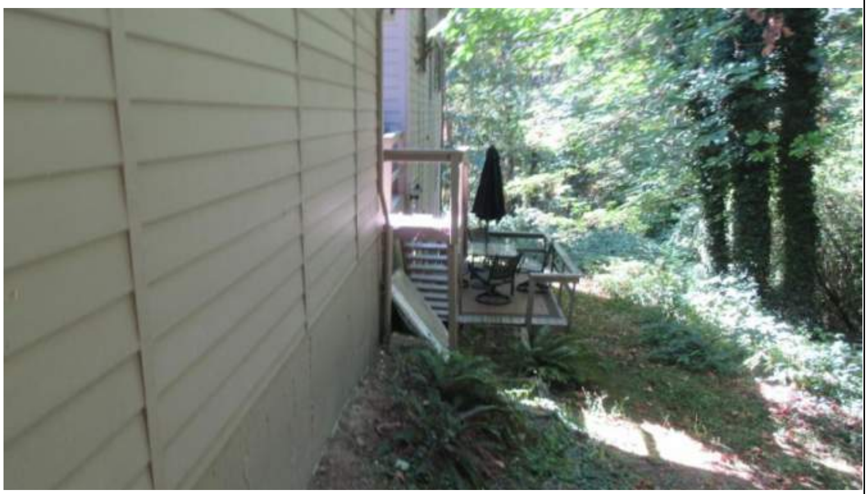
Typical jump-framed assembly.

**Photo 57**

Garage door openings are not flashed.

### Photo 58

Vertical trims in the cladding assembly run continuously from top to bottom of the assembly. Sealant failure along that line can permit bulk water to enter the cladding assembly.



### Photo 59

Typical wall assembly.

### Photo 60

The position of the weep holes drilled through the H-mullions do not prevent water from spilling over the side of the assembly and down the jambs, were it may be trapped behind the cladding. Sealant is likely applied in this cavity; however, based on the condition of the sealant at other joints, sealant may be nearing failure.

**Photo 61**

Where siding is cupping, small voids in the cladding assembly are formed, that can permit water entry.

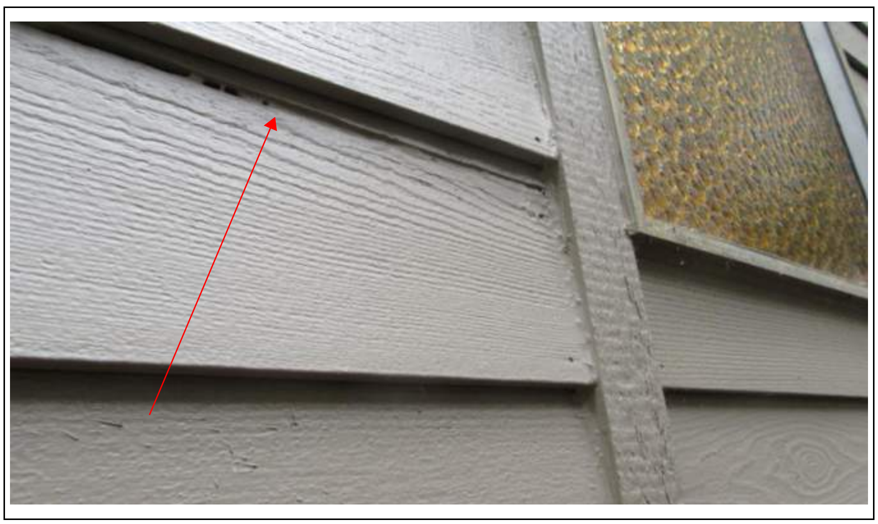


**Photo 62**

Cracked siding near vertical trim creates additional avenues for water intrusion.

**Photos 63**

Invasive openings indicated that vertical trim locations are permitting water ingress.

**Photo 64**

Typical staining on wall sheathing at vertical trim locations.

**Photos 65**

At floor lines, stud framing is becoming exposed. Additionally, water can migrate behind the gypsum sheathing into the stud cavities at these locations.

**Photo 66**

Water staining clearly shows water is entering at the vertical trim and migrating along the top edge of the beveled siding.

Photo 67

Window opening is not wrapped with membrane flashing. No weather barrier was present.

Photo 68

No visible weather barrier. Membrane flashing applied to the window frame only.

Photo 69

Weather barrier and membrane flashings omitted.

**Photo 70**

Weather barrier present well below the window, where water ingress at the window or above will migrate behind the paper and become trapped.

**Photo 71**

Partially applied weather barrier is heavily damaged due to prolonged exposure to moisture.

**Photo 72**

Weather barrier and membrane flashings omitted. Wall sheathing is also missing at this location.

**Photo 73**

Sheet metal flashings at projecting wood trim or through-wall penetrations are omitted throughout the complex.

**Photo 74**

Recess electric meter with open joint between trim.

**Photo 75**

Surface mounted electric meter without head flashing.

**Photo 76**

Typical exposed light fixture, surface mounted to the siding.

**Photo 77**

Typical damaged wall sheathing below balcony ledger.

**Photo 78**

Omitted flashing at ledger detail allowing water ingress below balcony ledgers.

### Photo 79

Water damaged gypsum sheathing below balcony ledger.

### Photo 80

Water damaged gypsum sheathing and visible organic growth at original window installation.

### Photo 81

Damaged gypsum wall sheathing below balcony ledger.

**Photo 82**

Jump-framed window not installed to mitigate air leakage.

**Photo 83**

Vinyl flanged window not installed to mitigate air leakage.

**Photo 84**

Vinyl flangeless window not installed to mitigate air leakage.

**Photo 85**

Vinyl sliding glass door not installed to mitigate air leakage.

**Photo 86**

Through-wall penetrations not installed to mitigate air leakage.

**Photo 87**

Aluminum framed window not installed to mitigate air leakage.

**Photo 88**

Typical guard wall assembly.  The horizontal surface consists of wood and is not protected by sheet metal flashing. Organic growth and warped, or otherwise damaged siding, was typical.

**Photo 89**

Typical guard wall condition. Water intrusion likely at joints in the wood cap. Further investigation recommended.

**Photo 90**

Typical  damage to wood guard wall cap.

**Photo 91**

Delamination of painting typical at guard wall due to water ingress.

**Photo 92**

Guard walls are not constructed to limit water ingress into the enclosed stud spaces.

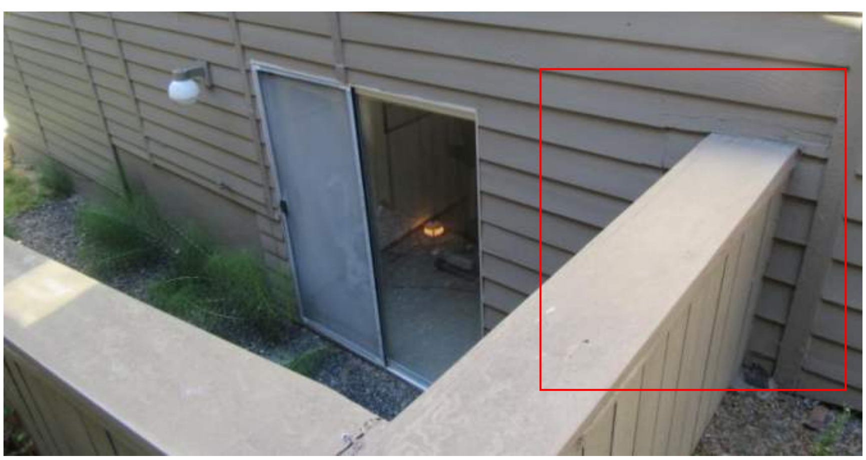


**Photo 93**

Where guard walls intersect building walls, flashings are not installed to prevent water intrusion.

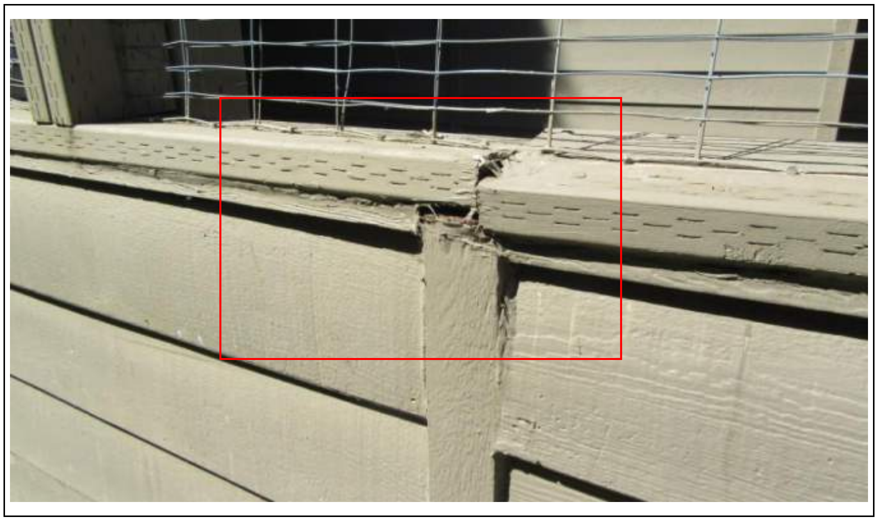


**Photo 94**

Typical joints, such as this, are prone to water intrusion.

**Photo 95**

View into a stud cavity. Staining on the underside of the beveled siding is indicative of water intrusion.

**Photo 96**

At invasive opening 8, water damage to siding and stud framing was observed.

**Photo 97**

Water damaged siding at guard wall.

**Photo 98**

Water damaged stud framing at guard wall.

**Photo 99**

Water intrusion at guard wall impacting building wall.

### Photo 100

Omitted or insufficient flashing observed at most balcony ledgers. Water staining on the siding surfaces indicating bulk water transitioning over these surfaces.

### Photo 101

Ledgers anchored over T1-11 siding.

### Photo 102

Evidence of water intrusion, due to improperly anchored and flashed deck ledgers was observed in units 47/49 Further investigation is recommended.

**Photo 103**

South elevation under unit 49.

**Photo 104**

Deck ledger anchored to framing and T1-11 siding without adequate flashing.

**Photo 105**

At some units, ledgers are not flashed, nor are projecting guard walls.

**Photo 106**

Exhaust vents are not flashed or sealed to prevent air leakage behind the wall assembly.

**Photo 107**

Bath fans were observed to be ducting into the joist cavity within the flooring.

**Photo 108**

Painting was generally in good condition, though there were obvious locations where paint had been applied over siding in poor condition. Additionally, there were numerous locations where sealant repairs have been made in the interim time between painting.

**Photo 109**

Failed joint sealant around window frames was observed at numerous locations.

**Photo 110**

Failed sealant at unflashed projecting wood trim was observed.

**Photo 111**

Failed sealant at wood trim and siding was observed at numerous locations.

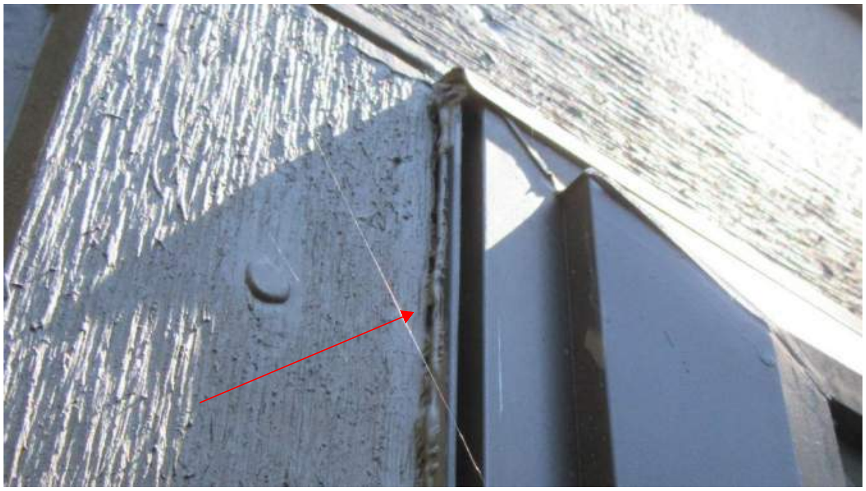


**Photo 112**

Failed sealant between wood trim and window frames was observed at numerous locations.

**Photo 113**

At numerous locations, the original aluminum window frames are still in service.

**Photo 114**

Original aluminum window frames are not integrated with the weather barrier and are not thermally broken to mitigate heat transfer.

**Photo 115**

Original aluminum sliding doors are not thermally broken.

**Photo 116**

Aluminum jump-framed windows are not thermally broken.

**Photo 117**

Aluminum jump-frame windows are installed within the original aluminum window frames and are not thermally broken.

Jump-framed windows are dependant of sealant between the frames and do not improve the water tightness of the original assembly.

Photo 118

Vinyl windows have been installed as replacement window throughout the complex. In most cases, the newer windows do not integrate with the weather barrier.

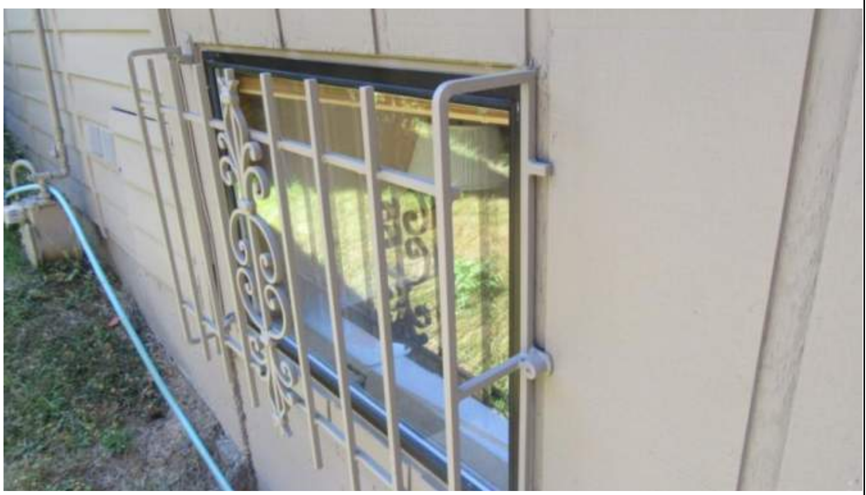


Photo 119

Original aluminum windows are still in service within the T1-11 siding.

Photo 120

At some locations, vinyl window have been installed within the T1-11 siding. At these locations, the windows were installed outboard of the cladding assembly and lack proper integration.

**Photo 121**

Another example of a jump-framed window installation.

**Photo 122**

Many aluminum sliding glass doors are still in service.

**Photo 123**

The thresholds of sliding glass doors do not appear to have been flashed to allow for the egress of incidental moisture.

**Photo 124**

Typical balcony.

**Photo 125**

Balconies are constructed with pressure treated lumber, in a post and beam configuration. Pressure treated joist attach to a balcony ledger, via galvanized metal hangers at the building structure. The joist project outward from the building over supported beams.

**Photo 126**

A single cantilevered balcony is still in service.

**Photo 127**

Typical wood deck entry landing.

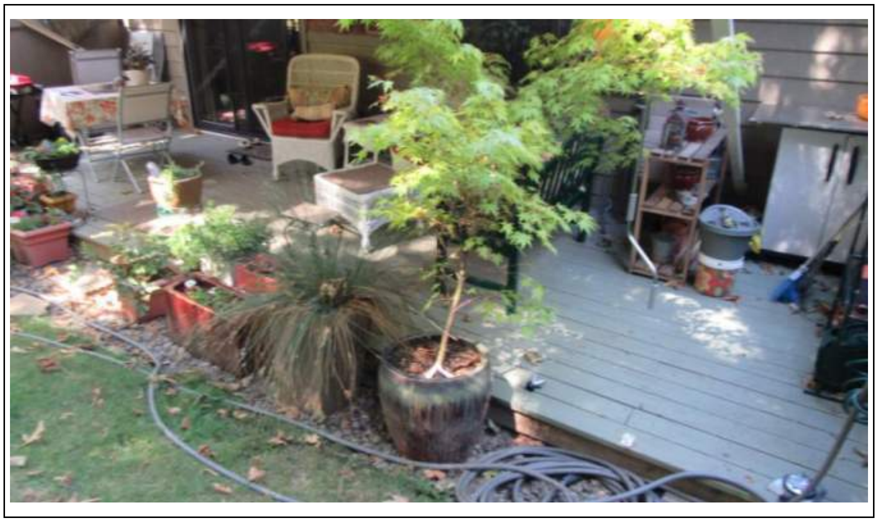


**Photo 128**

Typical rear deck.

**Photo 129**

Overall of typical rear deck configuration.

**Photo 130**
Open joint wood decking.

**Photo 131**
Open joint wood decking

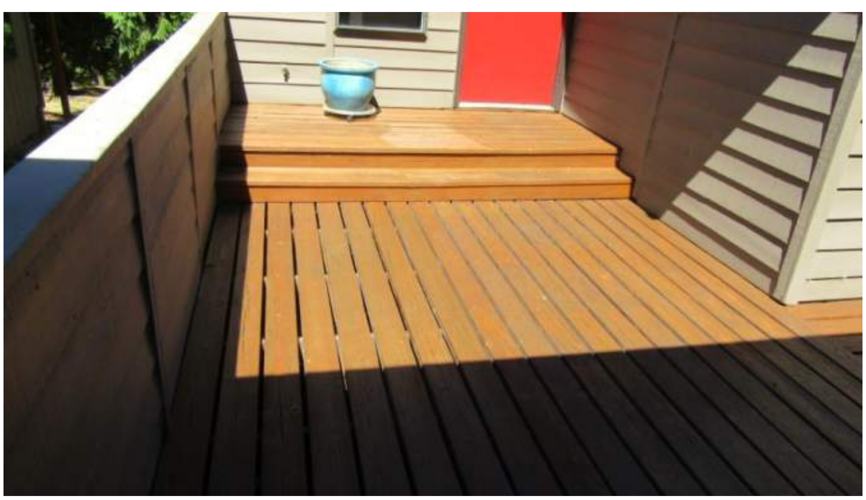


**Photo 132**
Open joint wood decking

**Photo 133**

PVC composite decking.

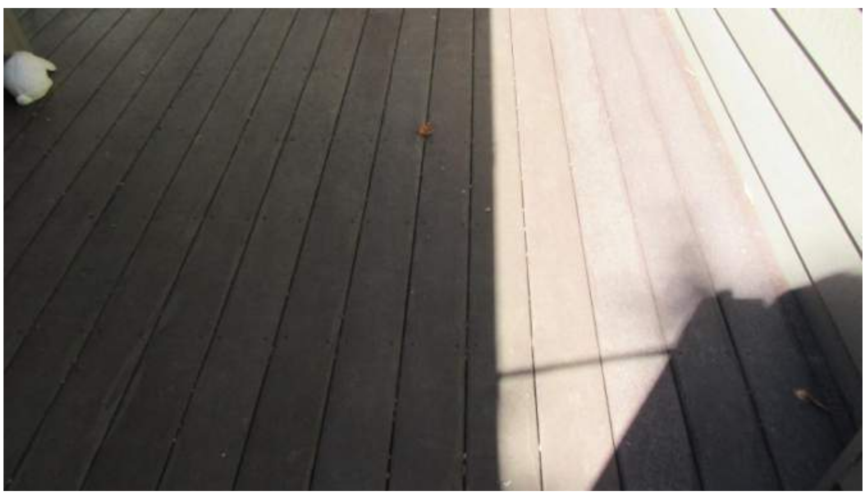


**Photo 134**

First generation composite decking with embedded wood fibers.

**Photo 135**

Overall of wood deck with railings.

**Photo 136**

Typical wood deck ledger attachement.

**Photo 137**

At this location, the original cantilevered joists have been sawn off and new joist have been attached to the original blocking.

**Photo 138**

Typically, a pressure treated ledger has been installed over the original rim joist, which supports the balcony joists with sheet metal hangers.

**Photo 139**

Typical balcony railing system. Guard walls separate the private balconies.  Typically, the guard walls are not flashed to mitigate water entry on the top exposed edger.

**Photo 140**

Typical guard wall assembly with a wood cap.

**Photo 141**

Typical guard wall assembly. Water damage is visible on the wood cap.

**Photo 142**

Vents are installed within the guard walls to mitigate condensation within the wall cavities.

**Photo 143**

Guard walls on balconies are often in adequately supported.

**Photo 144**

Additionally, water damage to the stud framing can be observed from below.

**Photo 145**

Typical concrete patio.

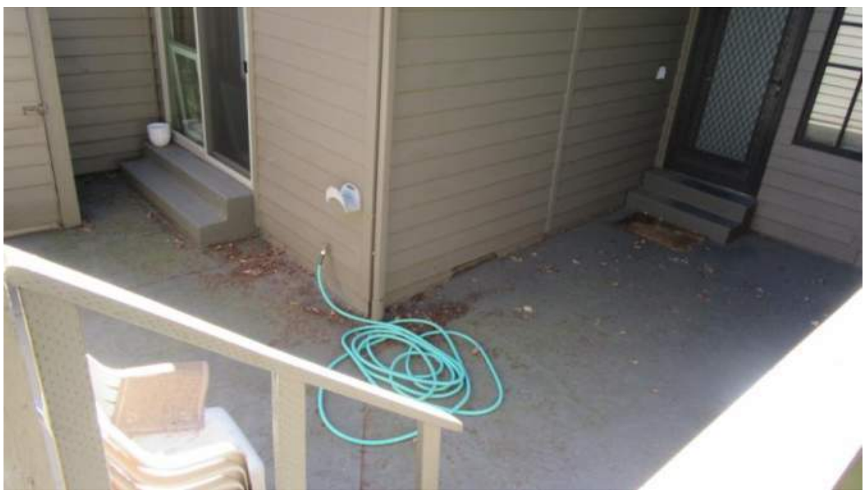


**Photo 146**

At front entries, concrete patios are less common. Most have been over clad with a wood framed balcony.

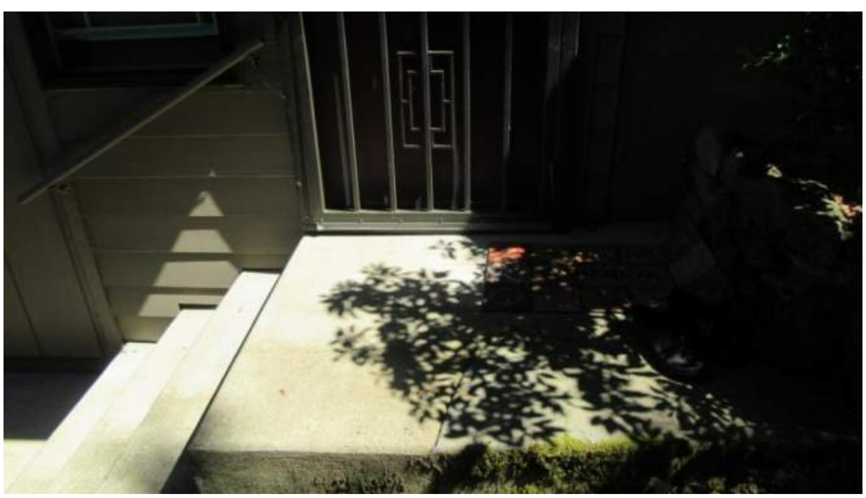


**Photo 147**

Generally, concrete patios are in good condition.

**Photo 148**

Overall of typical roof line.

**Photo 149**

Generally, the roof surface are in good condition.

**Photo 150**

Normal granular loss for the age of the shingle.

Photo 151

Miner cupping was observed on the shaded elevations.

Photo 152

Overall of typical roof surface.

Photo 153

Generally, the roof surface were in good condition.

**Photo 154**

Gutter flashing is incorrectly sequenced with the roofing underlayment.

**Photo 155**

Rake wall flashing was in good condition.

**Photo 156**

Rake wall flashing appeared to be properly sequenced with the roof surface.

Photo 157

Diverter flashing was not installed at roof to wall transitions.

Photo 158

Siding in contact with the roofing. Siding does not appear to have been disturbed during the roof replacement.

Photo 159

Diverter flashings are omitted at roof-to-wall transitions.

**Photo 160**

Sheet metal flashing has been installed at this offsetting roofline.

**Photo 161**

Evidence of water intrusion was observed in the soffit. Further investigation is recommended.

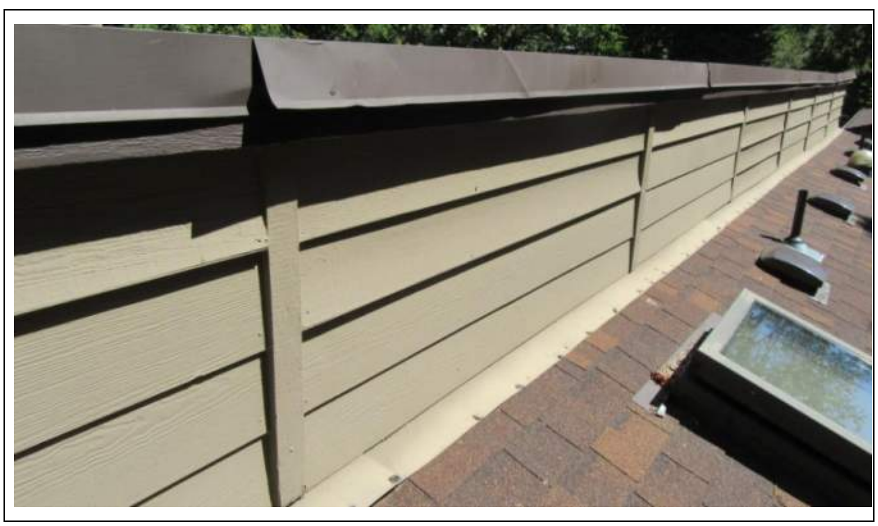


**Photo 162**

Typical head wall condition.

**Photo 163**

Fasteners are poorly sealed or not sealed at all.

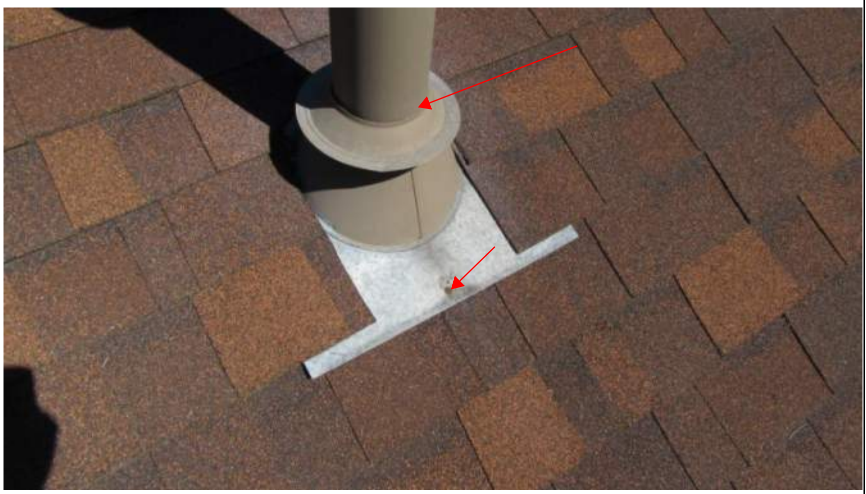


**Photo 164**

Sealant at storm collars requires replacement.

**Photo 165**

Typical gutter guard covers.

**Photo 166**

Gutter guard covers require removal to clean out fine debris periodically.

**Photo 167**

At some locations gutters appeared to have over flowed.

**Photo 168**

Gutters only have a single downspout for the entire length of the building, which is allowing the system to become overwhelmed.

Photo 169

Additionally, where gutters drain into gutters below, this slows drainage and increases the likelihood that overflowing may occur.

Photo 170

Typical building with single downspout to drain half of the roof surface.

Photo 171

Typical attic condition.

### Photo 172

Generally, attic insulation is insufficient. Current building code requires 15.5 in. of blown in insulation.

### Photo 173

Sheet metal exhaust ducts are inadequately supported and are not properly flashed to the exterior of the building.

### Photo 174

In most cases, ductwork was directed at a roof opening, but not sealed to prevent air leakage within the attic.

**Photo 175**

Visible condensation on the roof sheathing was observed throughout the complex.

**Photo 176**

Staining on roof sheathing due to accumulation of moisture latent interior air.

**Photo 177**

Typical condensation staining at the perimeter of the building.

**Photo 178**

Evidence of water intrusion at chimney stack.

**Photo 179**

Ponding water and open joints appear to be an issue at the chimney cap.

**Photo 180**

Water entering failed seams appears to be entering behind the cladding at this chimney. Further investigation is recommended.

**Photo 181**

Typical crawlspace.

**Photo 182**

Below floor insulation and vapor barrier in tact.

**Photo 183**

Structural improvements have been made.

# Appendix B:
# Photographs

**Photo 1**

Opening 1 - Unit 47:

Trim was removed around the basement window.

**Photo 2**

Opening 1 - Unit 47:

Water damaged trim has been painted over.

**Photo 3**

Opening 1 - Unit 47:

Window head is not flashed and voids are present in the sealant.

**Photo 4**

Opening 1 - Unit 47:

Gaps in the siding remain, where siding was apparently removed to facilitate the installation of the window.

**Photo 5**

Opening 1 - Unit 47:

Water staining is visible on the back side of the jamb trim.

**Photo 6**

Opening 1 - Unit 47:

Staining on the bottom side of the interior face of the trim is indication that water is pooling on the window frame behind the cladding.

**Photo 7**

Opening 1 - Unit 47:

Water staining behind trim at the sill.

**Photo 8**

Opening 1 - Unit 47:

Water is bypassing the cladding assembly.

**Photo 9**

Opening 1 - Unit 47:

Overall of window opening. Jump-framed window installed onto wood framing. Building paper or membrane flashings are not present.

**Photo 10**

Opening 1 - Unit 47:

Stained T1-11 indicating moisture is getting behind the trim.

**Photo 11**

Opening 1 - Unit 47:

Jump-frame aluminum window is a window that is installed by mounting the new frame to the original. Sealant is all that prevents water infiltration at this joint.

The original window frame is damaged at the corner.

**Photo 12**

Opening 1 - Unit 47:

The jump-framed does not appear to have a tight seal to the original window frame.

Photo 13

Opening 2 - Unit 31:

Siding removed below balcony ledger and above vinyl window.

Photo 14

Opening 2 - Unit 31:

Water stains on siding, indicating bulk water flow down siding.

Photo 15

Opening 2 - Unit 31:

Open joint between the siding and underside of the balcony ledger.

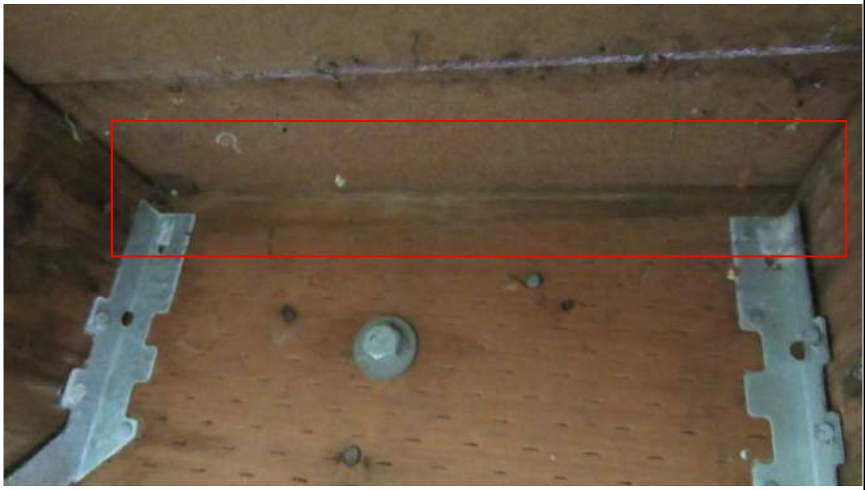


**Photo 16**

Opening 2 - Unit 31:

Omitted flashing above balcony ledger.

**Photo 17**

Opening 2 - Unit 31:

Sheet metal flashing is not provided above projecting wood trim.

**Photo 18**

Opening 2 - Unit 31:

Siding removed below ledger. Staining behind siding and on gypsum sheathing indicate bulk water behind the assembly.

### Photo 19

Opening 2 - Unit 31:

No weather barrier present. Membrane flashing terminated at the edge of the window flange and does not lap onto sheathing.

### Photo 20

Opening 2 - Unit 31:

Water damage and organic growth present on wall sheathing.

### Photo 21

Opening 2 - Unit 31:

Sheathing has deteriorated to the point of failure.

**Photo 22**

Opening 2 - Unit 31:

Water staining on the framing behind the gypsum sheathing, indicating bulk water is entering the stud cavity.

**Photo 23**

Opening 2 - Unit 31:

Staining on the underside of the siding. Repeated wetting is causing the tannins to leach from the wood.

**Photo 24**

Opening 2 - Unit 31:

Water staining behind the trim and corroded fasteners.

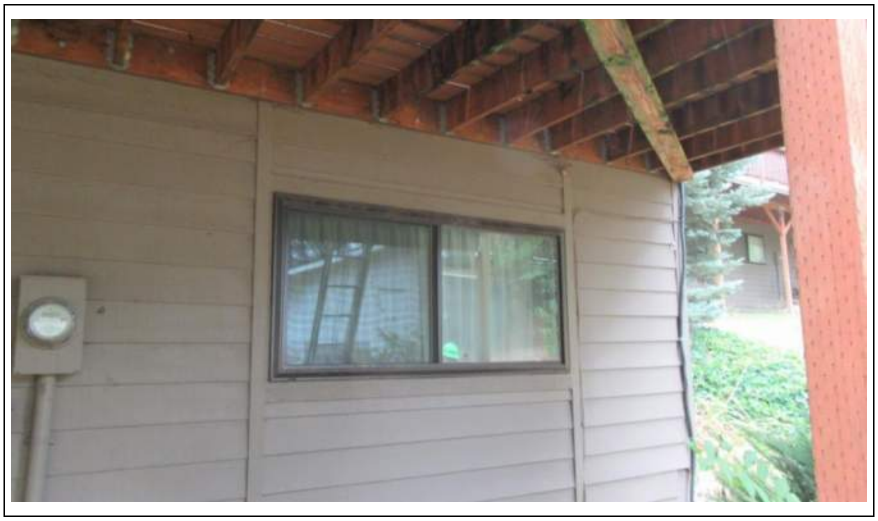


**Photo 25**

Opening 3 - Unit 93:

Siding removed under balcony ledger and above window head.

**Photo 26**

Opening 3 - Unit 93:

Sheet metal flashing is installed above the ledger.  Voids are present between the siding and bottom edge of the ledger.

**Photos 27**

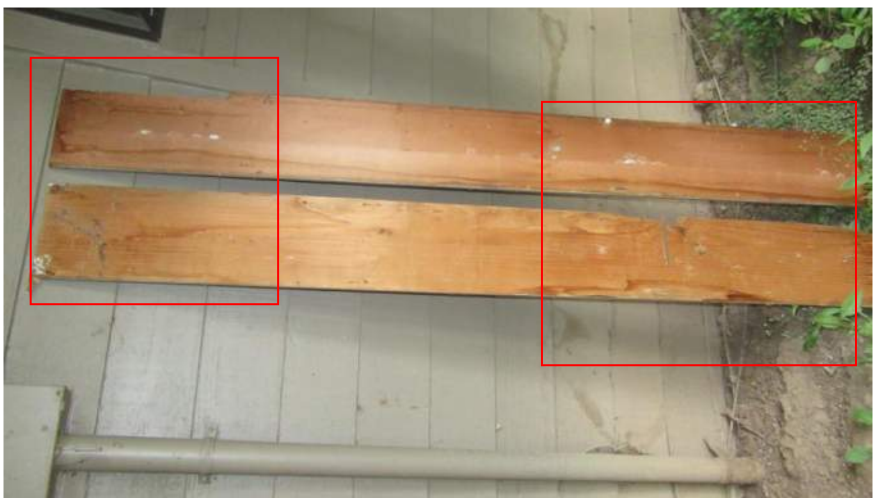
Opening 3 - Unit 93:

Sheet metal flashing not provided above projecting wood trim.

**Photo 28**

Opening 3 - Unit 93:

Water staining is visible on the underside of the siding.



**Photos 29**

Opening 3 - Unit 93:

Typical water staining behind the siding.

**Photo 30**

Opening 3 - Unit 93:

No weather barrier present.

**Photo 31**

Opening 3 - Unit 93:

The stucco-type window is installed within the rough opening without the application of membrane flashings. The window is not installed in a manner that would prevent air leakage.

**Photo 32**

Opening 3 - Unit 93:

Adjacent to the window head, additional siding was removed under the ledger.

**Photo 33**

Opening 3 - Unit 93:

Typical water staining behind the siding.

**Photo 34**

Opening 3 - Unit 93:

Partial weather barrier was installed on this section of the wall. Staining on the sheathing is typical at the vertical transitions.

**Photo 35**

Opening 3 - Unit 93:

Organic growth visible on the sheathing.

**Photo 36**

Opening 3 - Unit 93:

Stud framing did not have water staining at this location.

**Photo 37**

Opening 4 - Unit 85:

Siding removed under the balcony ledger and above the window head.

**Photo 38**

Opening 4 - Unit 85:

Sheet metal flashing is not provided above the window head.

**Photo 39**

Opening 4 - Unit 85:

Water staining on the back side of the siding.

**Photo 40**

Opening 4 - Unit 85:

Typical staining on siding.

**Photo 41**

Opening 4 - Unit 85:

Weather barrier is not provided. The window is sealed directly to the sheathing.

Visible water staining on the gypsum sheathing.

**Photo 42**

Opening 4 - Unit 85:

Gypsum sheathing has failed due to exposure to water.

Photo 43

Opening 5 - Unit 81:

Siding removed below original aluminum window.

Photo 44

Opening 5 - Unit 81:

Visible damaged siding adjacent to window.

Photo 45

Opening 5 - Unit 81:

Typical water staining behind siding.

**Photo 46**

Opening 5 - Unit 81:

Water appears to be finding ingress at the vertical joints and then spreading out along the horizontal surface of the beveled siding.

**Photo 47**

Opening 5 - Unit 81:

Typical water staining on the back side of the siding. Tannins have leached out of the siding due to prolonged water exposure.

**Photo 48**

Opening 5 - Unit 81:

Organic growth and damaged gypsum sheathing.

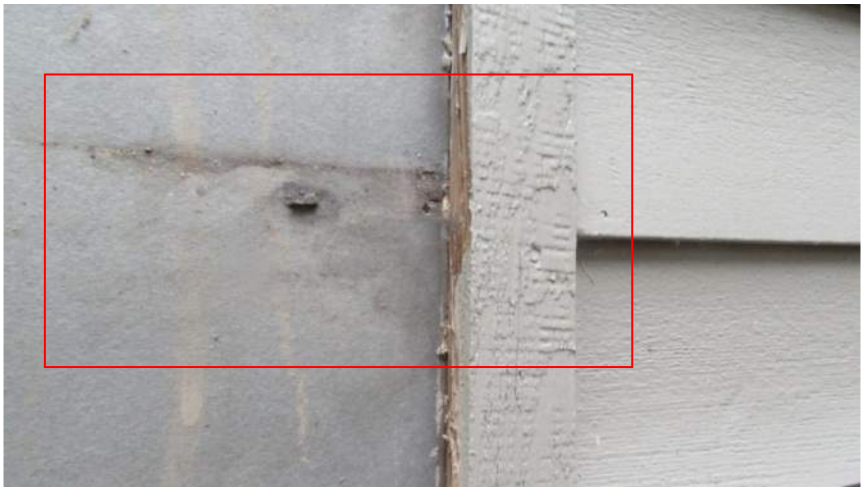


**Photo 49**

Opening 5 - Unit 81:

Typical water entry points along the vertical joint formed by vertical trim and beveled cedar siding.

**Photo 50**

Opening 5 - Unit 81:

Visible water staining on the wood framing.

**Photo 51**

Opening 5 - Unit 81:

Visible water staining and organic growth on the wood framing.

**Photo 52**

Opening 6 - Unit 77:

Trim and siding removed around newly installed vinyl sliding door.

**Photo 53**

Opening 6 - Unit 77:

Sheet metal flashing is not provided above projecting wood trim.

Numerous voids in the joint sealant were observed.


**Photo 54**

Opening 6 - Unit 77:

Open voids in the cladding due to omitted head flashing and poor sealant application.


**Photo 55**

Opening 6 - Unit 77:

Slider was not flashed in the rough opening.

**Photo 56**

Opening 6 - Unit 77:

Water staining on wood framing was observed at the base of wall.

**Photo 57**

Opening 6 - Unit 77:

Sheathing was removed and not replaced behind the sliding door.

The sliding door was not properly fastened to the stud framing.

**Photo 58**

Opening 6 - Unit 77:

The sliding door sits directly on the threshold and is not flashed to prevent water ingress.

**Photo 59**

Opening 6 - Unit 77:

Siding adjacent to the door is water damaged.

**Photo 60**

Opening 6 - Unit 77:

Water damaged siding.

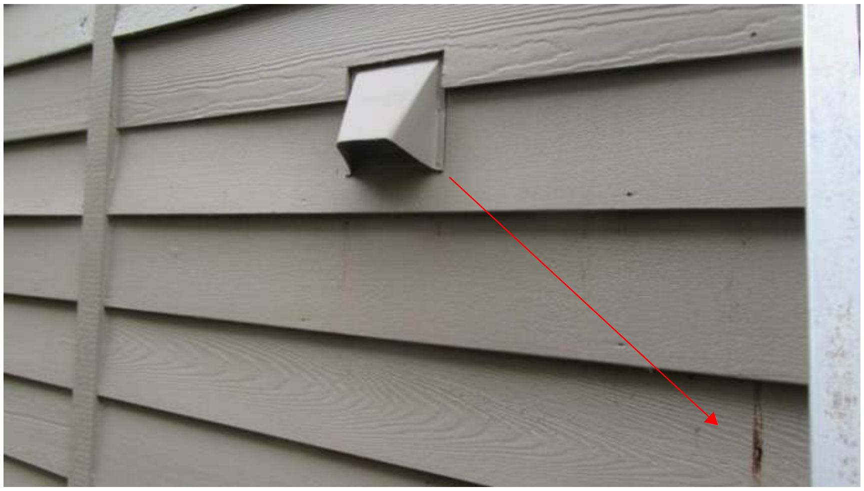


**Photo 61**

Opening 7 - Unit 77:

Siding was removed at the through-wall vent penetration. Siding is cupping.

**Photo 62**

Opening 7 - Unit 77:

Streaking was emanating from behind the cladding.

**Photos 63**

Opening 7 - Unit 77:

Continuous weather barrier was not applied. The weather barrier present below was heavily damaged due to prolonged exposure to moisture. Water staining and organic growth was visible on the sheathing.

**Photo 64**

Opening 7 - Unit 77:

The weather barrier was damaged due to prolonged exposure to moisture. Water staining was also visible on the wood framing.

**Photos 65**

Opening 7 - Unit 77:

The vent penetration was not flashed or sealed to prevent air leakage.

**Photo 66**

Opening 7 - Unit 77:

Organic growth on wall sheathing.

**Photo 67**

Opening 8 - Unit 81:

Siding removed below balcony ledger and at top of privacy wall.

**Photo 68**

Opening 8 - Unit 81:

At privacy wall, no sheathing is provided. Siding and stud framing are water damaged.

**Photo 69**

Opening 8 - Unit 81:

Water damaged wood framing.

**Photo 70**

Opening 8 - Unit 81:

Staining on the underside of the lap siding.

**Photo 71**

Opening 8 - Unit 81:

Water damaged wall sheathing near the inside corner.

**Photo 72**

Opening 8 - Unit 81:

Water staining on wood framing.

**Photo 70**

Opening 9 - Unit 89:

Siding removed below aluminum window sill.

**Photo 71**

Opening 9 - Unit 89:

Typical condition. Window installed with vertical trim at the jambs and siding applied directly above and below the window.

**Photo 72**

Opening 9 - Unit 89:

Typical siding condition, siding is cupping as it nears the end of its useful life.

**Photo 70**

Opening 9 - Unit 89:

Staining on the back side of the siding. Tannins are leaching out due to prolonged exposure to moisture.

**Photo 71**

Opening 9 - Unit 89:

Weather barrier installed below window sill but not integrated with membrane flashing at the rough opening.

**Photo 72**

Opening 9 - Unit 89:

The gypsum sheathing has been damaged due to wetting. Visible staining and organic growth was visible on the surface of the sheathing.

**Photo 70**

Opening 9 - Unit 89:

Weather barrier damaged due to prolonged exposure to moisture.

**Photo 71**

Opening 9 - Unit 89:

Window rough opening is not flashed.

**Photo 72**

Opening 9 - Unit 89:

Typical wetting patters at vertical trim.

# Appendix C: Photographs

# Component Life & Cost Analysis

| Commonly Owned Component | Component Description and Comments | Component Condition | Expected Useful Life (Years) | Remaining Useful Life (Years) | Estimated Replacement Date | Component Quantity | Units |
|---|---|---|---|---|---|---|---|
| **110 - Building Cladding Components - Lap, Panel, etc.** | | | | | | | |
| Cedar Lap Siding | Siding is at the end of its useful life. Association should begin budgeting for replacement and assume 60% of wall sheathing will require replacement. | Fair/Poor | 35 | 1 | 2018 | 48000 | SF |
| T1-11 Panel Siding | This component is at the end of its useful life. | Fair/Poor | 35 | 1 | 2018 | 7000 | SF |
| **120 - Building Cladding Components - Sealants and Finishes** | | | | | | | |
| Exterior Paint & Sealant | Exterior paints and sealants would be replaced as part of a siding rehab project. This figure assumes guard walls and privacy walls. | Fair | 10 | 5 | 2022 | 64000 | SF |
| Deck & Balcony Wood Preservative | The Association should consider application of wood preservatives on a regular cycle. | Varies | 3 | 1 | 2018 | 10035 | SF |
| Pool Fencing Stain | Apply as needed to maximize the useful life of the fencing. | Good | 3 | 2 | 2019 | 2160 | SF |
| **130 - Building Cladding Components - Roofing** | | | | | | | |
| Composition Roofing | Monitor and replace as needed. Replacement figures should assume significant replacement of roof sheathing and include applicable ducting and ventilation upgrades. | Good | 25 | 18 | 2035 | 40900 | SF |
| Composition Roofing | Monitor and replace as needed. Replacement figures should assume significant replacement of roof sheathing and include applicable ducting and ventilation upgrades. | Good | 25 | 23 | 2040 | 22300 | SF |
| Rain Gutters and Downspouts | Gutters could last up to the next roof renewal. Prior to then, it may be desirable to installed additional downspouts connected to the storm water system. | Fair | 50 | 18 | 2035 | 1540 | LF |
| Rain Gutters and Downspouts | Gutters could last up to the next roof renewal. Prior to then, it may be desirable to installed additional downspouts connected to the storm water system. | Fair | 50 | 23 | 2040 | 840 | LF |
| **140 - Stairs, Railings, Decks, Etc.** | | | | | | | |
| Cantilevered Balcony | Units 39/41 | Fair | 30 | 5 | 2022 | 400 | SF |
| Balcony Surface and Railings | Replace deck surface with structure. | Fair | 15 | 5 | 2022 | 400 | SF |
| Balcony Structure | Units 31/33, 35/37, 43/45, 47/49 | Good | 30 | 26 | 2043 | 1600 | SF |
| Balcony Surface and Railings | Replacement of deck surface should assume minor repairs to the structure. | Good | 15 | 11 | 2028 | 1600 | SF |
| Balcony Structure | Units 91/93, 95/97 | Fair | 30 | 19 | 2036 | 800 | SF |
| Balcony Surface and Railings | Replacement of deck surface should assume minor repairs to the structure. | Fair | 15 | 4 | 2021 | 800 | SF |
| Balcony Structure | Units 75/77, 79/81, 87/89 | Fair | 30 | 22 | 2039 | 1200 | SF |
| Balcony Surface and Railings | Replacement of deck surface should assume minor repairs to the structure. | Fair | 15 | 7 | 2024 | 1200 | SF |
| Rear Decks Structure | Units 59, 65 | Poor | 30 | 2 | 2019 | 432 | SF |
| Rear Decks Surface | Replacement of deck surface should assume minor repairs to the structure. | Poor | 15 | 2 | 2019 | 432 | SF |
| Rear Decks Structure | Units 51, 63, | Fair | 30 | 6 | 2023 | 432 | SF |
| Rear Decks Surface | Replacement of deck surface should assume minor repairs to the structure. | Fair | 15 | 6 | 2023 | 432 | SF |
| Rear Decks Structure | Units 71, 73, 87, 89 | Good | 30 | 23 | 2040 | 864 | SF |
| Rear Decks Surface | Replacement of deck surface should assume minor repairs to the structure. | Good | 15 | 8 | 2025 | 864 | SF |
| Rear Decks Structure | Units 53, 57, 69, 71, 73 | Good | 30 | 28 | 2045 | 864 | SF |
| Rear Decks Surface | Replacement of deck surface should assume minor repairs to the structure. | Good | 15 | 13 | 2030 | 864 | SF |
| Front Decks Structure | Units 31, 95, 97 | Good | 30 | 13 | 2030 | 852 | SF |
| Front Deck Surface | Replace deck surface with structure. | Good | 15 | 13 | 2030 | 852 | SF |
| Front Decks Structure | Units 37, 39, 41, 85 | Fair | 30 | 10 | 2027 | 1136 | SF |
| Front Deck Surface | Replace deck surface with structure. | Fair | 15 | 10 | 2027 | 1136 | SF |
| Front Decks Structure | Units 35, 43, 45 | Fair | 30 | 7 | 2024 | 852 | SF |
| Front Deck Surface | Replace deck surface with structure. | Fair | 15 | 7 | 2024 | 852 | SF |
| Front Decks Structure | Units 73, 75, 85 | Fair | 30 | 3 | 2020 | 852 | SF |
| Front Deck Surface | Replace deck surface with structure. | Fair | 15 | 3 | 2020 | 852 | SF |
| Front Decks Structure | Units 49 & 83 | Fair | 30 | 10 | 2027 | 568 | SF |
| Front Deck Surface | Replace deck surface with structure. | Fair | 15 | 10 | 2027 | 568 | SF |
| Guard wall / Privacy Walls | Replacement of guard walls and privacy walls are needed. We recommend coordinating replacement with the siding rehabilitation. Modifications to the design should be made to prevent water ingress and improve flashing at exterior wall transitions. Cost should include replacement of siding, addition of wall sheathing, and repairs to stud framing. | Poor | 25 | 1 | 2018 | 9000 | SF |

# Component Life & Cost Analysis

| Commonly Owned Component | Component Description and Comments | Component Condition | Expected Useful Life (Years) | Remaining Useful Life (Years) | Estimated Replacement Date | Component Quantity | Units |
|---|---|---|---|---|---|---|---|
| **150 - Exterior Openings** | | | | | | | |
| Skylights | The Association should consider replacing these components at the time of roof replacement | Varies | 35 | 1 | 2018 | Unit Owned | |
| Unit Windows | The Association should consider replacing these components at the time of siding replacement. | Varies | 35 | 1 | 2018 | Unit Owned | |
| Unit Swing Doors | The Association should consider replacing these components at the time of siding replacement. | Varies | 35 | 1 | 2018 | Unit Owned | |
| Unit Sliding Doors | The Association should consider replacing these components at the time of siding replacement. | Varies | 35 | 1 | 2018 | Unit Owned | |
| **210 - Furnishings & Amenities** | | | | | | | |
| Pool Furniture | Replace as needed | Good | 15 | 13 | 2030 | Allowance | |
| Pool House Furnishings | Replace as needed | Good | 15 | 6 | 2023 | Allowance | |
| Pool House Appliances | Replace as needed | Good | 12 | 6 | 2023 | 1 | EA |
| Pool House Interior Finishes | Replace as needed | Good | 10 | 6 | 2023 | Allowance | |
| Pool Cover | Replace as needed | Good | 12 | 25 | 2042 | 540 | SF |
| Monument Sign | Replace as needed | Good | 50 | 25 | 2042 | 1 | EA |
| **250 - Pool & Spa Components** | | | | | | | |
| Pool Surfaces (Plaster) | Monitor for cracking or surface failure and replace as needed. Association may want to budget repairs as needed to maximize expected useful life. | Good | 15 | 10 | 2027 | 1125 | SF |
| Pool Tile | Replace with surface repairs | Good | 15 | 10 | 2027 | 48 | SF |
| Pool Deck | Replace as needed. Seal deck surface to prolong EUL. | Good | 30 | 20 | 2037 | 1100 | SF |
| Pool Deck - Sealer & Sealant | Apply on a regular cycle of 3-5 years. | Good | 5 | 3 | 2020 | 1100 | SF |
| Pool Piping | The condition of this component is unknown. The Association should have this component reviewed by a pool specialist and budget according to their recommendations. | Unknown | 25 | 8 | 2025 | Unknown | |
| Pool Circulation Pump | We were unable to review this component at the time of our assessment. The Association should review their records and budget according to the last replacement. | Unknown | 12 | 8 | 2025 | 1 | EA |
| Pool Heater | We were unable to review this component at the time of our assessment. The Association should review their records and budget according to the last replacement. | Unknown | 10 | 8 | 2025 | 1 | EA |
| Pool Filter | We were unable to review this component at the time of our assessment. The Association should review their records and budget according to the last replacement. | Unknown | 15 | 8 | 2025 | 1 | EA |
| **260 - Plumbing** | | | | | | | |
| Domestic Water Supply Piping | The condition of this component is unknown. The Association should have this component reviewed by a plumbing specialist and budget according to their recommendations. | Unknown | 45 | 2 | 2019 | Unknown | |
| Waste Piping | The condition of this component is unknown. The Association should have this component reviewed by a plumbing specialist and budget according to their recommendations. | Unknown | 45 | 2 | 2019 | Unknown | |
| **290 - Lighting Fixtures** | | | | | | | |
| Building Lighting | Replace as needed or coordinate replacement with the Energy Trust to receive incentives for efficiency upgrades. | Good | 25 | 10 | 2027 | 34 | EA |
| Unit Lighting | Replace as needed or coordinate replacement with the Energy Trust to receive incentives for efficiency upgrades. | Good | 25 | 10 | 2027 | 83 | EA |
| Carport Lighting | Replace as needed or coordinate replacement with the Energy Trust to receive incentives for efficiency upgrades. | Good | 25 | 10 | 2027 | 31 | EA |
| Site Lighting | Replace as needed or coordinate replacement with the Energy Trust to receive incentives for efficiency upgrades. | Good | 20 | 15 | 2032 | 4 | EA |
| **330 - Exterior Improvements** | | | | | | | |
| Asphalt Paving Overlay | Replace as needed. Seal deck surface to prolong EUL. | Good | 30 | 25 | 2042 | 41000 | SF |
| Asphalt Sealants Sealer | Apply seal coat to prolong life of asphalt surface. | Good | 6 | 3 | 2020 | 41000 | SF |
| Asphalt Crack Seal | Seal cracks to prevent frost heave. | Fair | 3 | 1 | 2018 | 150 | LF |
| Parking Area Striping & Graphics | Coordinate replacement with seal coat renewal | Fair | 10 | 3 | 2020 | 220 | LF |
| Concrete Flatwork | We recommend the Association develop a budgetary allowance to repair concrete as needed. | Good/Fair | 8 | 6 | 2023 | Allowance | |
| Concrete Curbs | Determine if replacement is necessary and replace as needed. Application of reinforcement within the concrete will provide a longer EUL. | Fair/Poor | 30 | 1 | 2018 | 2800 | LF |
| Pool Area Wood Fencing | Replace as needed. | Good | 25 | 24 | 2041 | 180 | LF 6' |
| Unit Wood Fencing | Replace as needed. | Fair/Poor | 25 | 3 | 2020 | 340 | LF 6' |
| Stone Retaining Walls | Stone walls can be restacked as needed. | Good | 30 | 15 | 2032 | 75 | LF 3' |
| Concrete Stairs - Common | Monitor and replace as needed | Fair | 30 | 8 | 2025 | 1 | EA |
| Irrigation Systems | This component is unknown. Likely full replacement will not be necessary; however, the association should budget for overhaul on a 20-25 year basis. | Unknown | 20 | 10 | 2027 | Unknown | |
| Irrigation Timers | Replace as needed. | Unknown | 12 | 8 | 2025 | 1 | EA |
| Landscaping | General landscaping is typically a operations expense. The Association should establish a budgetary allowance for major landscaping overhauls. Often, these coincide with irrigation renewals, to repair damaged landscaping. | Varies | 20 | 10 | 2027 | Allowance | |