BUILDING ENVELOPE EVALUATION

AT THE LOCATION OF:  
Tall Firs Condominiums  
31841 18th Ave SW  
Federal Way, WA 98023

FOR:  
Tall Firs Homeowners Association  
c/o Robb White, Property Manager  
Targa Real Estate Services, Inc.  
33515 10th Place S, Building 15  
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DATE PREPARED:  
February 23, 2010
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1.0 EXECUTIVE SUMMARY

1.1 GENERAL DESCRIPTION OF PROPERTY

Tall Firs Condominiums is a 17.92 acre property and is situated at the northeast corner of 21st Ave SW and SW 320th St. This property consists of 51 two-story buildings containing 201 condominiums plus a clubhouse and a racquetball building. The property was originally developed in 1978.

The buildings have pitched roofs with asphalt-composition roof surfacing. The buildings are clad with vinyl siding over the top of wood siding. The windows on this property are both the original aluminum-frame windows as well as vinyl frame windows.

Each second story building has an elevated deck that is surfaced with elastomeric coating. Some of these decks are covered by the roof and some are not covered. All decks have metal spindle railings that are original.

1.2 GENERAL CONDITION OF PROPERTY

The building envelopes of the buildings on this property have some moisture infiltration problems due to poor building envelope details and some deferred maintenance on this property. The vinyl siding was not installed properly; however, due to the fact that there is wood siding beneath this vinyl siding, the wood siding appears to be acting somewhat like a rain screen to prevent further moisture infiltration into most areas of the building envelope. Therefore, based on our visual investigation, infrared results and invasive investigation, ultimately we believe that if some of the details are corrected as recommended in this report, the vinyl siding will have a typical lifespan of 30 to 50 years.

As we understand, the siding on these buildings were resurfaced in the mid 1990’s, therefore, the earliest that the buildings will likely have to be stripped and re-clad will be in 2025, and quite possibly beyond this date. At this time, the buildings should be re-clad per modern architectural details.

The asphalt-composition roofing appears to be CertainTeed Landmark roof surfacing and typically has a lifespan of between 25 and 30 years. We believe that the roofs on these buildings have approximately 10 to 15 years of remaining life on them, provided that certain details are corrected. There are several roofing details that are in need of immediate correction; these corrections are detailed in the roofing section of this report. Of particular note is the poorly installed Plexiglas “skylights that has rotted much of the sheathing in the areas below. In these areas, the Skylights will have to be replaced with properly installed skylights and the roofing and much of the sheathing on these levels of roofing will have to be replaced.

The windows on these buildings are a mix of the original aluminum frame windows and newer vinyl windows. The original windows are poor from an energy efficiency standpoint and poorly exclude moisture entry from entering the building envelope, as the infrared study showed moisture entry beneath most of these windows. The vinyl frame windows were installed in a variety of different ways as these windows are the responsibility of the individual owners and were installed by many different contractors. The majority of these windows are flangeless, making it impossible to flash per AAMA standards and modern architectural details. We believe that in all future window replacements, it is imperative that the windows on the exterior of these buildings be installed per modern AAMA standards by an approved list of contractors, with oversight to ensure that these details are followed.

There are two types of individual decks on this property: covered and uncovered decks. The covered decks are not installed correctly; however, due to the overhang on these decks, they are generally in good condition. The uncovered decks are in poor condition and are all in need of some renovation including the replacement of rotten framing in approximately half of the decks. Additionally, there is
almost none of the required flashing and counter-flashing on these decks. Consequently, the plywood decking and deck surfacing is in poor condition and most will likely need to be replaced.

In addition to the need for flashing, the sliding glass doors were not installed with door pans and should be removed and replaced over the top of door pans that are integrated into the deck flashing. This would be a good time to replace the sliding glass doors; however, it is possible to reinstall the old doors over proper door pans and flashing if proper care is taken when removing the doors. When all flashing is installed on these decks and all rotten framing and decking is replaced, these decks will need to be recoated with either an adequate vinyl deck surface or both a base coat and a finish coat of a high quality polyurethane elastomeric deck coating.

1.3 RECOMMENDED PLAN OF ACTION

The poor details on the roofs (and roofing/siding transitions) should be corrected by qualified professionals. Additionally, a contractor experienced in proper deck flashing should be obtained to renovate all of the decks. We recommend that 2 separate Requests for Proposal (RFPs) be written to ensure that all contractors bid on the same criteria. Quality contractors should be pre-qualified to bid on these scopes of work. Our company is available to aid in writing each scope of work, selecting contractors, and ensuring that all details are installed properly with course of construction inspections.

Delay in the correction of the poor envelope details will increase the amount of damage and moisture entry into the structures and will only increase the cost of rehabilitation.

While the windows on these buildings were not installed properly, there is not an immediate urgency to replace these windows. Going forward; however, all windows should be installed properly per the details outlined in this report. This installation should be inspected each time. While our company could aid in these inspections in the future, this proper installation could also be taught to the on-site maintenance manager, who could perform these inspections and sign off on each window.

There are many pieces of wood siding on the racquetball building that is in poor condition with woodpecker holes visible. We believe that spot siding replacement can be performed by the on-site maintenance staff.

1.4 PRIORITIZATION

1. **Roof Repairs** - Both the improper roof details and decks should be corrected as soon as possible to avoid further damage. However, since the roof scope will be simpler and can be more easily performed to protect these buildings, we would perform this scope prior to the deck repair scope. This scope of work should include the poor transition details between the roofing and the siding, painting of all wood trim, fascias, etc.

2. **Uncovered Deck Renovation** - Following the roof repairs, the uncovered deck renovation scope should follow immediately (if not be performed concurrently). This should include the replacement of all railings per modern code as well as the extension of all dryer vents to the exterior of the decks.

3. **Covered Deck Renovation** - While not urgent, we recommend that the covered decks be resurfaced with proper flashing as well in order to ensure that these areas exclude moisture adequately.
4. **Window Replacement** - None of the windows that we investigated were installed adequately. Ideally, the windows should all be replaced. However, we do not believe that this is an urgent matter. We have detailed how to replace these windows in the future so that eventually the windows can be tied in with future siding replacement.

5. **Siding Replacement** - At some point in the future, the siding on these buildings will need to be replaced. This siding replacement does not appear to be necessary for at least 15 years (even though it was installed improperly), as the wood siding beneath this siding is acting as a de-facto rain screen and allowing the moisture that penetrates the vinyl to exit below. At the time that the siding is replaced; however, the siding should be installed per modern architectural details.
2.0 INTRODUCTION

2.1 PURPOSE OF BUILDING ENVELOPE INSPECTION AND REPORT

The purpose of this investigation was to evaluate the current condition of the building envelopes and to identify areas in need of remediation. We understand that these buildings were not built to the modern building code and we were not evaluating the building envelopes to that standard. Rather, we were concerned with all areas that were allowing moisture into the building envelopes and/or areas that were vulnerable to future moisture penetration into the building envelopes.

After identifying envelope problems, we prioritized the repairs and have attempted to provide a general plan to mitigate the envelope problems at these buildings.

Associations have a responsibility to their members to adequately maintain their properties and our Building Envelope Evaluations provide our clients with the information they need to correct poor design details and to implement building envelope maintenance. Going forward, with proper envelope design along with routine maintenance, there is typically a significant overall savings for property owners' maintenance.

2.2 SCOPE OF WORK

We performed the following tasks as part of this scope of work:

- Detailed visual inspection of the exteriors of these buildings including the roofs, siding, wing walls, trim, windows, doors, decks, and various building envelope penetrations.
- Infrared inspection of the exteriors of these buildings. This was contracted through Cascade Thermal Imaging, Inc.
- Invasive investigation into many areas of the buildings
- Final report presented to the board.

To complete this building envelope investigation, we are available to meet with the Board to discuss our findings and our recommendations for remediation. At this time we will discuss the envelope needs in the context of financial realities and we will discuss a feasible plan for remediation.

All inspections are performed in accordance to the National Academy of Building Inspection Engineers (NABIE) Standards of Practice, which can be viewed at [www.nabie.org](http://www.nabie.org).

2.3 SOURCES OF INFORMATION

The following people provided us information for this study:

- Robb White, Property Manager, Targa Real Estate Services
- Mick Crawford, Board Member
- John Roundtree, On-Site Maintenance Manager

The following documents were viewed as part of this study

- *No documents were necessary to be reviewed as part of this study*

The following companies aided us in our building envelope investigation at this property:

- Cascade Thermal Imaging – Infrared investigation of all building envelopes on this property
- Remco Deacon – Removed and replaced siding and trim for invasive investigation
2.4 LIMITATIONS

This report has been prepared for the exclusive use of Tall Firs Homeowners Association and their property management company. We do not intend for any other party to rely on this report for any reason without our expressed written consent. If another individual or party relies on this study, they shall indemnify and hold Jeff Samdal & Associates harmless for any damages, losses, or expenses they may incur as a result of its use.

This report is a snapshot in time of the condition of the property at the time of inspection. Our opinions are based on what we believe one could reasonably expect and are not based on worst case scenarios. These opinions are based upon our experience with other buildings of similar age and construction type. Opinions will vary and you may encounter contractors and/or consultants with differing opinions from ours. All ratings are determined by comparison to other buildings of similar age and construction type. The quality of materials originally impacts our judgment of their current state.

This report will tell you a great deal about the overall condition of the building envelopes on this property. However, this report does not constitute a warranty, an insurance policy, or a guarantee of any kind.
3.0 ANALYSIS OF BUILDING ENVELOPES

3.1 ROOFS

The asphalt-composition roofing appears to be CertainTeed Landmark roof surfacing and typically has a lifespan of between 25 and 30 years. We understand that the roofs were installed in the mid 1990’s and we believe that the roofs on these buildings have approximately 10 to 15 years of remaining life on them, provided that certain details are corrected. In this section we have detailed the typical details that need to be corrected across the entire property, with photos showing examples of the defect.

Clerestory Flashing: The clerestory flashing on the ridges of these buildings should be sealed together with an appropriate flashing sealant. None of the flashing pieces that we observed had sealant between pieces. The clerestory flashing on these buildings is secured with regular roofing nails with no ring shank. All pieces of clerestory flashing should be secured with rubber grommet screws long enough to grab on to the roof sheathing securely. Due to the improper fastener, many of the fasteners are missing and several pieces of clerestory flashing are flapping loosely on the roofs. This will lead to this flashing blowing off of the roof in high winds.
Poor Transition at Small Elevation Changes in Roofing: There are a couple of areas of roofing that have what roofers refer to as a “bastard hip.” This is where two different elevations of roofing come together and the elevation differential is small, 1 inch to 2 inches. This is an improper roofing installation and puts stress on the roofing material and eventually tears the roof surface along the ridge. The proper installation is to build a curb all along the transition line and step-flash both sides of this curb along with cap flashing on top of the curb.
**Missing Roof to Wall Flashing:** A few of the townhomes on this property have roof to wall flashing. However, the majority of the buildings on this property do not have roof to wall flashing. It is possible that the original roof surface had this flashing. But the new roof surface simply butts up to the wall, leaving this joint vulnerable. This should be corrected in all areas.

![Lack of Roof to Wall Flashing](image1)

**Step Flashing:** At all roof to wall joints where the roof is sloping down along a wall, there should be step flashing. There actually is step flashing on the original roof surface; however, in order for this step flashing to be effective, it has to be on the top roofing surface. This should be corrected as soon as possible as it is leading to moisture entry into the building envelopes.

![Missing Step Flashing at Roof/Wall Joint](image2)

![Evidence of Moisture Seepage Above Original Step Flashing](image3)
**Missing Kick-out Flashing:** At all roof to wall joints where the roof is sloping down along a wall that ends at a gutter, there should be kick-out flashing at the end of the step flashing (also missing). This lack of kick-out flashing is leading to moisture entry into the building envelope in all of these areas. This was very evident from the infrared scan in all of the areas beneath the junctions where the gutters terminate at the walls.

![Lack of Kick-out Flashing at the Gutters](image)

**Inadequate Clerestory Flashing on Carports:** The tops of the carports originally had clerestory flashing over the original roof surface; however, the new roof surface was placed right over the top of this flashing, rendering it useless. In many places, the roof surface was just folded over the top of the roof, which puts a stress on the roof surface and eventually tears the roof surface at the bend. The folded over roof surface should be trimmed at the top of the carport roof and new clerestory flashing should be installed in all of these areas.

![Inadequate Clerestory Flashing with Roof Surface Folded Over Top of Carport Roof in Many Places](image)
Roofing Fasteners: Some of the fasteners that we observed were coil nails or ring shank nails, which is the proper fastener for this type of roof surface. However, in other areas, we observed staples holding down the roof surface, which is improper for this type of roof surface. These fasteners are not adequate to hold down this roof surface during high winds. We understand from the on-site maintenance manager, that some roof shingles have blown off during high winds on this property in the past on several occasions. This is not an item that can be corrected without roof resurfacing; however, we thought that it was prudent to point out the improper fasteners so that proper installation of the next roof surface can be ensured in the future.

Missing Starter Metal Flashing: There is a lack of starter metal flashing between the first course of roofing and the gutters. This starter flashing would help to support the roof surface that hang over into the gutter during periods of snow on the roofs. The current situation leaves the roofing that overhangs into the gutter vulnerable to breaking off under snow loads.

Gutters and Downspouts: The gutters on these buildings should be cleaned immediately and once or twice per year thereafter. There are also several areas of the downspouts that are disconnected and should be secured immediately.
Moss and Debris: Removal of moss and debris should be part of routine maintenance. This should be done by first removing loose debris with a blower, then placing a zinc sulfate based treatment on the mossy areas and letting it sit for approximately 6 weeks. This will give the zinc sulfate a chance to kill the roots of the moss. At this point a blower, a garden hose, or a push broom can be used to remove the rest of the moss. DO NOT use a pressure washer to clean these roofs as it removed a significant amount of the life of the roof surface each time that it is used.
**B-Vent Storm Collars:** We noticed that the caulking around the storm collars on the B-Vents was dried-out, cracking, and loose in some areas. We recommend that all of these B-Vent Storm Collars be re-caulked to limit moisture entry into these areas.

![B-Vent Storm Collars SHOULD BE RE-CAULKED](image)

**Sewer Vents:** The sewer vents on the roof should be secured to the roof on the bottom with gasketed coil nails. Many of the sewer vents that we observed were not secured with any fasteners on the bottom and others were secured with regular roof nails. This leaves these vents vulnerable during high winds and should be corrected soon.

![NO FASTENER VISIBLE ON THE BOTTOM OF THE SEWER VENT](image) ![FASTENER SHOULD BE A GASKETED COIL NAIL](image)
Chimneys: The chimney caps on the chimneys are inadequate to prevent moisture entry into the chimneys. We recommend that new chimney caps be installed that slope to the exterior, as the current chimney caps are flat or even concave and are holding water. The new chimney caps should extend down around the exterior of the chimneys a minimum of 3 inches and should have a drip edge to get the moisture away from the chimney.

Some of the chimneys have adequate crickets above them; however, several others have inadequate crickets and flashing on the high side of these chimneys. The chimneys with lack of crickets are allowing moisture entry into the buildings. In some areas, make-shift flashing has been installed on the high side of some of the chimneys; however, this is ineffective and should be replaced with crickets and proper flashing.

Ventilation: The roofs appear to have adequate ventilation with soffit vents and gable vents on each building. At the time of resurfacing, however, the Association may want to consider the installation of a ridge vent.
**Townhouse Plexiglas Skylights:** The townhouses have Plexiglas skylights that are ineffective at excluding moisture entry. These skylights are allowing moisture entry into the roof below and have rotted much of the sheathing beneath the roofing below the skylights. We recommend that the levels of roof surface that currently have these Plexiglas skylights be completely stripped and re-surfaced. This will require complete removal of the roof surface, skylights, and likely most of the sheathing. This will also likely require the replacement of some areas of framing. All rot damaged wood that is discovered should be removed and replaced. The new roof surfacing should be installed with modern architectural details that are consistent with the details discussed in this report. 
**Areas of Roof Replacement:** As stated in the previous section, the roof surface beneath the Plexiglas will need to be replaced.

There are also many areas of spot replacement that should be replaced around the property that is generally considered routine maintenance. These areas should be taken care of by a comprehensive roof scope that includes the correction of most of the defective details mentioned above.

There is an area on building 34 that has rotted beneath the roof surface due to a faulty downspout above. This entire section of roofing and sheathing will have to be replaced. All rot damaged wood that is discovered should be removed and replaced. The new roof surfacing should be installed with modern architectural details that are consistent with the details discussed in this report.
AREAS WHERE SHEATHING AND ROOFING WILL NEED TO BE REPLACED ON THE SOUTH SIDE OF BUILDING 34/35

ROT IN SHEATHING VISIBLE UNDERNEATH THE ROOF SURFACE SHOWN AT LEFT
3.2 EXTERIOR CLADDING

The buildings are clad with vinyl siding over the top of wood siding. There is both vinyl and wood trim on these buildings. The vinyl siding was not installed properly; however, due to the fact that there is wood siding beneath this vinyl siding, the wood siding appears to be acting somewhat like a rain screen to prevent further moisture infiltration into most areas of the building envelope. Therefore, based on our visual investigation, infrared results and invasive investigation, ultimately we believe that if some of the details are corrected as recommended in this report, the vinyl siding will have a typical lifespan of 30 to 50 years.

As we understand, the siding on these buildings were resurfaced in the mid 1990’s, therefore, the earliest that the buildings will likely have to be stripped and re-clad will be in 2025, and quite possibly beyond this date. At this time, the buildings should be re-clad per modern architectural details.

**Vinyl Siding:** The vinyl siding itself is generally in good condition. There were some areas with holes and cracks, but this type of damage is typical and spot siding replacement will always be part of having vinyl siding.

**Weather Resistant Barrier:** Directly beneath the vinyl siding is 3/8” Amocor P38 Extruded Polystyrene Insulation Boards. This vinyl siding and polystyrene insulation was installed directly over the original wood siding. Since the vinyl siding (and polystyrene insulation) is installed directly over the original siding, the original siding is supposed to act as sheathing. There should be a weather resistant barrier over the top of this original siding or over the top of the polystyrene insulation; however, there is none.

There is 15-pound tar-paper beneath the original wood siding; however, in many of the areas that we viewed, this tar-paper was either reverse lapped around the windows or cut around the windows. Therefore, there is not a positive lap that removes moisture from the building envelope.

Clearly, correction of this problem is a complete strip and re-clad of the buildings, which is very expensive. While we concede that the current situation is not ideal, since we did not discover significant rot from this problem and the original siding is acting somewhat like a rain screen, we believe that no remediation is necessary at this time for this problem.
Trim: These buildings have wood trim on them. This wood trim is in need of repainting within the near future. This will require spot replacement of some of this wood trim. We believe that it is most appropriate to put repainting and spot replacement of this trim in the same scope of work as the roof repairs as most of this trim is on the fascias and adjacent to the roofs. This could cut down on cost as the roofing company will already be mobilized.

Structural Rot in the Buildings: There was rot in the header above the sliding glass door beneath a deck in the areas that was adjacent to the dryer exhaust. We assume that there will be many similar areas of structural rot. All of these areas should be opened up and all rot damage should be removed and replaced.
Uncovered Decks (and Sliding Glass Doors): There are two types of individual decks on this property: covered and uncovered decks. The uncovered decks are in poor condition and are all in need of some renovation including the replacement of rotten framing in approximately half of the decks. Additionally, there is almost none of the required flashing and counter-flashing on these decks. Consequently, the plywood decking and deck surfacing is in poor condition and most will likely need to be replaced.

In addition to the need for flashing, the sliding glass doors were not installed with door pans and should be removed and replaced over the top of door pans that are integrated into the deck flashing. This would be a good time to replace the sliding glass doors; however, it is possible to reinstall the old doors over proper door pans and flashing if proper care is taken when removing the doors. When all flashing is installed on these decks and all rotten framing and decking is replaced, these decks will need to be recoated with either an adequate vinyl deck surface or both a base coat and a finish coat of a high quality polyurethane elastomeric deck coating.

The dryer exhausts from the first floor units are currently discharging directly beneath the decks from a joist cavity. In the one area that we opened up, this dryer exhaust has damaged the surrounding areas. It is certain that this is the case with many of these dryer exhausts and all of these areas should be opened up and all rot damage and other moisture damage should be replaced. Then the dryer exhausts should be extended to the perimeter of these decks. We observed one such correction by the on-site maintenance staff. We believe that this was an adequate correction and believe that barring structural repairs, the on-site staff is capable of this correction.

The following steps should be taken to renovate all of the uncovered decks:
1. Remove the current railings.
2. Remove and replace all rot damaged framing and building materials after removing the vinyl siding between the decks and the lower level sliding glass doors.
3. Treat adjacent areas for termites and carpenter ants.
4. Remove the current deck surface and replace the decking as necessary where rotten or delaminated.
5. Remove the bottom course of siding above the decks.
6. Install 3 inch X 5 inch wall/deck flashing at all such joints.
7. Install perimeter deck flashing that extends down the edge of the deck a minimum of 2 inches with kick-out drip edge.
8. Install transition flashing boots at the corners of the deck adjacent to the buildings (ensuring that transitions to other pieces of flashing are properly lapped and soldered where necessary).
9. Remove all top level sliding glass doors and install a door pan that integrates with the wall/deck flashing.
10. Replace sliding glass doors with new doors or with original doors if care was taken in removal. The sliding glass doors should be installed per our window installation method below from the wet-setting step forward.
11. Either install a new vinyl deck surface (such as Duradek) or apply two coats of a polyurethane elastomeric coating on this deck (base coat and finish coat).
12. Extend the dryer ductwork to the perimeter of the decks.
13. Re-Install the siding and the railings (if the municipal inspector allows the original railings to be reused).
A TYPICAL EXAMPLE OF AN EXTERIOR DECK

ONE OF NUMEROUS EXAMPLES OF ROT IN THE DECK FRAMING

ONE EXAMPLE OF WHERE THE DRYER EXHAUST PIPE WAS EXTENDED TO THE EXTERIOR OF THE DECK
Covered Decks: The covered decks were not installed correctly and have inadequate flashing with poor transition details similar to the uncovered decks. However, due to the overhang on these decks, the covered decks are generally in good condition. The covered decks should be resurfaced as well with proper edge flashing and wall/deck joint flashing. This includes the replacement of the sliding glass doors. As the overhang on these decks has given these decks more room for error, they are in much better condition to the uncovered decks. Therefore, the flashing installation and the deck resurfacing should be a secondary priority at this property.
Windows: The windows on these buildings are a mix of the original aluminum frame windows and newer vinyl windows. The original windows are poor from an energy efficiency standpoint and poorly exclude moisture entry from entering the building envelope, as the infrared study showed moisture entry beneath most of these windows. The vinyl frame windows were installed in a variety of different ways as these windows are the responsibility of the individual owners and were installed by many different contractors. The majority of these windows are flangeless, making it impossible to flash per AAMA standards and modern architectural details. We believe that in all future window replacements, it is imperative that the windows on the exterior of these buildings be installed per modern AAMA standards by an approved list of contractors, with oversight to ensure that these details are followed.

No flangeless windows should be installed on these buildings from this point on. All future window installations include positive lapping of all areas of an adjacent weather resistant barrier, the installation of Bitumen self-adhesive membrane (including reinforcing corners) over the sills and jambs prior to windows installation, and the installation of Bitumen self-adhesive membrane on the jambs and header after windows installation. In addition to lapping the top portion of the weather resistant barrier over the Bitumen self-adhesive membrane and metal Z-flashing installed properly over the windows and any window trim. All windows should be installed so that they are “wet set” into adequate polyurethane caulking so that a solid seal is created around these windows.

The new window installations will facilitate the integration of future weather resistant barrier. The following steps should be taken (in order) for each window installation in the future:

1. Remove the original window.
2. Remove the vinyl siding and the polystyrene insulation 36 inches around each window (or as much as possible up to 36 inches).
3. Install a 36 inch roll of weather resistant barrier (such as JumboTex 60 minute) beneath the window opening so that it extends to the side of each opening 36 inches and so it wraps over the jamb of the window opening.
4. Install a thin wedge that slopes to the exterior (such as a beveled piece of lap siding).
5. Install a 12 inch wide strip of self adhesive membrane (such as Grace Vycor) on the window jam so that a minimum of 4 inches of this membrane folds over the jamb.
6. Install reinforcing corners (made for window installation).
7. Install 6 inch wide self adhesive membrane on the sides of the jambs of the window opening.
8. Install the windows so that they are “wet set” into the window opening. They should be “wet set” into quality polyurethane caulking such as OSI Quad.
9. Install 36 inch wide sections of weather resistant barrier at the sides of each window so that the top pieces are lapped a minimum of 6 inches over the lower sections.
10. Install a 6 inch wide self adhesive membrane over the flanges of the new window at the jambs.
11. Install a 6 inch wide self adhesive membrane over the flange of the new window at the header.
12. Install a 36 inch roll of weather resistant barrier over the top of the new window so that it extends past each side of the window 36 inches. In the future, when the siding is replaced, the future weather resistant barrier can be integrated to the weather resistant barrier around each window.
13. Reinstall the polystyrene insulation and the vinyl siding around the window.
Doors: The unit entry doors are adequate and will not need to be replaced, unless the Association desires to upgrade these doors.

Racquetball Building: The racquetball building has diagonal wood siding with several pieces of siding that have woodpecker holes and others that are split and warped. Generally, this type of siding is not a good surface as it directs water toward the corners and often rots out the corners. This siding could easily justify complete replacement. At a minimum, spot siding replacement should occur on this building and the building should be repainted. This is likely within the capabilities of the on-site maintenance staff.
**Carports:** There are many carports on this property. These carports are supported by 12 inch diameter poles that are secured beneath the asphalt surface presumably by concrete. Some of these posts have rotted at the base and have been replaced by poles mounted above the asphalt surface on small concrete piers. While this is good from a rot prevention standpoint, care should be taken to not overly hinder the lateral stability of these structures. Therefore, additional lateral support may be necessary as more of these poles are replaced. We recommend the consultation of a structural engineer for precise calculations.

There were a few areas where settlement of the carports has deformed a few of the roofs (particularly in the carport in front of building 10). While somewhat unsightly, this is not a functional defect of the roof surfaces themselves.

**3.3 AREAS OF INVASIVE INSPECTION:**

We removed the siding and/or trim in 14 areas around the buildings. These 14 areas gave us a good idea of the condition of many different areas around these buildings.

1. **Building 1 East Side above Unit 1C Entry (Beneath Eave and Window):** We removed the vinyl siding beneath the window and beneath the eave and discovered that there was no weather resistance barrier beneath the vinyl siding. There is merely polystyrene insulation secured to the wood siding beneath this vinyl siding. There is no Bitumen membrane or any flashing visible.
2. **Building 1 East Side above Unit 1C Entry (Above Door):** We understand that this unit has had moisture entry problems in the past. This is due to the fact that there is no kick-out flashing at the gutter terminus with the exterior wall and the lack of Z-flashing above the unit entry door.
3. **Building 1 West Side at Northwest Corner beneath Covered Deck:** We removed the siding and insulation in this area to see that there is inadequate flashing at the edge of this deck. The angle flashing should form a positive lap with a kick-out to get water away from the wall below.
4. **Building 9/10 at 10D at Northwest Side Second Story Far Left Window:** We removed the vinyl siding, insulation, and pried back the wood siding to reveal 15-pound tar-paper. This window had a flange; however, there is no bitumen membrane and the tar-paper was cut beneath the window rendering a lack of lap beneath these vinyl windows.

![Area Beneath Window](image1.jpg)

![No Membrane or Flashing Beneath Windows](image2.jpg)

5. **Building 9/10 at 9C on the Northwest Side, Second Window from Right:** We removed the siding, insulation, and wood siding to reveal that the flanges were trimmed from this window. No flashing or bitumen membrane was present around this window.

![Brown Vinyl Window](image3.jpg)

![Flange Was Cut Off and Window Was Not Flashed](image4.jpg)
6. **Building 9/10 at 9A on the Northwest Side, Third Window from Right:** We removed the vinyl siding, insulation, and wood siding to reveal 15-pound tar-paper. However, this tar-paper was reverse lapped beneath this window.

![Typical Aluminum Window](image1)

![Tar Paper Lapped Backwards Beneath the Window](image2)

7. **Building 9/10 at 9A on the Northwest Side beneath Deck at Dryer Vent Discharge:** There are dryer vents that discharge beneath the uncovered decks. This has led to a moisture surcharge beneath these decks and led to rot damage. This area was opened up to reveal rot in the header above the sliding glass door. There was also termite damage visible in this wood. These areas will all have to be opened up and all rot damaged wood will have to be replaced. Then the exhaust should be extended to the end of the deck.

![Area Beneath Deck at Dryer Vent Discharge](image3)

![All Nails Pulled from This Area Were Rusted](image4)
ROTTEN WOOD SIDING BENEATH INSULATION

ANOTHER PHOTO OF ROT

ROT IN SLIDING GLASS DOOR HEADER

MOISTURE LEVELS WERE ABOVE 28% IN THE HEADER ABOVE THE SLIDING GLASS DOOR
8. **Building 9/10 at 9A on the Southwest Side beneath Gutter:** In many areas where the gutter terminated at the wall, there was evidence of moisture entry beneath this terminus. This is due to the lack of kick-out flashing in these areas. Kick-out flashing should be added to all of these areas.

9. **Building 16/17 at 16A at Fascia Terminus into Exterior Wall:** There was evidence of moisture entry beneath many fascia transitions to the exterior walls. We believe that this is due to the lack of adequate step flashing along the roof wall joint (not visible in the photo below).
10. Building 20/21 West above and below Gutter on 2\textsuperscript{nd} Chimney from North Side: The infrared study revealed moisture anomalies in many of the chimneys. The invasive study did not reveal any defects at the gutter area (beyond the lack of weather resistant barrier on any of the exterior beneath the vinyl siding). We believe that the moisture in these chimneys is due to inadequate chimney caps and the lack of adequate crickets on these chimneys.

SIDING REMOVED ABOVE AND BELOW GUTTER ON CHIMNEY

CLOSE UP OF SIDING REMOVED BELOW THE GUTTER

CLOSE UP OF SIDING REMOVED ABOVE THE GUTTER
11. **Building 20/21 North Side beneath Aluminum Window above Entry:** This particular window had anomalies visible on the infrared scan. However, when the siding was removed around this window we discovered that it was installed similarly to all other aluminum windows. No flashing, no bitumen membrane, and no weather resistant barrier visible.

![Siding removed beneath window (and above entry)](image)

12. **Building 30/31 Southeast beneath 30D Deck:** We removed siding beneath this deck in order to get a better sampling of these types of areas below uncovered decks. This particular deck did not have any visible damage like that of a previous similar area on building 9/10.

![Siding removed beneath deck](image)
13. **Building 30/31 Southeast beneath 30D Window:** We removed the vinyl siding, insulation, and wood siding to reveal 15-pound tar-paper. However, this tar-paper was reverse lapped beneath this window.

![VINYL SIDING, INSULATION, AND WOOD SIDING REMOVED BENEATH ALUMINUM WINDOW](image1)

![TAR PAPER REVERSE LAPPED](image2)

14. **Building 41/42 Northwest beneath 41C Deck:** We removed siding beneath this deck in order to get a better sampling of these types of areas below uncovered decks. This particular deck did not have any visible damage like that of a previous similar area on building 9/10.

![41C DECK](image3)

![CLOSE-UP OF SIDING AND INSULATION REMOVED FROM AREA BENATH DECK](image4)
4.0 CONCLUSION

We appreciate the opportunity to be of assistance and we hope that we have provided you a clear understanding of the building envelopes of the buildings on your property. This report supersedes any opinion or discussion that occurred during the inspection and should be considered our complete opinion of the condition of this property.

Please contact us if you have any questions regarding this report or your property in general. We will be happy to be of assistance.

Jeff Samdal, PE

Jeff Samdal & Associates
Areas of Expertise
Mr. Samdal is the owner of Jeff Samdal & Associates, Inc. (formerly Samdal Engineering), a private business that specializes in building inspections, engineering, and related services. He is a double-licensed Professional Engineer (Mechanical and Civil) in Washington State with nearly ten years of experience. He is also an accredited Building Inspection Engineer (BIE) and Reserve Specialist (RS). He has performed over 1,000 building inspections within the previous four years as well as numerous additional services such as building envelope design, construction management, and general consulting for property owners pertaining to building maintenance, scheduling and budgeting. Mr. Samdal consistently earns repeat and referral business because of his attention to detail, practical approach, knowledge of the industry, and genuine appreciation for clients' concerns for their real estate investments.

Capabilities
Mr. Samdal is experienced at performing residential, commercial, and industrial inspections in Washington State. Mr. Samdal’s experience includes the following:

- Property Condition Assessments (PCAs)
- Owner’s Representative Construction Management
- Building Envelope Design and Construction Monitoring
- Capital Needs Assessments and Facilities Surveys
- Condominium/Homeowner’s Association Reserve Studies
- Condominium Conversion Studies
- Structural Failure Analysis and Investigation
- Warranty Claims Investigations
- Window Water Exclusion Testing per ASTM Standards

Relevant Work History
Mr. Samdal has been owner and operator of Jeff Samdal & Associates / Samdal Engineering since 2005. Before concentrating on building inspections, Mr. Samdal worked for Washington Group International’s (WGI) Hydropower and Water Resources Group. While working for WGI, Mr. Samdal was involved in rebuilding and rehabilitating hydro facilities. He served as the on-site powerhouse and switchyard inspector during construction. His duties included design, drawing and specification preparation, cost estimating, scheduling, and construction management. Prior to working for WGI, Mr. Samdal worked for Duke Energy in a similar role.

Education
BS in Mechanical Engineering, University of Washington

Licenses and Certifications
- Licensed Professional Engineer (PE), Mechanical Engineering, State of Washington, #40985
- Licensed Professional Engineer (PE), Civil Engineering, State of Washington, #40985
- Reserve Specialist (RS), Community Associations Institute (CAI), #173
- Professional Reserve Analyst (PRA), Association of Professional Reserve Analysts
- Building Inspection Engineer (BIE), National Association of Building Inspection Engineers
- Structural Pest Inspector, State of Washington, #70763
- Licensed Home Inspector, State of Washington, #349

Professional Affiliation
American Society of Mechanical Engineers, 2002 – present
Thermography Report

Customer:
Jeff Samdal & Associates
P.O. Box 2489
Woodinville, WA 98072

Site:
Tall Firs Condo’s
31841 18th Ave SW
Federal Way, WA 98023

Thermography date: 1-19-10
Outdoor temperature: 48 °F
Indoor temperature: 65 °F
Temp diff In-Out Δt: 17 °F
Weather: Clear

ITC Certified Thermographers
~ Larry D. Stratton ~
Picture 1. Captured at: (Tall Firs Condo’s, Federal Way, WA)

Building #1 North Upper Right Wall Surface – Phase -1 (1979)
Comment: Minor evidence of moisture intrusion in Ar1 area of this wall. Vinyl Siding over Cedar/no Tyvec.

Picture 2. Captured at: (Tall Firs Condo’s, Federal Way, WA)

Building #1 North Upper Left Wall Surface – Phase -1 (1979)
Comment: Minor evidence of moisture intrusion in Ar1 area of this side of the wall surface as well. Vinyl Siding over Cedar/no Tyvec.
Picture 3. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #1 North Lower Right Wall Surface – Phase -1 (1979)
Comment: Minor evidence of moisture intrusion in Ar1 area of this side of the wall surface. Vinyl Siding over Cedar/no Tyvec.

Picture 4. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #1 North Lower Left Wall Surface – Phase -1 (1979)
Comment: Minor evidence of moisture intrusion in Ar1 & Ar2 on this side of the wall surface as well. Vinyl Siding over Cedar/no Tyvec.
Picture 5. Captured at: (Tall Firs Condo's, Federal Way, WA)

<table>
<thead>
<tr>
<th>Sp2</th>
<th>Ar1</th>
</tr>
</thead>
</table>

FLIR Systems
Building #1 East Entry of Unit C - Phase -1 (1979)
Comment: Evidence that moisture has been or is present under the clerestory at the left of this image. Temperature difference of 7.9° F between Ar1 and Sp2. Vinyl Siding over Cedar/no Tyvec.

Picture 6. Captured at: (Tall Firs Condo's, Federal Way, WA)

<table>
<thead>
<tr>
<th>Ar2</th>
<th>Sp1</th>
</tr>
</thead>
</table>

FLIR Systems
Building #1 East Entry of Unit B - Phase -1 (1979)
Comment: Evidence that moisture has been or is present under the clerestory at the left of this image (Ar2) as well as above the door (Ar1) on the right. Temperature difference of 11.4° F between Ar1 and Sp1. This indicates the potential that moisture has in the past or is still running down behind the Vinyl Siding in both locations. Vinyl Siding over Cedar/no Tyvec.
Picture 7. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #1 East Side Entry of Unit B - Phase -1 (1979)

Comment: Evidence that moisture has been or is present under the clerestory (Ar1) at the left of this image. This indicates the potential that moisture has in the past or is still running down behind the Vinyl Siding in this location. Vinyl Siding over Cedar/no Tyvec.

Picture 8. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #1 South Side Beneath Peak - Phase -1 (1979)

Comment: Odd anomalies show up in this image. (Ar1,2,3 & 4) Possibly due to some moisture intrusion at siding joints. Vinyl Siding over Cedar/no Tyvec.
Picture 9. Captured at: (Tall Firs Condo’s, Federal Way, WA)

Building #1 South Side
Comment: This is an anomaly (Ar1) that warrants further investigation, as there is enough evidence that moisture has been or is present beneath the window of Unit 1-A and on the adjacent wall surface to the right. Vinyl Siding over Cedar/no Tyvec.

Picture 10. Captured at: (Tall Firs Condo’s, Federal Way, WA)

Building #9/10 SW Side Under Window
Comment: Small anomaly under window (Ar1) indicating area of concern. Moisture is likely to have made an intrusion here under the window.
Picture 11. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #9/10 SW Side
Comment: (Ar1) indicates an anomaly that warrants concern. Although minor it is apparent that there has been potential moisture intrusion, possibly at the siding joins as well as from above.

Picture 12. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #9/10 NW Side - Right
Comment: (Ar1) indicates an anomaly that warrants concern. It is apparent that there has been moisture intrusion, possibly from the above window area.
Picture 13. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #9/10 NW Side – Bottom Right Deck
Comment: Moisture present in deck sheathing. Visible signs of moisture damage are also present in this location.

Picture 14. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #9/10 NW Side – Left of Right Deck
Comment: Here again, (Ar1) indicates an anomaly that warrants concern. It is apparent that there has been moisture intrusion in the past or it is still present in this location, possibly from the above window area.
Comment: (Ar1) indicates an anomaly that warrants concern. It is apparent that there has been moisture intrusion in the past or it is still present in this location, possibly seepage from the above window installation.

Comment: Minor moisture seepage at this wall surface location – Note heat emanating from range in kitchen area is visible just left of the tree.
Picture 17. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #9/10 SE Side – Unit #10-C
Comment: (Ar1) indicates an anomaly of concern beneath the window area, as it appears that moisture has been or is present under this window.

Picture 18. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #9/10 SW Side
Comment: (Ar1) indicates an anomaly and area of concern, as moisture could be entering at the gutter area and getting in behind the siding

Recommendation:
Picture 19. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #9/10 SW Side @ Right
Comment: (Ar1) indicates an anomaly of concern, as moisture may be present and entering beneath top of fascia. (Ar2) Wall surface is also inconsistent with the thermal pattern of the rest of the wall surface indicating that this may also be an area of concern.

Picture 20. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #16/17 NW Side – Middle Left
Comment: (Ar1) indicates an anomaly of concern, as moisture may be present and entering beneath this window.
Picture 21. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #16/17 NE Side
Comment: Fairly consistent thermal pattern on this wall surface. Evidence of fireplace and possibly dryer in the lower left portion of the image.
Recommendation:

Picture 22. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #16/17 SE Side – Middle Right Between Right and Right Center Units
Comment: (Ar1,2,3 & 4) Are anomalies that warrant concern as possible moisture intrusion locations.
Picture 23. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #16/17 SE Side - Left
Comment: (Ar1) Some evidence of moisture intrusion beneath upper aluminum window. An anomaly that warrants itself to be an area of concern.

Picture 24. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #16/17 SW Side – Right
Comment: (Ar1) Some evidence of moisture intrusion beneath gutter/wall interface. An anomaly that warrants itself to be an area of concern.
Picture 25. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #21 West Side – Unit C Chimney Stack Area
Comment: (Ar1) Some evidence of moisture intrusion beneath gutter at chimney stack. Some visible evidence of mildew and moisture problems above as well. An anomaly that warrants itself to be an area of concern.

Picture 26. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #21 West Side – Upper Left Window
Comment: (Ar1) Some evidence of moisture intrusion beneath aluminum window. An anomaly that warrants itself to be an area of concern.
Comment: (Ar1) Again, this anomaly would indicate that there has been or still remains moisture intrusion beneath this aluminum window. An anomaly that warrants itself to be an area of concern.

Comment: (Ar1) Indicates an anomaly both above and below the gutter area at this chimney stack. An anomaly that warrants itself to be an area of concern.
Picture 29. Captured at: (Tall Firs Condo's, Federal Way, WA)

Comment: (Ar1) Again, this anomaly would indicate that there has been or still remains moisture intrusion beneath this aluminum window. An anomaly that warrants itself to be an area of concern.

Building #21 West Side – Unit A

Comment: (Ar1 & 2) Indicate anomalies of potential moisture intrusion under this window area. This would be considered an area of concern.

Picture 30. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #21 – North Indent

Comment: (Ar1 & 2) Indicate anomalies of potential moisture intrusion under this window area. This would be considered an area of concern.
Picture 31. Captured at: (all Firs Condo's, Federal Way, WA)

Building #21 – North Beneath Peak
Comment: (Ar1) Indicates an anomaly under the peak area of this wall surface. (Ar2) is structural beam.

Picture 32. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #30/31 SW Side - Right
Comment: (Ar1) Indicates an anomaly beneath the gutter/wall interface. This thermal pattern warrants itself to be an area of concern.
Picture 33. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #30/31 SW Side – SE Facing Wall
Comment: (Ar1) Indicates an anomaly up and to the right of the lower window. The unevenness of the thermal pattern on this surface warrants this to be an area of concern.

Picture 34. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #30/31 SW Side – Left Side
Comment: Some minor seepage is evident on this wall surface.
Picture 35. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #30/31 – NW Side - Right
Comment: (Ar1) indicates the potential evidence of moisture intrusion form beneath top fascia area.

Picture 36. Captured at: (Tall Firs Condo's, Federal Way, WA)

Building #30/31 – NW Side – 2nd From Right – Unit #31-D
Comment: (Ar1) Also indicates a thermal pattern that evidences the potential of moisture intrusion form the above aluminum window.
**Picture 37. Captured at: (Tall Firs Condo's, Federal Way, WA)**

![Image showing a thermal scan with a temperature scale ranging from 43.7 to 54.0°F. The scan indicates a thermal pattern with a temperature of 47.1°F.](image1)

**Building #30/31 – NW Side – Middle – Unit #31-A**

Comment: (Ar1) Indicates a thermal pattern that evidences the potential of moisture intrusion from the above aluminum window here as well. There is also some evidence of some seepage above and to the right and left of this window area.

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**Picture 38. Captured at: (Tall Firs Condo's, Federal Way, WA)**

![Image showing a thermal scan with a temperature scale ranging from 43.7 to 54.0°F. The scan indicates a thermal pattern with a temperature of 52.1°F.](image2)

**Building #30/31 – NE Side**

Comment: (Ar1) indicates some potential moisture entry at the center left of this wall surface.
Picture 39. Captured at: (Tall Firs Condo’s, Federal Way, WA)

Building #30/31 – SE Side – Right @ Stairs

Comment: (Ar1) Here we see evidence that there has been or is moisture present emanating from the light fixture block, which may have not been properly installed, or caulked properly.

Picture 40. Captured at: (Tall Firs Condo’s, Federal Way, WA)

Building #41/42 – SE Side - Left

Comment: (Ar1) Indicates a thermal pattern consistent with the potential moisture intrusion seen in similar locations under such aluminum windows.
Summary:
At the time of this Infrared Inspection there was rain for 4-5 days prior to the inspection dates. The evenings chosen presented fairly optimal conditions for this IR Inspection. The purpose of this particular IR inspection was to pick buildings constructed during all three phases of the property construction cycle and to non-invasively assist in the prioritization of any needed more intrusive investigation and required repairs. There were fairly consistent thermal patterns evident in the earlier Phase I & II construction and a more evident level of potential moisture intrusion at these locations. It would appear that many of the older aluminum windows and or their installation is allowing moisture to enter behind the siding.

In some areas the clearstory construction and some of the gutter installations have resulted in the creation of similar conditions.