

November 16, 2023

Tanglewood Hills HOA

Re: Tanglewood Hills HOA – J2 Ventilation Memo

Dear Tanglewood Owners,

The scope of J2's work was limited to evaluation and design of exterior building assemblies, and did not include mechanical engineering or ventilation of the unit interiors. However, the interior environments have a significant impact on the performance of building exteriors. The purpose of this memo is to emphasize the importance of properly ventilated unit interiors.

The Building Code relevant to the current repair project (2019 Oregon Structural Specialty Code Section 1203) requires the interior of all buildings to be ventilated by natural means or mechanical means. As with many residential multi-family buildings, the subject buildings are not ventilated by mechanical means, per the mechanical code, and are therefore reliant on natural ventilation. Among other requirements, Section 1202.5 states that *natural ventilation* of an occupied space shall include:

- 1) Operable windows, doors, louvers, or other openings to the outdoors
- 2) The opening area of item #1 above shall not be less than 4 percent of the floor area being ventilated
- 3) Bathing rooms shall still be mechanically ventilated in accordance with the Mechanical Code

Although not a specific requirement, it is also recommended to have mechanical ventilation that exhausts to the outside in cooking areas, laundry rooms, etc.

The opening size requirement noted above is quite large. It equates to roughly four large windows fully opened in a typical 3-bedroom residence. The code does not specify when or how often to open the windows, but it states that the openings need to be "readily controllable by the building occupants." **So, this makes natural ventilation 100% user dependent.**

The purpose of adequate ventilation is at least twofold. First, it allows fresh air for people to breath, and secondly, it helps equalize the humidity of the interior with the exterior so that it limits the amount of water vapor that is forced through the exterior walls, roofs and crawlspaces. People breathing, bathing, cooking, washing dishes and clothes, pets, plants, etc. are all activities that produce significant amounts of moisture. Especially in the winter and early spring months, this interior moisture naturally tends to move from the interior to the exterior of the building to equalize. When relying on natural ventilation, this means that **windows must be open** periodically, or this moisture will be introduced directly into the assemblies of exterior walls, attics, and crawlspaces. When the moisture hits a cold surface like the exterior wall sheathing or roof sheathing, it can condense into liquid water and has the potential to cause moisture damage. This condition seems to occur more in multi-family housing much more than single family housing in part due to many of the walls and ceilings sharing the same space as the adjacent unit. There is less surface area to volume ratio that the higher moisture must diffuse through.

Therefore, while the code is not specific as to how to operate windows, **the opening of windows by the occupants is a ventilation code requirement** that should be performed at all times of the year so that moisture damage does not occur to the exterior walls, roofs/attics and crawlspaces.

Regular usage and maintenance should consider the following basic interior ventilation recommendations:

- 1) "Trickle vents" are provided on some new window frames. Ensure these vents are kept in the open position.
- 2) If windows are fogged up, interior humidity is elevated, or air feels "stuffy", open the window.
- 3) Ensure kitchen hood fans are exhausted to the exterior of the building and are not recirculating. Use hood fans when cooking.
- 4) Ensure bathroom fans are operating properly and use fans during and after bathing.
- 5) Install humidistats and/or timers on exhaust fans. Humidistats should be set at approximately 50-60% RH.
- 6) Ensure clothes dryers are rated for the existing length of exhaust duct length considering elbows/fittings and exhaust hood restrictions.
- 7) Inspect and/or pressure test exhaust ducts to ensure they are not disconnected, leaky and that the flowrates meet code minimums for continuous and/or intermittent exhaust flowrates.

Please advise if further clarification is required.

Sincerely,

J2 BUILDING CONSULTANTS, INC.



Ryan Paddock, P.E., Principal