

BALANCED MECHANICAL WHOLE-HOUSE VENTILATION STRATEGIES OREGON RESIDENTIAL SPECIALTY CODE

On April 1, 2021, the 2021 Oregon Residential Specialty Code (ORSC) became effective, introducing new requirements for continuously-operating, balanced mechanical whole-house ventilation (WHV) in Section R303.4 and revised other requirements. This document highlights the intent of the 2021 ORSC when installing mechanical ventilation and provides compliance examples. Use of a furnace fan for ventilation was permitted under the 2017 ORSC and is not prohibited under 2021 ORSC.

SECTION M1505.4— MECHANICAL WHOLE-HOUSE VENTILATION SYSTEM (WHV)

Section M1505.4 of the 2021 ORSC requires that the WHV system provide balanced ventilation. Local exhaust or supply fans are permitted to serve as part of such a system. Outdoor air ventilation provided by a supply fan ducted to the return side of an air handler shall be considered as providing supply ventilation for the balanced system. A furnace fan for ventilation is not prohibited under the 2021 ORSC.

The WHV system shall be provided with controls that enable manual override. The continuous ventilation rate shall be determined in accordance with Table M1505.4.3(1) or the equation: ventilation rate in cubic feet per minute = $(0.01 \times \text{total square foot area of house}) + [7.5 \times (\text{number of bedrooms} + 1)]$.

There is an exception which allows the WHV to operate intermittently where the system has controls that enable operation for not less than 25% of each 4-hour segment and the ventilation rate prescribed in Table M1505.4.3(1) is multiplied by the factor determined in accordance with Table M1505.4.3(2). Reducing operation time requires an increase in the ventilation rate.

**TABLE M1505.4.3(1)
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS**

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 – 1	2 – 3	4 – 5	6 – 7	> 7
	Airflow in CFM				
< 1,500	30	45	60	75	90
1,501 – 3,000	45	60	75	90	105
3,001 – 4,500	60	75	90	105	120
4,501 – 6,000	75	90	105	120	135
6,001 – 7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

For SI: 1 square foot = 0.0929 m², 1 cubic foot per minute = 0.0004719 m³/s.

**TABLE M1505.4.3(2)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS^{a, b}**

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor ^a	4	3	2	1.5	1.3	1.0

a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.

b. Extrapolation beyond the table is prohibited.

BALANCED VENTILATION SYSTEMS

Balanced ventilation systems are a combination of exhaust and supply methods providing approximately equal (within a 10% margin) indoor exhaust and outdoor supply air flow. Outside air should be taken from a known fresh air location then filtered and tempered before delivery to the conditioned space. Balanced ventilation should not affect the pressure of the interior space relative to outdoors.

A typical balanced ventilation system is designed to supply fresh air to bedrooms and living rooms where occupants spend the most time. It then exhausts air from rooms where moisture and pollutants are most often generated such as the kitchen, bathrooms, and/or the laundry room. A balanced system may, or may not, include a heat recovery ventilator (HRV) or an energy recovery ventilator (ERV).

EXAMPLE SECTION FIGURES

These figures provide examples of compliant WHV systems, but not all possible examples, relative to what is intended and what is not allowed by the ORSC.

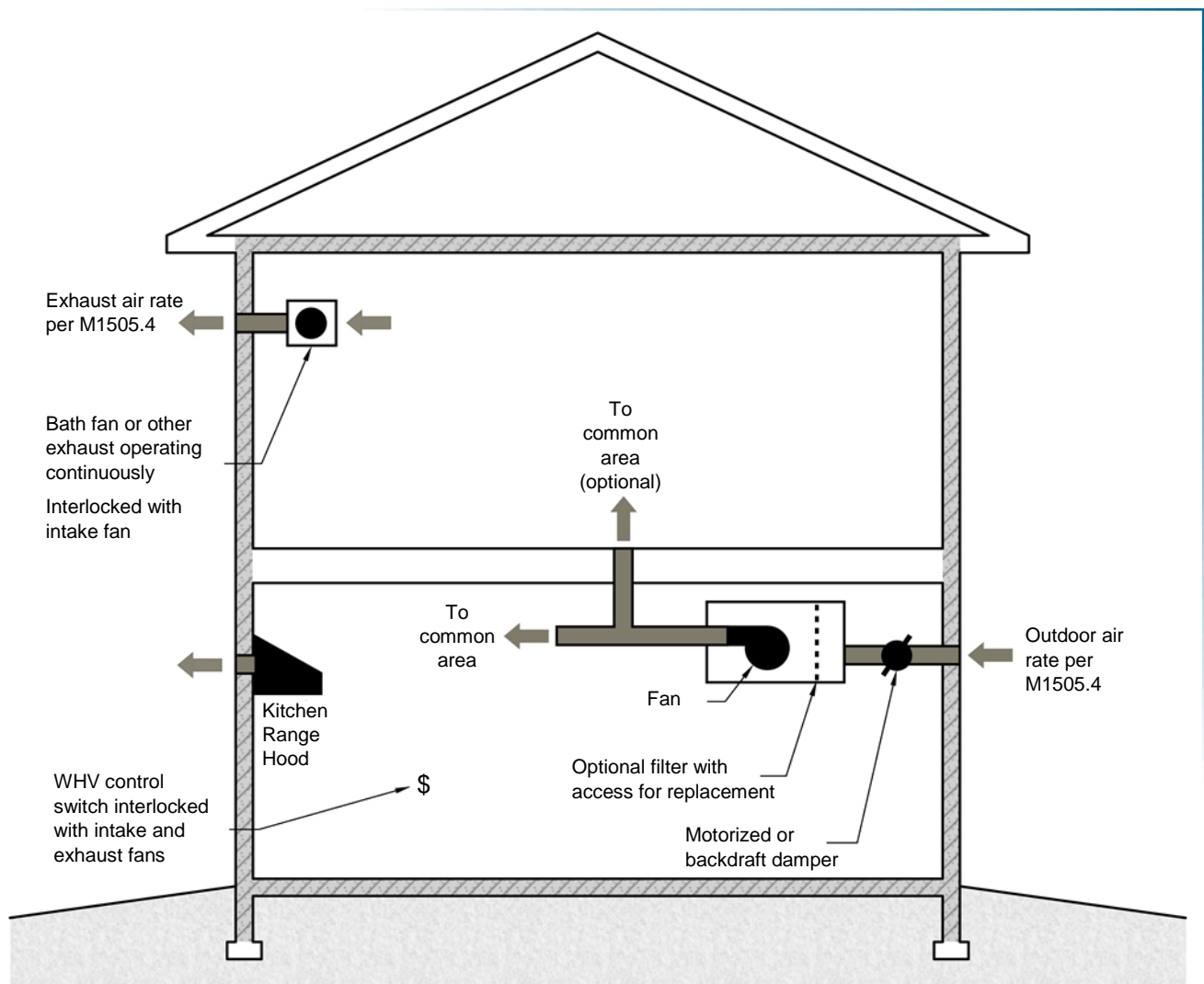


FIGURE 1.
Minimum compliance:
Supply and exhaust fans providing continuously-operating, balanced, WHV *without* a furnace.

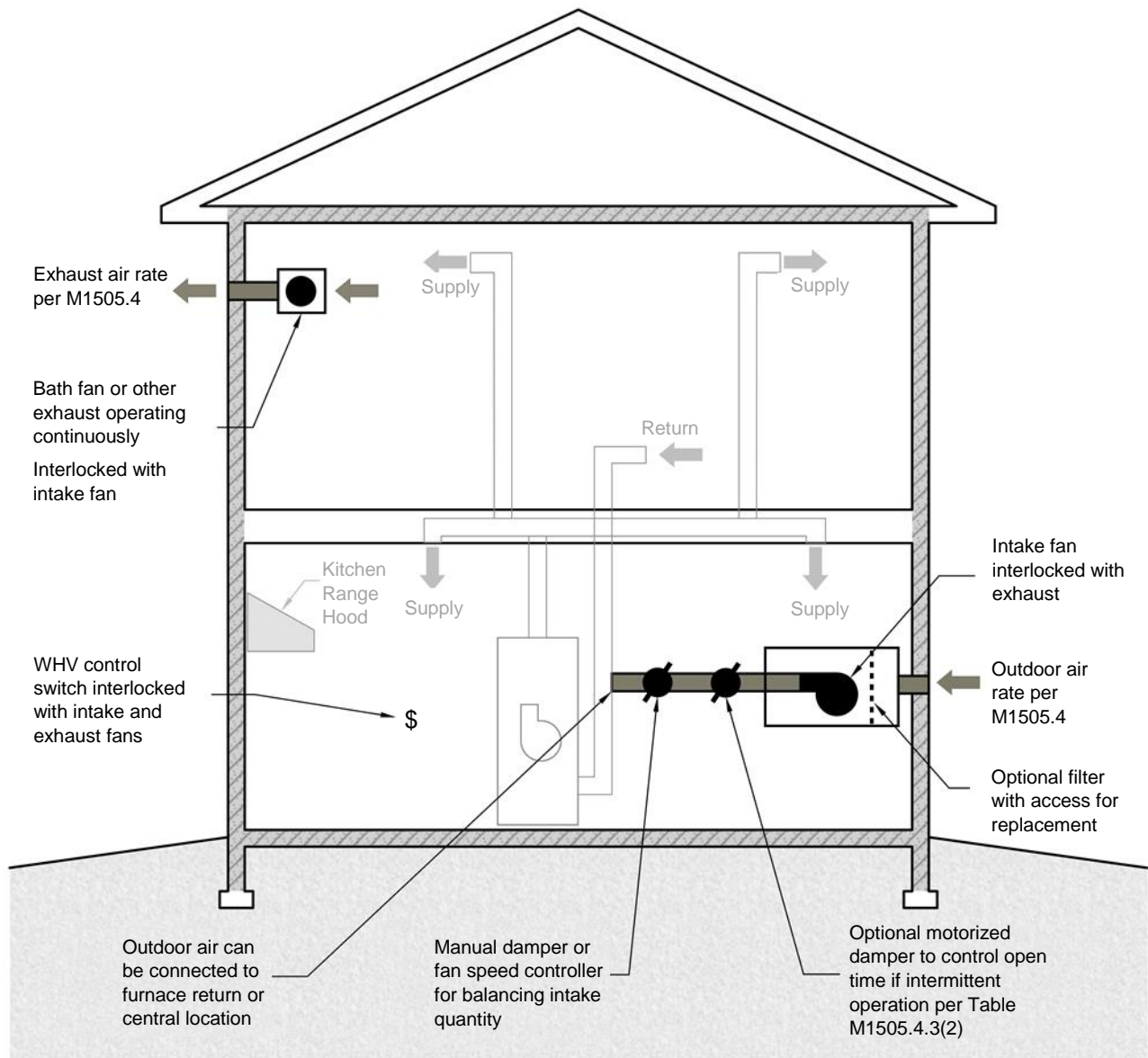


FIGURE 2. Supply and exhaust fans providing continuously-operating, balanced, WHV *with* furnace.

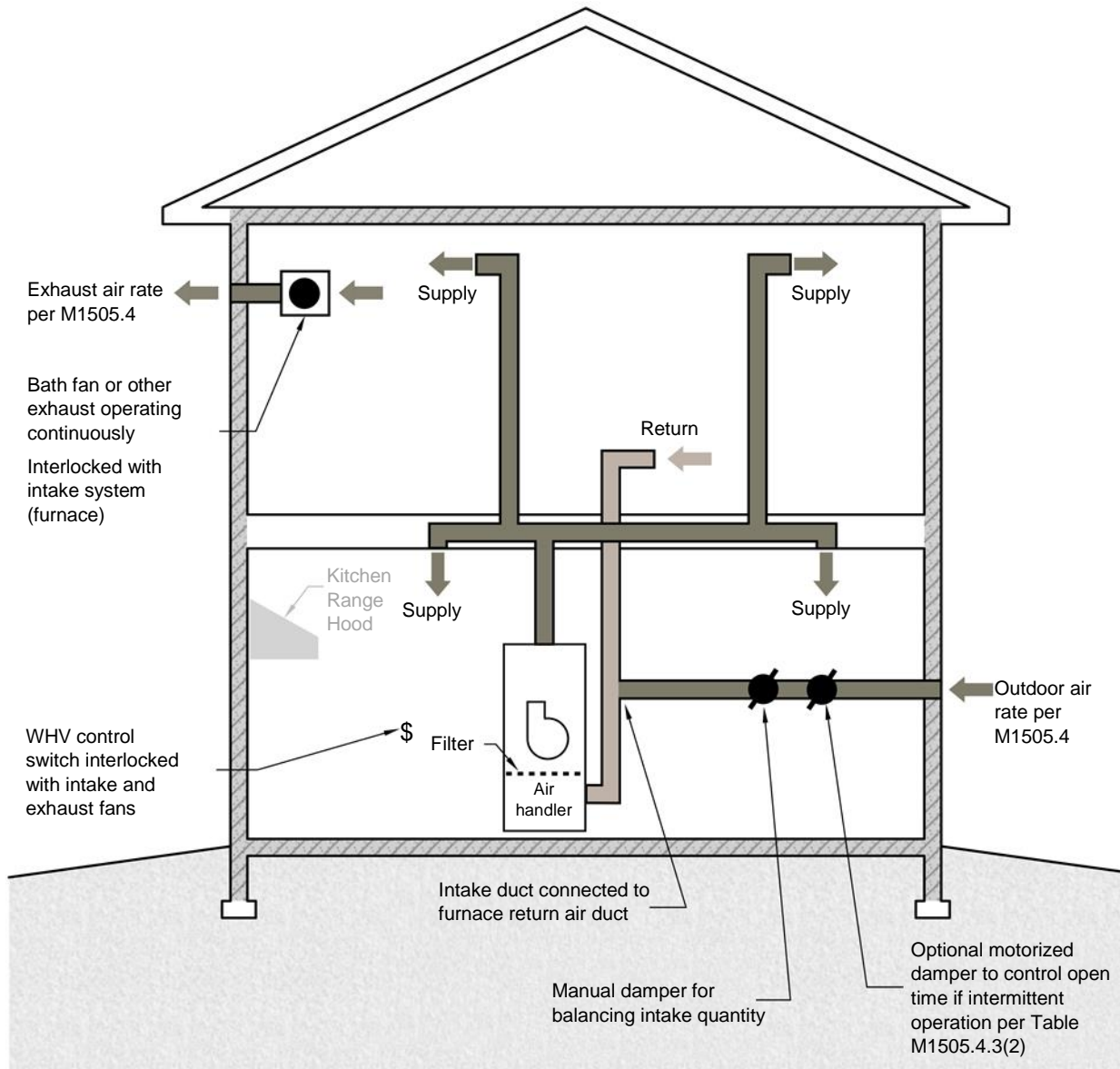
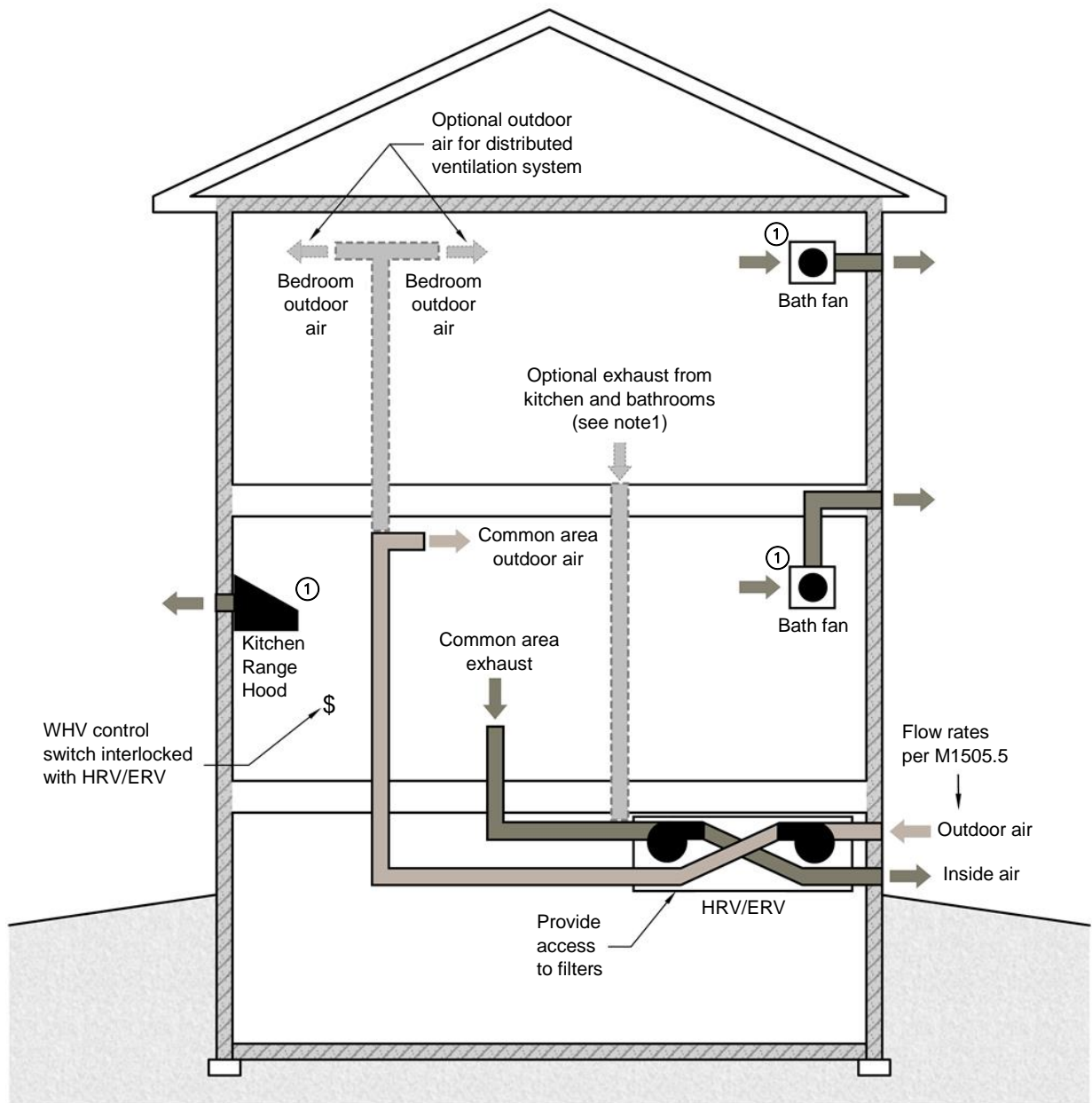


FIGURE 3.

Central Fan Integrated Supply (CFIS) continuously-operating, balanced WHV. Furnace serves as the intake fan. Shall be interlocked with the exhaust system AND an override switch.



① ERV/HRV exhaust may serve bath or kitchen in lieu of local intermittent fan per M1505.5 and M1503.3, Exception

FIGURE 4. Heat Recovery/Energy Recovery Ventilation (HRV/ERV) providing continuously-operating, balanced, WHV. Supply may be connected to the central furnace return air.

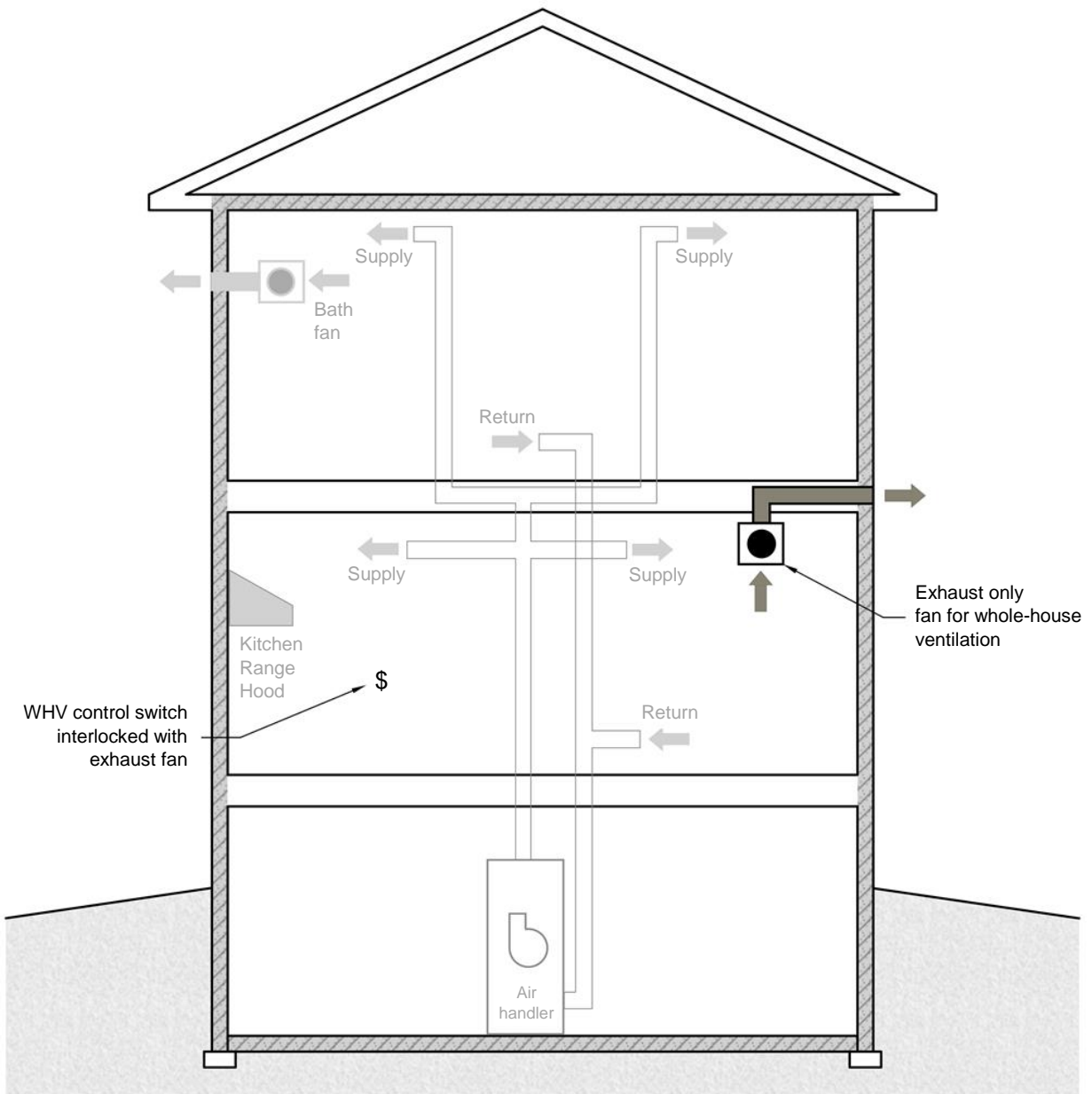


FIGURE 5.
Unacceptable ventilation configuration: Single-point exhaust only ventilation (without balanced intake).

CONCLUSION

There are many ways to provide a balanced mechanical WHV system in accordance with the 2021 ORSC. There are also many ways to improperly ventilate a home. The section drawings above provide common examples, but not all possible examples, relative to what is intended by the ORSC.

As with all site-specific matters, it is recommended to begin development discussions early in the initial planning stages. This technical bulletin also reminds the end user that local building officials retain broad local flexibility and discretionary authority.