BASIS OF DESIGN

POAH Design + Building Performance Dept.

LAST UPDATED 04.11.2024

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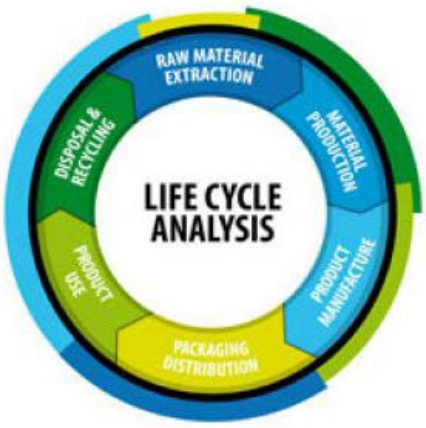
WELCOME TO THE BASIS OF DESIGN

THE RIGHT CHOICES MATTER:

The Basis of Design (BOD) specifies performance criteria based on durability + maintenance requirements, availability, and energy + water efficiency and provides sample products. By standardizing building performance across the portfolio, we can ensure quality-built homes for our residents. The products in the BOD have been vetted by POAH and are shown as examples that meet our standards. Alternates are welcome, however they must be brought to POAH's attention and approved by POAH if they are to be used in the project.



The Basis of design is a product specification/selection resource, not a product purchasing platform.

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POAH Design + Building Performance Dept.

LAST UPDATED 04.09.2024

AIR CONDITIONER COVERS

PRODUCT DEFINITION:

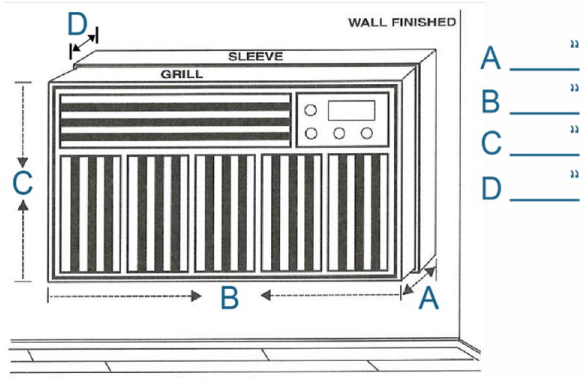
In locations with permanently installed window or through wall air conditioners, a plastic hard cover should be installed on the interior of the air conditioner unit during the winter months. Air conditioner covers reduce cold air infiltration into the units/building, save on heating costs, and make units more comfortable. For use on the interior of the unit only.

http://www.parksupplyofamerica.com
Mid States Plactics Chill Stop'r Air Conditioner Cover

PRODUCT ORDERING INFORMATION:

Record the size of your existing air conditioners. The following dimensions are required:

- Depth of air conditioner and sleeve (A)
- Width of air conditioner (B)
- Height of air conditioner (C)
- Depth of sleeve (D)



This information can then be used by the architect, contractor, product representative, or Project Manager coordinating the installation. Contact manufacturer directly for specific measurement requirements.

LAST UPDATED 04.09.2024

AIR CONDITIONER COVERS

SAMPLE PRODUCT:

Battic Door Energy Conservation Products / Universal Air Conditioner Indoor Cover

- (A) Cover Depth: 6”
- (B) Cover Width: 30”
- (C) Cover Height: 21”
- High impact hard cover
- R-Value R5

ORDER HERE

ADDITIONAL INFORMATION:

- At sites where residents provide their own air conditioner, the depth of the cover may vary. If possible, select one depth that will fit all existing depths.
- Some minor modifications to the existing wall or the installation of trim may be required to acommodate the air conditioner cover. If recommended product is not conducive to existing conditions, please contact the Design + Building Performance Department for assistance.

CLICK HERE FOR AC UNIT SPEC

CLICK HERE TO CONTACT THE DESIGN + BUILDING PERFORAMNCE DEPARTMENT

REFRIGERATOR

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White or Black; Color to be determined by architect, POAH Design + Building Performance Department, or match existing. All appliances must match.
- Volume:
  - Non-Family Units: 17.5 cubic feet minimum or match existing.
  - Family Units: 21 cubic feet minimum or match existing.
- Width: 30" minimum width or match existing.
- Energy Star Rated: Required
- Self-Defrosting: Required
- Reversible Hinges: Required
- Water/Ice Dispensers: Not Permitted
- Ice Makers: Not Permitted
- Side-by-Side Doors: Not Permitted
- Refrigerators in ADA units must be ADA compliant:
  - 100% of the fresh food space below 54" maximum AFF
  - 50% of the freezer space below 54" maximum AFF
  - Controls must be below 54" maximum AFF

SAMPLE PRODUCT:
Whirlpool

- 30" Wide
- 18.2 Cubic Feet
- Top Freezer
- ADA Compliant

Manufacturer Number:
WRT108FFDM

RANGE

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White or Black; Color to be determined by architect, POAH Design + Building Performance Department, or match existing. All appliances must match.
- Volume: 4.5 cubic feet minimum or match existing.
- Width: 30" minimum width or match existing.
- Knobs on Front Face of Range: Required
- Self-Cleaning Ranges: Not Permitted
- Electric Ranges: Preferred
  - Gas ranges are a fire hazard and introduce harmful fuels into the dwelling unit.
  - When replacing gas ranges, confirm possibility of converting to electric.

SAMPLE ELECTRIC RANGE (PREFERRED):
GE

- 30" Wide
- ADA Compliant

Manufacturer Number:
JBS460DMWW

SAMPLE GAS RANGE:
Whirlpool

- 30" Wide
- ADA Compliant
- Gas Range

Manufacturer Number:
WFG320M0BW

SPLASH PLATE INSTALLED BEHIND RANGE
Broan

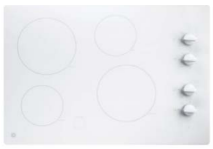
- Reversible Background
- Install on wall behind stove

Manufacturer Number:
SP300108

COOKTOP

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White or Black; Color to be determined by architect, POAH Design + Building Performance Department, or match existing. All appliances must match.
- Width: 30" minimum or match existing.
- Coordinate cabinetry shop drawings with product choice.
- Product to meet ADA standards; Architect to verify mounting height/ location meets ADA standards.
- Electric cooktops preferred.



SAMPLE ELECTRIC COOKTOP (PREFERRED):
GE

- 30" Wide
- ADA Compliant

Manufacturer Number:
JP3030TJWW

SAMPLE GAS COOKTOP:
Whirlpool

- 30" Wide
- ADA Compliant

Manufacturer Number:
W3CG3014XW

RANGE HOOD

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White or Black; Color to be determined by architect, POAH Design + Building Performance Department, or match existing. All appliances must match.
- Width: 30" minimum or match existing.
- If at all possible, range hood should vent to exterior:
  - In new construction, drawings should show the range hood exhausting to the exterior.
  - In rehabs, this should be designed and bid as an add alternate.

SAMPLE VENTED RANGE HOOD (PREFERRED):
Air King

- 30" Vented Range Hood
- 3-1/4" x 10" Vent
- 100/250 CFM

Manufacturer Number:
ESQZ2308

SAMPLE VENTED RANGE HOOD (PREFERRED):
Broan

- 30" Vented Range Hood
- 7" Round Vent
- 190 CFM

Manufacturer Number:
423001

SAMPLE NON-VENTED RANGE HOOD:
Broan

- Non-Vented Range Hood

Manufacturer Number:
413001

RANGE HOOD CONT.

GENERAL INFORMATION & REQUIRED DETAILS:

- All range hoods must receive StoveTop FireStop® Rangehood Fire Extinguishers.
  - Extinguishers must fit within the depth of rangehood without being noticeably visible.

SAMPLE FIRE EXTINGUISHER:
StoveTop

- FireStop Rangehood
- Height: 3.5”
- Diameter: 3.4”

Manufacturer Number:
675-3

SAMPLE FIRE EXTINGUISHER:
StoveTop

- FireStop Microhood
- Height: 2.2”
- Width: 3.9”
- Length: 13.9”

Manufacturer Number:
677-1 (Black), 677-2 (White)

EXAMPLE OF NON-CONFORMING FIRE STOP INSTALLATION
Firestops should be concealed within depth of range hood and be hidden in plain sight.

MICROWAVE OVER THE RANGE

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White or Black; Color to be determined by architect, POAH Design + Building Performance Department, or match existing. All appliances must match.
- Width: 30" minimum or match existing.
- If at all possible, microwave should vent to exterior:
  - In new construction, drawings should show the microwave exhausting to the exterior.
  - In rehabs, this should be designed and bid as an add alternate.

SAMPLE OVER THE RANGE MICROWAVE
Whirlpool

- 30" Vented Microwave
- 1.7 Cubic Feet
- 220 CFM

Manufacturer Number:
MH1170XSQ

SAMPLE OVER THE RANGE MICROWAVE
Frigidaire

- 30" Vented Microwave
- 1.8 Cubic Feet
- 300 CFM

Manufacturer Number:
FFMV1846VW

MICROWAVE OVER THE RANGE CONT.

GENERAL INFORMATION & REQUIRED DETAILS:

- All over the range microwaves must receive StoveTop FireStop® Microhood Fire Extinguishers.
  - Extinguishers must not be noticeably visible.

SAMPLE FIRE EXTINGUISHER:
StoveTop

- FireStop Microhood
- Height: 2.2”
- Width: 3.9”
- Length: 13.9”

Manufacturer Number:
677-1 (Black), 677-2 (White)

WALL OVEN

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White or Black; Color to be determined by architect, POAH Design + Building Performance Dept., or match existing. All appliances must match.
- Volume: Minimum 4 cubic feet or match existing.
- Coordinate cabinetry shop drawings with product choice.
- Product to meet ADA standards; Architect to verify mounting height/ location meets ADA standards.
- Electric wall oven preferred.

SAMPLE ELECTRIC WALL OVEN (PREFERRED):
GE

- 27" width
- Electric Single Standard Wall

Manufacturer Number:
JK3000DNWW

SAMPLE GAS WALL OVEN:
Whirlpool

- 27" width
- Single Wall Oven

Manufacturer Number:
WOS51EC7AW

DISHWASHER

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White or Black; Color to be determined by architect, POAH Design + Building Performance Dept., or match existing. All appliances must match.
- Width: 24" minimum width or match existing.
- Energy Star Rated: Required.
- All dishwashers to be built-in to cabinetry/ counter assembly.
- Coordinate cabinetry shop drawings with product choice.

SAMPLE DISHWASHER:
Whirlpool

- 24" width
- Built-in Dishwasher

Manufacturer Number:
WDF550SAFW

SAMPLE DISHWASHER:
GE

- 24" width
- Built-in Dishwasher

Manufacturer Number:
GSD3300DWW

AIR CONDITIONING UNIT (WINDOW OR THROUGH-WALL)

GENERAL INFORMATION & REQUIRED DETAILS:

- Confirm electrical supply can accommodate new air conditioning unit.
- Energy Star: Required.
- AC unit must fit through-wall sleeve.
- Through-wall sleeve to slope to exterior.

AC Unit should be sized appropriately per energy star's guidelines:

Area To Be Cooled (square feet)	Capacity Needed (BTUs per hour)
100 up to 150	5,000
150 up to 250	6,000
250 up to 300	7,000
300 up to 350	8,000
350 up to 400	9,000
400 up to 450	10,000
450 up to 550	12,000
550 up to 700	14,000
700 up to 1,000	18,000
1,000 up to 1,200	21,000
1,200 up to 1,400	23,000
1,400 up to 1,500	24,000
1,500 up to 2,000	30,000
2,000 up to 2,500	34,00

SAMPLE PRODUCT:
LG

- 12,000 BTU, 115 Volt Window Air Conditioner
- Energy Star

Manufacturer Number:
LW1216ER

LAUNDRY

GENERAL INFORMATION & REQUIRED DETAILS:

- Front loaded for easy ADA accessibility.
- Energy Star Rated: Required.

SAMPLE WASHER:
Samsung

- 4.5 Cubic Foot
- Full Size Front Load Washer
- ENERGY STAR

Manufacturer Number:
WF45T6000AW

SAMPLE HEAT PUMP DRYER:
LG

- 4.2 Cubic Foot Heat Pump
- High-Efficiency Electric Dryer

Manufacturer Number:
DLHC1455W

SAMPLE GAS DRYER:
GE

- 7.8 Cubic Foot Vented
- High-Efficiency Gas Dryer

Manufacturer Number:
GFD55GSSNWW

SAMPLE ELECTRIC DRYER:
LG

- 7.4 Cubic Foot Vented
- High-Efficiency Electric Dryer

Manufacturer Number:
DLE3400W

BASIS OF DESIGN

POAH Design + Building Performance Dept.

LAST UPDATED 04.09.2024

BACK-UP POWER

WHEN TO USE THIS BASIS OF DESIGN SECTION

This section should be used for both new construction projects and rehab project when considering back-up power generation. The objective is to guide the design and installation of back-up power to cover the loads required by local building codes, important site-specific loads (i.e. septic system pumps) and if possible an area of refuge. The area of refuge (see graphic 2) is a location in the building residents can inhabit in case of a prolonged power outage. The requirements listed in this section are intended to serve as minimum standards. Projects may exceed these requirements as circumstances allow.

REQUIREMENTS:

Existing Generators: For properties with an existing generator: evaluate the capacity and loads covered by the existing back-up power system. When replacing the back-up power system increase the size (if necessary) to add resilient loads as described below.

Existing Buildings without Generators: For properties without back-up power: evaluate the feasibility of adding an Energy Storage System (ESS) as the source of back-up power. If it is not feasible, install a generator sized to cover all code related loads and the resilient loads listed below. The gas or electric service will need to be evaluated to determine if upgrades are necessary to support the fuel or service needed to power the generator.

New Construction Buildings: All new construction projects should include a back-up power system capable of accommodating code required loads and resilient loads.

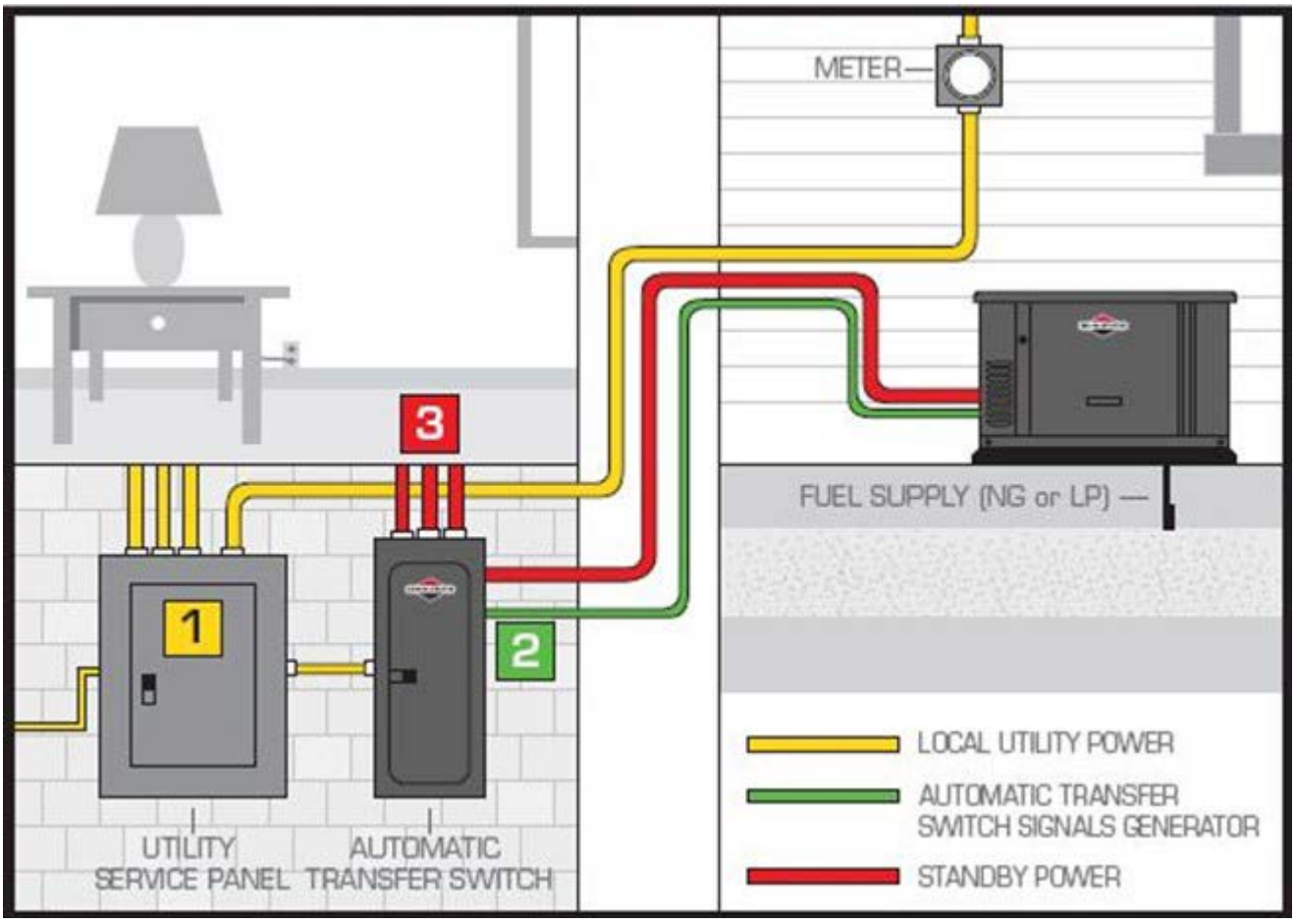
BACK-UP POWER

LAST UPDATED 04.09.2024

REQUIRED DETAILS:

Code Regulations: Follow all national, state, and local codes for the design and location of all generators. New and updated back-up power will likely require an electrical permit.

Automatic Standby: All generators should include an automatic transfer switch to activate the back-up power in an outage to prevent service disruption. Each meter included on the generator will need its own transfer switch. The transfer switch is connected to the utility panel(s) where the critical loads are located. See graphic below.



Graphic 1: Simplified diagram of a back-up power system. When power is disrupted the automatic transfer switch (2) signals generator (4) to activate standby power (3) and carry the loads on the utility panel (1).

BACK-UP POWER

Fuel Source: Local codes may dictate the required fuel source. Diesel fueled generators are preferred as diesel engines are more reliable. Any generator larger than 100 kW should only use diesel fuel.

- **Diesel:** Any diesel tank greater than 500 kW need to be certified by the fire chief. Only use #2 off-road diesel fuel. Do not use any type of bio fuel with a diesel tank. Weekly testing of the generator is imperative to ensure the fuel is constantly moving in the tank. The diesel tank should also be checked once a year to maintain the quality of the fuel. If the generator is diesel fueled and located on a roof, work with an engineer to design a flow pump system to pump diesel from a ground level tank to the roof level tank.
- **Natural Gas:** If natural gas is used and pressure is an issue, a generator with low pressure capability will be needed. Be aware that in some power outages caused by a natural disaster, the utility company will shut off natural gas service, rendering the generator unusable. Most plumbing codes will require flexible connections between the gas supply and the gas inlet of the generator.
- **Battery:** If local building and fire department codes allow, consider an Energy Storage System (ESS) or battery for back-up power. This applies to new construction and rehab projects, especially if a solar PV system is in place or planned for the future.

Emissions Regulations: Some states regulate generator exhaust emissions. Regardless of regulations, specify a generator with a catalytic converter.

Run Time: The run time will vary based on the loads the generator is designed to carry and the duration the loads need to be accommodated.

Location: The generator must be installed in a location that allows proper exhaust. Consult any local zoning regulations that may dictate minimum distances from the generator to property lines or other nearby structures. Distance from windows, fresh air intakes, patios and balconies and outdoor amenity space should also be reviewed as part of the building permit. Generators should also be in a location away from potential water intrusion from gutters and sprinklers.

Support Structure: Steel should be used for any/all generator structural supports. Wood is not permitted.

BACK-UP POWER

Housing/Enclosure: Check local noise ordinances and design the back-up power system enclosure to mitigate sound while allowing proper airflow and exhaust.

Code-Required Emergency Loads: Electrical engineer to size back-up power to accommodate any building code requirements. These loads may include the following:

- Fire alarm panel*
- Elevators
- Fire pump (sprinkler system)
- Lighting (corridors/ stairwells)*
- ADA devices (door openers)

**These items can include integral back up power. POAH's preference is for them to include integral batteries.*

Additional Loads to Consider:

- Electric door strikes/latch at building entrances (if not on back-up power the doors need to go to fail-safe mode)
- Garage ventilation
- Domestic water boost pump

Resilient Loads: Generators should be sized appropriately to address resilient loads as follows:

- Septic/sewer ejector pumps
- Community space lights and plugs
- Community space kitchenette and refrigerator (for medication)
- Community space HVAC
- Office lights and lugs
- Heating system pumps if heat is provided in a hydronic system powered by fossil fuel

Testing: Follow any local codes or utility regulations for testing and run time log documentation. NFPA 99 and 110 provide regulations for this testing in certain building types and is considered good practice for all building types. To ensure back-up power system is operating properly, all generators must be tested weekly for 20-30 minutes.

Service Contracts: All generators must have a service contract in place for routine testing and maintenance. Diesel powered generators should be inspected and cleaned (if necessary) on an annual basis.

BACK-UP POWER

Remote Monitoring: Any remote monitoring should use cell-based monitoring which is more reliable in the event of a power outage.

Preventative Maintenance: Generators should be test run once a week for 20-30 minutes to ensure performance. Diesel powered generators should be serviced no less than annually to inspect and clean if necessary. Ensure that no debris (i.e. leaves, grass, branches) is allowed to collect around the generator.

Climate Considerations: Properties located in areas prone to snow should ensure back-up power systems are part of the snow removal plans to confirm exhaust isn't blocked. Properties located in a flood zone or area of increased flooding need to ensure generators are installed on structures above the designated flood level. If the property is in a coastal climate with exposure to harsh salt air, consult a generator technician about the best coating or protection for the generator and support structure to prevent rust from forming.

AREA OF REFUGE:

Code Regulations: Follow all national, state, and local codes for the design and location of all generators. New and updated back-up power will likely require an electrical permit.

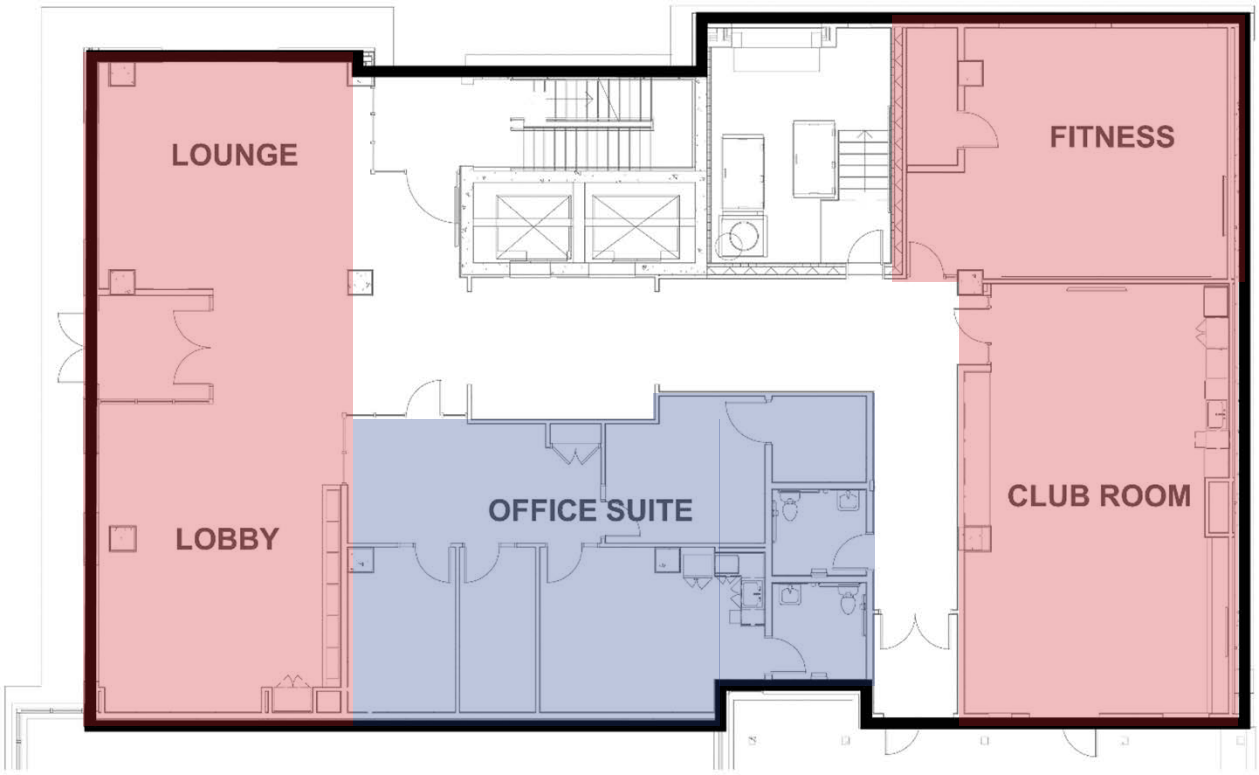
Automatic Standby: All generators should include an automatic transfer switch to activate the back-up power in an outage to prevent service disruption. Each meter included on the generator will need its own transfer switch. The transfer switch is connected to the utility panel(s) where the critical loads are located. See graphic below.

REQUIRED DETAILS:

Design: This space should include the property management office suite and a community space for residents. The space should include a bathroom and kitchenette.

Electric Loads Required: The HVAC and DHW systems, lighting, and all plugs should be powered by a generator. These loads are imperative to maintain comfort levels, power devices and provide refrigeration for resident medications.

BACK-UP POWER



Graphic 2: This plan highlights the common spaces in a building which are included in its area of refuge. All plugs, lighting, heating, cooling, ventilation and DHW for this area (typically on the first floor) are powered by the generator. This includes the refrigerator for resident medication.

LAST UPDATED 04.09.2024

BATH ACCESSORIES - COMMON

GENERAL INFORMATION+MIRRORS

DO NOT INSTALL:

GENERAL INFORMATION & REQUIRED DETAILS:

- Soap dishes at bathroom sinks

MIRRORS

GENERAL INFORMATION & REQUIRED DETAILS:

- Wall-mounted mirror
- 24" x 36" stainless steel channel frame mirror
- Frame: Stainless steel, roll-formed one-piece construction
- Glass: 1/4" thick, No. 1 quality, plate/float glass, silver coated and hermetically sealing with a uniform copper plating
- Installation:
  - Install per manufacturer's instructions
  - Install on wood stud or add blocking; do not install directly to sheetrock

SAMPLE PRODUCT:
Bobrick

- Framed mirror 24" x 36" stainless steel

Manufacturer Number:
165 2436

TOILET TISSUE HOLDERS

GENERAL INFORMATION & REQUIRED DETAILS:

- Surface mounted holder for standard core roll tissue
- Unit to be fabricated stainless steel
- Finish: Satin stainless steel, roller to be chromed-plated high impact resistant ABS plastic
- Installation:
  - Install per manufacturer's instructions
  - Install on wood stud or add blocking; do not install directly to sheetrock

SAMPLE PRODUCT:
Franklin Brass

- Stainless steel twin toilet paper holder concealed mount

Manufacturer Number:
819425

GRAB BARS

GENERAL INFORMATION & REQUIRED DETAILS:

- Grab bars wtih snap-on flange covers for concealed mounting shall be fabricated of stainless steel
- Tubing shall be 1-1/2" O.D. (outside diameter)
- End flanges shall have (2) 3/8" diameter mounting holes, center/intermediate supports shall have 2 keyhole slots for easy access.
- All exposed surfaces to be satin stainless-steel finish
- All grab bar tubing to have peened, non-slip finish
- Provide in configurations and mounting heights as required by federal, state, and local accessibility codes and Fair Housing Guidelines
- Installation:
  - Install per manufacturer's instructions
  - Install on wood stud or add blocking; do not install directly to sheetrock

SAMPLE PRODUCT:
Bobrick

- Concealed mount grab bar non-slip grip
- 1-1/2" diameter, 18" length

Manufacturer Number:
B6806.99x18

SAMPLE PRODUCT:
Bobrick

- Concealed mount grab bar non-slip grip
- 1-1/2" diameter, 24" length

Manufacturer Number:
B6806.99x24

SOAP DISPENSERS

GENERAL INFORMATION & REQUIRED DETAILS:

- To be installed in Common Bathrooms only
- Stainless steel construction
- Satin finish
- ADA compliant
- Installation
  - Install per manufacturer's instructions
  - Install on wood stud or add blocking; do not install directly to sheetrock

SAMPLE PRODUCT:
Bobrick

- Soap dispenser vertical mount tall stainless steel

Manufacturer Number:
2111

HAND DRYERS

GENERAL INFORMATION & REQUIRED DETAILS:

- Stainless steel cover
- Installation
  - Install per manufacturer's instructions
  - Install on wood stud or add blocking; do not install directly to sheetrock

SAMPLE PRODUCT:
XLERATOR

- No heat hand dryer with noise reduction
- Brushed stainless

Manufacturer Number:
XL-SB-ECO-1.1N

MEDICINE CABINETS

GENERAL INFORMATION & REQUIRED DETAILS:

- If possible, all medicine cabinets:
  - Be recessed into the wall (eliminates shadow from vanity light)
  - Have beveled edge mirror; no metal frame
- Rust-resistant steel body
- Adjustable steel shelves (no glass shelves)
- In ADA Units, install medicine cabinet on side wall and mirror over sink. Confirm heights with architect or building code for ADA compliance.
- Installation:
  - Install per manufacturer's instructions
  - Install on wood stud or add blocking; do not install directly to sheetrock

SAMPLE RECESSED MEDICINE CABINET (PREFERRED):

- 16" W x 26" H Recessed
- Beveled Edge Mirrored Medicine Cabinet
- Steel Body
- Metal Shelves

Manufacturer Number:
189813

SAMPLE SURFACE MOUNTED MEDICINE CABINET:

- 16" W x 26" H Surface Mount
- Steel Body
- Metal Shelves

Manufacturer Number:
404469

MIRRORS

GENERAL INFORMATION & REQUIRED DETAILS:

- In ADA Units, install mirror over sink, and medicine cabinet on side wall. Confirm heights with architect or building for ADA compliance.
- Wall-mounted mirror
- 24" x 36" Stainless Steel Channel Frame Mirror
- Frame: Stainless Steel, roll-formed one piece construction
- Glass: 1/4" thick, No. 1 quality, plate/float glass, silver coated, and hermetically sealed with a uniform copper plating
- Installation:
  - Install per manufacturer's instructions
  - Install on wood stud or add blocking; do not install directly to sheetrock

SAMPLE PRODUCT:
Bobrick

- Framed Mirror 24" x 36"
- Stainless Steel

Manufacturer Number:
165 2436

TOILET TISSUE HOLDERS

GENERAL INFORMATION & REQUIRED DETAILS:

- Surface mounted holder for standard core roll tissue
- Unit to be fabricated stainless steel
- Finish: Stainless steel, roller to be chrome-plated high impact resistant ABS plastic
- Installation:
  - Install per manufacturer's instructions
  - Install on wood stud or add blocking; do not install directly to sheetrock

SAMPLE PRODUCT:
Franklin Brass

- Stainless steel toilet paper holder concealed mount

Manufacturer Number:
819400

TOWEL BARS

GENERAL INFORMATION & REQUIRED DETAILS:

- Square towel bar to be fabricated of stainless steel
- Bar shall be square tubing and shall be held in receiver holes in support posts
- Installation
  - Install per manufacturer's instructions
  - Install on wood stud or add blocking; do not install directly to sheetrock

SAMPLE PRODUCT:
Franklin Brass

- Futura 3/4" x 18" chrome towel bar set

Manufacturer Number:
818725

SAMPLE PRODUCT:
Franklin Brass

- Futura 3/4" x 24" chrome towel bar set

Manufacturer Number:
818740

SAMPLE PRODUCT:
Franklin Brass

- Futura 3/4" x 24" century towel bar set

Manufacturer Number:
819350

ROBE HOOKS

GENERAL INFORMATION & REQUIRED DETAILS:

- Fabricated of stainless steel
- Install in solid wood or use appropriate anchors to support weight
- Installation
  - Install per manufacturer's instructions
  - Install on wood stud or add blocking; do not install directly to sheetrock

SAMPLE PRODUCT:
Symmons

- Dia chrome robe hook

Manufacturer Number:
459079

SHOWER CURTAIN RODS

GENERAL INFORMATION & REQUIRED DETAILS:

- Heavy duty with flanges fabricated from alloy stainless steel
- Tubing shall be 1" diameter
- Flanges shall be provided and have dimpled holes for exposed fasteners
- Installation
  - Install per manufacturer's instructions
  - Install on wood stud or add blocking; do not install directly to sheetrock

SAMPLE PRODUCT:
HD Supply

- 60" chrome shower rod set

Manufacturer Number:
822450

GRAB BARS

GENERAL INFORMATION & REQUIRED DETAILS:

- Grab bars with snap-on flange covers for concealed mounting shall be fabricated of stainless steel
- Tubing shall be 1-1/2" O.D. (outside diameter)
- End flanges shall have (2) 3/8" diameter mounting holes, center/intermediate supports shall have 2 keyhole slots for easy access
- All exposed surfaces to be satin stainless-steel finish
- All grab bar tubing to have peened, non-slip finish
- Provide in configurations and mounting heights as required by federal, state, and local accessibility codes and Fair Housing Guidelines
- Installation
  - Install per manufacturer's instructions
  - Install on wood stud or add blocking; do not install directly to sheetrock

SAMPLE PRODUCT:
Bobrick

- Concealed mount grab bar non-slip grip
- 1-1/2" diameter, 18" length

Manufacturer Number:
B6806.99x18

SAMPLE PRODUCT:
Bobrick

- Concealed mount grab bar non-slip grip
- 1-1/2" diameter, 24" length

Manufacturer Number:
B6806.99x24

BATHING FIXTURE SEATS

SHOWER GENERAL INFORMATION & REQUIRED DETAILS:

- "L-shaped" fold -up padded shower seat. To meet or exceed ADA requirements.
- Shall be of adequate strength to suport a load of 250 pounds and shall conform to the size and edge clearances as diagrammed in ADA.
- Tube: 18 gauge (0.48 in thick) type 304 stainless steel, 1" diameter and 1 ¼" square. Unitized all welded construction. Exposed surfaces are satin finish. Edges and Corners are radius-ed and burr free.
- Flange: 3/16" type 304 stainless steel. Exposed surfaces have satin finish. Edges and Corners are radius-ed and burr free.
- Bracket: 16 gauge (0.06 in thick) type 304 stainless steel. Exposed surfaces to have satin finish. Edges and corners are radius-ed and burr free.
- Bracket: 16 gauge (0.06 in thick) type 304 stainless steel. Exposed surfaces to have satin finish. Edges and corners are radius-ed and burr free.
- Spring: Stainless steel type 304, O.D. 27/32" coils x 2 ¼" body length x .085" wire diameter.
- Installation
  - Install per manufacturer's instructions
  - Install on wood stud or add blocking; do not install directly to sheetrock

BATHTUB GENERAL INFORMATION & REQUIRED DETAILS:

- The bathtub seat meets or exceeds ADA requirements
- If a permanent bathtub seat is not provided, a removable seat is required
- Top of Seat: Between 17" minimum and 19" maximum above the bathroom finish floor
- Seat Depth: Between 15" minimum and 16" maximum

BATH ACCESSORIES - UNIT

BATHING FIXTURE SEATS CONT.

SAMPLE SHOWER SEAT:
Bobrick

- Shower seat 32" ivory

Manufacturer Number:
5181

SAMPLE BATHTUB SEAT:
Freedom Showers

- Portable ADA bathtub seat
- 26.5" W x 15" D
- Legs adjustable between 16" - 17.5"
- Solid phenolic white

Manufacturer Number:
APFSHPQ-265150PWS

LAST UPDATED 04.09.2024

BUILDING ENCLOSURE

NEW CONSTRUCTION

WHEN TO USE THIS BASIS OF DESIGN SECTION

This BOD section should be used for new construction projects. A high-performance building enclosure will minimize loads on heating/cooling systems and is essential to building durability, resident comfort, and energy efficiency at POAH properties. This section is intended to outline criteria for high performance building enclosure in new construction projects.

HIGH PERFORMANCE BUILDING ENCLOSURES: CONTROL FUNCTIONS

POAH expects its design consultants to design and contractors to construct high performance building enclosures for all new construction projects. POAH's requirements in this regard may – and most likely do – exceed minimum code requirements.

A high-performance enclosure will excel at providing the following 5 critical control functions:

1. Water Control
2. Air Control
3. Thermal Control
4. Vapor Control
5. Critter Control

Requirements relative to these enclosure control functions are outlined below. Note that the outline is not exhaustive. Additional measures beyond those listed may be required to achieve performance objectives. Some of these measures may not apply to specific projects (e.g. step flashing would not apply to a membrane roof). Consult with POAH Design + Performance regarding deviations or questions of applicability.

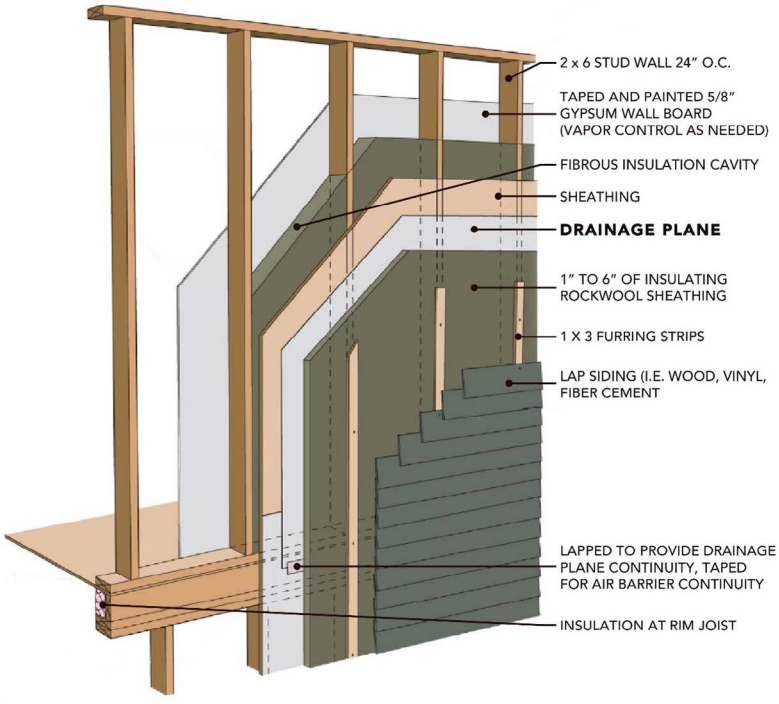
GENERAL DESIGN REQUIREMENTS

DESIGN DOCUMENT REQUIREMENTS:

- Building enclosure details in design documents must clearly designate the components providing these control functions. Note: Color coding of control layers in details is required.
- Provide building sections that demonstrate continuity of Water, Air and Thermal control layers. Note: Color coding of control layers in sections is required.

WATER CONTROL REQUIREMENTS:

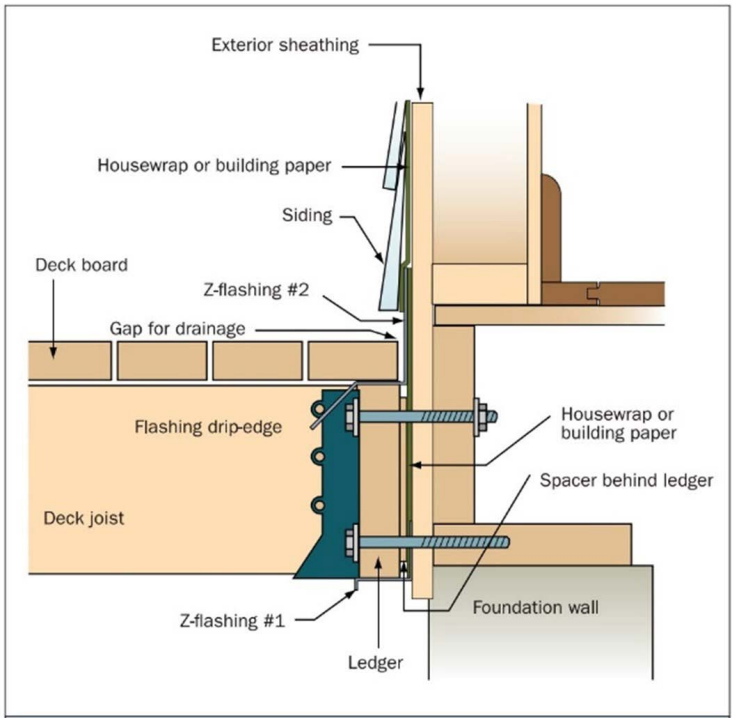
- **Roof:** Refer to BOD Roofing Section - https://www.poahbod.org/roofing
- **Wall - Water Control Layer:**
  - Provide a continuous water control layer (a.k.a. drainage plane, weather-resistive barrier or WRB) at all exterior walls. The water control layer could be comprised of shingle-lapped building wrap, shingle-lapped building felt, a fully-adhered sheet membrane, a fluid-applied membrane, rigid insulation with taped seams, or structural panels with integral water control membrane and taped seams.



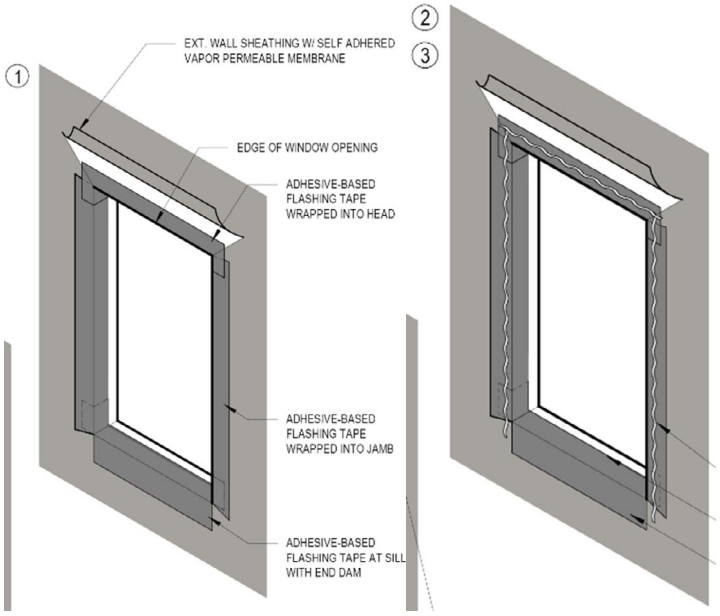
Detail showing water control layer.

Fluid-applied membrane.

- Provide self-sealing water control membrane between wall sheathing and ledger boards or other structural attachments.
- Provide robust flashing at all wall openings such as window and door openings.
    1. Sill flashing drains to the OUTSIDE (use slope and back dam) over the water control layer or cladding.
    2. Jamb flashing continuous up full height of jamb.
    3. Head flashing diverts water away from the opening.



Water control layer between ledger board and wall.



WINDOW INSTALLATION STEPS:

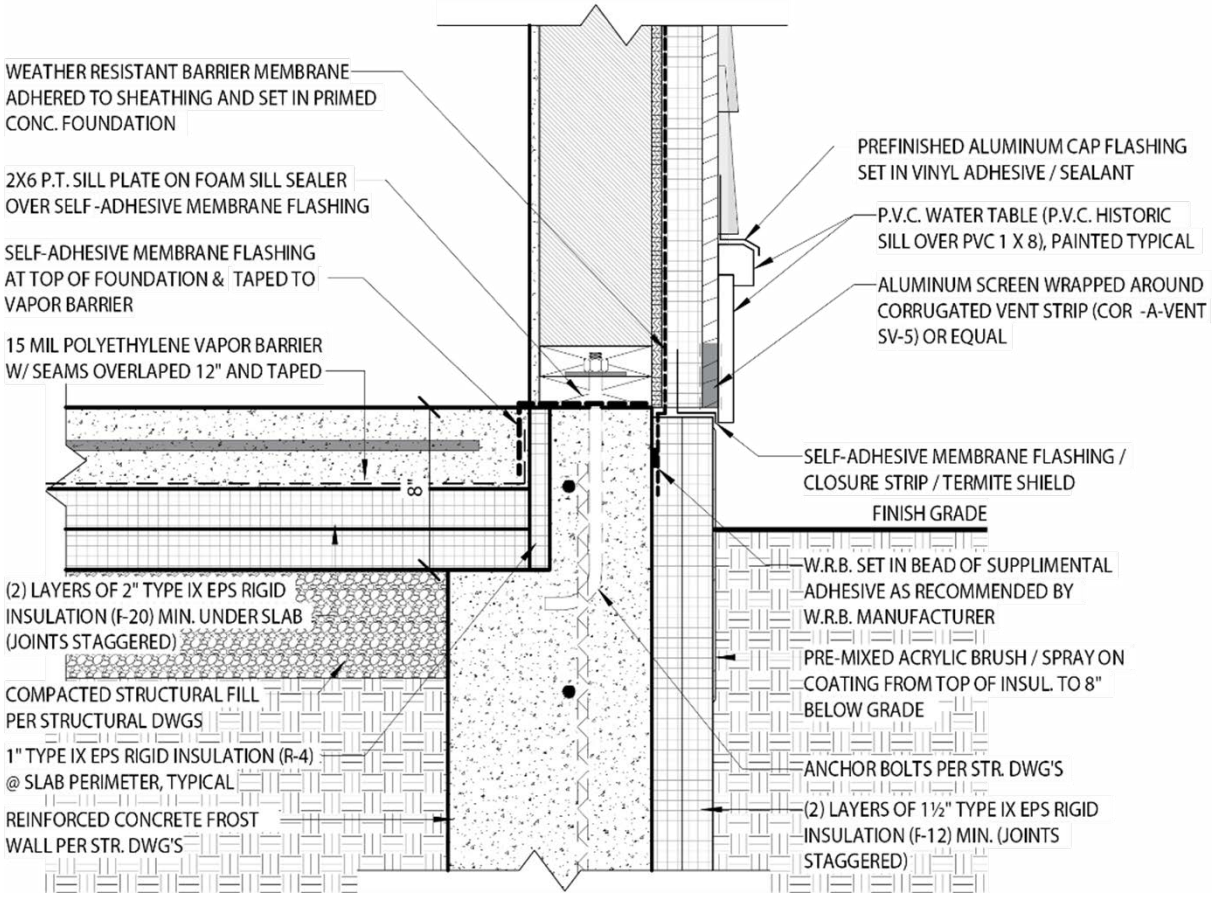
1. FASTEN WALL SHEATHING TO THE WOOD FRAME AND INSTALL SELF ADHERED VAPOR PERMEABLE MEMBRANE AS SPECIFIED BY MANUFACTURER
2. APPLY ADHESIVE-BASED FLASHING TAPE, ENSURING THAT FLASHING EXTENDS UP JAMBS AT LEAST 6" & OVERHANGS SHEATHING AT LEAST 2".
3. APPLY A 3/8" NOM. DIA. BEAD OF SEALANT TO THE BACKSIDE (INTERIOR) OF THE WINDOW MOUNTING FLANGE AT THE TOP AND SIDES ONLY. PLACE BEAD IN LINE WITH ANY PRE-PUNCHED HOLES.
4. IMMEDIATELY INSTALL WINDOW USING MANUFACTURER RECOMMENDED FASTENERS.
5. APPLY BEAD OF SEALANT ACROSS THE FACE OF THE MOUNTING FLANGE AT HEAD.
6. APPLY JAMB FLASHING, EXTENDING TO 1/2" BELOW TOP OF HEAD FLASHING. ONCE IN PLACE USE TAPE GUN OR ROLLER TO SEAL THE FLASHING TO THE SHEATHING.
7. APPLY HEAD FLASHING, OVERLAPPING JAMB FLASHING BY 1" MINIMUM. ONCE IN PLACE USE TAPE GUN OR ROLLER TO SEAL THE FLASHING TO THE SHEATHING.
8. TAPE HOUSE WRAP OVER HEAD FLASHING.

- Provide proper flashing at all roof-wall intersections
    1. A self-adhering polymer-modified bitumen sheet shall be installed at roof-wall intersections behind step flashing and extending at least 12 inches up the vertical face of the wall sheathing and 12 inches under the roof membrane layer.
    2. Step flashing integrated with roof cladding
- Top edge of flashings to be terminated with compatible tape or mastic or lapped shingle-fashion by a water control membrane.
- For additional details applicable to roofs windows and doors, see their corresponding BOD sections:
    - Roofing Section: https://www.poahbod.org/roofing
    - Door Section: https://www.poahbod.org/doors
    - Window Section: https://www.poahbod.org/windows

- **Wall - Cladding:**
    - Install all wall cladding and trim in a back-drained or "rain screen" configuration.
        - Brick veneer to have 1" clear drainage space behind
            1. Through-wall flashing to be supported if not a rigid material (unsupported membranes can form troughs that inject water at open seams)
            2. Provide weep openings 16" O.C. at base of wall and above through wall-flashing.
        - Fiber-cement or wood siding to have minimum 3/8" drainage/ventilation gap behind
            1. Furring or spacers strips to be installed in vertical orientation only.
            2. Do not caulk lap joints of lapped siding.
        - Vinyl siding without insulation backing is considered a vented and back-drained cladding.
    - Maintain a separation of at least 2" clearance between wall cladding and roof surface or horizontal surface such as decks or paving.

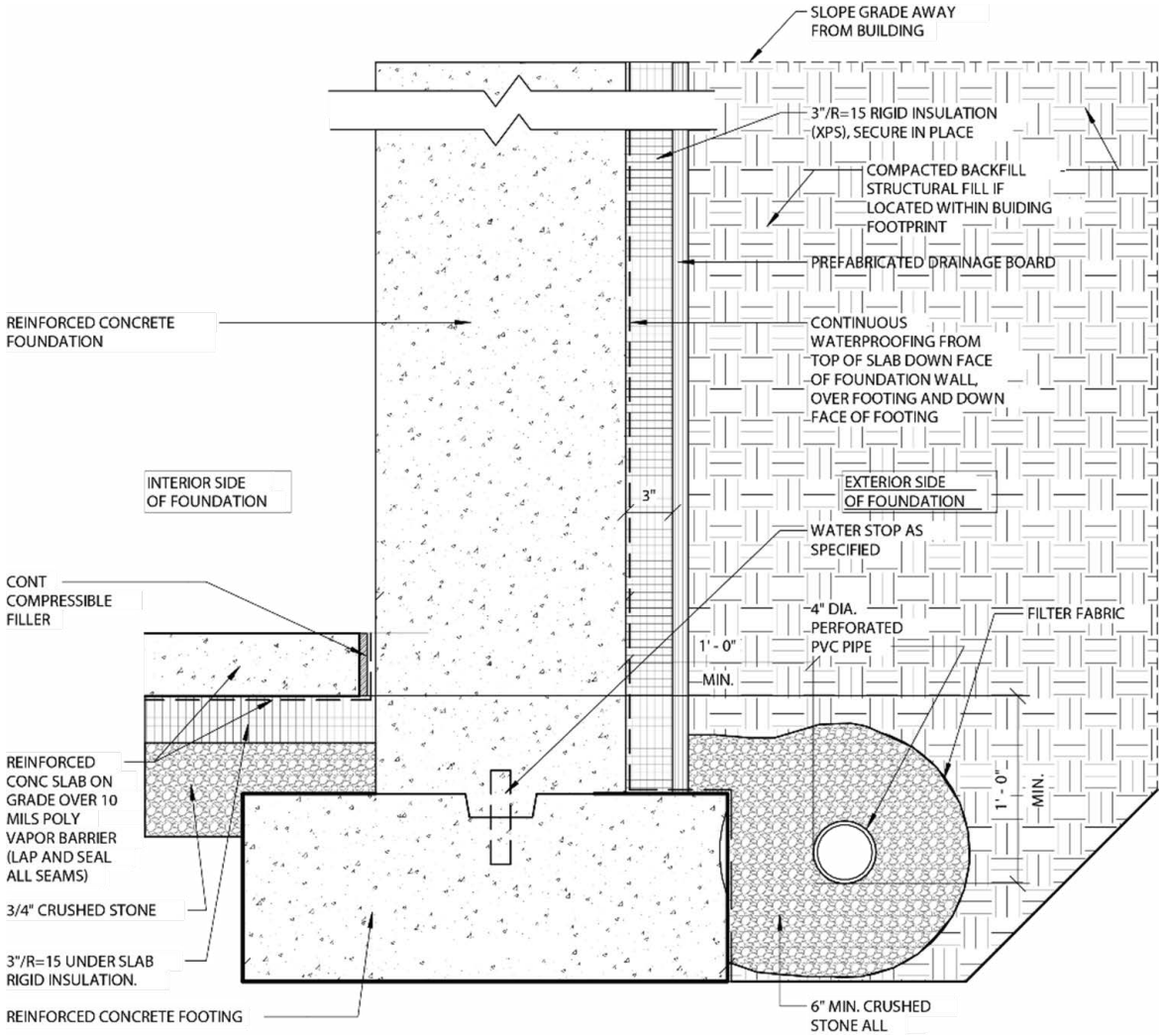
Wood furring strips provide drainage gap (rain-screen)

- **Foundation/Slab:**
  - Use the slope of grade to divert surface water away from the foundation.
  - Provide a capillary break membrane between concrete and ANY wood member regardless of whether the wood is pressure treated. Wood shall not be in direct contact with concrete.
  - Provide a drainage layer/capillary break of at least 4" washed gravel beneath slabs
  - Provide a vapor control/capillary break membrane in direct contact with the under side of the slab.
  - Provide a capillary break between footing and foundation wall or between the footing and soil.
  - Provide protected damp-proofing at below-grade, ground-contact foundation surfaces.



Typical exterior wall assembly at foundation

- If using a foundation drain, direct water to daylight or to sump/drywall around perimeter of footings.
- Protect foundation drain with layer of clean gravel wrapped in filter fabric.
- Back fill above perimeter drain with free-draining backfill.



Typical exterior wall assembly at foundation.

AIR CONTROL + INSULATION REQUIREMENTS

POAH has adopted the PHIUS+ standard to guide building enclosure thermal and air control of new construction project. POAH has found that the R-values for opaque assemblies in a Passive House enclosure are not far beyond current IECC requirements, although POAH acknowledges that the R-values required may be beyond current local practice standards. PHIUS+ certification for the project is encouraged, but not required unless otherwise directed. The thermal performance (R-value and U-value) parameters listed below are provided for guidance. Refer to the Passive House Institute US (PHIUS) website (https://www.phius.org/phius-certification-for-buildings-products) for specific information.

Source: phius.org

EXTERIOR ENCLOSURE AIR CONTROL REQUIREMENTS:

- Provide a continuous air barrier around the entire building enclosure to meet a tested performance of no more than 0.06 cfm air leakage per sf enclosure when tested at a pressure of 50 Pascals. Note: If areas of the building are excluded from the whole-building air barrier (e.g. compactor rooms, commercial space, etc.) the separation between the residential program and these spaces must meet the air tightness requirement.
- Airtightness is sometimes regarded as a proxy for overall construction quality. The airtightness of a building and of apartments within buildings are properties that can be measured.
- The common method for testing and verifying the airtightness is through the use of a calibrated fan and pressure measuring gauges. In the construction industry the common term for this testing apparatus is “blower door”. The widespread availability of blower door equipment and qualified technicians allows for quantitative airtightness targets to be established for new construction and renovation projects.
- See Compartmentalization section of the Basis of Design for in-unit air control measures.

Example of blower door test.

THERMAL CONTROL - OPAQUE COMPONENTS (R-VALUE)

Thermal bridge-free: Minimize thermal bridging through the insulation layer. Note that insulation between metal girts cannot be considered continuous insulation. Any insulation layer that is subject to thermal bridging must be discounted accordingly.

High-R-Value Assemblies: Provide a building enclosure (including the integrated performance of the whole enclosure) capable of meeting Passive House heating and cooling performance requirements. The table below is provided for guidance. A Passive House analysis can be used to refine the specific requirements for the project.

Climate Zone	Zone 1	Zone 2	Zone 3	Zone 4 (Except Marine)	Zone 5 + Marine 4	Zone 6
Roofs						
Insulation entirely above roof deck	R-40ci	R-40ci	R-40ci	R-49ci	R-49ci	R-55ci
Vented Attic and other	Not Rec.	Not Rec.	R-45	R-60	R-60	R-70
Walls						
Mass Walls (load-bearing masonry, stone, etc).	R-10ci Interior	R-12ci (in hurricane zones, insulation should be interior)	R-15ci	R-20ci	R-20ci	R-24ci
Metal Framed	R-10ci	R-13 + R-10ci	R-13+R12ci	R-13+R-15ci	R-13+R-20ci	R-13+R-24ci
Wood Framed + other	R-13+ R-5ci or R-20	R-13+R-5ci or R-20	R-13+R-8ci or R-20+R-4ci	R-13+R-12ci or R-20+R-12ci	R-13+R-16ci or R-20+R-12ci	R-13+R-20ci or R-20+R-16ci
Below grade walls/ foundation walls	NR	NR	NR	R-10ci	R-7.5ci	R-7.5ci
Mass Floors (concrete slab)	R-5ci	R-8.3ci	R-10ci	R-10ci	R-12.5ci	R-12.5ci
Joist/Framing	R-13	R-15	R-20	R-30	R-38	R-40
Unheated Slabs	NR	NR	NR	R-10 for 24" vertical, R-5 below	R-10 for 24" vertical, R-8 below	R-15 for 48" vertical, R-12 below
Opaque Doors	R-4.75	R-4.75	R-4.75	R-4.75	R-6	R-8
Fenestration						
Windows	U-≤ 0.40, SHGC≤ 0.25	U-≤ 0.40, SHGC≤ 0.25	U-≤ 0.30, SHGC≤ 0.25	U-≤ 0.28, SHGC≤ 0.25	U-≤ 0.27, SHGC≤ 0.35	U-≤ 0.25, SHGC≤ 0.40

For additional requirements for windows and doors, see their corresponding BOD sections:

- Door Section: https://www.poahbod.org/doors
- Window Section: https://www.poahbod.org/windows

VAPOR CONTROL

Vapor retarders are classified according to their vapor permeability:

Vapor Retarder Class	Definition	Examples
I	≤ 0.1 perm	Sheet polyethylene, sheet metal, non-perforated aluminum foil, foil-faced insulating sheathing, glass
II	>0.1 perm ≤1.0 perm	Kraft-faced fiberglass batts or vapor retarder paint, unfaced expanded polystyrene, fiber-faced polyisocyanurate
III	> 1.0 perm	Latex or enamel paint (on gypsum wallboard)

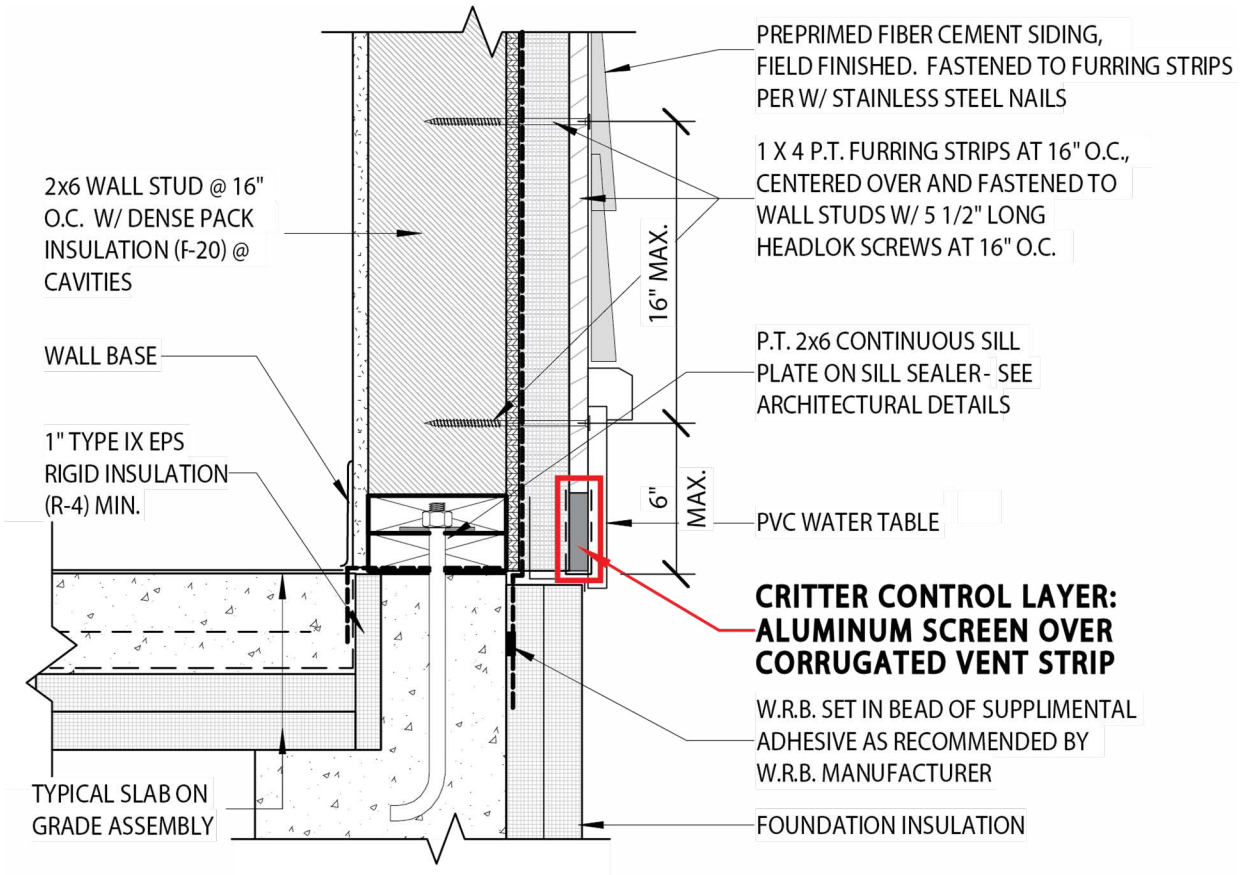
- Avoid use of low permeability (i.e. Class I vapor retarder such as polyethylene) vapor retarders or wallpaper to the interior side of any wall assembly.
- In Warm climates (climate zone 3 and below) using a Class II or Class III vapor retarder to the exterior of the sheathing is recommended. Many weather-resistive barriers (WRB) or air-and-water barriers are also vapor retarders, check product data sheet.
- In all climate zones, provide sufficient insulation to the exterior of the sheathing to allow the use of Class III vapor retarder (gypsum wallboard with latex paint) at the interior side of framed wall assemblies. Generally, this will mean that from 30% (in warmer climates) to 45% (in cold climates) of the total wall assembly R-value is located exterior to the sheathing.

CRITTER CONTROL (PEST CONTROL) REQUIREMENTS

Necessary measures for pest control depend on local conditions and local pest pressures. Follow recommended pest practices for the locality.

General requirements (all locations):

- Provide a robust termite barrier between any below grade insulation and non-concrete building components.
- Do not plant vegetation such that, when mature, it will be within 1' of the building.
- Provide screening or metal closure at the bottom of exterior wall assemblies such that exterior insulation and ventilation cavities of exterior walls are not exposed.
- Seal around all penetrations through foundations. Pack larger gaps (wider than 3/8") with copper mesh before applying sealant.
- Use a flashing membrane to seal the bottom of sheathing to the foundation wall. Bituminous flashing membrane with aggressive adhesive works best. Prime the foundation wall as needed for effective adhesion.



LAST UPDATED 04.09.2024

COMPARTMENTALIZATION

WHEN TO USE THIS BASIS OF DESIGN SECTION

This BOD section should be used during new construction, unit turns or rehab projects that involve the construction or modifications at the interior of a building. Even appliance replacement projects represent an opportunity for compartmentalization.

This section is intended to provide examples of unit turn and rehab projects and associated compartmentalization opportunities. It is acknowledged that this document cannot be exhaustive of either renovation projects or compartmentalization opportunities. Project managers should become familiar with the examples in this document and learn to recognize compartmentalization opportunities present in each project.

COMPARTMENTALIZATION MEASURES + MAINTENANCE:

Measures to improve compartmentalization should be incorporated into any interior rehab scope. This is particularly important in occupied buildings because the opportunity to make improvements within occupied spaces is rare. Even regular maintenance activities can be leveraged to improve compartmentalization of apartments. Examples of typical renovation or maintenance scopes and associated opportunities for airtightness improvement are lists below. See end of this section for a full description of compartmentalization.

A note regarding pest control: it is a good practice to use backing or blocking that will discourage pests. Copper mesh backing should be used for sealing around wires, pipes and conduits when the gap is more than 3/8". An "L" bend of sheet metal solidly attached to substrate and sealed at seams can be an effective pest barrier at the wall to floor joint behind cabinets and other such areas hidden from view. Elastomeric sealants, asphaltic sealants and bituminous membranes tend to discourage most pests (just be careful to avoid excessive VOC or products with objectionable odors).

LAST UPDATED 04.09.2024

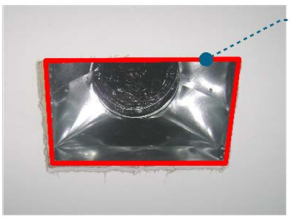
COMPARTMENTALIZATION

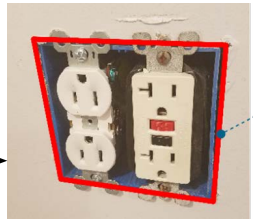
FLOORING REPLACEMENT:

- Seal the wallboard to the floor at the base of the wall (full perimeter of the floor).

PAINTING:

- Slide plumbing escutcheons away from the wall and seal around pipe penetrations.
- Remove ventilation and heating/cooling register grilles. Seal the register boot ductwork to the wallboard or ceiling. If the register boot does not reach the wallboard, extend it so that it does.
- Seal the wallboard to the ceiling at the top of the wall (full perimeter of the ceiling).
- If using a dropped ceiling, ensure the demising walls are continuous and seal to the underside of the floor deck above.
- Temporarily remove switch plate and outlet covers, caulk between electric box and wallboard.





PLUMBING REPAIRS + MAINTENANCE:

- Use elastomeric sealant and, where necessary, backing, to seal pipe penetrations behind toilets, shower heads, hot water heaters and under bathroom vanities and kitchen sinks.
- Slide escutcheons away from the wall and seal around pipe penetrations.

COMPARTMENTALIZATION

ELECTRICAL RENOVATIONS + REPAIRS:

- Seal electrical penetrations at all walls and ceilings: electrical panel box, data boxes (i.e. phone), outlets, and switches, behind oven/fridge, telephone box, intercom, in closet ceilings/floors with caulk, foam or with a gasket. (See image above in painting section.)
- Foam penetrations made by electrical fixtures and wiring in attic.
- Seal ceiling penetrations at light fixtures with foam. When possible switch to surface mounted LED fixtures.
- When replacing ceiling-recessed fixtures use only Insulation Contact (IC) and Airtight (AT) rated fixtures.

DUCT CLEANING + HVAC MAINTENANCE:

- Clean supply and exhaust registers on an annual basis. When cleaning registers ensure the duct boot is sealed to the wallboard or ceiling. (See image above in painting section.) Every 3 - 5 years all ductwork should be cleaned.

BATHROOM RENOVATION:

- Tub replacement: ensure that the tilebacker, cement board or other non-moisture-sensitive substrate surrounding the tub is continuous to the floor behind the tub.
- Use elastomeric sealant and, where necessary, backing, to seal pipe penetrations behind toilets, shower heads, and under bathroom vanities. (See image above in plumbing section.)
- Use surface mounted medicine cabinets or mount recessed cabinets in an airtight enclosure.
- Seal at base of bathtubs, toilets and top of shower tile with caulk.

UNIT ENTRY DOOR MAINTENANCE, PAINTING, OR REPLACEMENT:

- Replace entry door weather stripping if necessary; use metal V-seal if possible.
- Caulk door frame to wall and floor.
- Foam inside door latches making sure foam fills cavity above, below, and sides of latch opening. Cut any foam that interferes with latch operation.

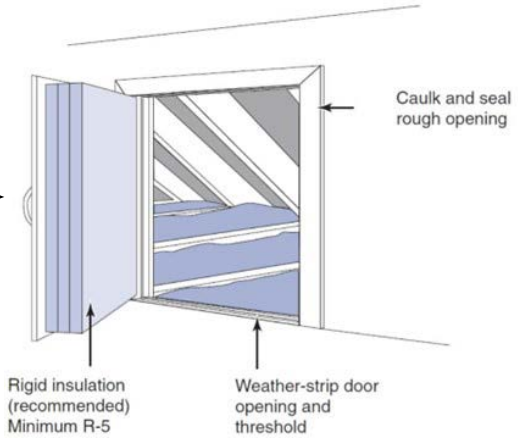
STAIR TREAD REPLACEMENT OR STAIR RENOVATION:

- Caulk gaps around risers, treads, and stringers.
- Caulk between stringers and walls.

COMPARTMENTALIZATION

ATTIC HATCH INSTALLATION:

- Glue 2 layers of 2-inch rigid foam to back of hatch and use gasket or weather stripping to provide a good seal around the hatch when it is closed.
- Ensure the hatch engages gasket or weather stripping when placed in opening.



KITCHEN RENOVATION:

- Repair drywall (ensure it is continuous) and seal all holes and cracks in the drywall behind cabinets and appliances.
- Seal the wallboard to the floor. (See image above in flooring section.)
- Seal all penetrations through the wallboard and use a metal mesh backer for openings wider than 3/8”.
- If the kitchen includes a dropped soffit, ensure that wallboard at the back of the soffit is continuous to the underside of the floor above.
- Seal around the range hood exhaust duct penetration through the ceiling/wallboard with appropriate sealant.

COMPARTMENTALIZATION

WHAT IS COMPARTMENTALIZATION?

Besides being a long word that is difficult to say, compartmentalization is providing a robust separation between different spaces within a building including a separation between living or occupied spaces and interstitial spaces like framing cavities and shafts. Compartmentalization is important to controlling the flow of odors, air, smoke, airborne contaminants, and pests between units and between units and other spaces within the building. An airtight enclosure around an apartment unit is needed to prevent airborne contaminants, smoke and odors in one apartment from spreading to neighboring apartments. Likewise, and airtight enclosure around an apartment (or other space) will also prevent the ingress of airborne contaminants, smoke and odors from other parts of the building and building cavities. With an airtight enclosure it is easier to control odors and other airborne contaminants within an apartment using ventilation. Compartmentalization, therefore, is very important to indoor air quality.

An effective air barrier also supports pest control. Generally, if air can't leak through an enclosure, then it would be hard for pests to gain access to the space. Holes at the base of a wall behind appliances and around pipes that penetrate through a wall provide opportunities for pest entry. These also allow air, and anything carried in the air, to leak into the apartment. The airtightness of individual apartments is also key to controlling air leakage for the overall building. This is because compartmentalization prevents accumulation of forces acting on a building that move air into or through the building. For example, the ground floor of a multi-story building would be less subject to drafts, and out-swinging doors would be easier to open in cold weather, if a building is well compartmentalized. In this way, compartmentalization impacts comfort and energy performance.

Airtight enclosures also support the operation of conditioning and ventilation systems by making it easier to control the pressures and direction of air flow between spaces. For example, if we want a corridor to be slightly pressurized relative to apartments so that odors from apartments do not migrate into the corridor, then it helps to have an airtight enclosure of that corridor space. The more airtight an enclosure the less airflow is needed to pressurize or depressurize the space with the enclosure. Therefore, with better airtightness it is possible to maintain the desired pressure relationships while using less energy and installing smaller ducts and equipment. Ventilation, heating, cooling and dehumidification systems are more effective and are better able to meet set points within spaces if those spaces are well compartmentalized.

WHAT ABOUT MAKE-UP AIR?

But wait a minute! Don't we need to allow fresh air into apartments so people can breathe!? Exactly. We want fresh, clean, good quality air to be delivered to people in our buildings. That means we cannot allow the air to be leaking in from building cavities where rodents may live or have lived (expired), from under sinks, through maintenance closets with harmful chemicals and pesticides, from the apartment of neighbor who smokes, from the trash room... To be able to have good quality, fresh air, we need to know where it is coming from.

COMPARTMENTALIZATION + QUALITY ASSURANCE

Airtightness is sometimes regarded as a proxy for overall construction quality. The airtightness of a building and of apartments within buildings are properties that can be measured.

The common method for testing and verifying the airtightness is through the use of a calibrated fan and pressure measuring gauges. In the construction industry the common term for this testing apparatus is a "blower door". The widespread availability of blower door equipment and qualified technicians allows for quantitative airtightness targets to be established for new construction and renovation projects.

POAH encourages establishing a pre-renovation baseline airtightness for apartments and then measuring achievement at improving airtightness as various stages of the project. Blower door diagnostics can also be used to evaluate specific air sealing measures and pin-point those which are most effective. Thus, in a project involving repetitive scope or renovation work in a large number of similar apartments, it would be worthwhile to use blower door diagnostics to refine the compartmentalization scope to be included with the renovation project.

Example of blower door test.

CABINETRY

GENERAL INFORMATION + REQUIRED DETAILS:

- All cabinetry to be plywood construction (no particleboard).
- 180 degree hinges, wrap hinge.
- No blind corners.
- All space below the corner of a kitchen countertop must be accessible from either of the adjacent cabinets, or by a special corner cabinet door.
- No drawers larger than 18".
- KCMA certification preferred.
- Hardware (pull) to be included in all cabinetry.
- The cabinetry products in this section are shown as reference. Other cabinetry products that meet the requirements of the spec may be used.
- Seal with foam all plumbing and electrical penetrations behind cabinetry.

CLICK HERE FOR CABINETRY COMPLIANCE FORM

BOX CONSTRUCTION REQUIRED DETAILS:

A) Front Frame: 3/4" solid hardwood or thermo-foil vinyl wrapped solid finger jointed lumber or LVL linear veneer lumber Bore and dowel/pocket screw construction frame joinery reinforced with glue/nails. Stiles 1 1/2" wide. Mulls 3" wide. Rails 1 3/4" wide. Stile and top and bottom rails dadoed to receive ends, tops, and bottoms.

B) End Panels: Standard: Nominal 1/2" thick multi-ply birch veneer plywood dadoed to receive tops and bottoms, with wood grained or laminate on interior/exterior surfaces. All end panels are inserted into dado in face frame and recessed 3/16".

C) Top/Bottom Panels: 1/2" thick multi-ply hardwood plywood. Tops and bottoms are set into grooved end panels and front rails glued and stapled. Bottoms are supported by 1/2" thick wood base composite panel.

D) Hanging Rails: Wall cabinets have 1/2" thick x 2 7/8" multi-ply plywood hanging rail, running full cabinet width at top and bottom. Base cabinets have 1/2" thick x 2 7/8" wood based composite panel hanging rail running full cabinet width at top. Hanging rails are captured between end panels recessed behind.

CABINETRY

E) Back Panel: 1/8" thick hardwood plywood Securely glued/stapled to end panels and hang rails. Back panels are fully captured on wall cabinets.

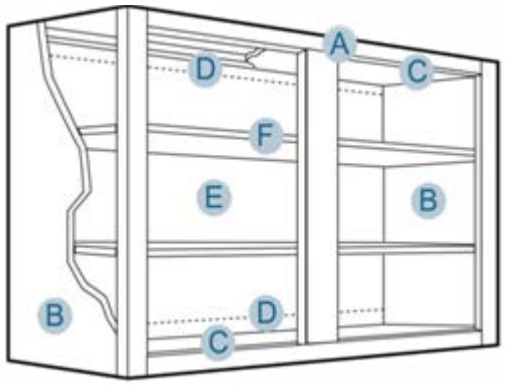
F) Shelves: 5/8" thick multi-ply hardwood plywood, with hardwood veneer banded front edge. Shelves are adjustable in all standard wall and base cabinets.

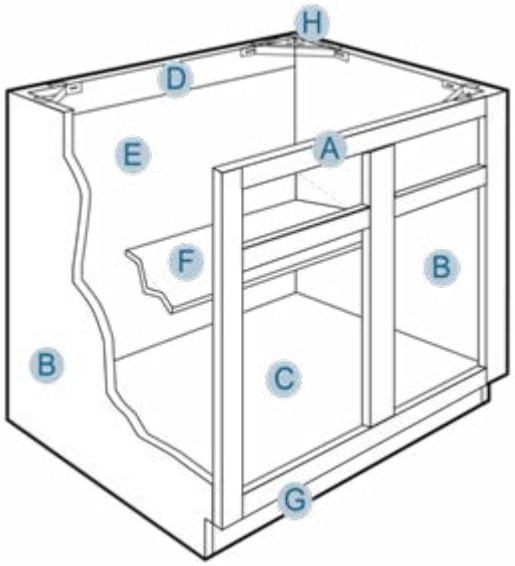
G) Toe Kick: 4" high and recessed 3 3/8".1/2" thick unfinished wood based composite panel captured between end panels. Finish should be covered with infill panel to match finish.

H) Base Corner Braces: High impact, injection molded plastic.

I) Drawers: 1/2" thick multi-ply hardwood front, back, and sides. Drawer bottoms are nominal 1/4" thick multi-ply hardwood inserted into dado in front back and sides. All drawer parts glued and stapled together.

J) Drawer Guides: High-quality epoxy coated steel, Cushion-Tec, side mounted guides, self-adjusting in mounting brackets. Built-in stop, self-closing and stay-closed features with a 100 lb. rated load capacity.

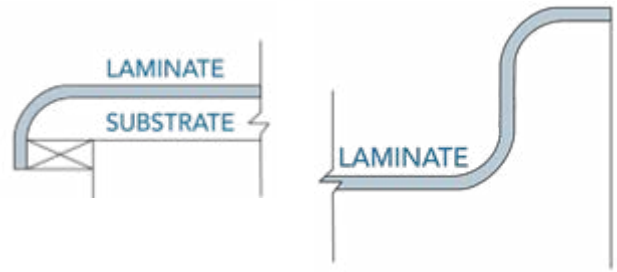




COUNTERTOP REQUIRED DETAILS

PLASTIC LAMINATE (KITCHEN ONLY):

- Suggested Laminate Manufacturers: Wilsonart or Formica.
- NEMA LD 3 compliant, HGP Grade, and minimum 1.0mm thickness.
- Countertop Construction:
  - Post form (continuous, no visible joints).
  - Front Edge - Continuous, Double Round Over, 1 3/8" high (See Section Below).
  - Backsplash - Continuous one piece raises up wall with 1 1/8" return to wall (See Section Below).
  - Side splash - square edged loose, installed between wall and counter, height to match back splash height.
  - Substrate: Comply with ASTM D 1037.
    - At Sink: Exterior grade plywood or phenolic resin.
    - Particleboard: Compliance with ANSI A208.1 (Grade M-2 exterior glue), 45-lb density and minimum 3/4" thick.
    - MDF: Compliance with ANSI A208.2 and minimum 3/4" thick.
  - Provide BK-20 Backer Sheet if unsupported countertop area.



SOLID SURFACE / VANITY TOP WITH INTEGRAL SINK (BATHROOMS ONLY):

- Suggested Manufacturers: Swanstone.
- Coordinate size with cabinetry manufacturer.
- Coordinate product with faucet. No open holes or plugs to be used.
- 2 gallon bowl capacity.

CABINETRY

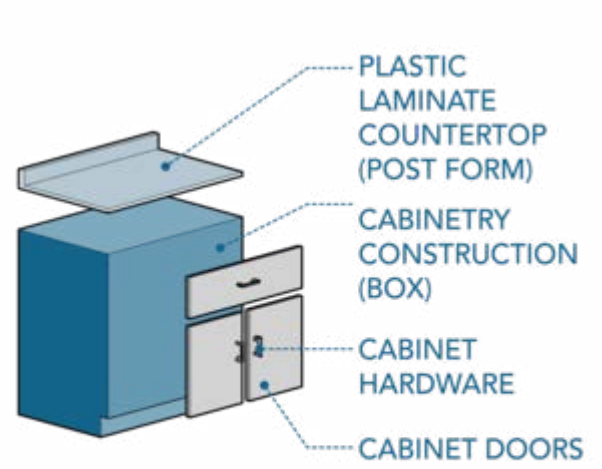
DOOR REQUIREMENTS

GENERAL INFORMATION + REQUIRED DETAILS:

- Family properties: 3/4" thick solid wood door frames and drawer fronts.
- Senior Properties: MDF center panels acceptable.
- Standard reveal doors and drawer fronts.

ADDITIONAL INFORMATION

VOCAB:



EXTERIOR DOORS

LOCATIONS INCLUDE:

Lobby entries, corridors, town homes units, community rooms, mechanical closets, and management offices.

ALL EXTERIOR DOORS SHOULD INCLUDE:

- Install thresholds on silicone type water repellent proper to installation
- Pan flashing
- Doors must have VYCOR brand or equal, self adhered flashing installed to all perimeters and sills for protection against air, water and moisture
- Weather-stripping: vinyl foam compression type or equal around perimeter; vinyl sweep at door bottoms; and aluminum with vinyl seal strip threshold with thermal brake at all exterior doors
- Preferred: Aluminum Storefront with sidelight and power door operator preferred

PERFORMANCE REQUIREMENTS OF ALL EXTERIOR DOORS:

- Minimum STC rating of 35
- Exterior doors must be energy star rated, and comply with the following:

DOORS			
GLAZING LEVEL	U-FACTOR[1]	SHGC[2]	
Opaque	≤ 0.17	No Rating	
≤ ½-Lite	≤ 0.25	≤ 0.25	
> ½-Lite	≤ 0.30	Northern North-Central	≤ 0.40
		Southern South-Central	≤ 0.25

Air Leakage for Sliding Doors ≤ 0.3 cfm/ft2
Air Leakage for Swinging Doors ≤ 0.5 cfm/ft2

STOREFRONT SYSTEMS

FOR USE AT LOBBY ENTRIES:

- May have an automatic opener/closer
- Insulated glazing
- Thermally broken framing system and door

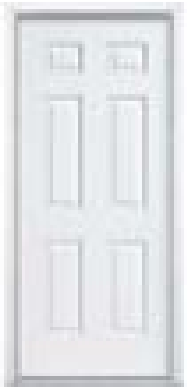
SAMPLE PRODUCT:
Kawneer

- Storefront System 451T
- 2-3/4" x 5" Thermal Exterior Frame System Field Glazed

UNIT ENTRY EXTERIOR DOORS

FOR USE AT TOWNHOUSES + UNITS WITH DIRECT ACCESS TO EXTERIOR:

- Door unit may include sidelight, transom, or lite integral to the door itself
- Minimum 1-3/4", 20-gauge six-raised panel steel insulated doors with 26 gauge steel frame
- Use vinyl exterior jambs instead of wood jambs to prevent rot
- Preferred: Endura PVC door jambs
- All doors to have peephole. See Door Hardware section below



SAMPLE PRODUCT:
Jeld-Wen

- 6-Panel Pre-Hung Door Insulated Core
- Energy Star

Manufacturer Number:
957077

INTERIOR DOORS

LOCATIONS INCLUDE:

Unit entries, closets, bedroom, bathroom, mechanical closets, etc.

GENERAL INFORMATION + REQUIRED DETAILS:

- Minimum 1-3/8" wood or solid/ semi-solid core high-density fiberboard (HDF).
- Use flush thresholds for ease of tenants.
- Do not silicone / caulk metal frames to wall board because it affects future shimming as building settles.
- New Construction:
  - Solid doors should be used at family properties.
  - Hollow core doors are acceptable at senior properties.
- Rehab:
  - Replace doors in-kind (hollow or solid core depending on tenancy type), unless resident damage warrants upgrade to solid core.

DOORS

INTERIOR - UNIT ENTRY DOOR FROM CORRIDOR

UNIT ENTRY INTERIOR DOORS

- Preferred: Jeld-Wen or Mohawk smooth core wood door.
  - Alternate: Six panel solid core wood door with paint finish. If replacing individual units, finish TBD by Property Manager.
- Corridor doors must have adjustable (knock down) frames for future adjustments.
- Doors must comply with fire rating required by code.
  - Fire rating information should be included in door label. Contact basisofdesign@poah.org with questions.
- All doors to have peephole. See Door Hardware section below.
- Clear width of a door opening must be 32 inches minimum to satisfy Fair Housing Act Regulations
  - 32" clear width is achieved with a 36" wide door
- Weatherstrip all unit entrance doors using:

Q-Lon

- Door Weatherstripping at Head + Jamb
- Polyethylene-clad Urethane Foam Secured to a PVC Carrier

Available at:
Conservation Mart

Pemko

- Door Weatherstripping at Sill
- 36" Fire-Rated Door Sweep Aluminum

Manufacturer Number:
307AV36

SAMPLE PRODUCT:
Jeld-Wen

- 1-3/4" Thick Flush Legacy Tru-Oak Solid Core Slab Door

Manufacturer Number:
984124

UNIT INTERIOR DOORS

BEDROOM:

- Preferred: Jeld-Wen or Mohawk 1-3/4" hinged solid core doors
- Clear width of a door opening must be 32 inches minimum to satisfy Fair Housing Act Regulations
  - 32" clear width is achieved with a 36 inch wide door

BATHROOM:

- Clear width of a door opening must be 32 inches minimum to satisfy Fair Housing Act Regulations
  - 32" clear width is achieved with a 36 inch wide door
- No raised threshold at bathroom doors. If possible, create a flush transition from hallway floor to bathroom floor

CLOSET:

- MAGIGLIDE Bifold Closet Door System
  - MAGIGLIDE Bi-Fold Closet Door is the ONLY bi-fold closet door available today that meets the HUD Specification for "Heavy Duty Bi-Fold Closet Doors."

SAMPLE BEDROOM/ BATHROOM PRODUCT:
Jeld-Wen

- 1-3/4" Thick Flush Legacy Tru-Oak Solid Core Slab Door

Manufacturer Number:
984124

SAMPLE CLOSET PRODUCT:
MAGIGLIDE

- Bi-Folding Closet Door
- Flat Panel
- Solid Core

DOOR ACCESSORIES

PEEP HOLES:

- To be provided at building entry doors and unit doors. Handicapped units shall be provided with two (2) peep holes, one at the regular height and one in accordance with the ADA standards.

SAMPLE PRODUCT:
HD Supply

- 190 Diameter Fire Rated Door Viewer
- Satin Chrome

Manufacturer Number:
874140

HARDWARE - GENERAL INFORMATION + REQUIRED DETAILS:

- All public, common area and handicap unit doors shall be equipped with lever type hardware or hardware that meets ADA/UFAS design standards
- Floor mounted door stops to be installed at all doors
- Finish: all hardware to be brushed aluminum, or satin chrome
- Anti-pick latches with single action lever
- Keying for common spaces and unit entries
- Key tree to be reviewed by POAHC
- No grand master key for dwelling units
- Include 4-5 cores as additional stock for unit entry doors to accommodate unit turns
- Site staff to use HandyTrac key control system
- Main building entries to be equipped with Knox Box rapid entry system for local fire department

HARDWARE - UNIT ENTRANCE (FROM EXTERIOR + FROM CORRIDOR):

- Doors shall be equipped with interlocking mortise lock sets. Operation of the lock set shall include to following features:
  - From exterior of unit entrance, key unlocks both dead latch and deadbolt
  - From interior of unit entrance, turning knob disengages both dead latch and deadbolt at the same time.

HARDWARE - UNIT BEDROOMS, CLOSETS, + PASSAGE DOORS:

- Use levered handles; no knobs
- No locks

HARDWARE - UNIT BATHROOM DOORS:

- Use levered handles; no knobs
- Required: lock with "pin-hole" reset

HARDWARE - UNIT MECHANICAL CLOSETS:

- Use levered handles; no knobs
- Required: lock with key for site personnel only
- Need to be secured and accessed by site personnel only

SAMPLE UNIT ENTRY PRODUCT:
Schlage

- Mortise Storeroom Lockset 06 Lever
- Interconnected Lock

Manufacturer Number:
L9080L 07A 626

SAMPLE BEDROOM, CLOSET, + PASSAGE DOOR PRODUCT:
Schlage

- Manhattan Passage Lever
- Satin Chrome

Manufacturer Number:
F10MNH

DOORS

DOOR ACCESSORIES

SAMPLE BATHROOM PRODUCT:
Schlage

- Manhattan Passage Lever
- Satin Chrome

Manufacturer Number:
F10MNH

SAMPLE MECHANICAL PRODUCT:
Schlage

- Manhattan Entry Lever
- Satin Chrome

Manufacturer Number:
F51MNH

ATTIC HATCHES:

- Access to attic areas for maintenance and/or inspection shall be outside of the dwelling unit, where possible.
  - If inside, access doors will be insulated and furnished with key locks and fire rated where required

STORM DOORS:

- Unit entrance doors, which open directly to the exterior of the building, shall be equipped with storm doors with screens
  - Storms and screens must be stored within the door and require no storage of panels during winter or summer
  - Preferred: Larson Duratech surface - window and screen

SAMPLE PRODUCT:
Larson

- Manhattan Passage Lever
- Satin Chrome

Manufacturer Number:
F10MNH

COMMON AREAS FLOORING

CONTACTS:

POAH has negotiated pricing with select manufacturers and wholesalers. When purchasing and installing new flooring please contact the following representatives. See the Manufacturer Contacts section of the BOD for more information.

NEW CONSTRUCTION:

- Architect to provide common area floor design for all spaces in building.
- Follow compartmentalization/ air sealing per architect's details. If not included in details, highlight for architect.

REHABS:

- Architect to provide common area floor design for all spaces in building.
- Moisture testing is required in basement or slab on grade units.
- All new flooring requires a level subfloor free from cracks, bumps and excessive adhesive residue from former floors.
  - Subcontractor must evaluate existing subfloor condition and include associated costs for necessary repairs in their bid.

PROPERTY MANAGEMENT:

Contact Design + Building Performance Dept. for design support.

VINYL PLANK + VINYL TILE OPTIONS

Locations: Corridor, offices, community spaces, elevator lobbies
Size: 4" x 36", 6" x 36", 6" x 48" planks, 1/8" thickness

GLUE DOWN PLANK OPTIONS:
Subfloor Condition: Even, smooth, and free of cracks
Size: 8" x 48" planks, 2.0mm thickness

MOHAWK
Dodford 20 Db
Fawn Brindle
Glue-down

MOHAWK
Dodford 20 Db
Mochochino Pine
Glue-down

MOHAWK
Dodford 20 Db
Bordeaux Oak
Glue-down

MOHAWK
Dodford 20 Db
Chateau Brown
Glue-down

MOHAWK
Dodford 20 Db
Suede Oak
Glue-down

MOHAWK
Dodford 20 Db
Dorian Oak
Glue-down

MOHAWK
Dodford 20 Db
Chinchile Oak
Glue-down

GLUE DOWN TILE OPTIONS:

Subfloor Condition: Even, smooth, and free of cracks
Size: 12" x 24" planks, 2.0mm thickness

MOHAWK
Dodford 20 Db
Keystone
Glue-down

MOHAWK
Wanderers Loop
Bavarian Cream
Glue-down

FLOATING / CLICK OPTIONS:

Subfloor Condition: Even, smooth, and free of cracks
Size: 6" x 48" or 7" x 48" planks, 3.2mm thickness

MOHAWK
Founder's Trace
Cathedral Grey
Uniclic

MOHAWK
Discovery Ridge
Granite Valley
Uniclic

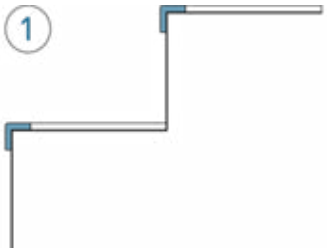
MOHAWK
Discovery Ridge
Lamb's Ear
Uniclic

MOHAWK
Discovery Ridge
Richmond Gold
Uniclic

MOHAWK
Discovery Ridge
Brushed Beige
Uniclic

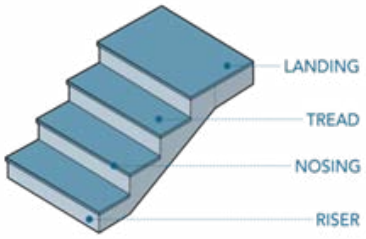
STAIRS - RUBBER OR VINYL

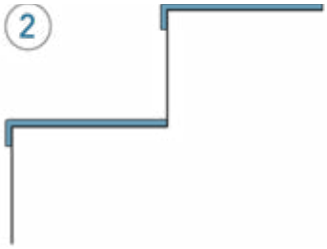
BASED ON STAIR TRAFFIC, PICK FROM SOLUTIONS BELOW:



LIGHT TRAFFIC
NOSING

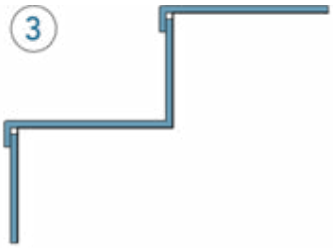
Nosing: Rubber or Vinyl
Tread: Flooring Material
Riser: Painted





MEDIUM TRAFFIC
TREAD

Nosing/Tread: Rubber or Vinyl
Riser: Painted



HEAVY TRAFFIC
TREAD+INTEGRATED RISER

All rubber or all vinyl

APPROVED PRODUCT:

ARMSTRONG
Rubber Stair Solutions

Square Pattern
1/8" Thickness

WALK-OFF MAT

APPROVED LOCATIONS:

- Main entry vestibules.
- Area just inside door if no vestibule.
- Inside elevator cabs if elevator is near main entry.
- New construction:
  - Work with architect to provide recessed floor to accommodate thickness of mat.
- Rehab:
  - It is likely the existing flooring will need to be removed to install new walk-off mat.
  - Confirm any anticipated threshold changes or issues caused by new walk-off mat.

APPROVED PRODUCTS:

SHAW
Succession II
24" x 24" Tiles
or 12'-0"
wide roll

SHAW
Ruffian II
24" x 24" Tiles;
5/32" Thickness
Vinyl Backing

MATS INC.
Cocoa Mat
6'-7" x 39'-4" roll;
5/8" Thickness
Vinyl Backing

CARPET

APPROVED LOCATIONS:

- Carpet only to be installed if approved by POAHC Director of Maintenance.
- Carpet may be installed in certain instances but after pricing is secured for all flooring options.

APPROVED PRODUCTS:

J+J FLOORING
Kinetex
Size varies
Modular Tiles
0.205" Thickness

CARPET SPECS - TILE OR BROADLOOM CARPET:

- Construction: Textured graphic loop, Fiber: Branded Nylon 6,6 or Solution Dyed Nylon
- Protective treatment: Soil Protection
- Stitched per inch: 10-13, Gauge: 1/10 - 1/12, Tufted weight: 28.0 to 32 oz
- Secondary backing: Moisture barrier backing
- Environmental: Green Label Plus
- Warrantee: Lifetime warrantee against edge ravel and delamination
- Methane Pill Test (ASTM-D-2859): Passes
- Flooring Radiant Panel Test (ASTM-E-648): Class I
- NBS Smoke Chamber Test (ASTM-E-662): <450
- Electrostatic Propensity test (AATCC): <3.5 KV

RUBBER BASE

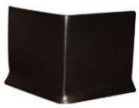
APPROVED LOCATIONS:

Corridor, offices, community spaces, elevator lobby.

APPROVED RUBBER BASE PRODUCTS:

- Suggested Manufacturers: Armstrong, Mannington, Johnsonite
- Type TV (vinyl thermoplastic); Group I (solid, homogeneous)
- Length: Coil stock ONLY, in manufacturer's standard length
- Size: 4 inches in height, 0.125"min. thickness, and Cove style

CORNER INSTALLATION:



Factory-Made Outside Corners: Install factroy-made outside corners before installing wall base.

Field-Made Inside Corners: Use a utility knife to score the back and notch out the base for inside core.

UNIT FLOORING

CONTACTS:

POAH has negotiated pricing with select manufacturers and wholesalers. When purchasing and installing new flooring please contact the following representatives. See the Manufacturer Contacts section of the BOD for more information.

REQUIRED DETAILS FOR ALL FLOORING TYPES:

- UNIT TURNS:
  - To achieve unit compartmentalization, seal joint from new flooring to existing wall with manufacturer approved joint sealant.
  - All new flooring requires a level subfloor free from cracks, bumps and excessive adhesive residue from former floors.
    - Subcontractor must evaluate existing subfloor condition and include associated costs for necessary repairs in their bid.
- REHABS:
  - Moisture testing is required in basement or slab on grade units.
  - To achieve unit compartmentalization, seal joint from new flooring to existing wall with manufacturer approved joint sealant.
  - All new flooring requires a level subfloor free from cracks, bumps and excessive adhesive residue from former floors.
    - Subcontractor must evaluate existing subfloor condition and include associated costs for necessary repairs in their bid.
- NEW CONSTRUCTION:
  - Follow compartmentalization/ air sealing per architect's details. If not included in details, highlight for architect.

VINYL PLANK + SHEET VINYL OPTIONS

Locations: Kitchen, living room, bedroom, entry/corridor
Wear Layer: 12 mil

GLUE DOWN PLANK OPTIONS:

Subfloor Condition: Even, smooth, and free of cracks
Size: 8" x 48" planks, 2.0mm thickness

MOHAWK
Leighton
Merino
Glue-down

MOHAWK
Leighton
Sequoia
Glue-down

MOHAWK
Leighton
Ashen Tan
Glue-down

FLOATING / CLICK OPTIONS:

Subfloor Condition: Even, smooth, and free of cracks
Size: 6" x 48" planks, 4.5mm thickness

MOHAWK
Discovery Ridge
Coffee House
Tan
Uniclic

MOHAWK
Discovery Ridge
Rustic Taupe
Uniclic

SHEET VINYL OPTIONS:
Location: Bath
Size: 12'-0" wide rolls, 65 gauge thickness

MOHAWK
Gateway
Almond Spice

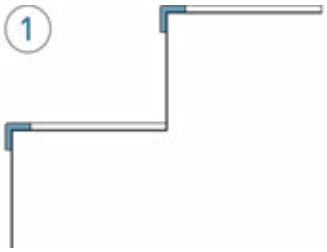
MOHAWK
Gateway
Silver Screen

REQUIRED DETAILS:

All seams must be chemically welded.
LINK TO CARE + MAINTENANCE GUIDELINES

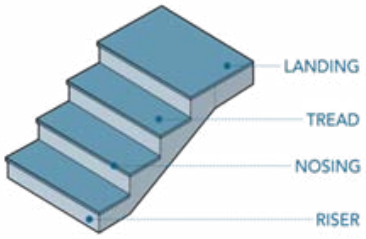
STAIRS

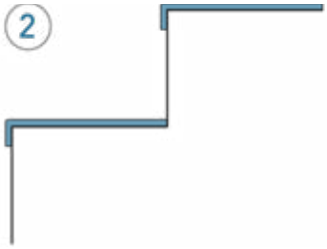
BASED ON STAIR TRAFFIC, PICK FROM SOLUTIONS BELOW:



LIGHT TRAFFIC
NOSING

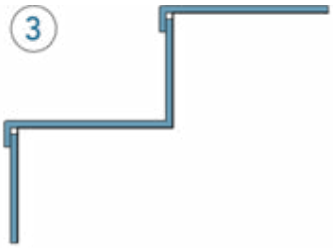
Nosing: Rubber or Vinyl
Tread: Flooring Material
Riser: Painted





MEDIUM TRAFFIC
TREAD

Nosing/Tread: Rubber or Vinyl
Riser: Painted



HEAVY TRAFFIC
TREAD+INTEGRATED RISER

All rubber or all vinyl

APPROVED PRODUCT:

TARKETT
Vinyl Stair Treads

Service Weight
22 Pearl CB

RUBBER BASE

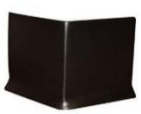
- Suggested Manufacturers: Armstrong, Mannington, Johnsonite
- Type TV (vinyl thermoplastic); Group I (solid, homogeneous)
- Length: Coil stock ONLY, in manufacturer's standard length
- Size: 4 inches in height, 0.125" min. thickness, and Cove style

TARKETT
Baseworks
Toe 4"
34 Almond

TARKETT
Baseworks
Toe 4"
09 Clay

TARKETT
Baseworks
Toe 4"
280 Shoreline

CORNER INSTALLATION:



Factory-Made Outside Corners: Install factroy-made outside corners before installing wall base.

Field-Made Inside Corners: Use a utility knife to score the back and notch out the base for inside core.

LAST UPDATED 04.09.2024

HEATING+COOLING

NEW CONSTRUCTION

WHEN TO USE THIS BASIS OF DESIGN SECTION

This BOD section should be used for new construction projects to guide Architects, Engineers, and Development staff toward heating + cooling solutions that are energy efficient and easy to maintain.

REQUIREMENTS:

A. MINIMIZE HEATING + COOLING LOAD THROUGH BUILDING ENCLOSURE + VENTILATION SYSTEM DESIGN:

A first step in providing effective and efficient heating and cooling of buildings is to provide a building enclosure and ventilation system that minimizes heating, cooling and dehumidification loads. See the Building Enclosure and Ventilation sections of the Basis of Design for more information.

B. USE HEAT PUMP TECHNOLOGY:

Use Central System with Heat Recovery (VRF-HR) (3 Pipe): Central systems afford more efficient sizing of equipment, and mitigate the tendency to oversize equipment, which is common in individual, or "1-to-1" systems. Central VRF-HR systems can deliver both heating and cooling at the same time. Heat recovery can occur year-round by setting a range of acceptable temperatures for all units. For example, if one space begins to overheat in the winter due to solar gain, the excess heat can be moved to another space that is calling for heat. These systems can be used for the whole building, or parts of building, and require one or more outdoor compressors located on the exterior.

C. DISTRIBUTION:

I. DUCTED FAN-COIL DISTRIBUTION FOR APARTMENTS: Provide a ducted air handler (fan-coil) for distribution of heating and cooling within residential apartments. Ducted distribution allows efficient use of space within the apartment (e.g., furniture can be placed against the exterior wall without compromising distribution) and contributes to air mixing within apartments. Horizontal fan coils can be installed in ceiling plenums, or vertical fan coils can be installed in closets. Ductwork distributes the heating/cooling to the different rooms of the apartment. All duct work must be sealed. Ductwork openings must be protected during construction to prevent contaminants getting in the ductwork.

II. EITHER DUCTED OR NON-DUCTED DISTRIBUTION FOR COMMON AREAS: Distribution of heating and cooling for common areas and non-residential areas must be appropriate to the use of the space. An internal conference room, for example, may be best served by a ceiling cassette that allows the loads of the conference room to be managed independently of perimeter office spaces. A large community room may benefit from ducted distribution to provide uniform conditions within the space. All duct work must be sealed. Ductwork openings must be protected during construction to prevent contaminants getting in the ductwork.

D. SIZE ALL EQUIPMENT USING ACCA MANUAL J+S OR ANSI/ASHRAE/ACCA STANDARD 183: Heating and cooling systems shall be sized to meet calculated loads for the specific building or space served. Rule-of-thumb sizing is not acceptable. For buildings 3 stories or less in height use ACCA Manual J to calculate building loads and ACCA Manual S to size equipment. For buildings over 3 stories in height calculate heating and cooling loads according to ANSI/ASHRAE/ACCA Standard 183 and size equipment not greater than these loads.

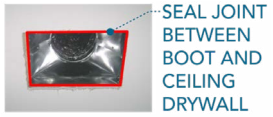
1. When calculating heat and cooling loads use the following interior conditions:
    a) Maximum of 74F for heating (this satisfies HUD's requirement of 68F)
    b) Minimum of 72F for cooling

E. PREDICTIVE MODELING FOR ENERGY CONSUMPTION + COST: POAH desires to have an estimate of energy consumption and cost for operation of the new building. Engineers shall provide estimates of energy use and cost for each of the following, broken out by common-meter energy use vs. resident-meter energy use:

1. Heating energy use (including electric and gas/oil as applicable)
2. Cooling energy use
3. DHW energy use (including electric and gas/oil as applicable)
4. Ventilation energy use (including electric and gas/oil as applicable)
5. Lighting energy use
6. Plug load energy use

F. COMPRESSOR PLACEMENT: Compressors should be placed away from windows and outdoor patios, and should be easily accessed by maintenance. Compressors should be installed on stands a minimum of 18 inches off the ground or roof. Any/all refrigerant lines should be covered/protected. Landscape plans should include a visual barrier of compressors without interfering with operation or access by maintenance.

G. DUCTWORK:



1. Duct Tightness: Duct leakage shall not exceed 4 CFM25 per 100 sq. ft. of conditioned floor area.
2. Duct System Static Pressure: The ductwork shall allow the air handler to operate within its recommended static pressure range.
3. Duct Boots: Duct boots must be sealed to the interior finish.
4. Installation: All duct work openings must be protected during construction to prevent contaminants getting into, and settling in, the ductwork.

H. CONTROLS:

Central VRF Systems must include:

1. Master Controller: control to all VRF units from a central location within the building. Allow the monitoring of issues, maintenance schedules, over-ride setpoints. Provide system with BACnet option to integrate other third-party HVAC equipment control. System to provide data trending. Control system to allow remote login access.
2. Provide onsite computer/laptop to operate the control system and trending, if specified by the manufacturer.
3. Watt Meters, or other manufacturer recommended BTU Meters, on outdoor units. Incorporate energy allocation software, to be used for efficient system operations and billing (where permitted)
4. Any additional metering required for Renewable Energy Credits (RECs), Alternative Energy Credits (AEC) or other incentive program, if applicable within the jurisdiction.

I. THERMOSTATS:

- Each fan-coil should have its own thermostat located within the space that it serves.
- See the Thermostat section of the Basis of Design for more information.

J. SPECIFICATION FORMAT:

- Project specifications to use industry standard 6-digit CSI Masterformat.

K. INCLUDE SPECIFICATIONS FOR COMMISSIONING (CX): The following specification sections are required in all new construction projects. Commissioning specifications to be reviewed, updated to reflect the current project, and included within the design specification. The HVAC Section (Division 23) must reference the following specifications:

1. **Section 019013 – General Commissioning Specification:** Section includes general and specific requirements that apply to the implementation of commissioning process for HVAC&R systems, assemblies, and equipment.
2. **Section 019013.01 Sample Commissioning (CX) Plan:** Provide a sample Cx Plan. This document outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process. Each commissioning plan should include:
    a) Commissioning Objectives
    b) Systems to be Cx.
    c) Project team contact list, Cx roles and responsibilities of team, general management plan, communication protocols.
    d) Summary of Cx process, schedule for Cx activities.
    e) Documentational requirements. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
    f) Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for HVAC&R systems, assemblies, equipment, and components to be verified and tested.
    g) Certifications: installation, prestart checks, and startup procedures have been completed. Ready for testing.
    h) Verification of testing, adjusting, and balancing (TAB) reports.
    i) Sample Issues Log and Corrective Action document.
3. **Section 230800 - Commissioning of HVAC:** Section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.
    a) If a Building Automation System (BAS/BME/EMS) is to be installed, the Integrated Automation Cx specifications within Section 23 HVAC will also require the following specification. All Cx specifications will also need to reference this specification:
        a. **Section 250800 - Commissioning of Integrated Automation:** Section includes commissioning process requirements for BAS.

b) The Cx specifications within Section 23 HVAC must also reference the following specifications, as applicable to the project:

a. **Section 220800 - Commissioning of Plumbing:** Section includes commissioning process requirements for plumbing systems, assemblies, and equipment.

b. **Section 260800 - Commissioning of Electrical:** Section includes commissioning process requirements for electrical systems, assemblies, and equipment.

LAST UPDATED 04.09.2024

HEATING

EXISTING CONSTRUCTION

WHEN TO USE THIS BASIS OF DESIGN SECTION

This BOD section should be used for 1) rehab projects to guide Architects, Engineers, and Development staff, and 2) during system replacement to guide maintenance staff. Modifications to existing heating equipment present significant and uncommon opportunities to improve performance, increase heating system efficiency and reduce utility costs.

REQUIREMENTS FOR ALL HEATING SYSTEM TYPES DURING REHAB:

When work to upgrade or replace the existing heating system is being considered, the following requirements should be reviewed by the project team:

A. EVALUATE CONVERSION TO HEAT PUMPS:

- POAH's preferred approach is to remove existing heating systems and to install new central heat pump systems with heat recovery (VRF-HR). For requirements on heat pumps, see the Heating + Cooling: New Construction section of the Basis of Design.
- If converting to heat pumps is not possible, proceed with the following requirements, as well as those listed for specific system types (below):

B. ALL NEW EQUIPMENT (HEAT PUMP OR NOT) MUST BE SIZED USING ACCA MANUAL J+S OR ANSI/ASHRAE/ACCA STANDARD 183: New heating and cooling equipment shall be sized to meet calculated loads for the specific building or space served. Rule-of-thumb sizing is not acceptable. For buildings 3 stories or less in height use ACCA Manual J to calculate building loads and ACCA Manual S to size equipment. For buildings over 3 stories in height calculate heating and cooling loads according to ANSI/ASHRAE/ACCA Standard 183 and size equipment not greater than these loads.

1. When calculating heat and cooling loads, use the following interior conditions:
    a) Maximum of 74F for heating (this satisfies HUD's requirement of 68F)
    b) Minimum of 72F for cooling

C. PREDICTIVE MODELING FOR ENERGY CONSUMPTION + COST: POAH desires to have an estimate of energy consumption and cost for operation of the new building. Engineers shall provide estimates of energy use and cost for each of the following, broken out by common-meter energy use vs. resident-meter energy use:

1. Heating energy use for primary heating fuel
2. Heating electrical energy use (for fossil fuel systems, this would capture the electrical associated with pumps + fans)
3. Cooling energy use
4. DHW energy use for primary water heating fuel
5. DHW electrical energy use (as for heating, this would capture electrical use associated with pumps and burner/vent fans
6. Ventilation energy use
7. Ventilation thermal energy use (e.g., gas if/as applicable)
8. Lighting
9. Plug loads

D. USE PROGRAMMABLE THERMOSTATS: See the Thermostat section of the Basis of Design for more information. Note: PTAC units will not include separate thermostats.

E. INCLUDE SPECIFICATIONS FOR COMMISSIONING (CX): The following specification sections are required in all projects. Commissioning specifications to be reviewed, updated to reflect the current project, and included within the design specification. The HVAC Section (Division 23) must reference the following specifications:

1. **Section 019013 – General Commissioning Specification:** Section includes general and specific requirements that apply to the implementation of commissioning process for HVAC&R systems, assemblies, and equipment.
2. **Section 019013.01 Sample Commissioning (CX) Plan:** Provide a sample Cx Plan. This document outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process. Each commissioning plan should include:
    a) Commissioning Objectives
    b) Systems to be Cx.
    c) Project team contact list, Cx roles and responsibilities of team, general management plan, communication protocols.
    d) Summary of Cx process, schedule for Cx activities.
    e) Documentational requirements. Plan for delivery and review of submittals, systems manuals, and other documents and reports.

f) Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for HVAC&R systems, assemblies, equipment, and components to be verified and tested.
g) Certifications: installation, prestart checks, and startup procedures have been completed. Ready for testing.
h) Verification of testing, adjusting, and balancing (TAB) reports.
i) Sample Issues Log and Corrective Action document.

3. **Section 230800 - Commissioning of HVAC:** Section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.
   a) If a Building Automation System (BAS/BME/EMS) is to be installed, the Integrated Automation Cx specifications within Section 23 HVAC will also require the following specification. All Cx specifications will also need to reference this specification.
   b) The Cx specifications within Section 23 HVAC must also reference the following specifications, as applicable to the project:
      a. **Section 220800 - Commissioning of Plumbing:** Section includes commissioning process requirements for plumbing systems, assemblies, and equipment.
      b. **Section 260800 - Commissioning of Electrical:** Section includes commissioning process requirements for electrical systems, assemblies, and equipment.

REQUIREMENTS FOR SPECIFIC HEATING SYSTEM TYPES DURING REHAB:

A. CENTRAL BOILERS WITH HYDRONIC DISTRIBUTION:

Evaluate the possibility of converting the system to an air-source heat pump, VRF system. The electrical system should be evaluated for capacity to carry heat pumps. If the electrical system does not have capacity, consider upgrading the electrical system. If a VRF system is not feasible and a gas boiler is to remain, proceed with upgrade of the plant and distribution as follows:

1. **Determine Water Quality:** When replacing boilers, determined if the boiler failed prior to its expected service life. Collect data on any previous water quality tests and premature system failures. Corrosion due to hard-water, chemical imbalances, oxygen in the system are typical culprits. A water treatment conditioning device may need to be installed within the boiler plant to minimize future corrosion. Water strainers need to be inspected for debris and materials within the system. On all existing systems, at the design exploration phase, perform a test of water hardness and chemistry. Check all pump strainers for debris and indications of distribution deterioration.
2. **Determine if System Includes Galvanized Piping:** Galvanized piping over time corrodes from the inside, reducing flow rates through the piping and causing costly leaks inside concealed walls and floors. If galvanized pipes are found, the project team must evaluate replacing the entire piping system (this applies to both the heating and plumbing system).

3. **Inspect Pipes Embedded in Concrete:** Leaks will degrade concrete, in turn the concrete will increase the speed of metal pipe corrosion.
4. **Boiler Plant:**
    a) **Boiler:** use modulating condensing boilers

    b) **Boiler Controls:** use Outdoor Air Temperature (OAT) Reset that modulates based on change in outdoor temperature (ΔT). The OAT sensor for the OAT reset controller must be:

        a. located on the exterior face of the building.
        b. located on the North side of the building; I.E. it should not be affected by changing temperatures caused by the sun. Alternative shaded locations may be suitable, subject to POAHs approval, where direct sunlight does not reach within 3' of the OAT sensor and the surface that it is mounted to does not fluctuate with sunlight.
        c. OAT sensor must be away from any devices that may affect its temperature reading, such as dryer or bathroom exhausts vents or AC/heat pump compressors.

c) **Piping Configuration:** If replacing distribution piping, utilize primary-secondary configuration. Use tertiary if needed for wings or auxiliary loads.
d) **Building Loop Pumps:** use lead lag, VFD pumps.
e) **Building Loop Pump Controls:** control by pressure, or pressure and ΔT

a. Pressure sensor 2/3 along building loop
b. ΔT between loop supply leaving boiler room and loop return entering boiler room

f) **Pipe Insulation:**

a. Pipes up to 1 ½" diameter: use minimum 1 ½" thick tubular insulation
b. Pipes greater than 1 ½" diameter: use minimum 2" thick tubular insulation.

g) **Combustion Exhaust Venting:** The exhaust vent must be located away from ventilation intakes, operable windows, etc. Refer to the International Mechanical Code (IMC) or the manufacturer's installation instructions.

a. Inlet and outlet need to be located above anticipated snow load. Clearances above grade must account for not just average snowfall, but also snowdrifts and piles made from snow plowing/blowing.
b. Configure the exhaust vent such that condensate will not fall upon any building surfaces or walks.

This boiler vent deposits condensate on the wall of the buildings and on the stairs leading to a shared laundry facility.

h) **Demolish unused flue/vent and patch the vent penetrations:** When converting the hot water heating to either electric heat-pump or direct-vent combustion, there typically will be an existing exhaust vent that is no longer needed. Abandoned exhaust vents should be demolished and the ceilings, floors, roofs and/or walls that the vent went through should be patched and made good. The abandoned shaft must be closed and sealed at the floor of the attic.

a. Where the vent penetrated a roof and or wall, the water control of must be restored with the water control layer properly shingle lapped.
b. The ceiling of the boiler room must be patched and sealed.

This abandoned exhaust vent provides a direct air leakage path to the exterior. It requires patching.

c. Floor penetrations that are accessible or can be access as part of the renovation work should be sealed air tight and as required for fire safety.
d. If the vent cannot be fully demolished – e.g., the flue chase is in occupied apartments with no provision for work in those apartments – then the accessible portions of the vent should be demolished with the chase and vent sealed at the top and bottom.
e. If using the vent chase for new vent or intake pipes, or refrigerant lines, or ventilation ductwork, electrical service, etc. be sure to seal around the pipes and wires where they enter the chase. The top and bottom of the chase should be closed and sealed.

i) **Heat Exchanger (HX):** Evaluate history of HX seal replacement, dates and reasons for replacement; evaluate if the HX requires premature seal replacement. If HX requires disassembly and new seals, check water quality as previously discussed within this BOD section. Check condition of HX, are the chambers "plugged" with debris, scaling, or water hardness, indication (symptoms) of distribution system issues. Ensure strainers (filters) on both supply sides to the HX, in locations that are easily accessed by maintenance. If there is a debris or water quality issue, DO NOT replace HX or seals without addressing water issues.

5. **Distribution Using Fintube/Baseboard Radiators:**

a) Insulate accessible piping
b) Zone piping:
a. provide isolation valves for zone piping if not already present. Use ball valves, do not use gate valves. Gate valves typically wear faster and will require replacement, they are more prone to corroding in a position. They have a higher tendency to leak. Ball Valves last longer and are less prone to leaking.

b. provide a bypass if needed to allow for individual zone control

c) **Radiators:** when replacing radiators, replace with high-output radiators capably of meeting the space load with 120F water

d) **Zone Valves:** provide mechanical zone valves controlled by a zone thermostat

a. Low voltage zone valves for compatibility with thermostats and safety

6. **Distribution Using Fan Coils:**

a) Change filters

b) Wherever possible and where not already present, provide zone valve and bypass so heating output can be controlled

B. INDIVIDUAL APARTMENT FURNACE WITH DUCTED DISTRIBUTION: Replacing a ducted furnace system may present an opportunity to convert to an air-source heat pump system. If the furnace is part of a split system with an outdoor compressor, the electrical system should be evaluated for capacity to carry heat pumps. If the electrical system does not have capacity, consider upgrading the electrical system. If an air-source heat pump system is not feasible and a gas furnace is to remain, proceed with the following:

1. **Furnace:** use condensing furnace with variable speed for higher efficiency

2. **Blower motors:** use ECM or variable speed

3. **Ductwork insulation and sealing:** Insulate and seal all accessible ductwork (Evaluate comprehensive duct sealing, e.g., Aeroseal)

4. **Combustion Exhaust Venting:** see Combustion Exhaust Venting Section listed above under "Central Boilers with Hydronic Distribution".

5. **Investigate adding cooling to existing system:** If not already provided, provide an evaporator coil and exterior condenser to provide air-conditioning capability to the existing system.

Seal all accessible ductwork.

C. PTAC SYSTEMS: Investigate removing all PTAC units and installing new air-source heat pumps. If upgrading to air-source heat pumps is not feasible and PTAC units are to remain, consult with Building Design and Performance to determine the appropriate approach. The following measures apply to systems that will remain as PTAC:

1. **PTAC types:**
   a) For Heat Pump PTAC units with electric resistance "back-up" heating: The controls for the PTAC unit must allow Heat Pump only heating down to a change-over temperature of no more than 40F.
2. **EER rating of AC function must be 10 or higher**
3. **Thru-wall Sleeves:**

   a) The wall opening in which the PTAC sleeve is installed must be fully flashed and treated like a window opening (fully flashed, able to drain, continuously sealed at inside perimeter)
   b) Cold climates: Line the wall opening with rigid foam insulation (min. compressive strength of 15 psi) to control condensation on the outside of the sleeve in the wall cavity.
   c) Insulate and seal the perimeter of the wall sleeve to avoid drafts.
4. **Multiple speed fans:** use models with 2-speeds, or more.
5. **Thermostats:** do not use remote thermostats.
6. **Transfer Ducts to adjoining rooms:**
   a) Duct connecting the PTAC unit with the distribution duct/ plenum must be sealed to the PTAC unit discharge. Verify that supply air does not leak and is supplied at supply grilles only.
   b) Provide a manual balancing damper in the ductwork.
   c) Balance system supply air.
7. **Ventilation through PTAC Units:**
   a) Warm, humid climates zones 1 and 2: Ventilation may be provided through the PTAC unit only if the PTAC unit provides dehumidification of the ventilation air. Dehumidification of ventilation supply air is also recommended for PTAC units in humid climate zones 3 and 4.

b) Mixed humid climates zones 3 and 4: Ventilation may be provided through the PTAC unit only if the PTAC unit provides either dehumidification of the ventilation air or ERV with a latent efficacy of at least 50%.
c) Cold climates, zones 5 and higher: Ventilation may be provided through the PTAC unit only if the PTAC unit provides energy recovery or heat recovery ventilation with a total recovery efficiency of not less than 65%.

LAST UPDATED 04.09.2024

COOLING

EXISTING CONSTRUCTION

WHEN TO USE THIS BASIS OF DESIGN SECTION

This BOD section should be used for 1) rehab projects to guide Architects, Engineers, and Development staff, and 2) during system replacement to guide maintenance staff. Modifications to existing cooling equipment present significant and uncommon opportunities to increase cooling system efficiency and reduce utility costs.

REQUIREMENTS FOR ALL COOLING SYSTEM TYPES DURING REHAB:

When planning a major rehabilitation, it is important to assess the condition of the existing heating and cooling equipment and distribution systems. If the existing systems are failing, the possibility of converting to heat pump technology should be considered.

EVALUATE CONVERSION TO HEAT PUMPS:

- Projects shall evaluate removing existing cooling systems and installing a new central heat pump system with heat recovery (VRF-HR). For requirements on heat pumps, see the Heating + Cooling: New Construction section of the Basis of Design.
- If converting to heat pumps is not possible, proceed with the following requirements, as well as those listed for specific system types (below):

IF NO COOLING SYSTEM CURRENTLY EXISTS:

Where there is no cooling provided presently, and converting the property to a heat pump system is not possible, the project development team should investigate the provision of cooling through the following options:

- If the building has baseboard heating: install new through-wall AC units in a panel fixed within the window frame. See the AC Units and AC Cover sections of the Basis of Design for more information.

- If the building has forced hot air heating: install new AC compressors that can supply existing heating ductwork with cooling during summer months.
- Incorporate cooling (and dehumidification and off-season heating) through an integrated in-unit ventilation system.

USE PROGRAMMABLE THERMOSTATS:

- See the Thermostat section of the Basis of Design for more information. Note: Through-wall ACs and PTAC units will not include separate thermostats.

INCLUDE SPECIFICATIONS FOR COMMISSIONNING (CX):

The following specification sections are required in all projects. Commissioning specifications to be reviewed, updated to reflect the current project, and included within the design specification. The HVAC Section (Division 23) must reference the following specifications:

1. **Section 019013 – General Commissioning Specification:** Section includes general and specific requirements that apply to the implementation of commissioning process for HVAC&R systems, assemblies, and equipment.
2. **Section 019013.01 Sample Commissioning (CX) Plan:** Provide a sample Cx Plan. This document outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process. Each commissioning plan should include:
    a) Commissioning Objectives
    b) Systems to be Cx.
    c) Project team contact list, Cx roles and responsibilities of team, general management plan, communication protocols.
    d) Summary of Cx process, schedule for Cx activities.
    e) Documentational requirements. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
    f) Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for HVAC&R systems, assemblies, equipment, and components to be verified and tested.
    g) Certifications: installation, prestart checks, and startup procedures have been completed. Ready for testing.
    h) Verification of testing, adjusting, and balancing (TAB) reports.
    i) Sample Issues Log and Corrective Action document.
3. **Section 230800 - Commissioning of HVAC:** Section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.
    a) If a Building Automation System (BAS/BME/EMS) is to be installed, the Integrated Automation Cx specifications within Section 23 HVAC will also require the following specification. All Cx specifications will also need to reference this specification.

a. **Section 250800 - Commissioning of Integrated Automation:** Section includes commissioning process requirements for BAS.

b) The Cx specifications within Section 23 HVAC must also reference the following specifications, as applicable to the project:

a. **Section 220800 - Commissioning of Plumbing:** Section includes commissioning process requirements for plumbing systems, assemblies, and equipment.

b. **Section 260800 - Commissioning of Electrical:** Section includes commissioning process requirements for electrical systems, assemblies, and equipment.

REQUIREMENTS FOR SPECIFIC COOLING SYSTEM TYPES DURING REHAB:

FURNACES WITH AC COMPRESSORS OUTSIDE (SPLIT SYSTEM):

(listed in order of preference)

1. **Replace the Outdoor Condenser with a Heat Pump:** Convert AC compressor to a heat pump compressor. Take into account the reduced loads (building enclosure upgrades) resulting from the renovation. Compressors should be placed away from windows and outdoor patios, and should be easily accessed by maintenance. Compressors should be installed on stands a minimum of 18 inches off the ground or roof. Any/all refrigerant lines should be covered/protected. Landscape plans should include a visual barrier of compressors without interfering with operation or access by maintenance.

a) Confirm the electrical panel has adequate amperage available to serve the new heat pump. If amperage is limited, the system will be duel-fuel and the heat pump heating capacity will be determined by the available amperage. If the system is duel-fuel, the heat pump will lock-out at low temperatures (based on available amperage), at which point the furnace will turn on.

2. **Replace the Condenser with a More Efficient Model:** SEER and HSPF as required to meet ENERGY STAR requirements.

LAST UPDATED 04.09.2024

COOLING

EXISTING CONSTRUCTION

HYDRONIC FAN-COIL SYSTEMS:

1. **Replace Central Chiller According to ANSI/ASHRAE/ACCA Standard 183:** Calculate heating and cooling loads according to ANSI/ ASHRAE/ACCA Standard 183 and size equipment not greater than these loads.

THROUGH-WALL OR WINDOW MOUNTED AC UNITS WITH BASEBOARD OR RADIATORS:

1. **See the following BOD Sections:**
    a) Appliances (subsection "AC Units"): Information on AC Units
    b) AC Covers: Information on insulated, hard-plastic AC covers
    c) Windows (subsection "AC Sleeve in Window Sash"): Information on AC sleeves

IF PTACS EXIST:

1. **See the Heating: Existing Construction Section of the Basis of Design.**

LAST UPDATED 04.09.2024

LANDSCAPING + HARDSCAPE

WHEN TO USE THIS BASIS OF DESIGN SECTION

This BOD section should be used in new construction and rehab projects as a guide for Landscape Architects, Civil Engineers and in ongoing property maintenance for landscape and hardscape. When installing any new plants, landscape contractors should guarantee plants for one year and should be responsible for all watering and fertilizers necessary for establishing the plant materials. The guarantee should cover replacement plants and removal of dead materials.

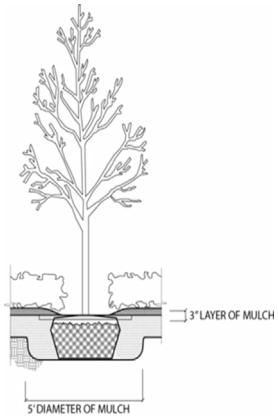
LANDSCAPING

A. SOD:

1. Use regionally appropriate seed mixes.
2. Consider low maintenance, shade and drought tolerant species.
3. Refer to irrigation section on how to water effectively.
4. Metal edging is only required between crushed granite or gravel and sod/plants.
5. Mowing:
    a) Mowing blades should be set at 2.5-3 inches.
    b) Make sure landscape contractors do not mow or manicure any “nature-scaping” zones which are intentionally overgrown to benefit wildlife.

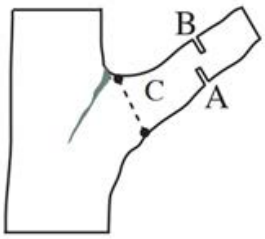
B. TREES:

1. **Planting:**
    a) Plant trees minimum 3 feet from any curb or sidewalk and 6 feet from any building or structure.
    b) Do not plant trees in an area where it will obstruct visibility to the building, signage, lighting or street traffic.
    c) Trees planted in turf areas should install a 5 feet diameter mulch ring to allow for proper turf maintenance without dis turbing the tree.
    d) Install a minimum 3 inches layer of hardwood bark mulch around all trees and in all planting areas. Create a natural spaded edge where planting beds meet turf areas.



e) Consider size of tree at maturity when planting in relation to structures and pavement.
f) Use a mix of deciduous, semi-evergreen, and coniferous trees.

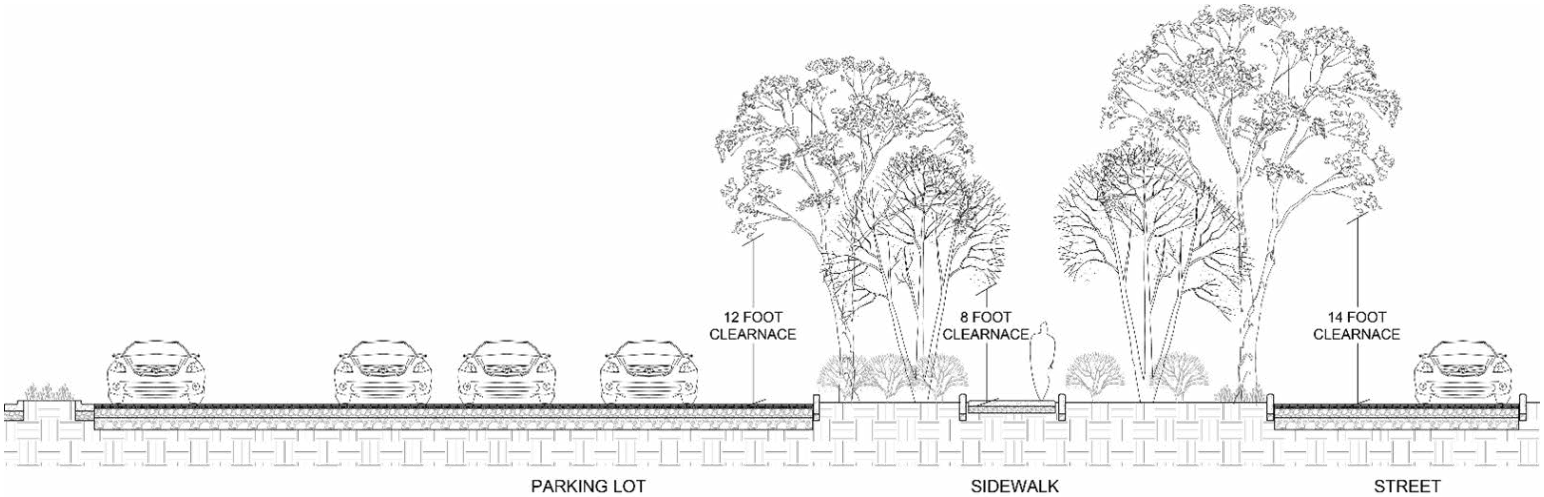
2. **Pruning:**



a) For extensive pruning across a property, hire a local arborist.
b) Prune in late winter before any new leaf buds have formed.
c) Never remove more than ¼ of a tree's canopy in a season.
d) Remove broken, dead, dying, diseased, or damaged branches.
e) Never leave stubs when pruning. Cut along line C when trimming branches. For large branches, make cut A and then cut B to remove the bulk of the branch before making a clean cut at line C.

3. **Maintain the Following Clearances from Ground to Lowest Branches:**

a) Trees along streets: 14 feet
b) Trees along sidewalks: 8 feet
c) Trees along parking lots: 12 feet
d) Trees in landscape: no clearance requirements



4. **Leaves:**
    a) Leaves on lawn/grass: mulch/shred leaves using a mower rather than collecting them and removing them from the property. Mulching the leaves return nutrients back to the soil and helps a healthy lawn return in the spring. If a landscape contractor is hired to conduct the work, mulching should also save on removal fees.
    b) Leaves elsewhere: collect leaves and mulch/shred them. Spread mulched leaves in planting areas around the property.

For specific options, refer to: BOD REGIONAL PLANT RECOMMENDATIONS

C. SHRUBS + PERENNIAL PLANTS

1. Use drought resistant, shade tolerant and low maintenance plants.
2. Use native species, do not use invasive species. See website for list of invasive species in your area.
3. If installing new plantings, obtain a minimum one-year warranty from the nursery or provider to replace or maintain if something happens to the plants.
4. Where possible, use perennials, not annuals. Annuals require more rigorous maintenance and should only be used in discrete locations.
    a) Perennials are plants that bloom for a short time each year and do not need to be replanted every year. While most perennials last many years, it is also typical for them to be replaced every three to five years if they stop performing well. Use manufacturer or landscaper recommendations for perennials.
    b) Annuals are plants that bloom for a longer season and need to be replanted every spring. These require more maintenance. Be selective about areas to plant them, such as in front of the management or leasing office. Consider groundcover as a low maintenance option in lieu of turf. Groundcover is defined as low-lying, creeping or spreading perennials which cover large ground sections.
5. Consider groundcover as a low maintenance option in lieu of shrubs and flowering plants. Groundcover is defined as low-lying, creeping or spreading perennials which cover large ground sections.
6. Groundcover is also suggested for areas such as planting beds, low or no traffic areas, near service areas, inside parking islands, shady areas, and steep slopes where grass will not grow well.
7. Groundcover should be kept 18 inches from building edge.

8. Spacing between groundcover plants will vary based on species but in general 12 - 24 inches apart will be sufficient. The objective is for neighboring plants to overlap enough to keep the ground shaded and discourage weed growth.
    a) Consider the plant's maximum width at maturity to determine the spacing.
    b) Allow extra spacing for fast growing species, less spacing for slower species.
    c) Be sure to use regionally appropriate species, as some are invasive or aggressive in certain areas and native in others.
9. Groundcover should be properly maintained so as to not become overly dense or protrude onto walkways, paths of travel, or parts of the building and other structures on site.

For specific options, refer to: BOD REGIONAL PLANT RECOMMENDATIONS

D. REGIONAL PLANT RECOMMENDATIONS

See website for a full list of native plants by region, see below for specific recommendations/suggestions. It is important to buy plants native to the region you are planting in. This allows plants to thrive, use less water and require less maintenance.

MIDWEST - TREES


Autumn Blaze Maple


Northern Pine Oak


English Oak

MIDWEST - SHRUBS


Grow Low Sumac Shrub


Hicks Yew


Highbush Cranberry

MIDWEST - GROUNDCOVER


Broadmore Juniper


Hosta Francee


Asarum Canadense

MIDWEST - SODS + GRASSES (grass seed or sod may be provided as a mixture of types)


Kentucky Bluegrass


Ryegrass


Buffalo Grass

MIDWEST - PERENNIALS


Black Eyed Susan


Purple Sensation


Graceful Beauty

NORTHEAST - TREES


American Sweetgum


Leyland Cypress


Eastern White Pine

NORTHEAST - SHRUBS


Lacecap Hydrangea


Dwarf Cranberry Viburnum


PJM Rhododendron

NORTHEAST - GROUNDCOVER


English Ivy


Pennsylvania Sedge


Pachysandra

NORTHEAST - SODS + GRASSES (grass seed or sod may be provided as a mixture of types)


Kentucky Bluegrass


Ryegrass


Fescue Grass

NORTHEAST - PERENNIALS


Black Eyed Susan


Shasta Daisy


Hemerocallis Daylily

MID ATLANTIC - TREES


American Sweetgum


River Birch


Eastern White Pine

MID ATLANTIC - SHRUBS


Red Sprite Winterberry


Virginia Sweetspire


Hummingbird Sweet Pepperbush

MID ATLANTIC - GROUNDCOVER


Tussock Sedge


Blue Mist Flower


Tufted Hairgrass

MID ATLANTIC - SODS + GRASSES (grass seed or sod may be provided as a mixture of types)


Kentucky Bluegrass


Ryegrass


Fescue Grass

MID ATLANTIC - PERENNIALS


Butterfly Milkweed


Cutleaf Coneflower


Hemerocallis Daylily

SOUTHEAST - TREES


Florida Elm


River Birch


Pond Cypress

SOUTHEAST - SHRUBS


Saw Palmetto


American Beautyberry


Crepe Jasmine

SOUTHEAST - GROUNDCOVER


Wiregrass


Cast Iron Plant


Purple Lovegrass

SOUTHEAST - SODS + GRASSES (grass seed or sod may be provided as a mixture of types)

Carpetgrass

Centipede Grass

St. Augustine Grass

SOUTHEAST - PERENNIALS

Pink Pinxter Azalea

Camellia Japonica

Swamp Sunflower

E. MULCH

1. **Product:**
   a) Use a regionally specific, single processed brown hardwood mulch.
   b) Hardwood bark mulch is defined as at least 85% lignin (bark) and generally produced from the debarking of logs at a sawmill or papermill.
   c) Mulch should pass chemical testing for CCA treated wood contaminants.
   d) Do not use mulch that is dyed (i.e. red), or mulch that contains cypress, pine, recycled content or green waste.

Single-processed brown hardwood mulch

2. **Installation and Maintenance:**
   a) When installing near trees:
      a. Do not mound up near tree base.
      b. Install a minimum 3 inches layer of hardwood bark mulch around all trees and in all planting areas. Create a natural spaded edge where planting beds meet turf areas.

Plant bed with natural edge created by a spade

b) When installing near the building edge:
    a. Mulch should be kept 18 inches from building edge, and any other wood, vinyl or deck areas as a fire prevention measure.
    b. Use non-combustible materials such as rock or pea stone in between building edge and mulch as well as around gas meters or other combustible portions of the structure.
    c. Create and maintain a slope away from the building.
    d. Do not install mulch near smoking receptacles or designated smoking areas.
    e. To prevent deep smoldering, do not pile mulch layers more than 3 inches.
    f. Landscape beds adjacent to walkways shall be graded to prevent wash out of mulch into walkways.

c) Metal edging is only required between crushed granite or gravel and sod/plants.

d) No edging is required for landscape beds adjacent to concrete drives, walkways or curbs. Landscape beds adjacent to walkways shall be graded to prevent wash out of mulch into walkways.

F. IRRIGATION

1. If possible, use plants that are drought resistant that won't require an irrigation system.
2. Contact local water municipality to determine if your site can install a separate water meter (deduct meter) for your irrigation system. This will remove the sewer charge for the water consumption used by the irrigation system.
3. Consider using well water for the irrigation system. There will be upfront costs to dig the well and install the pump but it should have a quick payback. If a well exists at the site, review any documentation on the well capacity and pump performance. You will need the following:
    a) the capacity of the well in gallons.
    b) the gallons per minute (gpm) the pump can provide at a steady flow. (Not just the initial rate which is typically higher if there is accumulated water.)

4. If an irrigation system exists at your site or you are considering installing one, follow these guidelines:

a) Must include an irrigation controller with cycle and soak settings to prevent waste from runoff and over-watering.
b) Must include a sensor to automatically shut off during rain events. (Rain sensor will override any pre-programmed water schedule in the case of a weather event.)
c) Install a back-flow preventer per local code regulations.
d) Use Water Sense certified components (sprinkler heads, controllers, etc.) whenever possible.
e) Consider using a drip irrigation system or soaker hoses in planter beds.
f) Minimize slopes in the landscape due to potential erosion and excessive runoff. If slopes are already present, use plants with deeper roots such as native ground covers and shrubs to stabilize and prevent erosion and unnecessary water waste from runoff.
g) Set up a watering schedule with zones based on the plant type and their recommended water schedule. Periodically test effectiveness of water schedule.
h) Installing high efficiency sprinkler heads and reduced pipe diameters for the irrigation lines increase the efficiency and reduce water consumption.

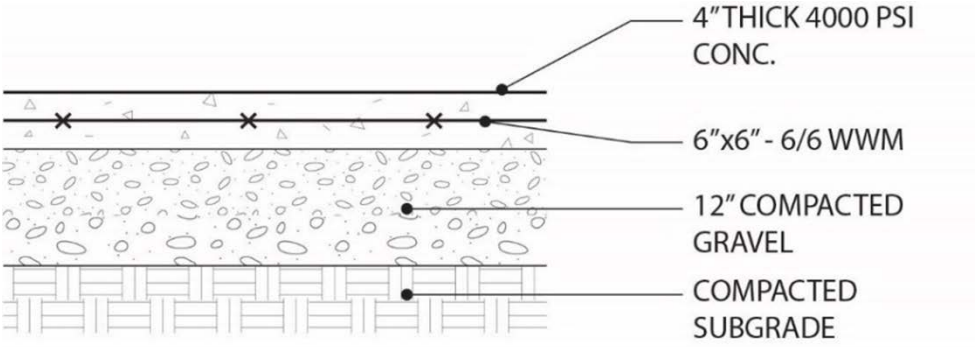
a. Space sprinkler head bodies for proper head-to-head coverage to avoid dry patches or large areas of overlap.
b. Make sure sprinklers are not positioned to spray onto non-landscaped areas such as sidewalks or parking lots.
c. Avoid watering too close to obstructions such as light poles, fences signs, etc.
d. Set sprinklers to water early in the morning (before sunrise) to prevent high evaporation rates.
e. Use sprinkler heads that regulate the pressure so it won't cause overuse through misting, fogging or uneven coverage.
f. Replace sprinkler heads that operate at or above 60psi with Water Sense spray sprinklers to save water use.
g. Always use sprinkler heads with flexible connections.
h. At sites where clay soil is predominant (dense and absorbs water slowly), implement a low flow watering schedule.

5. **Preventative Maintenance:**
    a) Once a month run your system manually to check for leaks or breaks.
    b) Adjust the water schedule based on plant type, soil type, sun exposure, site grading, climate, and the change in season to maintain efficiency.
    c) Require a full audit of the irrigation system every 3 years to ensure it continues to perform efficiency.
    d) In climate zones experiencing freeze cycles, winterize the irrigation system:
        a. Drain the system to prevent pipes from freezing.
        b. Blow out the line with compressed air.
6. **Recommended Products:**
    1. Hunter
        a) Pro-C Irrigation Controller →
        b) Optional Solar Sync feature for WaterSense certification
        c) Rain/ freeze sensor compatible
    2. Rain Bird
        a) WR2-48 Series Wireless Rain/Freeze Sensors →

HARDSCAPE

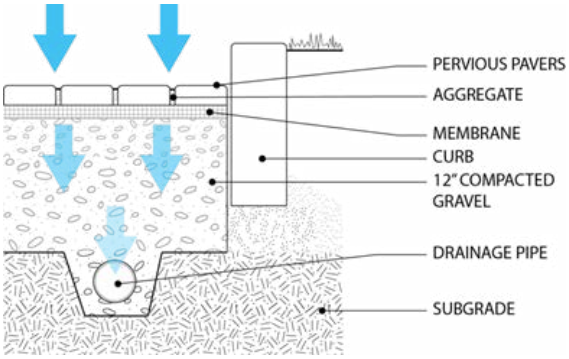
A. SIDEWALKS:

1. Concrete is the preferred material for all sidewalks due to light color and durability. To properly maintain and make effective repairs, constantly inspect for cracks, spalling or large changes in elevation.
    a) Concrete should be placed over a 12-inch bed of gravel to minimize heaving during freeze/thaw cycles.
    b) Avoid deicers with salt on concrete, especially new concrete as it will cause pits to form on the surface.



A. PARKING:

1. Asphalt is the most prevalent parking area material. Other options for parking areas are pervious pavers or pervious asphalt. These should be considered when installing new parking and/or the parking area contributes to stormwater management at the site. To properly maintain and make effective repairs, constantly inspect for cracks, sinking, potholes and changes in elevation.



a) Pervious asphalt contributes to onsite stormwater management by allowing the water to slowly infiltrate into the subgrade and groundwater supply, reducing the demand on the sewer system. It can also help improve the water quality since contaminants are filtered as the water infiltrates into the subgrade.

b) During construction, take measures to prevent stone reservoir and pavement from getting clogged with runoff and construction dust/materials.

c) Preventative maintenance for pervious asphalt includes:

a. Inspect infiltration rates annually during rain storms to make sure the asphalt is still effective.

b. Vacuum or power wash (for silt/sand/fine materials) as needed, no less than once a year.

c. Never sealcoat or crack seal to patch like regular asphalt.

d) Winter maintenance includes:
a. There are no special requirements for plowing.
b. This asphalt reduces the need for deicers since water can drain quickly after a storm.
c. Never use sand on pervious asphalt. It clogs the surface and prevents infiltration.

C. ICE MELT + DEICERS

1. **When selecting an ice melt (deicing product) consider the following:**
   a) Select products where the main ingredient is calcium chloride (CaCl) or magnesium chloride (MgCl). These ingredients are the least damaging to concrete and landscape.
   b) Products should be effective at temperatures below 0˚F.
   c) Products containing mostly rock salt (NaCl) or any amount of urea (carbonyl diamide) or glycols should never be used.
   d) Pet friendly deicer products are available for sites with pets.
2. **Careful practices when applying the product should be followed in order to maximize effectiveness and minimize waste:**
   a) Some products are designed specifically for larger areas, like a parking lot, while others are more effective for smaller walkways. Site staff should coordinate with any outside contractors they may use for parking areas to ensure the proper product is being used.
   b) Except in cases where permeable pavers or pervious asphalt are present, use sand in addition to the product to improve traction.
   c) Clear product quickly after storm ends and ice melts to prevent damage to plants or landscaping. Do not sweep or shovel remaining product into planter beds.
   d) Use of mechanical spreaders allows for greater accuracy and less waste during application.
3. **Recommended Product:**
   1. Road Runner Blended Ice Melt
      a) MgCl + CaCL blend
      b) 50 lbs bag

SITE FURNISHINGS

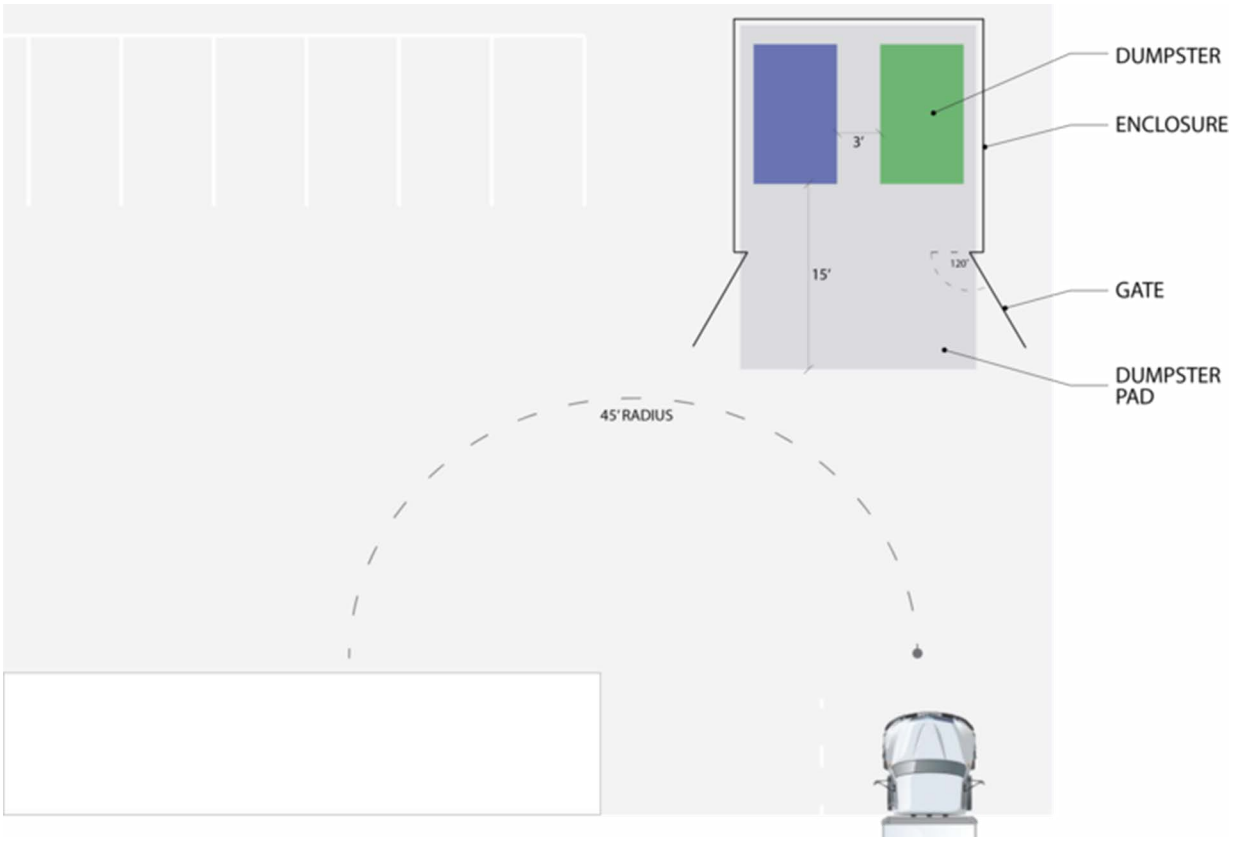
A. BIKE RACKS + SHELTERS:

1. Most cities have codes that dictate the quantity and configuration (sheltered, stacked, racking, etc.) of bike parking.
    a) All new construction should follow the code.
    b) For discrete rack installations consider a shelter to provide cover if outdoors and provide a rack that allows the bike to be locked in at least two points.

B. DUMPSTER ENCLOSURES

2. All dumpsters should be located in an enclosure.
3. Use CMU, chain link fence, or steel structure with fencing material for the enclosure. Do not use wood for the structure of the enclosure.
4. Enclosure walls should be a minimum of 1 foot higher than dumpster heights.
5. If multiple containers are in one enclosure, they should be spaced a min of 36 inches from each other. In addition, all containers should be a min of 12 inches from enclosure walls.
6. Include a visual buffer such as landscaping or screening if enclosure area is visible from the public right of way or street.
7. If dumpsters are used by tenants, they need to include a safe and accessible route to the dumpster enclosure area, so that no resident is required to travel more than 250 feet to reach it. This distance is reduced to 150 feet if accessed by residents at a senior building. It may be necessary to add an out-swinging man gate so that residents can access the dumpster.
8. If dumpsters are only accessed by site staff, they should include a locked gate only to be unlocked for staff access or on collection days.
9. If a gate is included as part of the enclosure:
    a) The gates need to open at an angle wider than 90 degrees, preferably 120 degrees.
    b) Provide a hold-open to keep gates open when the dumpster is being unloaded during collection.

10. All enclosures should include a reinforced concrete pad. The pad should be the full size of the enclosure and extend in front of the enclosure by at least half the depth of the enclosure pad.
11. The pad surface cannot have a slope in any direction greater than 2%.
12. A minimum height clearance of 25 feet above the enclosure is required.
13. A turning radius of 45' is needed near the enclosure so the collection truck can drive forward to access the dumpster, turn and exit the area moving forward, not backing up.



C. DESIGNATED SMOKING AREAS

1. Any smoking shelter or designated smoking area needs to be at least 25 feet from the main building and entry points.
2. The smoking shelters needs to follow ADA guidelines and include an accessible walkway or ramp as necessary.
3. The structure should be partially enclosed with cover from the elements, adequate lighting and some sort of seating option.
4. The shelter should include proper cigarette disposals containers.
5. The structure needs to be at least 18 inches from any mulch or landscaped area.

6. Follow all manufacturer's instructions for any installation and assembly on site.
7. **Recommended Products:**
    a) Alpine Industries
        a. Black Steel Wall-Mounted Cigarette Disposal
        b. Note: Install on shelter structure, not building wall
    b) Global Industrial
        a. Outdoor Smoking Shelter

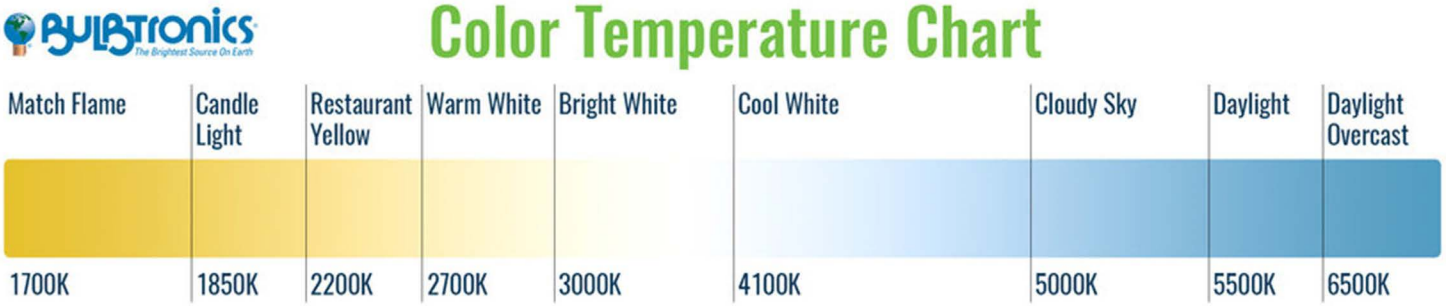
Wall-Mounted Cigarette Disposal

Outdoor Smoking Shelter

LIGHTING

GENERAL INFORMATION + REQUIRED DETAILS:

- All fixtures can be purchased through HD Supply, unless noted.
- All lenses must be acrylic; No glass.
- If replacing fixture in same location use LED w/ same lumens or higher to provide effective lighting.
- Energy Star rating Required unless LED fixture.
  - (Note: some LED fixtures are not Energy Star rated).
- Confirm if Energy Star rated fixtures are a requirement by lender or local building code (ex: Chicago properties require task lighting at kitchen sink).
- The project parameters (i.e. size of kitchen, integrated bathroom light and fan, etc.) should be established and architect/ engineer must confirm required light levels will be met with approved fixtures provided and required power will be provided.
- Bulbs should be available at local stores and can be affordably purchased by residents.
- Check with local utility for lighting rebates.
- Do not install exterior fixtures that shine light upwards or into residential unit windows.
- All exterior lighting should be controlled by photocell, not timers.
- All LED fixtures in units to be within 2700-3000 Kelvin color temperature.
  - Fixtures greater than 3000 Kelvin color temperature are acceptable in common areas only.



SURFACE MOUNTED ROUND

APPROVED LOCATIONS:

- Use in locations with hard (non-dropped) ceiling
- **In Unit:** All Rooms
- **Common Areas:** Office, Corridors, Community Rooms, + Lobbies

SAMPLE PRODUCT:
Feit Electric LED Ceiling Flush Mount

- Finish: White Trim
- Bulb Type: Integrated LED
- Kelvin: 3000, 4000, or 5000
- Diameter: 13.2”

Manufacturer Number:
PF13/RND/4WY/WH

SURFACE MOUNTED LINEAR

APPROVED LOCATIONS:

- Use in locations with hard (non-dropped) ceiling.
- **Units:** Avoid using in units unless replacing in kind.
  - Linear lights typically are above 3000 Kelvin, and have a very blue/white color.
- **Common Areas:** Offices, Corridors, Community Rooms, and Lobbies.

SAMPLE PRODUCT:
Lithonia Lighting / Futra LED

- Wattage/Voltage: 24 / 42 Watt - 120 Volt
- Finish: Brushed Nickel
- Bulb Type: Integrated LED
- Kelvin: 4000

Manufacturer Number - 2’-0” Length:
FMLFUTL 24 840 BN

Manufacturer Number - 4’-0” Length:
FMLFUTL 48 840 BN

RECESSED CANS

APPROVED LOCATIONS:

- Use in locations with hard (non-dropped) ceiling.
- **In Unit:** All rooms.
- **Common Areas:** Offices, Corridors, Community Rooms, and Lobbies.
- Must use airtight product or sealant if installed in top floor ceiling or in ceilings between units.

SAMPLE PRODUCT:
Cordelia / Retrofit Trim

- Wattage/Voltage: 9 / 11 Watt - 120 Volt
- Finish: Plastic
- Bulb Type: Integrated LED
- Kelvin: 2700

Manufacturer Number - 4" Diameter Retrofit:
EVL4730MWH27

Manufacturer Number - 5" / 6" Diameter Retrofit:
EVL673MWH27

LAST UPDATED 04.09.2024

LIGHTING

PENDANT + BATH VANITY

PENDANT

- If pendant lighting is requested, please contact Design + Building Performance Dept. with the following information:
  - Location of proposed pendant.
  - If proposed pendant is replacing an existing pendant fixture.

BATH VANITY

APPROVED LOCATIONS:

- **In Unit:** Bathroom Vanity, above medicine cabinet or mirror.

SAMPLE PRODUCT:
Brushed Nickel LED Vanity Light Bar w/ White Acrylic Shade

- Wattage/Voltage: 18 Watt - 120 Volt
- Finish: Brushed Nickel
- Bulb Type: Integrated LED
- Kelvin: 3000
- Length: 2’-3/4”

Manufacturer Number:
NBWL1023-24LED

WALL SCONCE

APPROVED LOCATIONS:

- **In Unit:** Hallways.
- **Common Areas:** Offices, Corridors, Community Rooms, and Lobbies.

SAMPLE PRODUCT:
Luminance ADL Lumic Bright Satin Nickel Indoor LED Wall Sconce

- Wattage/Voltage: 10 Watt - 120 Volt
- Finish: Satin Nickel
- Bulb Type: Integrated LED
- Kelvin: 3000
- Width: 7”

Manufacturer Number:
35-54225

CEILING FANS

APPROVED LOCATIONS:

- **In Unit:** Living Room, Bedrooms.
- **Common Areas:** Offices, Corridors, Community Rooms, and Lobbies.

SAMPLE PRODUCT:
Home Decorators 52" Indoor Ceiling Fan, LED Light Kit

- Wattage/Voltage: 9.5 Watt
- Finish: Brushed Polished Nickel
- Bulb Type: Integrated LED
- Dimensions: 52" D

Manufacturer Number:
35-73219

CLOSET LIGHTING

APPROVED LOCATIONS:

- **Units:** Closets.
- **Common Areas:** Closets.
- Do not use products that protrude far off ceiling down into the closet. Such products are prone to damage while storing items in high areas of closet.

SAMPLE PRODUCT:
Feit Electric LED

- Wattage/Voltage: 12 Watts
- Finish: White Trim, Glare-Free Acrylic Diffuser
- Bulb Type: Integrated LED
- Kelvin: 4000
- Diameter: 12" Round x 1" Profile

Manufacturer Number:
74206/CA/V2

SAMPLE PRODUCT:
Commercial Electric LED Flush Mount Ceiling Light

- Wattage/Voltage: 14.5 Watts
- Finish: White Trim, Glare-Free Acrylic Diffuser
- Bulb Type: Integrated LED
- Kelvin: 4000
- Diameter: 12" Round x 3" Profile

Manufacturer Number:
54074441

DROPPED CEILING LIGHTING

(CEILINGS WITH GRIDS + CEILING TILES)
APPROVED LOCATIONS:

- **Common Areas:** Offices, Corridors, Community Rooms, Lobbies, Mechanical Rooms.

SAMPLE PRODUCT:
Lithonia Lighting / LED 2'x2' Recessed

- Wattage/Voltage: 39 Watts - 120/277 Volt
- Finish: White Enamel Steel Base, Prismatic Acrylic Diffuser
- Bulb Type: Integrated LED
- Kelvin: 3500
- Diameter: 24" L x 24" W x 3.25" D

Manufacturer Number:
2GTL2 LP 835

SAMPLE PRODUCT:
Lithonia Lighting / LED 2' x 4" Recessed

- Wattage/Voltage: 39 Watts - 120/277 Volt
- Finish: White Enamel Steel Base, Prismatic Acrylic Diffuser
- Bulb Type: Integrated LED
- Kelvin: 3500
- Diameter: 48" L x 24" W x 3.25" D

Manufacturer Number:
2GTL4 LP835

UTILITY LIGHTING

APPROVED LOCATIONS:

- **Common Areas:** Mechanical Rooms, Maintenance Shops, & Other Back-Of-House Spaces.

SAMPLE PRODUCT:
Lithonia Lighting / LED Wrap Fixture

- Wattage/Voltage: 50 Watt - 120/277 Volt
- Finish: White Enamel Steel Base, Prismatic Acrylic Diffuser
- Bulb Type: Integrated LED
- Kelvin: 3500
- Diameter: 48” L x 10” W x 3”

Manufacturer Number:
LBL4 LP835

EMERGENCY LIGHTING

GENERAL INFORMATION + REQUIRED DETAILS:

- Emergency lighting to comply with local Building, Fire, & Egress codes
- The fixture must include a back-up battery within the fixture or be powered by the building's back-up system.
- If replacing in-kind, the fixture has to be located in same location or reviewed by the Fire Department.

SAMPLE PRODUCT:
Lithonia Lighting / Green LED Exit

- Wattage/Voltage: 120/277 Volt
- Finish: White Thermoplastic Housing
- Bulb Type: Integrated LED
- Diameter: 7-3/16" H x 11-5/8" W x 1-5/8" D
- Battery Back Up: 6 Volt Sealed Lead Calcium Battery

Manufacturer Number:
EXG LED EL M6

SAMPLE PRODUCT:
Lithonia Lighting / Two-Light Emergency Unit

- Wattage/Voltage: 120/277 Volt
- Finish: White Thermoplastic Housing
- Bulb Type: Integrated LED
- Diameter: 4-1/4" H x 10-1/4" W x 3-5/8" D
- Battery Back Up: NiCad Battery
- Use in stairways + corridors

Manufacturer Number:
ELM2 LED M12

LIGHTING CONTROLS

APPROVED LOCATIONS:

- **Common Areas:** Corridors, Public Bathrooms, Offices, + Community Rooms

RECOMMENDATIONS:

- Use occupancy or daylight sensors.
- Emergency lighting **cannot** be controlled with daylight or occupancy sensors.
- All exterior lighting should operate on photocells, no timers.

SAMPLE PRODUCT:
Lithonia

- Passive Infrared Switch Wall Occupancy Sensor
- White

Manufacturer Number:
184LCT

SAMPLE PRODUCT:
HD Supply / Photocell Wall Pack

- Wattage/Voltage: 27 Watt - 120/277 Volt
- Finish: Bronze Polycarbonate Housing, Prismatic Acrylic Lens
- Kelvin: 4100
- Dimensions: 10-3/4" H x 6-1/4" W x 5-1/2" D

Manufacturer Number:
HDS 326111

EXTERIOR WALL-MOUNTED

APPROVED LOCATIONS:

- **Exterior:** At unit and building entry.

SAMPLE PRODUCT:
Mission LED Wall Fixture w/ Photocell

- Wattage/Voltage: 9 Watt - 120 Volt
- Finish: Black Aluminum Housing, White Acrylic Diffuser
- Bulb Type: Integrated LED
- Kelvin: 5000
- Dimensions: 9-1/2" H x 7-3/4" W x 4-1/2" D

Manufacturer Number:
BSSW8700L30BK

EXTERIOR CEILING MOUNTED

APPROVED LOCATIONS:

- **Exterior:** At unit and building entry

SAMPLE PRODUCT:
Lithonia / LED Versi Lite

- Wattage/Voltage: 28 Watt - 120 Volt
- Finish: Textured Bronze w/ White Acrylic Diffuser
- Bulb Type: Integrated LED
- Kelvin: 3000
- Dimensions: 13” Diameter

Manufacturer Number:
FMLL 13 830 WL DDBT

EXTERIOR POLE

GENERAL INFORMATION + REQUIRED DETAILS:

- If replacing in-kind, use at least the same watt bulb.
- For new construction electrical engineer should provide lighting plan that provides the appropriate lumens for design.

APPROVED LOCATIONS:

- **Exterior:** At unit and building entry**.**

SAMPLE PRODUCT:
HD Supply / LED Post-Top Lanterns

- Wattage/Voltage: 22 Watt - 120 Volt
- Finish: Compression Molded Noncorrosive Resin
- Bulb Type: Integrated LED
- Kelvin: 4000
- Dimensions: 13” H x 22-3/8” W x 10-1/16” D

Manufacturer Number:
504439

EXTERIOR FLOOD LIGHTS (WALL PACKS)

GENERAL INFORMATION + REQUIRED DETAILS:

- If replacing in-kind, use at least the same watt bulb.

APPROVED LOCATIONS:

- **Exterior:** Typically building mounted.

SAMPLE PRODUCT:
Lithonia / LED Wall Pack

- Wattage/Voltage: 39 Watt - 120/277 Volt
- Finish: Bronze Cast Aluminum
- Bulb type: Integrated LED
- Dimensions: 15-3/4" H x 16-1/4" W x 8" D

Manufacturer Number:
223859

SAMPLE PRODUCT:
HD Supply / Photocell Wall Pack

- Wattage/Voltage: 27 Watt - 120/277 Volt
- Finish: Bronze Polycarbonate Housing, Prismatic Acrylic Lens
- Kelvin: 4100
- Dimensions: 10-3/4" H x 6-1/4" W x 5-1/2" D

Manufacturer Number:
HDS 326111

PAINT

PRODUCTS + APPLICATIONS

CONTACTS:

- POAH has negotiated pricing with select manufacturers and wholesalers. When purchasing and installing new flooring please contact the following representatives. See the Manufacturer Contacts section of the BOD for more information.

PRIME COAT:

- **Sheetrock Substrate:** Sherwin Williams- ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils wet, 1.5 mils dry.
- **Concrete/Concrete Block Substrate:** Sherwin Williams- S-W PrepRite Block Filler, B25W25, at 100 to 200 sq. ft. per gal (2.4 to 4.9 sq. m per l).
- **Wood Substrate:** Sherwin Williams- PrepRite ProBlock Primer Sealer, B51-620 Series, at 4.0 mils wet, 1.4 mils dry
- **Metal Substrate:** Sherwin Williams- S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry

TOP COAT:

- **Units + Low Traffic Common Areas:**
  - All Substrates, except metal:
    - Sherwin Williams- ProMar 200 Zero VOC Latex, B31-2600 Series, at 4.0 mils wet, 1.6 mils dry, per coat.
- **High Traffic Common Areas + Metal Substrates:**
  - All elevator walls, handrails, and doors in common areas.
    - Sherwin Williams- Pro Industrial Waterbased Alkyd Urethane Enamel, B53-115- Series, at 1.4-1.7 dry, per coat.

PREPARATION:

- Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted.
- Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulates.
- Using a damp sponge or cloth, wipe to remove the surface dirt and marks and any excess cleaner. For difficult stains, some scrubbing may be necessary.

- Do not allow the cleaner to dry on the surface.
- Review hazardous material O&M for locations of lead paint or asbestos-containing substrate. Any work on these surfaces must follow directions in O&M.

APPLICATION:

- Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
- Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F
- **Brush:** Use a nylon/polyester brush.
- **Roller:** Use a 3/8" - 3/4" nap synthetic cover.
- **Spray—Airless:**
  - Pressure: 2000 psi
  - Tip: 017"-.021"

UNIT PAINT COLORS

WALLS:	CEILINGS:	TRIM:	DOORS:
Sherwin Williams 6378 Crisp Linen Eggshell	**Sherwin Williams** 7002 Downy Flat	**Sherwin Williams** 7102 White Flour Semi-Gloss	**Sherwin Williams** 7102 White Flour Semi-Gloss

COMMON AREA PAINT

NEW CONSTRUCTION + REHAB:

- Architect to provide paint design for all interior common areas.
  - Paint design should include colored floor plan.

PROPERTY MANAGEMENT:

- Contact Design + Building Performance Dept. for design support.

AERATORS

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: Chrome or Stainless
- Water Flow:
  - Bathroom Faucets: 1.2 gpm maximum
  - Kitchen Faucets: 1.5 gpm maximum
  - WaterSense certified
- Aerator to be flushed yearly or if resident complains of weak flow:
  - Aerators can help control water usage, so it is important that they are maintained
  - Removal of aerator will result in higher water bills

SAMPLE BATHROOM FAUCET AERATOR:
Neopearl
Low Flow Dual Thread
Chrome Aerator

- 1.2 GPM
- Chrome

Manufacturer Number:
24-98491

SAMPLE KITCHEN FAUCET AERATOR:
Neopearl
Dual Thread Aerator 6pk

- 1.5 GPM
- Chrome

Manufacturer Number:
24-88252

If residents are removing aerators, use the following vandal-proof aerator and key:

AERATOR:
Neopearl
Dual Thread Vandal Proof
Faucet Aerator 6pk

- 1.2 GPM
- Chrome

Manufacturer Number:
24-88259

AERATOR WRENCH:
Neopearl
Vandal Proof Aerator
Wrench

Manufacturer Number:
51-2097

BATHROOM FAUCETS

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: Chrome or Stainless
- Water Flow: Maximum of 1.2 gpm
- WaterSense Certified: Required
- Aerator to be flushed yearly or if resident complains of weak flow
  - Aerators can help control water usage, so it is important that they are maintained
  - Removal of aerator will result in higher water bills
- Single tap / lever is preferred
- Coordinate faucet selection with sink holes (no holes can be empty)
- Pop-Up Drain: Required
- Faucets in ADA Units must be ADA compliant
- Faucets in common bathrooms must be ADA compliant

SAMPLE UNIT FAUCET:
Cleveland Faucet Group

- Single-Handle
- 1.2 gpm @ 60 PSI
- Chrome
- ADA Compliant

Manufacturer Number:
35-58447

SAMPLE UNIT FAUCET:
Delta

- 4” Centerset 2-Handles
- 1.2 gpm @ 60 PSI
- Chrome
- ADA Compliant

Manufacturer Number:
206503636

SAMPLE COMMON FAUCET:
Delta

- Single-Handle Metering Faucet
- 0.5 gpm @ 60 PSI
- Chrome
- ADA Compliant

Manufacturer Number:
87T105

KITCHEN FAUCETS

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: Chrome or Stainless
- Water Flow: Maximum of 1.5 gpm
- Aerator to be flushed yearly or if resident complains of weak flow
  - Aerators can help control water usage, so it is important that they are maintained
  - Removal of aerator will result in higher water bills
- WaterSense Certified: Required
- Single tap / lever is preferred
- Coordinate faucet selection with sink holes
- Sprayers: Not Permitted
- Faucets in ADA Units must be ADA compliant
- Faucets in common bathrooms must be ADA compliant

SAMPLE PRODUCT:
Moen Kitchen Faucet

- Single-Handle
- 1.5 gpm @ 60 PSI
- Chrome
- ADA Compliant

Manufacturer Number:
24-76338

SAMPLE PRODUCT:
CFG Cornerstone Kitchen Faucet

- Single-Handle
- 1.5 gpm @ 60 PSI
- Chrome
- ADA Compliant

Manufacturer Number:
CA40512

TUB / SHOWER FIXTURES

GENERAL INFORMATION & REQUIRED DETAILS:

- Water Flow: Maximum of 1.5 gpm
- WaterSense Certified: Required
- Finish: Chrome coating over brass
- Diverter integral to shower valve

SAMPLE SHOWER HEAD:
Niagara

- 1.5 gpm @ 80 PSI
- Chrome

Manufacturer Number:
N2915CH

SAMPLE HAND SHOWER:
Symmons

- 1.5 gpm
- Chrome
- Use in ADA Units and for reasonable accommodations

Manufacturer Number:
512HSA-1.5

SAMPLE CONTROL:
Symmons

- Chrome

Manufacturer Number:
S-9600-P

SAMPLE SPOUT:
HD ProPlus

- Chrome

Manufacturer Number:
HDS424800

SAMPLE VALVE REMODEL PLATE:
CFG Tub-Shower Plate

- Chrome
- Converts 2+3 handle applications into single-handle

Manufacturer Number:
40913

SAMPLE SHOWER TRIM REPLACEMENT:
Symmons Replacement Temptrol Trim

- Chrome

Manufacturer Number:
S-9600-P-TRM

TOILETS

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White
- Water Flow: 0.86 GPF maximum
- Comfort Height Toilets: Required
- Two-Piece Toilets: Preferred
- Bowl Type: Elongated Bowl Required
  - For Rehabs: Verify elongated bowl can fit within existing bathroom and maneuverability is not compromised
- Note Rough-In Size and if Rear / Wall Discharge vs. Floor-Mounted (Rehabs only)

SAMPLE OUTLET:
Niagara

- Back outlet
- Elongated toilet bowl
- ADA Compliant

Manufacturer Number:
N7799

SAMPLE OUTLET:
Niagara

- Floor outlet
- Elongated toilet bowl
- ADA Compliant

Manufacturer Number:
N7717

SAMPLE TOILET TANK:
Niagara

- 0.8 GPF tank
- 12" rough-in
- Floor or Back outlet

Manufacturer Number:
N7714T

SAMPLE BUTTON:
Niagara

- Stealth ADA Button
- Use in ADA Units

Manufacturer Number:
C7715-ADA

URINALS

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White Porcelain
- Water Flow: 0.5 GPF required
- Acceptable Manufacturers: American Standard, Toto, Kohler, Gerber, and Seasons

SAMPLE URINAL
Toto

- 0.125 GPF

Manufacturer Number:
UT105U

SAMPLE FLUSH VALVE
American Standard

- Flushometer Valve
  Manual
- 0.125 GPF

Manufacturer Number:
6045013.002

KITCHEN SINKS

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: Type 302, 18 Gauge Stainless Steel
- Bowl Number: Double Bowl Preferred
- Depth: 8" for standard unit, Maximum of 6.5" in ADA Units
- Drain Size: 3.5" Minimum
- Holes: 3 holes or less, no plugs permitted
- Sprayers: Not Permitted
- Required Mounting Details: Self-rimming

SAMPLE PRODUCT:
Moen

- 33" x 22" Double Bowl
- 3-Hole
- 8" Depth

Manufacturer Number:
G182133

SAMPLE PRODUCT:
Just Manufacturing

- 33" x 22" Double Bowl
- 3-Hole
- 8" Depth

Manufacturer Number:
DL-1933-A-3

SAMPLE PRODUCT:
Dayton

- 25" x 22" Single Bowl (consider a single bowl if counter space is limited)
- 3-Hole
- 8" Depth

Manufacturer Number:
DXR35223

GARBAGE DISPOSALS

GENERAL INFORMATION & REQUIRED DETAILS:

- New Construction + Rehab: Garbage disposals are not permitted
- Property Management: Remove garbage disposals when they warrant repair or replacement

WALL HUNG SINKS

GENERAL INFORMATION & REQUIRED DETAILS:

- ADA Compliance: Required
- Finish: White Porcelain
- Size: 2 gallon minimum capacity
- Holes: 3 holes or less, no plugs permitted
- Integral Wall Bracket Supports: Required with assembly
- Insulation / Padding: Required for exposed pipes
- Pop-Up Drain: Required at unit bathroom sinks, not required in common area sinks
- All sinks to have overflow drain

SAMPLE SINK:
American Standard

- Lucerne Wall Hung
- White China

Manufacturer Number:
0356.015

SAMPLE SINK:
Gerber

- Monticello II Wall Hung
- White China

Manufacturer Number:
G0012654

VANITY SINKS

GENERAL INFORMATION & REQUIRED DETAILS:

- Use solid surface vanity tops (sink integral with countertop)
- Width: 37" minimum, or match existing
- Holes: 3 holes or less, no plugs permitted
- Pop-Up Drain: Required at bathroom sink

SAMPLE VANITY:
Premier Vanity Tops

- Solid White Cultured Marble
- 37" W x 22" D
- 4" Faucet Centers
- Integrated Backsplash
- Fits 36" W x 21" D Bathroom Vanities

Manufacturer Number:
112007

SAMPLE VANITY:
Swanstone

- Solid Surface Lavatory
- Color: Bisque (018), or match existing

SAMPLE VANITY BASE CABINET:
Seasons

- 36" W x 32-1/2" H x 21" D White Vanity Base Cabinet
- 3/4" Solid Wood Face Frame
- 1/2" Plywood Construction

Manufacturer Number:
283759

BATHTUBS

GENERAL INFORMATION & REQUIRED DETAILS:

- Materials: White Porcelain Enameled Steel Tub
- Size: 60" minimum length, or match existing
- Wall Surround: See Tub/Shower Surround spec
- The 2010 ADA (if applicable) and/or some localities may require either a permanent or removable bathtub seat.
  - The top of bathtub seats should be 17" minimum and 19" maximum above the bathroom finish floor
  - The depth of a removable bathtub seat should be 15" minimum and 16" maximum

SAMPLE BATHTUB:
Bootz

- Aloha Bathtub
- Right Hand Drain
- Enameled Steel

Manufacturer Number:
011-2364-00

SAMPLE BATHTUB:
Bootz

- Right Hand Drain
- Enameled Steel
- Deep Soaker

Manufacturer Number:
011-2340-00

SAMPLE RETROFIT BATHTUB:
Cleancut

- Step-in kit to be installed upon resident reasonable request
- White
- Medium Width

Manufacturer Number:
S-W-M

ROLL-IN SHOWERS

GENERAL INFORMATION & REQUIRED DETAILS:

- Accessories: Folding shower seat and hand-held shower head
- Trench Drain: Required at shower threshold
- Wall Surround: See Tub/Shower Surround spec
- At senior properties were ADA Units are being built (new construction or rehab), as many bathrooms as possible should be converted to roll-in showers
- Shower pan to be made of solid surface material

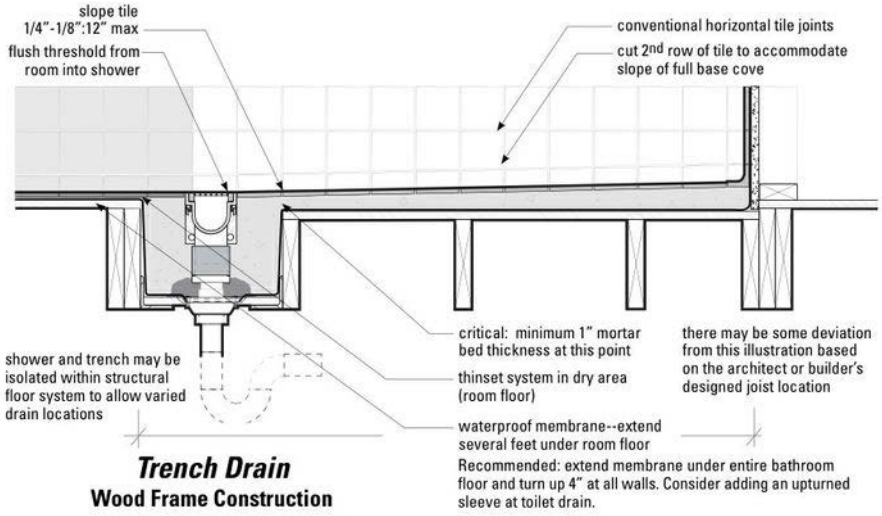
Roll-in shower with trench drain at threshold

APPROVED PRODUCTS:

- Swanstone in Bisque (018)
- Porcelain 12" x 12" tiles in natural or light color

ROLL-IN SHOWERS CONT.

TRENCH DRAIN DETAIL:



Trench drain detail in wood frame construction
Source: The Center for Universal Design, NC State University, College of Design

SAMPLE WATER MANAGEMENT PRODUCTS:

At locations where a trench drain installation is not feasible, the following products are recommended to keep water inside the shower. These collapsible water retainers keep water within the shower, but compress under a wheelchair or foot.

SAMPLE PRODUCT:
Swan

- Collapsible Shower Floor Water Barrier

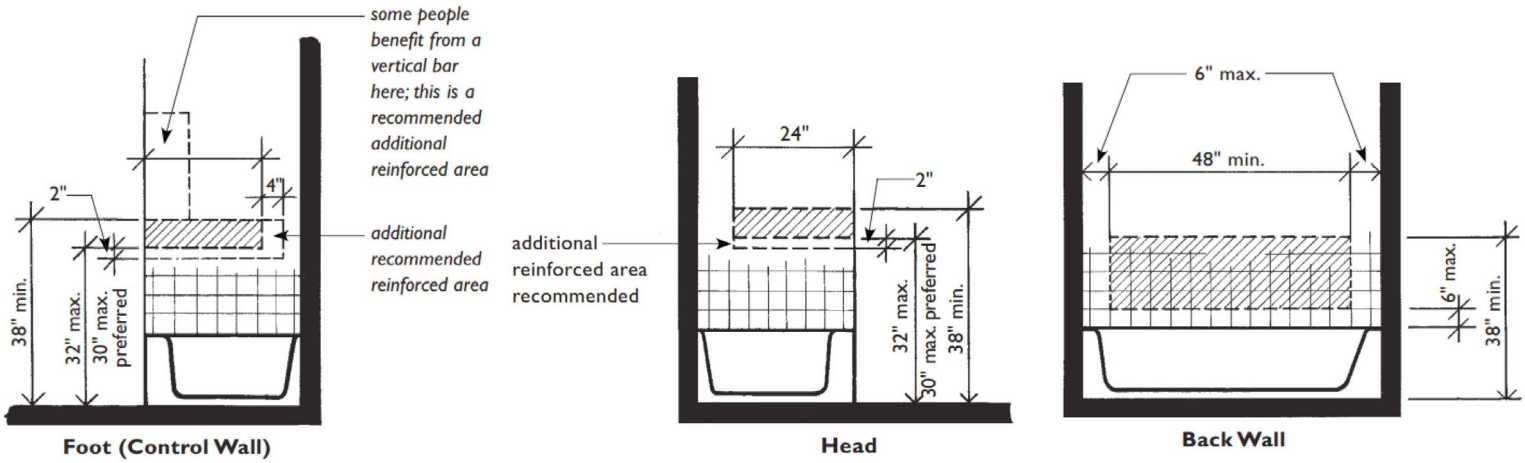
SAMPLE PRODUCT:
Best Bath Systems

- Rubber WaterStopper Kit

TUB / SHOWER SURROUNDS

GENERAL INFORMATION & REQUIRED DETAILS:

- Wall Surround: Solid Surface or Tiled Tub Surround
  - Acceptable Manufacturers and Finishes:
    - Swanstone in Bisque (018)
    - Porcelain Tile - White 12" x 12" Tiles
- Required Details: One of the following details must be incorporated into the shower design to accommodate the introduction of grab bars or other reasonable accommodation requests in the future
  - Install 3/4" plywood continuously on all shower walls between studs and waterproof backerboard, or
  - According to the Fair Housing Act Design Manual, install blocking in the following locations:

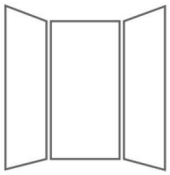


SAMPLE PRODUCT:
Swanstone

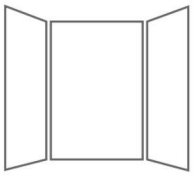
- 3-Piece Tub Surround
- Color: Bisque (018), or match existing

TUB / SHOWER SURROUNDS CONT.

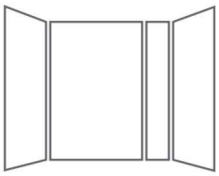
SAMPLE SHOWER KIT SIZES:



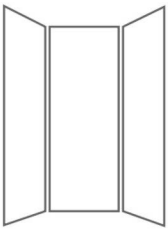
36"D x 36"W x 72"H kit with 2 shelves



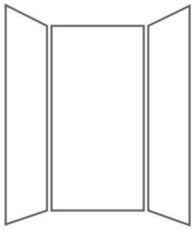
36"D x 48"W x 72"H kit with 2 shelves



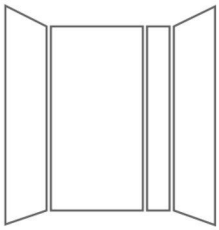
36"D x 60"W x 72"H with 11-3/4"W x 72"H overlap panel



36"D x 36"W x 96"H kit with 2 shelves



36"D x 48"W x 96"H kit with 2 shelves



36"D x 60"W x 96"H with 11-3/4"W x 96"H overlap panel

BASIS OF DESIGN
POAH Design + Building Performance Dept.

ROOFING

LAST UPDATED 04.11.2024

WHEN TO USE THIS BASIS OF DESIGN SECTION

This BOD section should be used for both new construction projects and re-roofing of existing buildings. The objective is to guide the design and installation of roofing systems that will offer a high level of performance. See the Building Enclosure section for performance requirements of roofs related to compartmentalization and insulation. Roofing systems that perform well will protect building durability as well as the maintenance of POAH properties. The requirements listed in this BOD section are intended to serve as minimum standards. Projects may exceed these requirements as circumstances allow.

REQUIREMENTS:

ROOF STRUCTURE:

- All new roofs need to be engineered to support a future PV or Solar Thermal system.

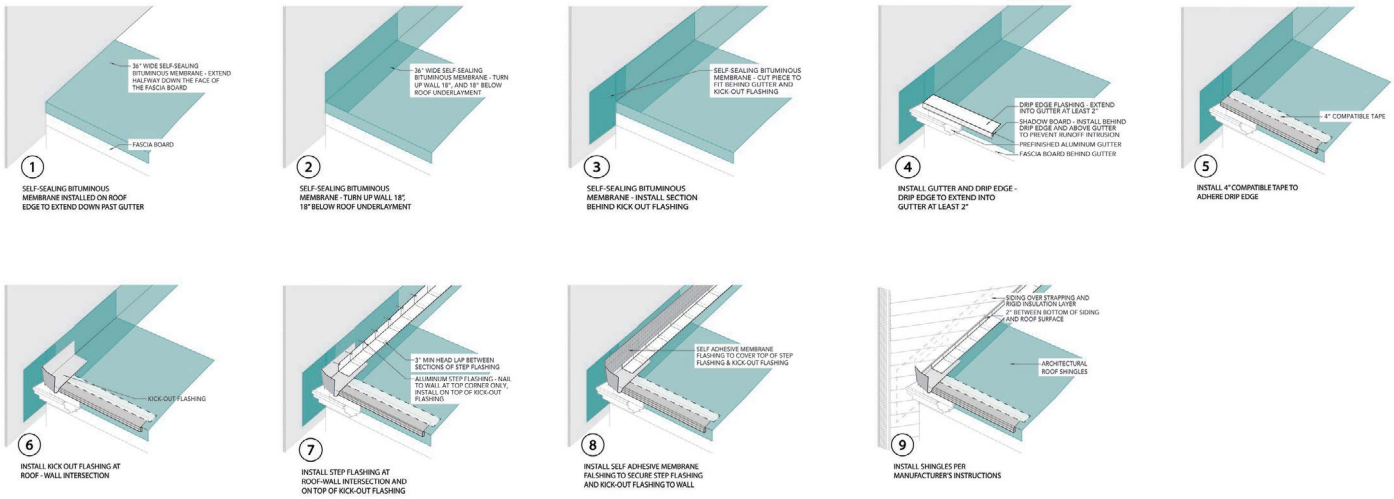
ROOF PENETRATIONS:

- All new roof design and construction projects must coordinate with plumbing and mechanical design/trades to locate vents on the north slope such that roof surfaces facing south or within 90 degrees of south are maintained clear of obstructions.
- All re-roofing projects mus thoroughly pursue moving plumbing vents and other obstructions as part of the re-roofing project. Project managers should consult with POAH Design+Building Performance for cases where moving the penetrations is not immediately feasible.

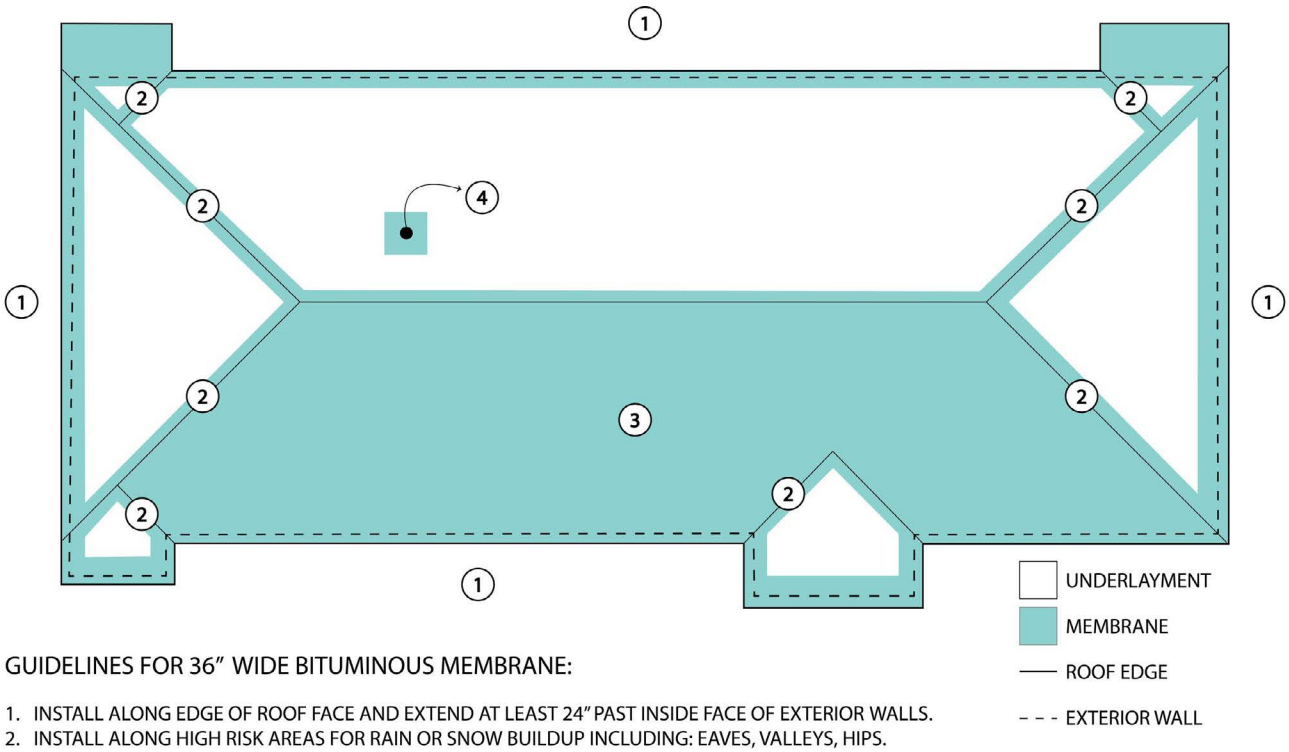
ROOFING

REQUIRED DETAILS:

- Roof Edge Membrane: Install a self-sealing bituminous membrane or the equivalent at the roof edge prior to the drip edge. Install the membrane to extend halfway down the face of the fascia (see detail below).
- Drip Edge: A metal drip edge shall be provided along the entire roof perimeter. The metal drip edge should have a drip leg that extends at least 1" below the sheathing, ½" from adjacent fascia or rake trim and at least 2" into the gutter. Install a shadow board per the detail below to ensure the rain is directed into the gutter. The top edge of the drip edge shall be covered with a minimum 12" self-sealing bituminous membrane or the equivalent.
- Kick-Out Flashing: Install an aluminum flashing (kick-out) to divert water away from where a sloped roof edge intersects a vertical sidewall. The vertical leg of the kick-out flashing shall extend at least 4" on the wall surface above the roof deck and shall be integrated with the drainage plane of the wall. The kick-out flashing is required regardless of the type of wall cladding. A kick-out/diverter flashing should also be installed at the end of eaves where a gutter is installed at the eave and the gutter does not extend past the end of the eave. See the sequence diagram below for proper installation.



- Ice and Water Barrier: In locations that experience snow fall, a self-sealing bituminous membrane, or the equivalent shall be installed at the roof edge and extend from the edge of the roof deck to a point not less than 24 inches to the inside of the exterior wall line of the building. See image below.



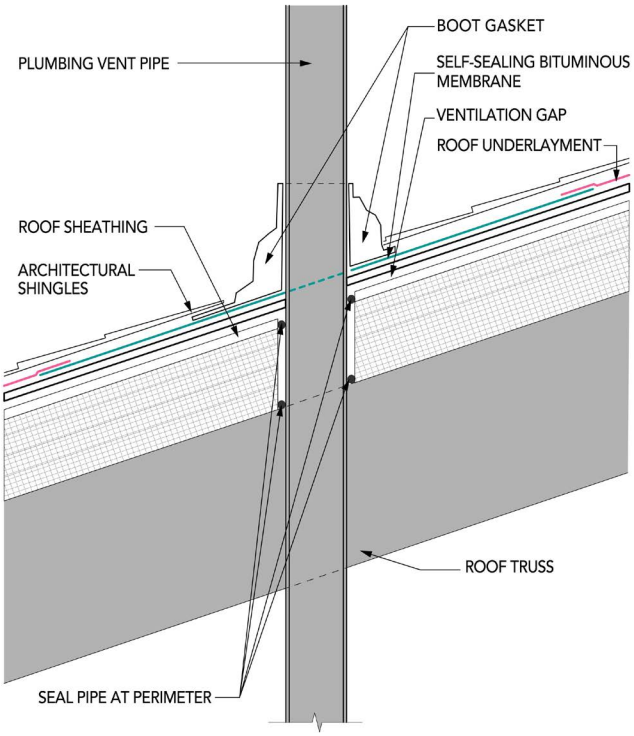
Roof plan showing ice and water barrier locations

- Roof-to-Wall Intersections:
  - Shingled roofs: Step flashing shall be installed at wall and roof intersections. A self-sealing bituminous membrane or the equivalent shall be installed at roof-wall intersections behind step flashing and extending at least 12" up the vertical face of the wall sheathing. The top edge of this adhered water control membrane shall be taped to the sheathing with compatible tape. See detail below.
  - Metal and Membrane roofs: Install a continuous flashing (with separate pieces lapped shingle fashion), between the roof and wall sheathing. The continuous flashing shall be self-sealing bituminous membrane or the equivalent at least 36" wide. It shall be installed to extend at least 18" onto the roof sheathing and 18" onto the wall sheathing.

- Roof Valleys and Changes in Slope: Install a self-sealing bituminous membrane or the equivalent at all valleys and all changes is roof slope. Note that this water protection membrane must not obstruct intentional roof vent openings.
- Roof Penetrations: Fully flash all roof penetrations.

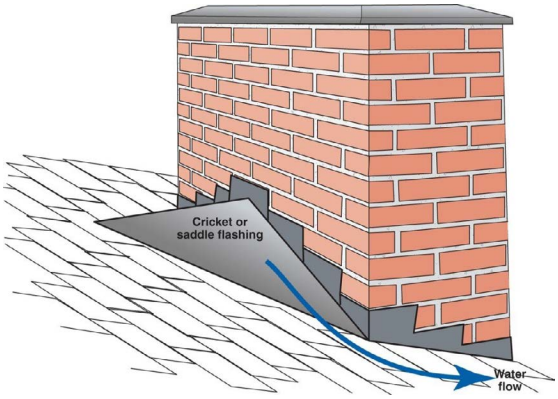
Self-sealing bituminous membrane installed at roof valley

Flashing at roof penetration



Roof penetration

- Roof Cricket: Provide a roof cricket for each chimney, skylight curb or other such penetrations or obstruction with a face perpendicular to the roof slope.
- Zinc Roof Strips: Use zinc strips to kill moss, algae, and lichen growing on the roof. These types of vegetation with shorten the life of the roof covering. Strips are typically installed at the peaks of sloped roofs.



Roof cricket at chimney


Zinc roof strips, Source: Home Architect

ROOF / ATTIC CONFIGURATION:

The roof/attic configuration may be vented or unvented. If the project involves re-roofing of an existing building, the project manager and design team should evaluate the opportunity for implementing an unvented attic.

VENTED ATTIC:

A vented attic is appropriate for situations where the roof is relatively simple in form and where no conditioned space or mechanical distribution is located in the attic space. With a vented attic, access to the attic should be restricted. Consider providing access through an exterior gable entry to allow for continuous insulation at attic floor without penetrations for access hatches.

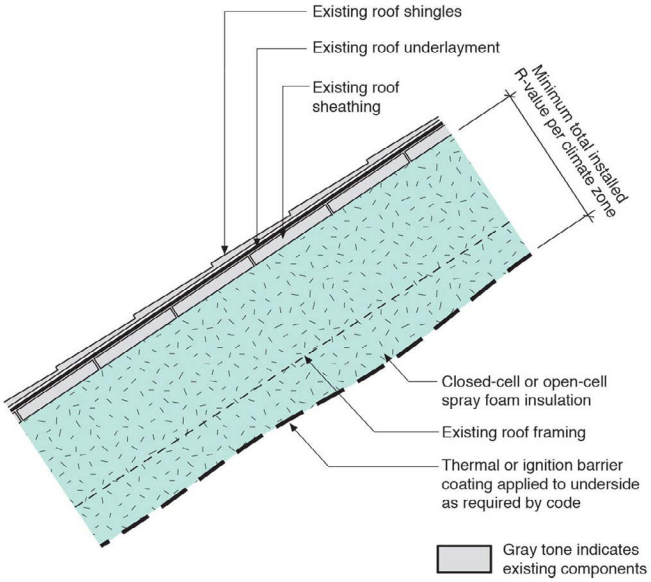

VENTED ATTIC ACCESS THROUGH ROOF GABLE

UNVENTED ATTIC:

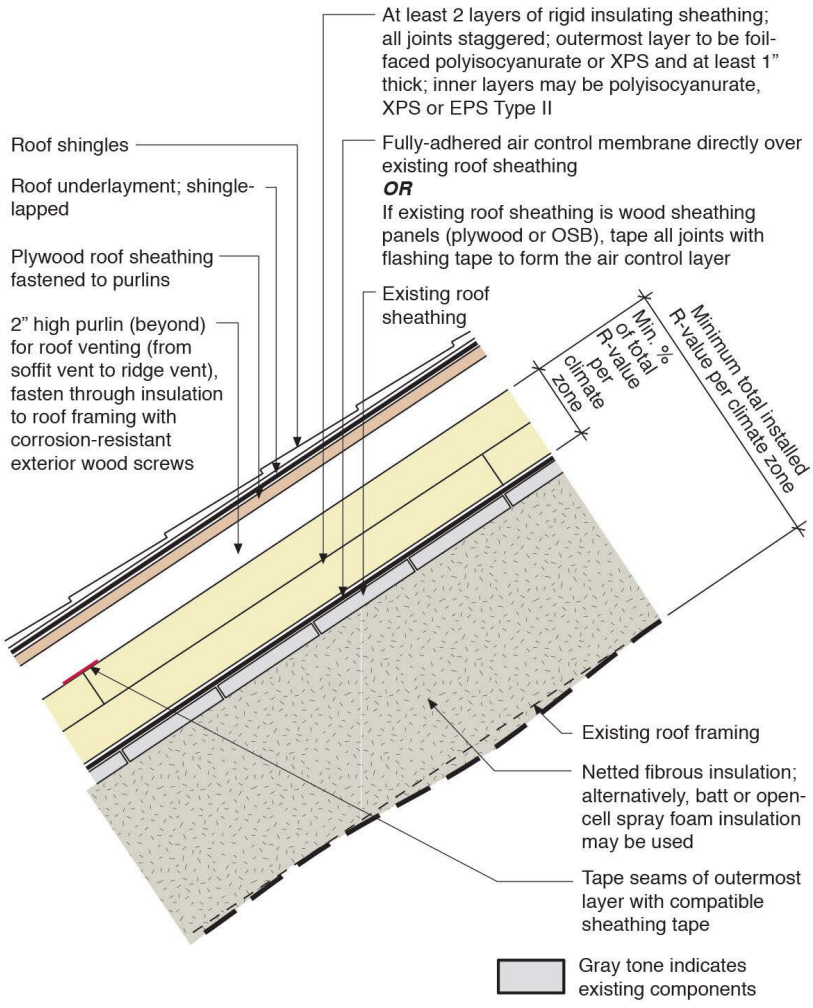
An unvented roof/attic is appropriate for situations where there is living space or mechanical systems/distribution in the space enclosed by the roof rafters. For example, where the ceiling finish is installed directly to the underside of roof framing in a vaulted or cathedral ceiling.

There are (2) general approaches for an unvented roof/attic:

1. Closed-cell spray foam applied to the underside of the roof sheathing, or
2. Rigid insulation and a nail base installed above the sheathing and under the roof covering (shingles, metal roofing, etc.) with additional fibrous insulation below the roof sheating. This configuration also provides a ventilation space between the rigid insulation and the nailbase. This approach can provide better thermal performance and better resistance to ice dams than a conventional vented attic approach.



Unvented attic approach 1



Unvented attic approach 2, showing a vented roof

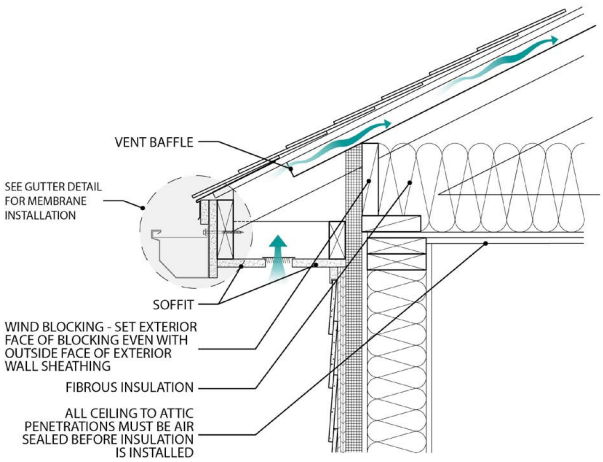
ROOFING

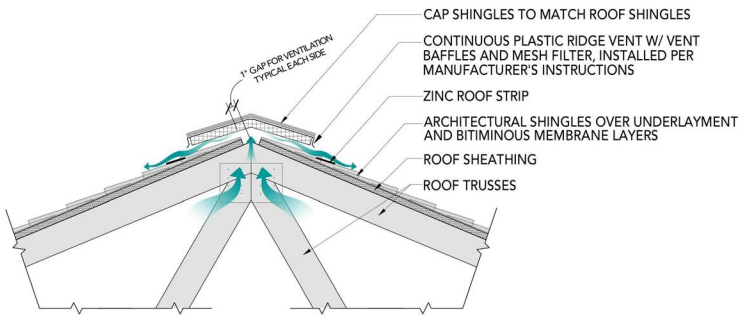
VENTED ROOF REQUIREMENTS:

- Ventilation shall be provided at a ratio of 1 square foot of free vent area for each 150 square feet of attic floor—with vents placed proportionately at the eaves (e.g., soffits) and at or near the ridge.
- Vented roofs shall have continuous vent openings at eaves and at the ridge.
- Where permitted by the roof configuration, a ventilation channel at least 2" deep shall be maintained clear from eave to ridge at each roof framing bay.
- Where a skylight, dormer or other obstruction precludes a continuous eave-to-ridge ventilation channel, provision shall be made for venting framing cavities above and below the obstruction.
- In hipped roof or valley configurations, ventilation openings shall be provided to achieve similar ridge and eave ventilation opening area.
- Wind blocking shall be installed at the perimeter of the attic to prevent roof ventilation from moving through or under the insulation. The wind blocking must be a solid material that is sealed to the wall top plate and to roof rafters. The blocking should extend to within 2" of the roof sheathing and seal to a vent baffle. See details below.
- A vent baffle shall be installed to extend along the roof slope to a point 12" above the top of the attic insulation.

UNVENTED ROOF REQUIREMENTS:

- The roof shall be designed and constructed with an airtight connection from the roof air barrier to the wall air barrier.
- The unvented roof shall meet the provisions of IRC 806.5 regardless of whether the IRC is applicable to the building.





GUTTER AND RAIN LEADER INSTALLATION:

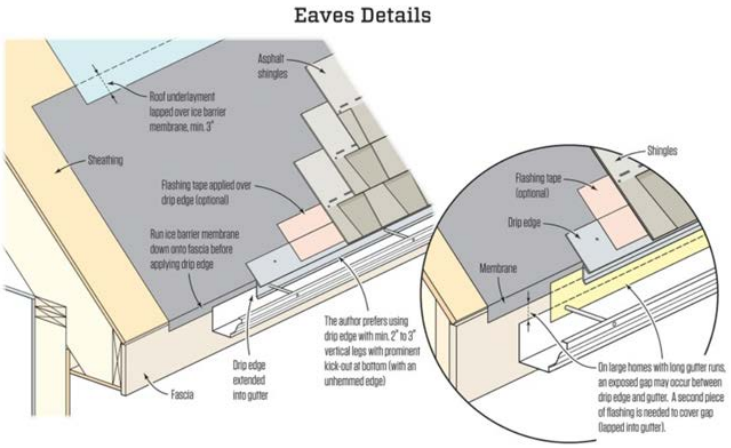
For Re-Roofing of Existing Buildings:

- Remove existing gutters carefully if they are to be reused.
- Remove any/all screw fasteners at the roof edge.

For New Buildings and Re-Roofing of Existing Buildings:

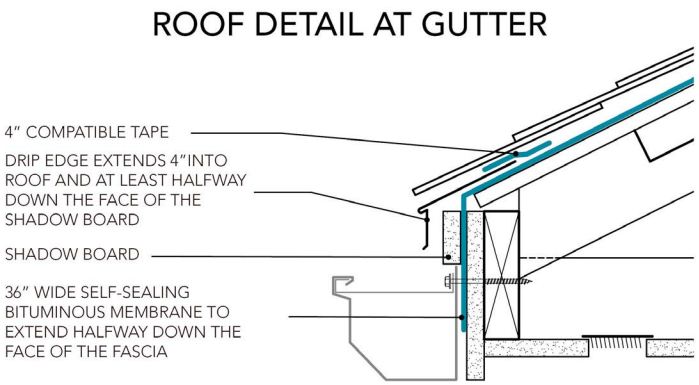
- Gutters, existing and new, will be installed with the appropriate hangers and spacing to effectively secure them to the building. Hangers should be no greater than 2'-0" apart. Include hanger type in specifications.
- Place a self-sealing bituminous membrane or the equivalent between the gutter and the fascia at location of gutter fasteners. See image of roof detail at gutter below.
- If fascia board is visible above the top edge of the gutter, install a flashing tucked under the roof edge membrane or drip edge and lapping into the gutter.
- Downspouts/rain leader will be installed effectively to collect and transport water to grade and away from building. Connect gutter to underground storm water system or to sloped lateral piping that opens on a sloped finish grade a minimum of 5 ft from the foundation or into a rainwater management system.
- Using of splash-blocks is not permitted for new construction. If existing, ensure the slope of the splash blocks is away from the building as part of the preventative maintenance plan.
- The downspouts/rain leaders should be 4" Schedule 40 PVC, painted to match the direct adjacent building color. Exterior Acrylic Paint specified for plastics should be used. Provide product information with bid.
- Do not install gutter/leaf guard unless approved by POAH Communities Director of Maintenance. If approved, gutter guard should be installed without damaging existing roof or gutter.
- Ensure gutters are installed with the correct slope to downspouts.
- Install the gutter at an effective distance below the roof edge to allow rain water to enter and not back up into building.

ROOFING



Tim Healey

If ice barrier membrane goes down before fascia, some types can be run wild over the plywood edge and bent down later. Others are too flexible, so the release paper needs to be left on to protect the last few inches of adhesive. It can be carefully sliced and left attached, or pieces of it can be re-adhered to the bottom edge of the membrane.



Products:

- Architectural Shingles: Preferred over 3-tab shingles for durability

Warranty:

- Labor Warranty: A separate 10-year labor warranty should be provided by the roofing installer. Most roofs that fail during the roof product warranty do so becasue they were installed incorrectly and in conflict with the manufacturer's recommended installation.

Specifications:

- EPA Indoor airPLUS New Construction: Where code is not updated to include these specifications, refer to this document for more details.
- High Wind Conditions: Seal the roof deck using one of the following three options, per the IBHS Fortified Hurricane and High Wind Standards:
  - Install a self-adhered (peel and stick) membrane over the entire roof deck (recommend a #15 felt bond break between membrane and shingles)
  - Install a nominal 4" wide roof deck flashing tape over all roof sheathing panel seams and cover with #30 felt or equivalent synthetic underlayment

TECHNICAL BRIEF: ICE DAMS

Where ice dams do occur, it is important to understand the causes so that an effective solution can be implemented.Ice dams are a symptom of poor thermal and air leakage control for roofs in cold winter climates. When diagnosing the causes of ice dams, it is critical to first determine if the roof system is a vented or an unvented roof (see Roof Configuration above). Never allow bath and kitchen exhaust to terminate in an attic. For more information on ice dams and how to avoid them, please view Fine Home Building's article referenced below.

Note: Ice dams should not occur in new buildings since following code provisions would control the mechanisms that cause ice dams. Incidents of ice damming in newer buildings may be reason to seek remedy from the designer, the contractor or both.

HOW TO FIX ICE DAMS

TERMS + VOCABULARY

CLICK HERE FOR CLARIFICATION OF TERMS AND VOCABULARY

CLICK HERE FOR COMPONENTS OF A SLOPED ROOF SYSTEM

SIGNAGE

PROPERTY SIGNAGE

When considering new property signage, POAH's properties will receive either monument signage or urban signage. The installation of signage helps identify and brand each property as a POAH community. The signs also provide information about fair housing, ADA offerings, and leasing websites. All properties need to abide by their local signing zoning ordinances and must receive a permit before any signage is installed.

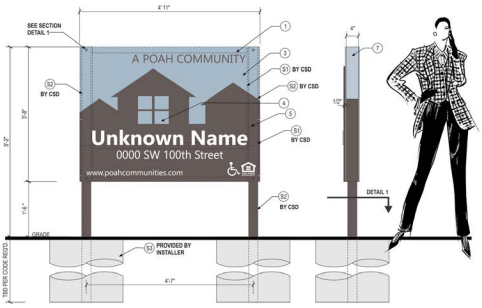
- Monument Signage: The sign shall be purchased from Creative Sign Design and permitted + installed by a local sign company
- Urban Signs: A local sign installer shall permit, manufacture, and install new signs

MONUMENT SIGNAGE:

- Where: At non-urban properties, monument signs (freestanding signs) are typically installed at the property entrance, or in a significant location to brand the property as a POAH Community.
- How: POAH has negotiated pricing with Creative Sign Design (CSD) of Florida to manufacture all new property signs. The project manager at each property is responsible for hiring a local sign installer to permit and install the sign. The following steps should be followed when purchasing and installing a new property sign.
    1. Download + review Monument Signage PDF
    2. Select desired sign type and position it on property
    3. Review selection and placement with Design + Building Performance Department
    4. Contact CSD, and contract with them for new sign(s)
        - http://www.creativesigndesigns.com/
        - 830 S. Ronald Reagan Blvd., Suite 232
          Longwood, FL 32750
        - (800)-804-4809
    5. CSD will produce a shop drawing to be used during permitting
    6. Send Request for Proposals to local sign companies for permitting and installation of new sign. Demolition of existing sign may need to be included in scope. Pricing will vary. Contract with selected local sign company.
    7. Local sign company to submit CSD's shop drawing for permit at local zoning/planning dpt.
    8. Local sign company to receive permit from municipality.
    9. CSD to manufacture and ship new sign to local sign company.
    10. Local sign company to install new sign.

SIGNAGE

A1



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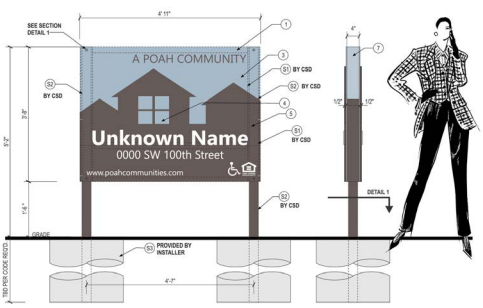
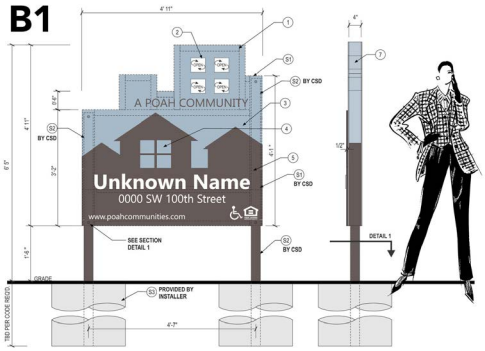


B1



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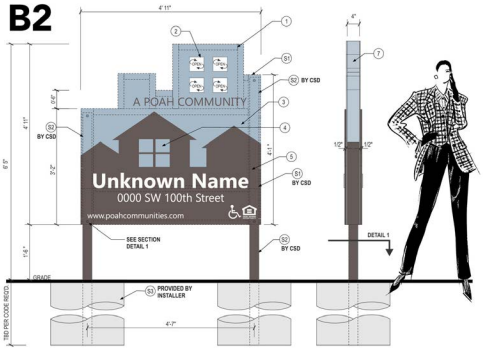
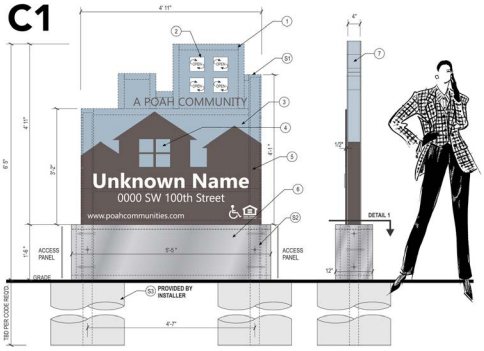


C1



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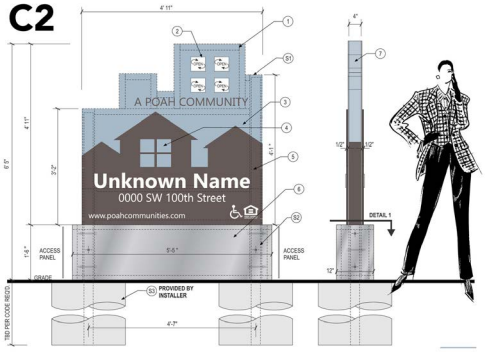
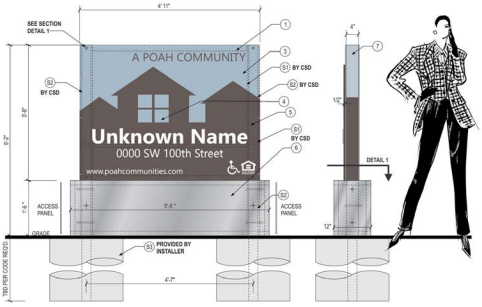


D1



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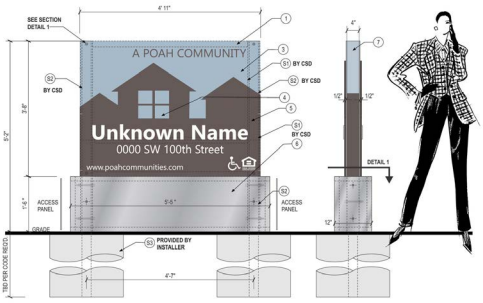


SIGNAGE

URBAN SIGNAGE:

Not all properties are able to receive a new monument sign. Urban properties typically do not have space for a free standing sign, or when they do have space, zoning regulations may not allow one to be installed. For these types of properties, a local sign company should provide a wall mounted sign.

1. Review potential urban sign locations and designs with Design + Building Performance Dept.
2. Send a Request For Proposal to local sign companies.
3. Select a local sign company and work with them to finalize a sign design.
    - All designs should incorporate the POAH logo, the property name, property address, ADA logo, www.poahcommunities.com, and the fair housing logo.
4. Local company should then submit design for permit.
5. Once the permit is received, the sign company will manufacture and install the new sign.
6. Local sign companies can also provide exterior wayfinding signage. POAH/POAHC fonts and colors should be used.

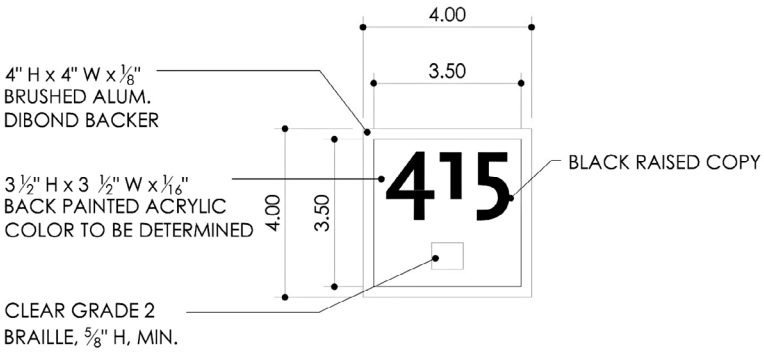
INTERIOR WAYFINDING + INSTRUCTIONAL:

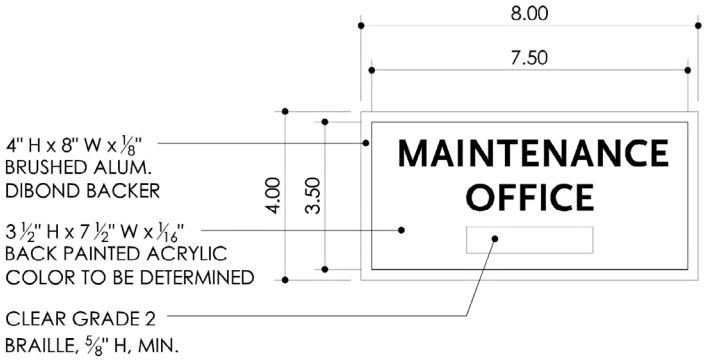
Includes unit, management, code required, and directional signage

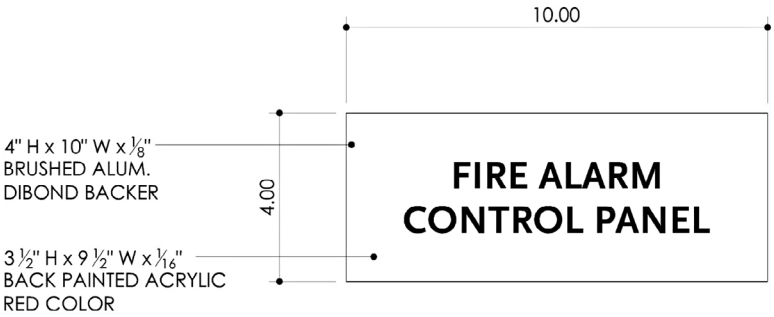
Architect to identify all required signs, including those required by code, and provide a sign schedule. Using the Interior Wayfinding Template as a starting point, signage shall be tailored to the specifics of the property. The project manager should pick an accent color for the background of interior wayfinding signs.

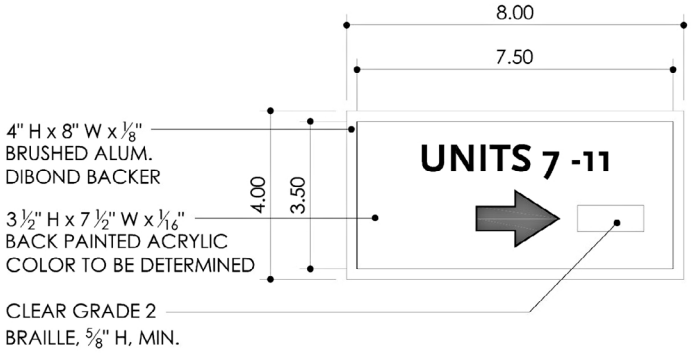
1. INTERIOR WAYFINDING TEMPLATE
2. INTERIOR MULTILINGUAL WAYFINDING TEMPLATE
3. INTERIOR PICTOGRAM WAYFINDING TEMPLATE
4. INTERIOR MULTILINGUAL/PICTOGRAM WAYFINDING TEMPLATE
5. LAUNDRY INSTRUCTIONAL SIGNAGE TEMPLATE
6. TRASH ROOM INSTRUCTIONAL SIGNAGE TEMPLATE
7. FITNESS CENTER INSTRUCTIONAL SIGNAGE TEMPLATE
8. OFFICE HOURS SIGNAGE TEMPLATE

SIGNAGE


4.00
3.50
4" H x 4" W x ⅛"
BRUSHED ALUM.
DIBOND BACKER
3 ½" H x 3 ½" W x 1/16"
BACK PAINTED ACRYLIC
COLOR TO BE DETERMINED
4.00
3.50
415
BLACK RAISED COPY
CLEAR GRADE 2
BRAILLE, ⅝" H, MIN.


8.00
7.50
4" H x 8" W x ⅛"
BRUSHED ALUM.
DIBOND BACKER
3 ½" H x 7 ½" W x 1/16"
BACK PAINTED ACRYLIC
COLOR TO BE DETERMINED
4.00
3.50
MAINTENANCE
OFFICE
CLEAR GRADE 2
BRAILLE, ⅝" H, MIN.


10.00
4" H x 10" W x ⅛"
BRUSHED ALUM.
DIBOND BACKER
3 ½" H x 9 ½" W x 1/16"
BACK PAINTED ACRYLIC
RED COLOR
4.00
FIRE ALARM
CONTROL PANEL


8.00
7.50
4" H x 8" W x ⅛"
BRUSHED ALUM.
DIBOND BACKER
3 ½" H x 7 ½" W x 1/16"
BACK PAINTED ACRYLIC
COLOR TO BE DETERMINED
4.00
3.50
UNITS 7 -11
CLEAR GRADE 2
BRAILLE, ⅝" H, MIN.

BASIS OF DESIGN
POAH Design + Building Performance Dept.

THERMOSTATS

LAST UPDATED 04.09.2024

WHEN TO USE THIS BASIS OF DESIGN SECTION

This BOD section should be used for selecting thermostats in both new construction projects to guide Architects, Engineers, and Development staff toward efficient heating + cooling solutions that are reliable and easy to maintain.

REQUIREMENTS:

ALL THERMOSTATS SHALL:

1. Be placed in a location out of the sun
2. Be programmable
3. Have easy to use settings
4. Attach firmly to the wall (no remotes)
5. Come factory set or set by mechanical sub to residential settings (not commercial)
6. Where POAH pays for heat, use limiting thermostats with the following temperature settings:
    a) Maximum of 74°F for heating (this satisfies HUD's requirement of 68°F)
    b) Minimum of 72°F for cooling

PRODUCT RECOMMENDATIONS:

1. **Air Source Heat Pumps:** Air source heat pump systems should use a proprietary thermostat provided by the system manufacturer. If using a central VRF system, in addition to the general requirements listed above, please refer to the Controls requirements listed in the Heating and Cooling: New Construction Basis of Design section.

2. **Boilers + Furnaces Where POAHC Pays for Heating:**
Chicago Controls Thermostats: HC7445 Residential Thermostat
HC7445 Residential Thermostat is factory set to limit heat to 74 degrees.

LAST UPDATED 04.09.2024

TRAUMA-INFORMED HOUSING

WHEN TO USE THIS BASIS OF DESIGN SECTION

This BOD section should be used in all new construction and rehab projects. This section should be also be referenced and applied during capital planning to guide the scope of resident and staff space upgrades to existing buildings.

What is Trauma-Informed Housing?

Trauma-Informed Housing (TIH) is a model that combines **human-centered design** and **trauma-informed care**.

For POAH, **TIH is about expanding the definition of affordable housing.** In addition to providing housing stability through financial affordability, we are committed to affording our residents the opportunity to feel safe, heard, and empowered through the design and operation of our properties.

What is Human-Centered Design?

Human-Centered Design (HCD) is design that is primarily focused on the physical, mental, and emotional safety, health, and well-being of residents. HCD includes not just trauma-informed principles (see below), but also universal design and health building design/sustainability.

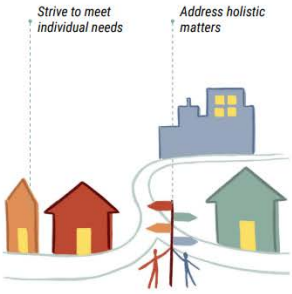
TRAUMA-INFORMED PRINCIPLES IN AFFORDABLE HOUSING

SAFETY & TRUST

Housing communities designed to **create a sense of safety and trust** offer spaces, services, and programs that are welcoming, inclusive, and representative of the local context and culture.

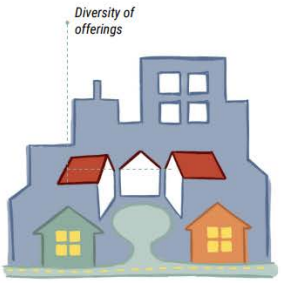
CHOICE & EMPOWERMENT

Housing communities designed to **lift up choice and empowerment** offer residents clear options of spaces and services to use that enable them to make choices of how to best meet their needs.



COMMUNITY & COLLABORATION

Housing communities designed to **build community and collaboration** cultivate social cohesion with a diversity of space and service offerings.

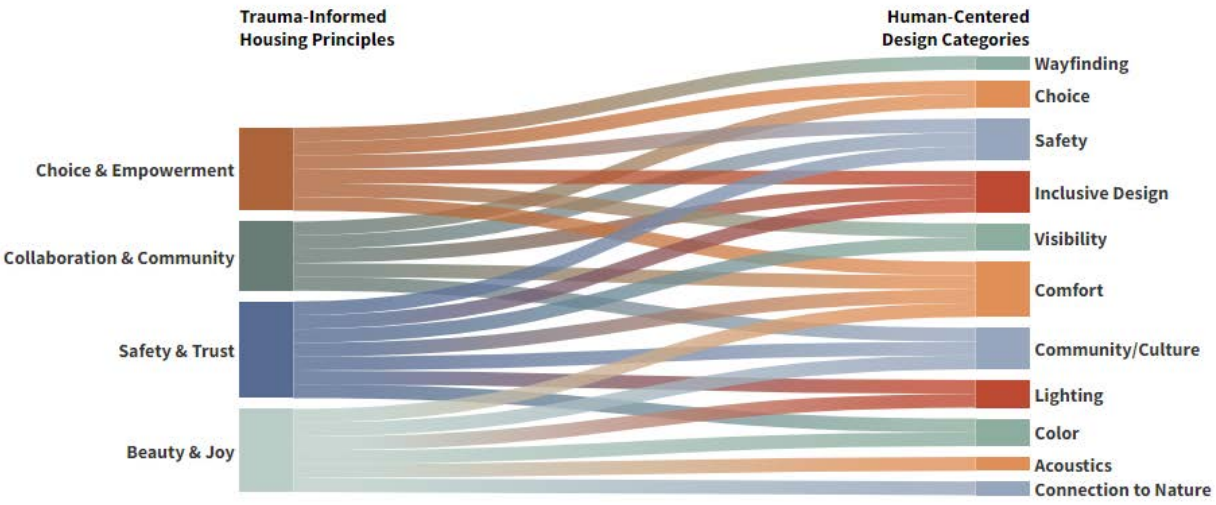


BEAUTY & JOY

Housing communities **spark beauty and joy** encouraging residents to take care of their environment to cultivate growth, pride, and delight.

TRAUMA-INFORMED HOUSING

HUMAN-CENTERED DESIGN CATEGORIES



EDUCATIONAL MATERIALS

POAH's human-centered design criteria are an extension of the resources and design opportunities (linked below) developed as a part of our Designing Trauma Resilient Communities: Trauma-Informed Housing Toolkit.

1. What is Trauma-Informed Design
2. Design Dos and Don'ts
3. Design Opportunities at a Glance
4. Spatial Program Guide
5. Case Study - Hawthorne Community Building

DESIGN CRITERIA

When to Use These Resources: These resources provide a list of all our human-centered design criteria organized by checklist or visually shown in sample unit floor plans.

1. SD+DD Checklist
2. SD+DD Sample Unit Floor Plans
3. CD Checklist
4. CD Sample Unit Floor Plans

ADDITIONAL RESOURCES ON TRAUMA-INFORMED HOUSING

POAH's Human-Centered Design Best Practices are an extension of our *Designing Trauma Resilient Communities* project, which utilizes *The Missouri Model Principles of Trauma-Informed Care*. This model focuses on 5 key principles: safety, trustworthiness, choice, collaboration, and empowerment.

To learn more, visit the following links:

- POAH's Trauma-Informed Housing Toolkit, POAH
- Center for Trauma Informed Innovation, University Health
- The Missouri Model of Trauma-Informed Approaches, Missouri Department of Mental Health
- SAMHSA's Concept of Trauma and Guidance for a Trauma-Informed Approach, Substance Abuse and Mental Health Services Administration

KITCHEN

LIGHT COLOR SCHEME:

WILSONART
Kalahari Topaz
4588K-07

WILSONART
Tungsten EV
4814-60

WILSONART
Desert Zephyr
4841-60

WILSONART
Sedona Bluff
1824

MEDIUM COLOR SCHEME:

WILSONART
Kalahari Topaz
4588K-07

WILSONART
Silicon EV
4811-60

WILSONART
Silver Travertine
1858K-55

WILSONART
Sedona Bluff
1824

DARK COLOR SCHEME:

WILSONART
Kalahari Topaz
4588K-07

WILSONART
Silicon EV
4811-60

WILSONART
Desert Zephyr
4841-60

WILSONART
Sedona Bluff
1824

[CLICK HERE TO VIEW CABINET DOOR AND BOX REQUIREMENTS]

[CLICK HERE TO VIEW COUNTERTOP POSTFORM REQUIREMENTS]

KITCHEN CONT.

PULLS AND SPLASH PLATE

SAMPLE PULL:
Amerock for Less

- Allison Curved
- 96MM Pull
- Satin Nickel

Manufacturer Number:
BP53003G10

SPLASH PLATE INSTALLED BEHIND RANGE
Broan

- Reversible Background
- Install on wall behind stove

Manufacturer Number:
SP300108

BATH

TUB / SHOWER SURROUND:
Swanstone

- Bisque (018)

VANITY:
Swanstone

- Bisque (018)

CLICK HERE TO VIEW TUB SURROUND REQUIREMENTS

CLICK HERE TO VIEW VANITY REQUIREMENTS

PAINT

CONTACTS:

- POAH has negotiated pricing wiht select manufacturers and wholesalers. When purchasing and installing new paint, please contact the following representatives.

CLICK HERE FOR CONTACT INFORMATION

WALLS:	CEILINGS:	TRIM:	DOORS:
SHERWIN WILLIAMS 6378 Crisp Linen Eggshell	**SHERWIN WILLIAMS** 7002 Downy Flat	**SHERWIN WILLIAMS** 7102 White Flour Semi-gloss	**SHERWIN WILLIAMS** 7102 White Flour Semi-gloss

For Sheetrock walls, use:

- Prime Coat: Sherwin Williams - ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils wet, 1.5 mils dry
- Top Coat: Sherwin Williams - ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600, at 4.0 mils wet, 1.5 mils dry

CLICK HERE FOR PAINT REQUIREMENTS

CONTACTS:

- POAH has negotiated pricing wiht select manufacturers and wholesalers. When purchasing and installing new paint, please contact the following representatives.

CLICK HERE FOR CONTACT INFORMATION

REQUIRED DETAILS FOR ALL FLOORING TYPES:

- Unit Turns:
  - To achieve unit compartmentalization, seal joint from new flooring to existing wall with manufacturer approved joint sealant.
  - All new flooring requires a level subfloor free from cracks, bumps, and excessive adhesive residue from former floors.
    - Subcontractor must evaluate existing subfloor condition and include associated costs for necessary repairs in their bid.
- Rehabs:
  - Moisture testing is required in basement or slab on grade units
  - To achieve unit compartmentalization, seal joint from new flooring to existing wall with manufacturer approved joint sealant.
  - All new flooring requires a level subfloor free from cracks, bumps, and excessive adhesive residue from former floors.
    - Subcontractor must evaluate existing subfloor condition and include associated costs for necessary repairs in their bid.
- New Construction:
  - Follow compartmentalization / air sealing per architect's details. If not included in details, highlight for architect.

VINYL PLANK + SHEET VINYL OPTIONS

Locations: Kitchen, living room, bedroom, entry/corridor
Wear Layer: 12 mil

GLUE DOWN PLANK OPTIONS:

Subfloor Condition: Even, smooth, and free of cracks
Size: 8" x 48" planks, 2.0mm thickness

MOHAWK
Leighton
Merino
Glue-down

MOHAWK
Leighton
Sequoia
Glue-down

MOHAWK
Leighton
Ashen Tan
Glue-down

FLOATING / CLICK OPTIONS:

Subfloor Condition: Even, smooth, and free of cracks
Size: 6" x 48" planks, 4.5mm thickness

MOHAWK
Discovery Ridge
Coffee House
Tan
Uniclic

MOHAWK
Discovery Ridge
Rustic Taupe
Uniclic

SHEET VINYL OPTIONS:
Location: Bath
Size: 12'-0" wide rolls, 65 gauge thickness

MOHAWK
Gateway
Almond Spice

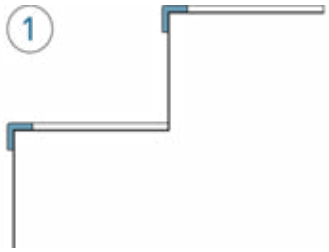
MOHAWK
Gateway
Silver Screen

REQUIRED DETAILS:

All seams must be chemically welded.
LINK TO CARE + MAINTENANCE GUIDELINES

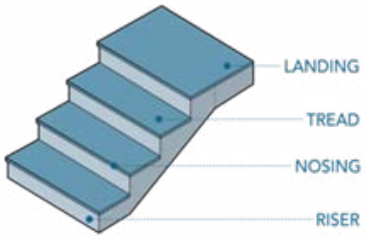
STAIRS

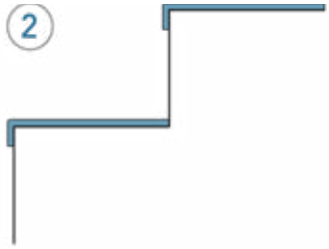
BASED ON STAIR TRAFFIC, PICK FROM SOLUTIONS BELOW:



LIGHT TRAFFIC
NOSING

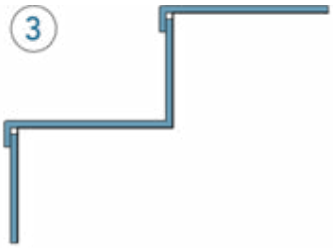
Nosing: Rubber or Vinyl
Tread: Flooring Material
Riser: Painted





MEDIUM TRAFFIC
TREAD

Nosing/Tread: Rubber or Vinyl
Riser: Painted



HEAVY TRAFFIC
TREAD+INTEGRATED RISER

All rubber or all vinyl

APPROVED PRODUCT:

TARKETT
Vinyl Stair Treads

Service Weight
22 Pearl CB

RUBBER BASE

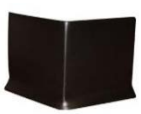
- Suggested Manufacturers: Armstrong, Mannington, Johnsonite
- Type TV (vinyl thermoplastic); Group I (solid, homogeneous)
- Length: Coil stock ONLY, in manufacturer's standard length
- Size: 4 inches in height, 0.125" min. thickness, and Cove style

TARKETT
Baseworks
Toe 4"
34 Almond

TARKETT
Baseworks
Toe 4"
09 Clay

TARKETT
Baseworks
Toe 4"
280 Shoreline

CORNER INSTALLATION:



Factory-Made Outside Corners: Install factroy-made outside corners before installing wall base.

Field-Made Inside Corners: Use a utility knife to score the back and notch out the base for inside core.

VENTILATION

LAST UPDATED 04.11.2024

WHEN TO USE THIS BASIS OF DESIGN SECTION:

This BOD section should be applied in all new construction and rehab projects. This section should also be referenced and applied during capital planning to guide the scope of upgrades to existing buildings.

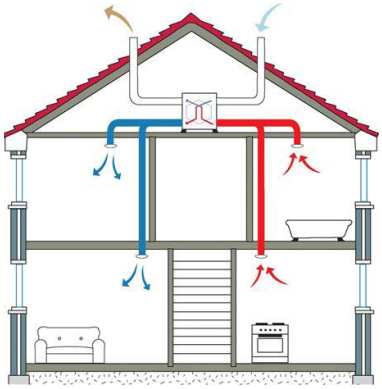
VENTILATION TYPE:

Ventilation has significant impact on resident health, resident comfort and building energy use. The purpose of ventilation is to:

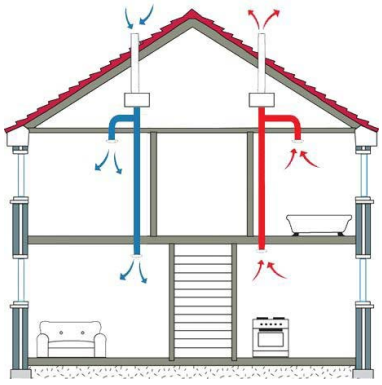
1. Exhaust airborne contaminants,
2. Dilute airborne contaminants that cannot be effectively removed, and
3. To provide fresh air

There are three types of ventilation systems (in order of preference):

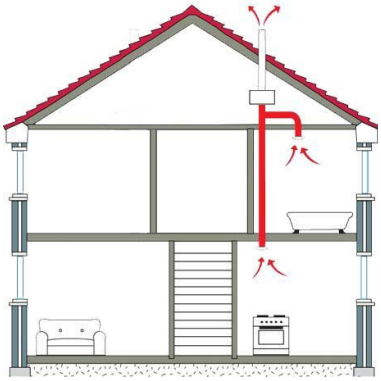
A. Balanced Exhaust and Supply with Recovery
B. Balanced Exhaust and Supply without Recovery
C. Exhaust Only



A. Balanced Exhaust and Supply with Recovery



B. Balanced Exhaust and Supply without Recovery



C. Exhaust Only

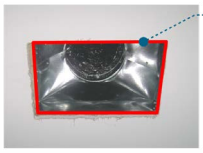
VENTILATION

VENTILATION REQUIREMENTS:

MEASURABLE DESIGN METRICS: Include in all designs

The following will be measured during and post construction:

- Predicted Energy: During design, the mechanical engineer must provide projected energy consumption for any modification or new system. Energy consumption will be verified with actual energy data post construction.
- Duct Tightness: Existing ductwork to be sealed with Aeroseal or equivalent, perform pre and post sealing leakage tests. New ductwork shall not exceed the sum of 2.5 CFM50 per register per shaft, and 2.5 CFM50 per floor per shaft during testing. (Other certification or code requirements may have tighter requirements). Duct tightness will be measured during construction.
- Flex Duct: Only used for transitions in lengths less than 6'.
- Fan Efficiency: Engineer to provide CFM/watt for each fan and the ventilation system in aggregate. Fan efficiency will be measured during building commissioning.
- ERV Efficiency: Engineer to provide sensible and latent efficiencies at designed airflow (CFM) for specified equipment for approval. System will be tested.
- Air Changes: Engineer to provide the calculated CFM required by space as well as for the building ventilation in aggregate (CFM/bedroom, CFM/sf). Air flow will be measured during building commissioning.
- Ventilation System Leakage Control: For fans installed directly through wall or ceiling finishes (e.g., ceiling bath fan), the fan housing shall be sealed to the interior finish.
- Mockup: A mock-up must be completed to measure sone (noise) level of new fans + existing ductwork.



APPROVED VENTILATION STRATEGIES:

This section outlines the ventilation strategies approved by POAH. All ventilation system designs should be reviewed by the Design & Building Performance Dept. Any deviation from the Approved Ventilation Strategies require prior approval from the Design & Building Performance Dept.

APARTMENT OR IN-UNIT VENTILATION:

EXHAUST (SOURCE CONTROL VENTILATION)
Bathroom Exhaust Through (Shared ERV or HRV):

- Every bathroom must include an exhaust fan that runs continuously. This approach employs continuous exhaust flow to achieve source control of excess humidity and odors. Ideally supply and exhaust systems are balanced and utilize recovery in the form of an ERV or an HRV.
- At a minimum, the bath exhaust fans should:
  - Run continuously in each bathroom at a 25 CFM for background exhaust.
  - Bath Exhaust should never terminate into the attic.
  - Seal the shaft all ductwork or all vertical ductwork to 5cfm at 50 Pascals per floor or less
  - Install Constant Airflow Regulators (CARs) for each exhaust intake grille to control exhaust flow rate.
  - Coordinate with Background Ventilation design to create a balance.

Kitchen Exhaust (Shared ERV or HRV):

Kitchen exhaust is either intermittent through a capture hood over the cook-top or continuous through a general area exhaust located in the cooking area.

- Continuous General Kitchen Exhaust: preferred method to integrate with Background Ventilation ERV. Every kitchen must include exhaust with a through wall/ceiling grill that:
  - Runs continuously at a 35 CFM for background exhaust.
  - Ensure exhaust grill is a minimum 6' distance from cook-top.
  - Ensure washable filter at the exhaust grill.
  - Review design with ERV manufacturer.
  - Install recirculation capture hood over cooking range.
  - Install Constant Airflow Regulators (CARs) for each exhaust intake grille to control exhaust flow rate.
  - Coordinate with Background Ventilation design.
- Range Hood: If continuous general kitchen exhaust through ERV is not possible, every kitchen must exhaust to exterior by using one of the following systems:
  - Range hood with integral fan exhausted directly to exterior; or
  - Range hood connected to a shared exhaust riser served by a rooftop fan exhausted to exterior.
- The following applies to all range hood installations:
  - Sone level should be maximum 7.
  - Kitchen exhaust fan ductwork should never terminate into attic space.
  - Kitchen exhaust fan should include back draft damper.
  - CFM rating should be minimum 150.
  - Assist capacity required for buildings 3 stories and above. Install direct drive exhaust riser fan with variable speed barometric control to maintain duct pressure after existing ductwork has been sealed.
  - Range hood should be deep enough that Range Queen, when installed, is not visible. Range Queen Product information is found within the Rangehood BOD section. See link below.

VENTILATION

Sample products are located in the RANGEHOOD page of the APPLIANCES section:
SEE SAMPLE RANGEHOODS AND RANGE QUEENS HERE

Supply (Fresh Air):
BALANCED VENTILATION SYSTEM WITH RECOVERY PREFERRED SYSTEM IN NEW CONSTRUCTION AND REHABS:
Balanced ventilation can be described as exhausting stale/humid air and suppling fresh air at equal rates (cfm). The best design is general exhaust from the kitchen and bathroom and supply to the living room and bedrooms. Ideally provide balanced ventilation with Energy Recovery Ventilation (ERV) units. Heat Recovery Ventilation (HRV) may be permitted in dry climates, but requires prior approval from the Design & Building Performance Dept. Using a recovery system saves energy by capturing heat and humidity in the exhaust air. The captured heat is used to temper the supply air. There are a few strategies for installing a balanced ventilation system with recovery, see below for descriptions.

Semi-Centralized ERV (or HRV):
This is a horizontal ventilation approach that eliminates the need for vertical duct risers, associated fire dampers. It can be used in midrise and high-rise buildings with a double loaded corridor.

- ERVs located on each floor. May require/be advantageous to have more than one ERV per floor.
    - Horizontal supply and return air ducts from units to ERV(s).
    - Supply air is ducted to each living room and each bedroom.
    - Supply air duct is insulated for condensation control.
    - Exhaust air from bathrooms and general area kitchen exhaust.
        - Rangehood kitchen exhaust risers should NOT be connected to the ERV/ HRV due to grease buildup.
    - Insulated horizontal outdoor air and exhaust air duct from ERV(s) through exterior wall.
        - Minimize unconditioned air duct length, locate close to an exterior wall.
    - Install Constant Airflow Regulators (CARs) for each supply and exhaust location.
    - Locate ERVs in serviceable locations:
        - Ceiling mounted ERVs require ceiling access for filter changes, but do not require mechanical rooms. Can be installed in the corridors.
        - Floor mounted ERVs require mechanical rooms.
        - Provide post ERV refrigerant coil or hydronic coil
        - Provide enthalpy control (control humidity/moisture) of supply air. Every ERV requires humidity (moisture) control of post-ERV air.
        - Control Discharge Air Temperature (DAT) (Supply air)(variable) for comfort based on season. E.G. 55F DAT in summer and 70F DAT in winter.
    - ERV must have economizer. Controls must be capable of incorporating economizer when OA is beneficial.
    - Architectural coordination requirements:
        - Provide adequate floor-to-floor height for coordinating ducts with other services.
        - Accommodate supply and exhaust penetrations through enclosure.

Semi-Centralized ERV Options:

- Examples of successful ERVs – Ventacity Ceiling Mount Ventilators:
  - VS250CMe 60-270 CFM
  - VS400Cme 120-400 CFM
  - VS900Cme 200-900 CFM
  - VS1200Cme 300-1200 CFM

https://www.ventacity.com/products/ventilation-family/

Central ERV (or HRV):

A more traditional approach which locates the ERV in a central location with vertical and horizontal duct distribution. This approach allows for minimizing the number of penetrations through the exterior enclosure but will require more penetrations through assemblies within the building.

- ERV(s) are located:
  - Internally, such as in the attic or mechanical room.
    - Preferred for ventilation system performance and ERV durability.
    - Provide adequate access for future replacement of ERV. I.E., does not require cutting open a roof to replace ERV.
  - Rooftop.
    - Minimize rooftop ductwork.
- Supply air is ducted to each living room and each bedroom.
- Supply air duct is insulated for condensation control.
- Exhaust air from bathrooms and general area kitchen exhaust.
  - Rangehood kitchen exhaust risers should NOT be connected to the ERV/ HRV due to grease buildup.
- If ERV(s) is internal, insulate horizontal outdoor air and exhaust air duct from ERV(s).
- Horizontal and/or vertical supply and return air ducts from units to ERV(s).
- Install Constant Airflow Regulators (CARs) for each supply and exhaust location.
- ERV should control supply air:
  - Provide enthalpy control (control humidity/moisture) of Discharge Air (supply air). Every ERV requires humidity (moisture) control of post-ERV air.
  - Control Discharge Air Temperature (DAT) (Supply air)(variable) for comfort based on season. E.G. 55F DAT in summer and 70F DAT in winter.
  - ERV to temper the air with:
    - Provide post ERV refrigerant coil or hydronic coil.
    - Integral heat pump for large ERV.
    - ERV must have economizer. Controls must be capable of incorporating economizer when OA is beneficial.

Centralized ERV Options:

- Examples of successful ERVs – Ventacity Ceiling Mount Ventilators:
  - VS1000Rte 75-1000 CFM
  - VS3000Rte 750-3000 CFM

Individual Apartment (ERV) (or HRV):
Individual apartment ERVs (or HRVs) are suitable for single dwellings and townhomes where a larger ducted system is not practical. It offers the advantage of apartment-level control, off-the-shelf products and minimized risk of cross-contamination between apartments.

- ERV is located within the unit:
    - Insulated horizontal outdoor air and exhaust air duct from ERV(s) through exterior wall.
        - Minimize unconditioned air duct length, locate close to an exterior wall.
- ERV Supply:
    - Supply air is ducted to each living room and each bedroom.
    - Alternatively supply air is ducted to the return of the Fan Coil Unit (FCU); FCU is used for post ERV tempering. This requires further design consideration:
        - FCU diffusers must not cause drafts, comfort issues.
        - Control strategy to ensure air is circulated to occupied spaces when FCU thermal setpoint is met.
    - Supply air duct is insulated for condensation control.
- Exhaust air from bathrooms and general area kitchen exhaust.
    - Rangehood kitchen exhaust risers should NOT be connected to the ERV/ HRV due to grease buildup.
- Requires periodic in-unit equipment maintenance.

Individual ERV Option:

- Examples of successful ERVs: Panasonic FV-10VE2
- https://na.panasonic.com/us/home-and-building-solutions/ventilation-indoor-air-quality/energy-recovery-ventilators/intelli-balancetm-100-balanced-air-50-100cfm
- Heat pump ventilators
    - These systems can provide:
        - Ventilation
        - HEPA filtration
        - Dehumidification
        - Heat-Pump for tempering the air.
    - Similar mechanical design considerations as ERV, but larger ducts for higher CFM.
    - Architectural considerations: require a closet.

COMMON AREA EXHAUST (SOURCE CONTROL VENTILATION):

The following strategies apply to:

- Trash rooms.
- Janitor closets.
- Common area kitchens
- Elevator machine rooms (check local building codes for requirements)
- Other areas outside of apartments where airborne contaminants are generated.

Rooms to be evaluated for airborne contaminants by design team and source control ventilation to be based on the presence of contaminants:

- No harmful contaminants:
    - Shared exhaust system through ERV
    - Run continuously in each bathroom at appropriate CFM.
    - Seal the shaft to 5cfm at 50 Pascals per floor or less.
    - Install Constant Airflow Regulators (CARs) for each exhaust intake grille to control exhaust flow rate.
    - Coordinate with Background Ventilation design.
- Potential harmful contaminants:
    - Exhaust to the exterior of the building:
    - Install Constant Airflow Regulators (CARs) for each exhaust intake grille to control exhaust flow rate.
    - Install direct drive exhaust riser fan with variable speed barometric control to maintain duct pressure within parameters for CAR operation.

Common Area Supply (Fresh Air):

BALANCED VENTILATION WITH RECOVERY REQUIRED:

Background ventilation is part of the same system as in unit Semi-Centralized ERV or Centralized ERV. Similar strategy will be used.

- Calculate the required ventilation for the common areas, provide balanced ventilation for the space.
- Provide additional supply air to spaces that have adjacent rooms with exhaust. For example, if a trash room with exhaust is accessed from a corridor, provide the makeup air to the corridor to balance the system.
- Corridors shall not be used as supply air plenum for apartments. All unit entrance doors need to be weather-stripped to maintain unit compartmentalization.

EXISTING EXHAUST AND SUPPLY SYSTEM IMPROVEMENTS:

Utilize existing exhaust to incorporate an ERV to precondition supply air.

Modifications:

- Modify exhaust system(s) to incorporate ERV(s)
  - Combine unit bathroom exhausts in attic space or at roof.
  - If general area kitchen exhausts are used,
    - Ensure 6' from cooktop with washable filter and combine unit kitchen exhausts in attic space or at roof.
  - Install Constant Airflow Regulators (CARs) for each exhaust location.
- Replace existing supply air system (AHU/MAU/DOAS) with ERV using the exhaust to pre-condition.
  - Locate in attic or on roof. More significant rehab projects can utilize the horizontal semi-central approach.
    - If ERV is located in attic, for future replacement:
      - Ensure it can be brought in through existing openings to attic.
      - Or retrofit new adequately sized access.
      - Do not rely on cutting open building enclosure for future replacements.
  - ERV to temper the air with:
    - Provide enthalpy control (control humidity/moisture) of Discharge Air (supply air). Every ERV requires humidity (moisture) control of post-ERV air.
    - Control Discharge Air Temperature DAT (supply air) (variable) for comfort based on season for comfort. E.G. 55F DAT in summer and 70F DAT in winter.
  - ERV must have economizer. Controls must be capable of incorporating economizer when OA is beneficial.

- Supply air to the building:
  - Preferred approach: supply air ducts to common spaces, and unit living rooms, and bedrooms.
    - Requires in-unit retrofit of supply duct.
    - One option is to utilize soffits to conceal the supply duct.
  - If supply air ducts cannot be retrofitted to each unit at the time of the rehab, ensure that the common area duct can incorporate future upgrades to achieve in unit balanced ventilation.
  - Supply air duct is insulated for condensation control.

Compartmentalization:

- Refer the Basis of Design Building Enclosure section for all Compartmentalization requirements.
- Any opening or hole made from the installation of ductwork, equipment, pipework, refrigerant lines, electrical, controls, other MEP, or any penetrations caused by the ventilation system installation and modification discovered during retrofit shall be air sealed.

LAST AND LEAST FAVORABLE OPTION:

Prior approval of POAH's Design & Building Performance Dept. is required for the following option to be used. This assumes there is no feasible way for a project to install balanced supply and exhaust through ERVs. Supply pre-conditioned, filtered outdoor air to the corridors as makeup air to the in-unit exhausts. Air supplied to corridors will not effectively supply outdoor air to units. Requires unit entry doors to be undercut, most fire codes don't allow this, also eliminating unit compartmentalization goals. **The steps below are suggested for situations where direct ducted supply air to units or individual HRV/ERV are not possible.**

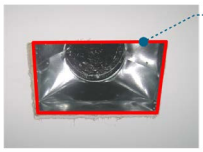
Exhaust Only System Improvements:

- Seal Ducts (vertical and horizontal)
  - Aero seal (or equivalent) all existing ducts

- Bathroom Exhaust
  - Exhaust fan requirements include:
    - Run continuously at 25 CFM for background exhaust and be capable of boosting to higher CFM when activated by occupancy sensor
      - The boost capability shall include a "delay-off" operation whereby the fan continues to operate for an additional ~15 minutes after the boost is turned off.
      - The low-speed setting (variable) is typically set within the fan.
      - To provide separate background and boost capabilities, either:
        - There must be two wires to the fan, a constant power wire and control wire.
        - Fan must be type that has built in occupancy sensor for boost control.
        - If a fan replacement with the existing fan only having one wire (on/off) and fan does not have occupancy sensor:
          - Include re-wiring of fan in scope of work.
          - The separate boost capability may be achieved through specialized wall switch or controller at the switch box. Example: Tamarack SmartExhaust Bath Fan Control. Contact POAH Design + Building Performance for other options.
  - Fans should be low noise.
    - Sone (measurement of sound) should be 0.9 maximum.
    - Ductwork cannot be loose, or uninsulated.
    - A mock-up must be completed to measure sone level of new fans + existing ductwork.

VENTILATION

- Air Tightness
  - Seal Ducts (vertical and horizontal) Aero seal (or equivalent) all existing ducts.
  - Use mastic or tape to seal any gaps between the ductwork and/or fan housing before installing fan or grill.
  - Seal between duct-boot and sheetrock.
  - After installation, the fan should be measured to confirm appropriate draw.



BATHROOM EXHAUST FAN OPTION:
Panasonic

- WhisperGreen Select
- CFM: 30-110
- Sone: 0.3-0.8
- CFM/Watt: 11.5-15.1

Manufacturer Number:
FV-05-11VKS1

BATHROOM EXHAUST FAN OPTION:
Panasonic

- WhisperSense Motion Sensor
- CFM: 80
- Sone: 0.3
- CFM/Watt: 5.1

Manufacturer Number:
FV-08VQC5

Bathroom Exhaust Fan on Roof:

- Exhaust requirements include:
  - Run continuously in each bathroom at a 25 CFM for background exhaust.
  - Install Constant Airflow Regulators (CARs) for each exhaust intake grille to control exhaust flow rate.
    - If variable CFM exhaust is needed for boost, use Aldes Zone Register Terminals with CAR dampers.
  - Install rooftop direct drive exhaust riser fan with variable speed barometric pressure control to maintain duct pressure.
  - Seal the shaft with Aeroseal to 5cfm at 50 Pascals per floor or less

Kitchen Exhaust

- Continuous General Kitchen Exhaust: assumes ERV cannot be retrofitted at this time. Every kitchen must exhaust to exterior by a through wall/ceiling grill to rooftop exhaust system (existing buildings).
  - Run continuously at a 35 CFM for background exhaust.
  - Ensure washable filter at the exhaust grill.
  - Install Constant Airflow Regulators (CARs) for each exhaust intake grille to control exhaust flow rate.

  - Install rooftop direct drive exhaust riser fan with variable speed barometric pressure control to maintain duct pressure.
  - Coordinate with Background Ventilation design for ERV/AHU.
- Range Hood with Intermittent Kitchen Exhaust: This requires fan powered range hoods. Every kitchen must exhaust to exterior by using one of the following systems:
  - Range hood with integral fan exhausted directly to exterior; or
  - Range hood connected to a shared exhaust riser served by a rooftop fan exhausted to exterior.
- The following applies to all range hood installations:
  - Sone sound should be maximum 7.
  - Kitchen exhaust fan ductwork should never terminate into attic space.
  - Kitchen exhaust fan should include back draft damper.
  - CFM rating should be minimum 150.
  - Assist capacity required for buildings 3 stories and above. Install rooftop direct drive exhaust riser fan with variable speed barometric pressure control to maintain duct pressure.
  - Range hood should be deep enough that Range Queen, when installed, is not visible. Range Queen Product information is found within the Rangehood BOD section. See link below.
  - Coordinate with Background Ventilation design.
    - The intermittent exhaust will yield a lower 24/7 average exhaust rate.
    - Engineer to use diversity factor to calculate continuous makeup supply air.
- Compartmentalization
  - Compartmentalize between units and between unit and corridors.
  - Any opening or hole made/discovered during retrofit shall be air sealed.

WINDOWS

LAST UPDATED 04.11.2024

GENERAL INFORMATION:

- Selecting the right windows can save energy and affect resident comfort.
- Window installation will have an impact on building durability (water control) as well as energy use and resident comfort.
- There are three main components of windows that affect performance: the glazing, the frame, and the spacer (material or system that separates the glass panes).
    - Window frames are available in a wide range of materials. Common materials for windows include wood, vinyl, aluminum, and fiberglass.
    - Glazing choices affect how much light the window will transmit and how much of the sun's heat they allow into interior spaces, and how well they prevent the flow of heat.
    - The spacer is the component that separates two panes of glass from one another and holds them at a fixed separation. Older double-pane glazing units typically have metal spacer that are highly conductive. This can increase the risk of condensation on the glass near the window frame. Newer high performance windows have thermal spaces that help maintain resistance to heat flow at the perimeter of the glazing unit.
- Window rating are based on three primary classifications:
    - U-factor, the amount of heat that a material conducts (lower is better).
    - Solar Heat Gain Coefficient (SHGC), a measure of how much of the sun's heat energy is transmitted through the glass.
    - Visual Transmittance (VT), is the percentage of visible light transmitted through the glass.
- Two other voluntary criteria (not required to be included on NFRC labels) are also important to window performance:
    - Air leakage
    - Condensation resistance
- Considerations for historic buildings:
    - Historic buildings may have restrictions on the type (operation) of window, the frame material, and certain panning details.
    - For projects using historic tax credits, all window details will have to be reviewed by local governing authorities.

WINDOWS

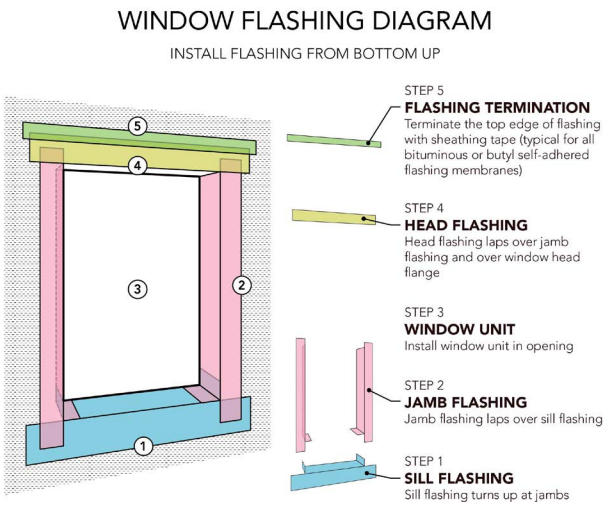
REQUIREMENTS:

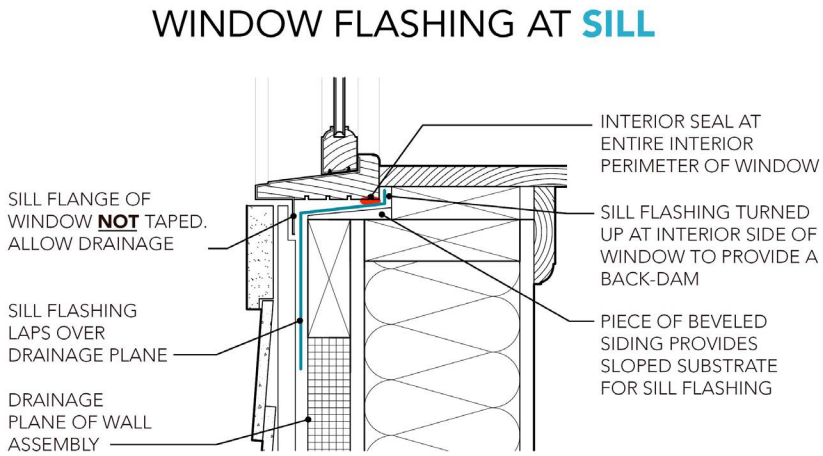
Safety Requirements:

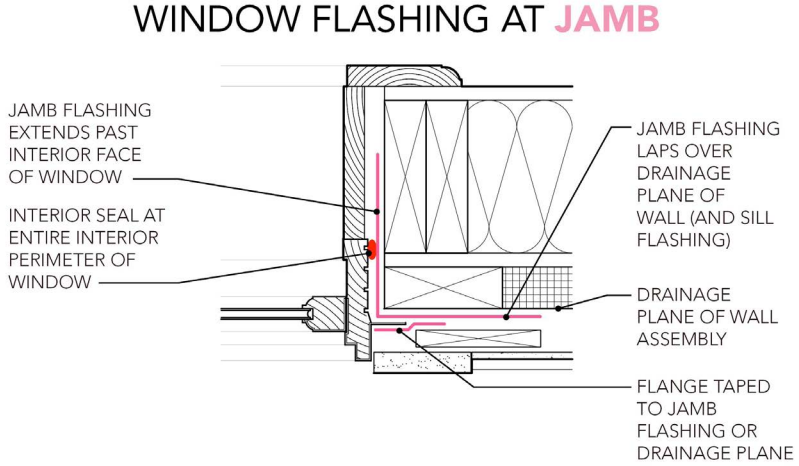
- POAH and POAH Communities Window Limiter Policy: Windows should be limited to opening 4" maximum.
- CLICK HERE FOR WINDOW LIMITER POLICY

Required Details:

- For each unique window type or wall assembly provide details for the head, sill, and jamb conditions.
- The details must clearly demonstrate the water control for the window opening (flashing and drainage).





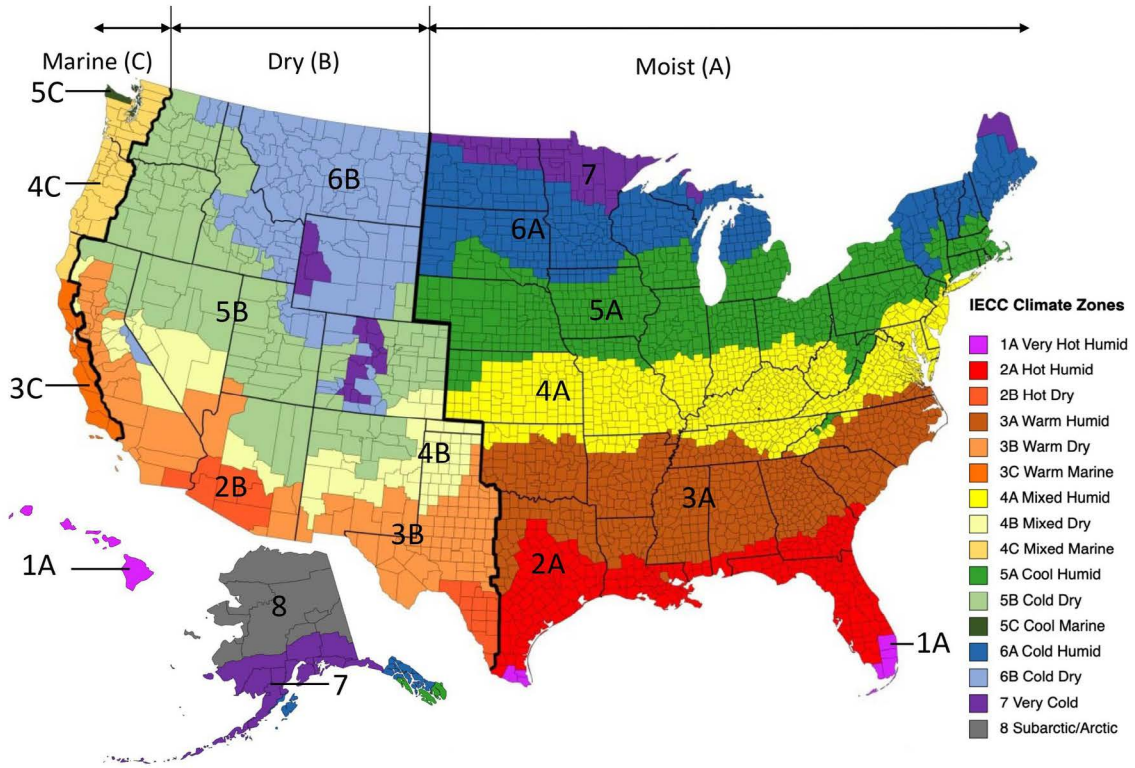


WINDOWS

Performance Requirements:

Windows must comply with local energy code.

- To verify if specific window energy properties comply with the local code requirements, look for the NFRC label.
- The National Fenestration Rating Council (NFRC) label is needed for verification of energy code compliance. The NFRC label displays whole-window energy properties and appears on all fenestration products which are part of the ENERGY STAR program (www.nfrc.org).
- Proper window installation is necessary for optimal performance, to avoid air and water leakage. Always follow manufacturers' installation guidelines and use trained professionals for window and skylight installation.
- Windows must be ENERGY STAR certified. Often energy star certified windows meet or exceed energy code requirements. Follow this link to determine the minimum U-Factor and Solar Heat Gain Coefficient (SHGC) for your area.
- Window performance can also be based on location and climate zone. The more stringent requirements between ENERGY STAR and the local energy code must be followed.



Climate Zone Map from the 2021 International Energy Conservation Code

AC SLEEVE IN WINDOW SASH:

Required Details:

- Physical Sizing: all AC units must be sized to fit the thru-wall sleeve.
- Thu-wall Sleeves: insulate and seal the perimeter of the wall sleeve to avoid drafts. Make sure thru-wall sleeves drain condensate to the exterior.
- Insulated AC Covers for Winter Use: all thru-wall sleeves should be covered during winter months with an interior, hard-plastic, insulated cover. Use covers that are deep enough to go over both the sleeve and the AC unit so AC units do not need to be removed during winter months. See the AC Cover section of the Basis of Design for more information.
    - CLICK HERE FOR AC COVER SPEC
- Use energy efficient AC unit: See the AC Unit section of the Basis of Design for more information.
    - CLICK HERE FOR AC UNIT SPEC

Preferred Strategies:

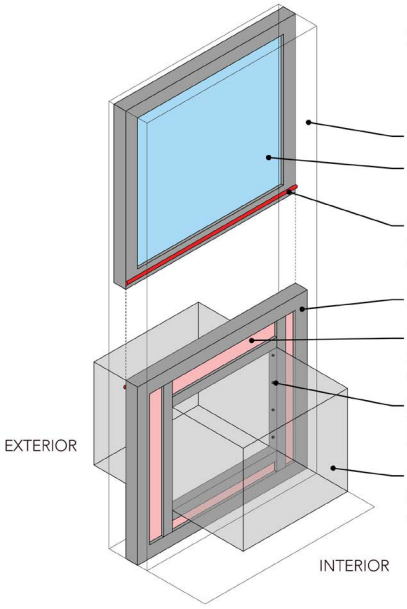
POAH's preferred strategy for in-window AC units is to install a new insulated sash panel with integral AC sleeve. The details shown below may need to be modified for each specific window condition.

Through-wall AC units in a panel fixed within the window. View from interior.

View from the exterior.

WINDOWS

AXON
VIEW FROM INTERIOR



WINDOW FRAME

UPPER SASH

WEATHERSTRIPPING
Weatherstripping aligns with lower sash.

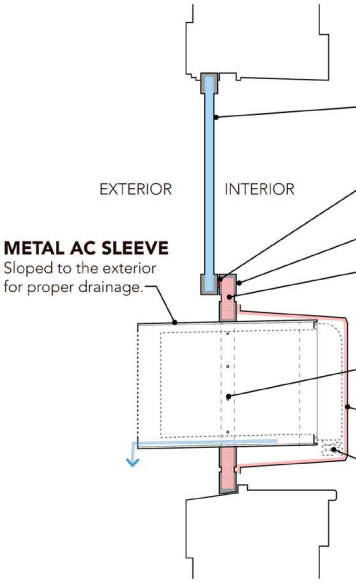
METAL FRAME

INSULATED METAL PANEL
Metal facing on both interior and exterior. All joints sealed.

FASTENERS
Fasteners connect AC sleeve to metal frame.

METAL AC SLEEVE
Sloped to the exterior for proper drainage.

SECTION



METAL AC SLEEVE
Sloped to the exterior for proper drainage.

UPPER SASH

WEATHERSTRIPPING
Weatherstripping between both sashes.

METAL FRAME

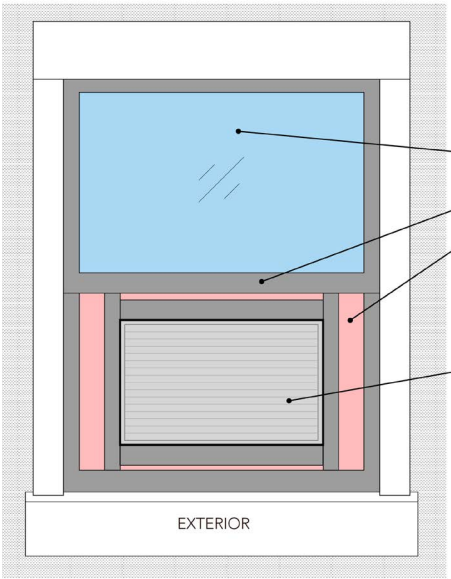
INSULATED METAL PANEL
Metal facing on both interior and exterior. All joints sealed.

FASTENERS
Fasteners connect AC sleeve to metal frame.

AC COVER
Hard-plastic insulated AC cover.

AC CORD
Tucked into bottom of AC cover.

ELEVATION
VIEW FROM EXTERIOR



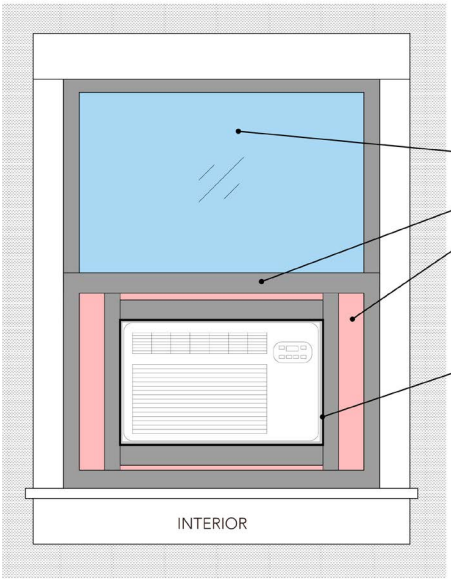
UPPER SASH

METAL FRAME

INSULATED METAL PANEL
Metal facing on both interior and exterior. All joints sealed.

METAL AC SLEEVE
Sloped to the exterior for proper drainage.

ELEVATION
VIEW FROM INTERIOR



UPPER SASH

METAL FRAME

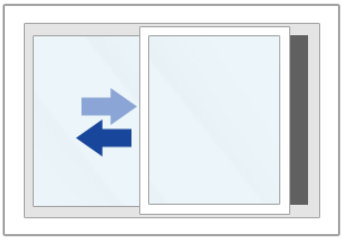
INSULATED METAL PANEL
Metal facing on both interior and exterior. All joints sealed.

METAL AC SLEEVE
Sloped to the exterior for proper drainage.

WINDOWS

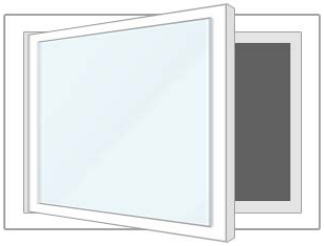
WINDOW TYPES:

SLIDER



WindowWellExperts.com

CASEMENT



WindowWellExperts.com

AWNING

WindowWellExperts.com

HOPPER

WindowWellExperts.com

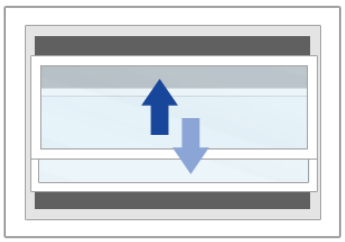
FIXED

WindowWellExperts.com

SINGLE HUNG

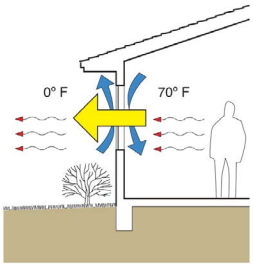
WindowWellExperts.com

DOUBLE HUNG



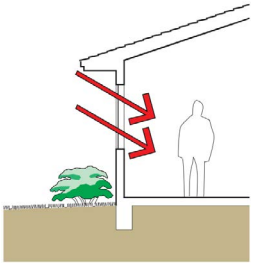
WindowWellExperts.com

TERMS + VOCABULARY:



U-Factor

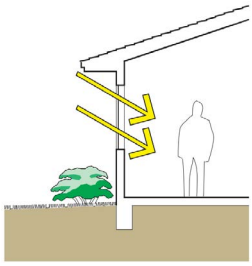
The rate of heat loss is indicated in terms of the U-factor (U-value). This rate of non-solar heat loss or gain through a whole window assembly is measured in Btu/hr-sf-°F. The lower the U-factor, the greater a window's resistance to heat flow and the better its insulating value.



Solar Heat Gain Coefficient (SHGC)

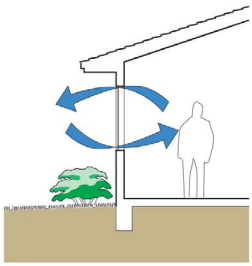
The SHGC is the fraction of incident solar radiation admitted through a window. SHGC is expressed as a number between 0 and 1. The lower a window's solar heat gain coefficient, the less solar heat it transmits. Whether a higher or lower SHGC is desirable depends on the climate, orientation, shading conditions, and other factors.

WINDOWS



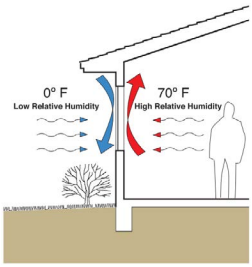
Visible Transmittance (VT)

The VT is an optical property that indicates the amount of visible light transmitted. VT is a whole window rating and includes the impact of the frame which does not transmit any visible light. While VT theoretically varies between 0 and 1, most values are between 0.3 and 0.7. The higher the VT, the more light is transmitted.



Air Leakage (AL)

AL is expressed in cubic feet of air passing through a square foot of window area (cfm/sf). The lower the AL, the less air will pass through cracks in the assembly. AL is very important, but not as important as U-factor and SHGC.



Condensation Resistance (CR)

CR measures how well a window resists the formation of condensation on the inside surface. CR is expressed as a number between 1 and 100. The higher the number, the better a product is able to resist condensation. CR is meant to compare products and their potential for condensation formation. CR is an optional rating on the NFRC label.

Further Resources:

- Efficient Windows Collaborative
- The National Fenestration Research Council