

Residential Field Study Photo Documentation

This document contains checklists of items to photograph while onsite to help answer questions that may arise regarding the accuracy of entries in the data collection form. Questions may be raised during quality assurance reviews by the project team and PNNL. For each piece of data entered, it is a best practice to have photo-documentation to facilitate future validation of that value. Photographs are also extremely useful for subsequent training programs, field guides, and educational documents.

The checklists in this tool are comprehensive, but project teams should work with their data collectors to determine what level of photo-documentation is practical. Photographs are for the project team's use only – PNNL will not request photographs. Photographs used in training programs or other public-facing materials must not include any identifying information, such as house wrap containing the builder's logo.

GENERAL BEST PRACTICES

- Hold camera level and still.
- Ensure there is adequate lighting (a headlamp might help) or the flash is on.
- Start with a photograph from further away to provide context, then zoom in for more detail. For example, take a picture of an entire wall assembly, then walk forward and take a picture of the insulation label.
- Move around the homes in a consistent way. For example, always start at the front door and move counterclockwise around the first floor. Then, move upstairs and do the same.
- Save all images in a separate folder for each home. The folder name should include the home's Identification Code.

The following pages contain photo-documentation checklists for several phases of construction: Foundation, Rough-in (Pre-drywall), Mechanical, and Final.

FOUNDATION PHASE

Site Identification		
<input type="checkbox"/>	Site ID	Any of the following to provide clear identification of the project: <ul style="list-style-type: none"> • Development entrance sign • Street sign • Lot number • Address number • Front page of the plans
<input type="checkbox"/>	Elevations	Entire foundation wall from each direction, including grade lines
Slabs-on-grade		
<input type="checkbox"/>	Thermal break	Insulation between the slab edge and foundation wall (taken from above): <ul style="list-style-type: none"> • Thickness • Continuity throughout the thermal envelope (including doorways and pads)
<input type="checkbox"/>	Below-grade insulation	Insulation extending below grade (as feasible, depending on backfill): <ul style="list-style-type: none"> • Depth (include tape measure in photo) • Thickness (include tape measure in photo) • Coverage area for each elevation • Manufacturer's R-value label, including material and design thickness as available
Foundation Walls		
<input type="checkbox"/>	Unvented crawl space, basement wall, and mass wall insulation	Insulation: <ul style="list-style-type: none"> • Thickness • Depth below grade (where feasible) • Manufacturer's R-value label, including material and design thickness as available, or insulation installer's certificate for blown-in and sprayed products • Coverage area for each elevation • Means of permanent attachment to wall (crawl spaces)

ROUGH-IN (PRE-DRYWALL) PHASE

Site Identification		
<input type="checkbox"/>	Site ID	Any of the following to provide clear identification of the project: <ul style="list-style-type: none"> • Development entrance sign • Street sign • Lot number • Address number • Front page of the plans
Exterior		
<input type="checkbox"/>	Elevations	Include entire elevation for all four sides when possible
<input type="checkbox"/>	Floors over outside air (e.g., cantilevers and bump-outs)	Floor insulation from underneath the floor: <ul style="list-style-type: none"> • Insulation coverage area/gaps • Joist depth and spacing • Manufacturer's R-value label, including material and design thickness as available, or insulation installer's certificate for blown-in and sprayed products
<input type="checkbox"/>	Exterior continuous insulation	<ul style="list-style-type: none"> • Coverage area/gaps • Thickness • Manufacturer's label • Manufacturer's R-value label, including material and design thickness as available
<input type="checkbox"/>	Exterior air barrier (house wrap, sheathing with integrated air barrier, continuous insulation)	<ul style="list-style-type: none"> • Manufacturer logo and product label • Window and penetration flashing • Fastener type • Sealing method at top of wall (or lack) • Sealing method at foundation (or lack) • Gravity dampers at exhaust terminations
Above-grade Walls from the Interior (repeat for each story)		
<input type="checkbox"/>	Whole wall	Image containing the entirety of each exterior wall, including knee walls
<input type="checkbox"/>	Framing	For each unique assembly type: <ul style="list-style-type: none"> • Material • Stud or SIP depth • Stud spacing
<input type="checkbox"/>	Insulation	<ul style="list-style-type: none"> • Coverage area and gaps • Manufacturer's R-value label, including material and design thickness as available, or insulation installer's certificate for blown-in and sprayed products • Image taken close to parallel to the wall to show compression or lack thereof • Compression due to plumbing, electrical, or other systems

<input type="checkbox"/>	Windows and doors	<p>For each window and exterior door:</p> <ul style="list-style-type: none"> • Entire assembly including surrounding framing • NFRC label • Header
<input type="checkbox"/>	Air sealing	<ul style="list-style-type: none"> • Foundation/sill plate junction • Top plate/sheathing junction • Knee walls (carefully pull back insulation if necessary to reveal attic-side air barrier or lack thereof) • Rim joist sealing • Corner framing detail • Joist bays above walls separating garages from conditioned space • Plumbing and electrical penetrations of the thermal envelope • Narrow cavities • Walls behind showers, tubs, fireplaces, bench seats, etc. on exterior walls
Unconditioned Basements and Vented Crawl Spaces		
<input type="checkbox"/>	Framing	Joist material, depth, and spacing
<input type="checkbox"/>	Insulation in floor above	<ul style="list-style-type: none"> • Support • Coverage area/gaps • Manufacturer's label
<input type="checkbox"/>	Stairwells (basements only)	<ul style="list-style-type: none"> • Sidewall insulation (may be required on first floor or in basement, depending on thermal envelope location) • Stringer insulation (when stairwell is conditioned space)
<input type="checkbox"/>	Air sealing	<ul style="list-style-type: none"> • Duct and flue shaft penetrations • Plumbing and electrical penetrations • HVAC register boot penetrations
Conditioned Basements and Unvented Crawl Spaces		
<input type="checkbox"/>	Whole wall	Big picture image of each basement wall
<input type="checkbox"/>	Framing (if applicable)	<p>For each unique assembly type:</p> <ul style="list-style-type: none"> • Material • Stud depth • Stud spacing • Corner framing detail
<input type="checkbox"/>	Insulation	<ul style="list-style-type: none"> • Coverage area and gaps • Manufacturer's R-value label, including material and design thickness as available, or insulation installer's certificate for blown-in and sprayed products • Image taken close to parallel to the wall to show compression or lack thereof • Compression due to plumbing, electrical, or other systems

<input type="checkbox"/>	Windows and doors	For each window and exterior door: <ul style="list-style-type: none"> • Entire assembly including surrounding framing • NFRC label • Header
<input type="checkbox"/>	Air sealing	<ul style="list-style-type: none"> • Sill plate/foundation junction • Rim joist sealing • Plumbing and electrical penetrations of the thermal envelope • Narrow cavities • Walls behind showers, tubs, fireplaces, bench seats, etc. on exterior walls
Unvented Crawl Spaces		
<input type="checkbox"/>	Vapor retarder	Concrete slab or vapor retarder including seams and distance up wall
Roofs and Ceilings		
<input type="checkbox"/>	Framing	Rafter material, depth, and spacing
<input type="checkbox"/>	Roof insulation	<ul style="list-style-type: none"> • Coverage area/gaps • Manufacturer's R-value label, including material and design thickness as available, or insulation installer's certificate for blown-in and sprayed products
<input type="checkbox"/>	Air sealing	ASTM E 283 (airtight) and IC-rating stickers for recessed lights in the thermal envelope
Other		
<input type="checkbox"/>	Mechanical	Refer to Mechanical Phase checklist and photograph all observable mechanical items

MECHANICAL PHASE

Site Identification		
<input type="checkbox"/>	Site ID	Any of the following to provide clear identification of the project: <ul style="list-style-type: none"> • Development entrance sign • Street sign • Lot number • Address number • Front page of the plans
Exterior		
<input type="checkbox"/>	Dampers	Gravity dampers on all exhaust terminations
<input type="checkbox"/>	Piping	Protection of exterior piping insulation and piping R-value (if observable)
Heat and Cooling Systems		
<input type="checkbox"/>	Heating and cooling units	Include air handler and connections to supply and return ducts
<input type="checkbox"/>	Nameplate	HVAC system nameplate, including model number, or EnergyGuide label to verify equipment efficiency
<input type="checkbox"/>	Filter box	Filter box sealing (sides and filter slot)
<input type="checkbox"/>	HVAC piping	Insulation type and thickness or R-value label
<input type="checkbox"/>	Duct system	Wide-angle view of a representative portion of the duct system
<input type="checkbox"/>	Duct sealing	Typical duct sealing and any visible leakage sites, including: <ul style="list-style-type: none"> • Transverse joints • Longitudinal seams • Change-of-direction fittings/connections • Register boots
<input type="checkbox"/>	Duct insulation	R-value label and any gaps in coverage
<input type="checkbox"/>	Supplementary heating systems	Supplementary heating systems (other than integral heat pump backup systems)
<input type="checkbox"/>	Fireplaces	Fireplace and identification of fuel type
Whole-house Mechanical Ventilation Systems		
<input type="checkbox"/>	Fan	Ventilation fan or HRV/ERV unit with fan housing, controls, manufacturer's label, and first foot of ductwork.
<input type="checkbox"/>	Ductwork	Ventilation system ductwork – Big picture to the degree possible
<input type="checkbox"/>	AHU-integrated fan	Air handler unit-integrated ventilation systems: <ul style="list-style-type: none"> • Duct from outside to return air system • Air handler blower motor nameplate
<input type="checkbox"/>	Measured airflow	Manometer reading showing measured CFM
Domestic Hot Water Systems		

<input type="checkbox"/>	Water heater	<ul style="list-style-type: none"> • Entire water heater unit including heat trap • Nameplate
<input type="checkbox"/>	Piping	Hot water piping showing insulation thickness or R-value label
<input type="checkbox"/>	Circulation system	Circulation pump, controls, and nameplate
<input type="checkbox"/>	Drain water heat recovery	Drain water heat recovery unit
Other		
<input type="checkbox"/>	Envelope	Refer to Insulation Phase checklist and photograph all observable envelope items
<input type="checkbox"/>	Electrical systems	Refer to Final Phase checklist Electrical Systems section

FINAL PHASE

Performance		
<input type="checkbox"/>	Site ID	Any of the following to provide clear identification of the project: <ul style="list-style-type: none"> • Development entrance sign • Street sign • Lot number • Address number • Front page of the plans
Performance		
<input type="checkbox"/>	Duct leakage rate	Manometer showing final CFM25 duct leakage reading
<input type="checkbox"/>	Envelope air leakage rate	Manometer showing final CFM50 air leakage reading
Insulation and Air Sealing		
<input type="checkbox"/>	Attic insulation	From the attic access hatch/door: <ul style="list-style-type: none"> • Entire ceiling • Depth markers • Installer's certificate for blown-in or sprayed-in insulation • Tray ceiling, knee walls, and similar features • Eave baffles
<input type="checkbox"/>	Air sealing	<ul style="list-style-type: none"> • Attic hatch and door weatherstripping • Exterior door weatherstripping • Gravity dampers on exhaust terminations
Interior Lighting		
<input type="checkbox"/>	Lamps (bulbs)	One lamp from each unique fixture type
<input type="checkbox"/>	Controls	Lighting control (switch, dimmer, occupancy sensor) for each room/space other than bathrooms and hallways
Exterior Lighting		
<input type="checkbox"/>	Controls	Exterior lighting controls when total exterior wattage is >30 W
Electrical Systems		
<input type="checkbox"/>	Electrical panel	Electrical panel nameplate, including Amperage
<input type="checkbox"/>	Electric vehicle	EV ready infrastructure (receptacle) or electric vehicle service equipment
<input type="checkbox"/>	Renewables	Onsite renewable system(s) including nameplate where feasible
<input type="checkbox"/>	Storage	Electricity storage system and nameplate
<input type="checkbox"/>	Smart devices	Smart home or connected devices
Other		
<input type="checkbox"/>	Certificate	Compliance certificate in mechanical room
<input type="checkbox"/>	Envelope	Refer to Insulation Phase checklist and photograph all observable envelope items

<input type="checkbox"/>	Mechanical	Refer to Mechanical Phase checklist and photograph all observable envelope items
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For more information, contact:

Mike Turns
mike.turns@pnnl.gov
www.pnnl.gov