Built Green Multi-family Handbook

Version 2017

BUILT GREEN®

TABLE OF CONTENTS

INTRODUCTION

This handbook contains detailed information about how projects can meet each action item in the Built Green Multi-Family Residential New Construction Checklist (2017). For each action item, the handbook identifies the party responsible for meeting the action item, the intent behind the action item, the performance requirement, the points breakdown, when the item should be verified, cross-references with related action items, and resources.

This handbook is divided into the same sections the Built Green checklist is, by environmental category. Within these categories, each action item is described in the following format.

Action Item # and Description

Responsible Party: Who is responsible for ensuring the action item requirements are met in the finished project. This may be both design and construction personnel.

Intent: What is the desired outcome resulting from meeting the requirements of the Action Item. This may be educational for the project team but is also helpful for the verifier in determining if the intent has been met.

Performance Requirement: Describes what the project team must do, as definitively as possible, to earn points for the Action Item. This gives the project team something clear to aim at, and the verifier something specific to measure against.

Points Breakdown: Points available, and how to earn different levels

When Verified: Guidance on the most effective time and method to verify, helping both project team and verifier to plan site inspections and review meetings. This a way to help teams and verifiers scope their verification plans for a project – it is a guide, not an absolute.

Cross-references: Referencing other relevant Action Items in the checklist.

Resources: Specific, reliable resources for reference.

ABOUT BUILT GREEN

THE PROGRAM

Built Green is a holistic green home certification of the Master Builders Association of King and Snohomish Counties, developed in partnership with King County, Snohomish County, and other government agencies in Washington State. It was originally founded in 1999. Since then, over 17,000 projects have been certified.

Built Green also serves as a network of architects, builders, developers, remodelers, subcontractors, product suppliers, lenders, and others involved in the green building industry. It is a resource on the human and environmental benefits of green building as well.

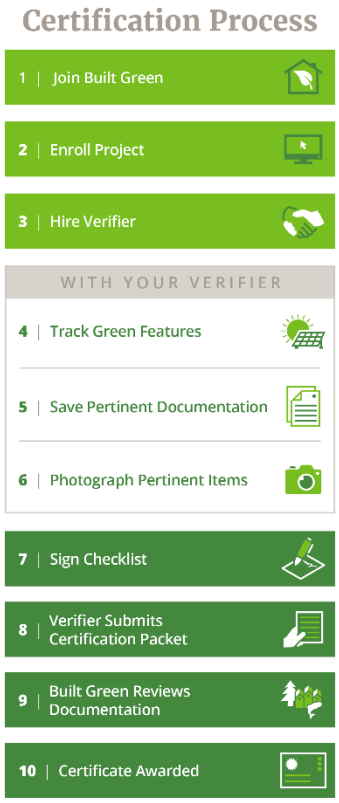
Built Green certifies residential construction of all kinds, with checklists for: single-family/townhomes, multi-family buildings, remodels, refits, and communities.

Built Green's mission is to serve as the driving force for environmentally sound design, construction, and development practices in Washington's cities and communities.

Built Green Process

All companies seeking to certify their project must join Built Green as a member. Additionally, all projects must receive third-party verification. A list of approved verifiers and how to join can be found on builtgreen.net.

The following diagram outlines the certification process:



In order to achieve a requisite star-level, the required action items and point thresholds for that level must be met. These are described in detail in this handbook.

REQUIRED ACTION ITEMS

3-Star Requirements

	required	Built Green assumes building meets local code regulations
	required	Third-party verification
	required	Achieve a minimum of 50 points from sections 2-5
Energy	required	All spot exhaust fans must be ENERGY STAR (See Action Item 3-50)
Energy	required	Install ENERGY STAR refrigerators, dishwashers and clothes washers (if provided by builder) (See Action Items 3-42, 3-47, 3-48)
Energy	required	Ventilation system flow rates are tested and within 20% of design flows. Controls and settings are consistent with design
Energy	required	Building modeled to have 10% better performance than the Washington State Energy Code cycle under which the project is permitted OR achieves additional credits in Section R406 (two credits) or C406 (two options) (above the WSEC requirements) (See Action Items 3-1 and 3-2)
IAQ	required	Use only low-VOC/low-toxic interior paints, primers, and finishes for ALL surface areas (See Action Item 4-15)
IAQ	required	Do not install a wood-burning fireplace inside unit or building (See below)
Materials	required	Post jobsite recycling plan on site and maintain at least two bins (one for waste, one for recyclables) (See below)
Materials	required	Recycle all clean wood, cardboard, new gypsum scrap, metal, asphalt paving/brick/concrete, electronics, and batteries (See Action Item 5-6, 5-25)
Materials	required	Use no endangered species or old growth wood (See Action Item 5-36)

Ventilation System flow rates are tested and within +/- 20% of design flows. Controls and settings are consistent with design

Responsible Party: Mechanical Designer, Ventilation System Installers, Built Green Verifier

Intent: Ensure that the residential unit ventilation system is functioning as designed.

Performance Requirement: Ventilation design flows and control strategy is communicated in the CDs. The whole house ventilation system in a representative sample of units is properly installed and operating as designed; flow rates are within +/- 20% of design flows, and control set up is consistent with the design intent (continuous or intermittent, on/off or boost activation, delay timing). 20% of units tested by the Verifier or

other independent party, according to the Built Green Performance Testing Requirements. NOTE: Non-compliances should result in root cause analysis and additional testing, in line with the sampling protocol.

Points Breakdown: 3-Star Requirement

When Verified: Completion of design, and final inspection.

Do not install a wood-burning fireplace inside unit or building

Responsible Party: Architect, HVAC Installer

Intent: Eliminate sources of combustion gases and hazardous particulates from peoples' homes

Performance Requirement: Do not specify or install wood-burning fireplaces, stoves or equivalent appliances anywhere inside the thermal envelope of the building.

Points Breakdown: 3-Star Requirement

When Verified: Final inspection

Post jobsite recycling plan on site and maintain at least two bins (one for waste, one for recyclables)

Responsible Party: General Contractor

Intent: Control and minimize waste generated on site.

Performance Requirement: Produce a jobsite recycling plan, clearly post it on site, and draw attention to it at regular safety meetings. Plan should describe project waste management goals, clearly communicate the construction team's responsibility for implementing the plan, what collection bins are provided, where they are located, what materials should and should not go in them, and penalties for contamination of bins. At a minimum, there should be one bin for mixed recyclables and one for waste (non-recyclables).

Points Breakdown: 3-Star Requirement

When Verified: At every site visit

Cross-references: See Section 5

4-Star Requirements

	required	Meet 3-Star requirements
	required	Achieve a minimum of 60 points from sections 2-5

Site & Water	required	Amend disturbed soil with compost to a depth of min. 10 inches to restore soil environmental functions (See Action Item 2-16)
Site & Water	required	Landscape with plants appropriate for site topography and soil types, emphasizing use of plants with low watering requirements (drought tolerant) (See Action Item 2-41)
Site & Water	required	Install ALL bathroom faucets with gpm 1.5 or less, must be WaterSense labelled (See below)
Site & Water	required	Install ALL showerheads with 1.75 gpm or less, must be WaterSense labelled (See Action Item 2-50)
Site & Water	required	Install ALL toilets with 1.28 gpf or less average flush rate, must be WaterSense labelled (See Action Item 2-54)
Energy	required	Building modeled to have 20% better performance than the Washington State Energy Code cycle under which the project is permitted (See Action Item 3-1)
Energy	required	Set up automatic energy benchmarking in Portfolio Manager and share data with Built Green (See below)
Energy	required	Design for solar readiness (See below)
Energy	required	80% of installed lighting shall be high efficacy AND listed on an approved "Qualified Products List" (See Action Item 3-40)
IAQ	required	Provide track-off mats, carpets, and/or shoe grates at principle entryways to building (See Action Item 4-69)
IAQ	required	Use CARB II and/or NAUF composite wood products for indoor applications (See below)
IAQ	required	Provide range exhaust hood directly over cooking appliance. Exhaust hood shall vent directly to the exterior of the building. General kitchen exhaust or recirculating hoods shall not meet this requirement. (See below)
Materials	required	Achieve minimum recycling rate of 50% by weight (See Action Items 5-13 through 5-29)

Install ALL bathroom faucets with GPM 1.5 or less, must be WaterSense labelled

Responsible Party: Architect, Plumbing Engineer, Plumbing Subcontractor

Intent: Reduce consumption to conserve water and energy associated with the delivery and treatment of water and wastewater and reduce building operating expenses.

Performance Requirement: All bathroom faucets/aerators (in units AND common areas) should be WaterSense labelled and must deliver 1.5 gpm or less in normal operating conditions. Rebates may be available for low-flow fixtures.

Points Breakdown: 4-Star Requirement

When Verified: Verify by flow test at final inspection

Design for Solar Readiness

Responsible Party: Architect/Designer

Intent: Optimize the building's potential for future installation of renewable energy systems to minimize non-renewable fuel consumption

Performance Requirement:

A solar zone shall be provided on the roof of the building or elsewhere on the building site. The area of the solar zone shall be the lesser of:

- 40% of the gross roof area (less area occupied by skylights and/or rooftop decks).
- Sized for an array capacity equal to 20% of the building's electrical service size.

Structural provisions shall be provided to address the future solar system.

Provisions for either photovoltaic arrays, or solar thermal arrays, or both, shall be provided.

For future PV:

- A capped roof penetration sleeve shall be provided in the vicinity of the future inverter, sized to accommodate the future PV system conduit.
- Means of interconnection at the main service panel shall be identified.
- Locations for future inverters, metering equipment and overcurrent device, and routing for future wiring shall be identified on As-built plans, provided to the owner/management.

For future solar thermal:

- Two capped pipe tees shall be provided upstream of hot water heating equipment for future interconnection of the solar water heating system
- Two roof penetration sleeves shall be provided, capable of accommodating supply and return piping for a future solar water heating system.
- Future location of thermal storage tanks and route for future piping shall be identified on plans.

Points Breakdown: 4-Star Requirement

When Verified: Completion of design, Final inspection

Set up automatic energy benchmarking in Portfolio Manager and share data with Built Green

Responsible Party: Owner, Property Management

Intent: Increase access to whole building energy consumption data for building performance measurement purposes

Performance Requirement: Create a building account in ENERGY STAR Portfolio Manager (ESPM) and set up a system for automatically or manually uploading monthly energy consumption data from utility bills and entering it into ESPM. Third-party billing services and building performance monitoring services can provide this service. Share the ESPM Account with the Built Green Program Manager Account (builtgreen@mbaks.com).

Points Breakdown: 4-Star Requirement

When Verified: Review ESPM account, and utility data collection plan at time of final inspection

Cross-references: Action Item 3-56

Resources: ENERGY STAR Portfolio Manager - www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager

Use CARB II and/or NAUF composite wood products for indoor applications

Responsible Party: Interior Designer, General Contractor

Intent: Protect worker and occupant health from harmful off-gassing from formaldehyde

Performance Requirement: Specify and use only CARB II compliant or certified No Added Urea Formaldehyde (NAUF) wood products for interior application.

Points Breakdown: 4-Star Requirement

When Verified: Review of product documentation and visually verify during intermediate and final construction inspections

Cross-references: Action Items 4-16, 4-17, 4-18, 4-19, 4-20

Provide range exhaust hood directly over cooking appliance. Exhaust hood shall vent directly to the exterior of the building. General kitchen exhaust or recirculating hoods shall not meet this requirement

Responsible Party: Architect, Mechanical Engineer, General Contractor, Venting Installer

Intent: Ensure effective removal of contaminants from cooking through installation of effective range hoods.

Performance Requirement: Install a range hood over every cooking appliance, and vent it to the exterior of the building.

Points Breakdown: 4-Star Requirement

When Verified: Completion of design, Final construction inspection

Cross-references: Action Item 4-61

5-Star Requirements

	required	Meet 4-Star requirements
	required	Achieve a minimum of 90 points from sections 2-5
Site & Water	required	Install ALL bathroom faucets with gpm 1.0 or less, must be WaterSense labelled (See Action Item 2-48)
Site & Water	required	Install ALL showerheads with gpm 1.5 or less, must be WaterSense labelled (See Action Item 2-50)
Site & Water	required	Install ALL toilets with 1.1 gpf or less average flush rate, must be WaterSense labelled (See Action Item 2-54)
Site & Water	required	Manage 50% of stormwater on site (See Action Item 2-20 for definition)
Energy	required	Building modeled to have 30% better performance than the Washington State Energy Code cycle under which the project is permitted (See Action Item 3-1)
Energy	required	Install solar PV producing 150 kWh for every 1000 sq ft OR install solar hot water producing 500 kBtu for every 1000 sq ft. (See Action Items 3-54 and 3-55)
IAQ	required	All hard surface flooring must contain no orthophthalates (See Action Item 4-22)
IAQ	required	All carpet must contain no fly ash (See Action Item 4-26)
Materials	required	Achieve a minimum recycling rate of 90% of waste by weight (See Action Items 5-13 through 5-29)

SECTION ONE: BUILT GREEN TEAM

1-1: Use Built Green member subcontractors, vendors, service providers, and real estate agents

Responsible Party: Owner/Developer

Intent: Cultivate relationships among the green building community and work with professionals who have more familiarity with Built Green and its requirements

Performance Requirement: The professional or company must be a current Built Green member at the time of contracting with them

Points: 1 point per member. Maximum 10 points

References: builtgreen.net member search

1-2a: Incorporate Built Green early in the design development phase by conducting an eco-charrette with the development team and owner to determine Built Green features to be included in the project

1-2b: Identify team member roles and how they relate to various phases of green lot design, prep and development

1-2c: Create a mission statement that includes the project's goals and objectives

Responsible Party: Owner/Developer

Intent: Incorporate green strategies early in the process, so they are better integrated into the process. Ensure all team members and stakeholders understand each other's roles, responsibilities, areas of impacts, expertise, and ideas. Establish team consensus around the project's aims.

Performance Requirement: The development team and owner must meet early in the design development phase to discuss Built Green as a part of the project. The third-party verifier must participate in this meeting. During this meeting, a mission statement should be developed and roles clearly identified.

Points: 5 points

1-3: Provide all documentation/copies to third-party verifier electronically

Responsible Party: Owner/Developer

Intent: Reduce paper waste, expedite project administration and review.

Performance Requirement: All project documentation shall be submitted to the third-party verifier electronically.

Points: 1 point

SECTION TWO: SITE AND WATER

2-1: Build on an infill lot to take advantage of existing infrastructure and reduce development of virgin sites

Responsible Party: Owner/Developer

Intent: Optimize the use of existing infrastructure (including services and transit), avoid infrastructure extensions and protect undeveloped productive agricultural land and natural habitat.

Performance Requirement: Demonstrate the lot boundary is within 100 ft of existing water, sewer and electrical service, and does not extend main gas line.

Infill lots are in areas in which each lot being developed already has access to municipal water and sewer, electricity, and roads, but *excluding* lots in designated critical areas or overly steep slopes. Land development and infrastructure installation must have been completed at least 5 years before the project site was acquired by the owner.

In those cases where a building already exists on the lot, Built Green encourages renovation of the existing structures if possible, or removal of the structure to another site to allow the highest use of zoning allowances. If the building is not structurally sound, then deconstruction, salvage and recycling of materials becomes the secondary goal.

Points: 10 points

When verified: Design Phase

2-2: Build in a planned Built Green development or certified Built Green Community

Responsible Party: Owner/Developer

Intent: Focus new construction in developments that are ecologically sound, and pedestrian and transit oriented.

Performance Requirement: Locate your project in a development that is already certified under the Built Green Community program, or which is requiring Built Green certification for projects within it.

Points: 10 points

When verified: Design Phase

2-3: Build on a greyfield or brownfield site

Responsible Party: Owner/Developer

Intent: To enhance the utilization of previously developed sites that are currently under-utilized due to abandonment, or contamination.

Performance Requirement: Select a site which is either:

- Greyfield – Existing development is economically obsolescent, failing, moribund or underused, and at least 50% impervious surface. Provide a determination by an authority having jurisdiction, or an assessment by a qualified community economic development authority; or

- Brownfield – where development or reuse may be complicated by the presence or potential presence of hazardous pollutants. Provide a determination by an authority having jurisdiction over the site, or the finding of a Phase 1 or Phase 2 Environmental Site Assessment

Points: 20 points

When verified: Design Phase

2-4: Create a Low Impact Development as defined in handbook

Responsible Party: Owner/Developer, Civil Engineer

Intent: Prevent measurable physical, chemical, or biological degradation to streams, lakes, wetlands and other natural aquatic systems from real estate development sites. Low Impact Development (LID) defines an approach to site design and planning based on preserving or restoring the watershed's natural hydrologic functions as the natural site water management system. The goal is to create a site that provides the hydrologic functionally equivalent performance of the pre-development (native) forested hydrologic condition. Achieving this goal requires a comprehensive approach to planning and designing the site. Not all sites are appropriate for this comprehensive approach; however there are individual techniques that can be used for any project.

Performance Requirement: To earn this credit, the project must meet the applicable local stormwater flow control code requirement using only groundwater infiltration, and on-site Low Impact Development BMPs, as required in the 2014 Stormwater Management Manual for Western Washington, and including rainwater harvesting for indoor reuse. I.E. the need for detention and other conventional stormwater BMPs is eliminated. There should be no overland flow or storm sewer conveyance off the site. Not all sites will be suitable for 100% retention, and credit can be earned for implementation of individual LID strategies under other Action Items in the Site and Water section.

Points Breakdown: 30 points

When Verified: Review surface water management design prior to construction. Visual verification of installed BMPs at time of final inspections.

Cross-References: Action Items 2-8, 2-9, 2-10, 2-16, 2-20, 2-21, 2-22, 2-58

Resources: Western and Eastern Washington SWMMs, LID Technical Manual for Puget Sound, etc.

2-5: Meet or exceed City of Seattle's Green Factor Standards

Responsible Party: Owner/Developer, Civil Engineer, Landscape Designer

Intent: Seattle Green Factor is a score-based code requirement that increases the amount of and improves the quality of landscaping in new development. Landscaping plays an important role in how new development looks and functions. Green Factor is required in some zones and for some building types in Seattle

Performance Requirement: For Seattle projects which have a Green Factor requirement, demonstrate compliance with Green Factor requirements using Landscape design documents and use the Green Factor calculator to calculate and document the Green Factor for the project.

Points Breakdown:

- Green Factor 0.6 5 points
- Green Factor 0.7 10 points
- Green Factor 0.8 15 points
- Green Factor 0.8 20 points
- Green Factor 1.0 25 points

When Verified: Design documents and Green Factor calculation should be reviewed prior to construction. Landscape should be visually verified when fully installed.

2-6: Bonus points: Use of Green Factor where it is not part of the project's jurisdictional development requirements

Responsible Party: Owner/Developer, Civil Engineer, Landscape Designer

Intent: Seattle Green Factor is a score-based code requirement that increases the amount of and improves the quality of landscaping in new development. Landscaping plays an important role in how new development looks and functions. Green Factor is currently required in some zones and for some building types in Seattle.

Performance Requirement: For projects which do not have a Green Factor requirement (in Seattle or elsewhere), complete Action Item 2-5, and earn additional points for a higher Green Factor score.

Points Breakdown:

- Green Factor 0.3 1 point
- Green Factor 0.4 2 points
- Green Factor 0.5 3 points
- Green Factor 0.6 4 points
- Green Factor 0.7 4 points

- Green Factor 0.8 4 points
- Green Factor 0.8 5 points
- Green Factor 1.0 5 points

These points are cumulative with those claimed in 2-5.

When Verified: Design documents and Green Factor calculation should be reviewed prior to construction. Landscape should be visually verified when fully installed.

Cross-references: 2-5

2-7: For each acre of development, set aside an equal amount of land as a conservation easement or transfer of development rights

Responsible Party: Owner

Intent: Limit the long term ecological impact of new development by protecting areas of higher ecological value

Performance Requirement: Set up a permanent conservation easement on land of equal or greater size and ecological value than the development site; or donate it to a community land trust; or enroll it in a Transfer of Development Rights (TDR) program where available.

Points Breakdown: 20 points

When Verified: Documentation review at time of final inspection

Cross-references: Action Item 2-11

Resources: King County TDR program - http://www.kingcounty.gov/services/environment/stewardship/sustainable-building/transfer-development-rights.aspx

Snohomish County TDR program - https://snohomishcountywa.gov/1523/Transfer-of-Development-Rights

Washington Land Trusts - www.walandtrusts.org

The Land Trust Alliance - www.landtrustalliance.org

The Nature Conservancy - www.nature.org

2-8: Avoid soil compaction by limiting heavy equipment use to building footprint and construction entrance

Responsible Party: General Contractor

Intent: Maintain the hydrological performance of the site

Performance Requirement: Develop and implement a soil protection plan, clearly identify areas where heavy equipment is allowed with construction fencing and signage, and communicate penalties for anyone operating equipment outside those areas

Points Breakdown: 3 points

When Verified: Visually verify during intermediate construction inspections, with review of plan

2-9: Preserve existing native vegetation as landscaping (min. 25% preserved)

Responsible Party: Landscape Designer, General Contractor

Intent: Maintaining ecological and hydrological function on the site. Retaining mature native and climate adaptive vegetation in a landscape (rather than removing and then replanting) reduces landscape maintenance, fertilizer and pesticide use, and also provides excellent erosion, sediment, dust, and pollution control.

Performance Requirement: Preserve existing native and climate-adaptive species on 25% or more of the vegetated area of the finished project.

During building layout, identify existing native plants, including trees and understory plants that you want to save. Identify and remove any non-native and invasive species as part of the preservation plan. Precautions during site preparation include the following:

Define protected areas on plans and field stake or flag on site. Identify or flag non-clearing buffers, open spaces, and setbacks from streams, wetlands, and steep slopes as indicated on plat maps.

Clear only actual areas needed to install driveways, parking areas, and building foundations.

Review site areas to be graded with excavation crew to ensure compliance with preservation plan.

Provide fencing for critical areas, such as tree root zones, to prevent crushing or filling.

If trees only (not understory) are designated for protection, hand clearing of understory will help protect tree roots. Be careful, however, about exposing some trees by clearing around them—they may become hazards in strong winds or rain. Check with an arborist.

Check grading operations frequently to prevent accidental damage to marked areas.

Never park heavy equipment or store heavy materials under trees.

Points: 3 points

When verified: Design Phase landscape plan review, visual verification during intermediate construction and final inspections

Cross-references: Action Items 2-8, 2-10

2-10: Retain trees on site

Responsible Party: Owner/Developer, Landscape Designer, General Contractor

Intent: Retain and protect mature trees to preserve the ecological and hydrological function of the site, and provide shade and transpiration cooling.

Performance Requirement: Perform a tree survey and preserve a percentage of the existing healthy trees on site. Trees determined to be unhealthy or hazardous should be excluded from the calculation. Tree preservation plan must include tree protection measures during construction.

Points Breakdown: 1 point for each 20% of existing trees retained.

When Verified: Tree survey verified during design. Tree protection measures visually verified at intermediate inspection and final tree count at substantial completion.

Cross References: Action Item 2-8

2-11: Restore percentage of site outside the footprint for the life of the building

Responsible Party: Owner/Developer, Landscape Designer, General Contractor

Intent: Maintaining the hydrological and ecological function of the site. Preserving areas of healthy, organic soil, in situ, is the best solution for hydrological and ecological function. Setting aside undisturbed areas of the site helps preserve soil stability, structure and biological diversity, and complexity. Healthy soils support healthy vegetation and clean contaminants from stormwater runoff before they enter receiving water bodies. Natural, vegetated filter areas also allow rainwater to stay on site and soak into the ground, recharging groundwater, instead of running off site. In addition, they provide a cost effective head start on landscaping.

Performance Requirement: Leave a percentage of the site, including native and adaptive plant species undisturbed. Area should be full protected during construction – no vehicles or lay down areas, or sediment on-flow. Invasive species should be removed to the extent feasible.

Where there are no significant undisturbed areas, the developer can choose an appropriate area in which to restore soil, water function and vegetation to mimic natural systems. Design work should be completed by someone with training and expertise in ecological restoration.

This area must be protected for the life of the building with a Conservation Easement, or equivalent covenant. Talk to local Community Land Trust organizations, or King County Parks.

Points Breakdown:

10% 10 points

20% 12 points

30% 15 points

When Verified: Set aside area verified during design. Conservation Set Aside reviewed no later than substantial completion of construction. Set aside area and protection measures visually verified at intermediate inspection and at substantial completion.

References: Washington Land Trusts - www.walandtrusts.org

The Land Trust Alliance - www.landtrustalliance.org

The Nature Conservancy - www.nature.org

2-12: Install and maintain temporary erosion control devices that significantly reduce sediment discharge from the site beyond code requirements

Responsible Party: Civil Engineer, General Contractor

Intent: Avoid stormwater related problems (erosion and increased runoff during construction), which can physical, chemical and biological degradation to receiving waters, delay construction, add costs, and damage public and private properties down-stream.

Performance Requirement: Develop and implement a Temporary Erosion and Sedimentation Control (TESC) Plan that exceeds minimum requirements (by including redundant, back-up BMPs, for example) and actively monitor and maintain all BMPs throughout the project

Points Breakdown: 2 points

When Verified: Review Erosion Control Plan prior to the start of construction. Visually verified at intermediate and final inspections.

Cross-references: Action Items 2-13, 2-14

Resources: Salmon Safe – www.salmonsafe.org

King County Erosion & Sediment Control Standards - http://your.kingcounty.gov/dnrp/library/water-and-land/stormwater/surface-water-design-manual/appendix-d.pdf

2-13: Use compost to stabilize disturbed slopes during construction

Responsible Party: Civil Engineer, General Contractor

Intent: Minimize erosion and increased runoff during construction) and improve soil quality and health.

Performance Requirement: This credit only available on sites with defined slopes greater than 20%. Apply compost to cover the entire exposed soil surface, extending approximately 3 feet over the top of the slope or meshing into existing vegetation. The compost application rate will vary depending upon degree of slope, soil type, and compost characteristics. If slope is greater than 50% (2 horizontal to 1 vertical), do not use compost blanket; slope should be terraced with retaining walls.

Points Breakdown: 3 points

When Verified: Visually verified during intermediate inspections

Cross-references: Action Item 2-12, 2-14

Resources: King County Erosion & Sediment Control Standards - http://your.kingcounty.gov/dnrp/library/water-and-land/stormwater/surface-water-design-manual/appendix-d.pdf

2-14: Retain all native top soil in-situ, or stockpile and protect from erosion

Responsible Party: Civil Engineer, General Contractor

Intent: Maintaining the hydrological and ecological function of the site. Native topsoil is the top layer of organic soil at the site. Undisturbed native top soil is valuable because it has developed on the site over time and is well adapted to the climate and local vegetation. Even when disturbed and then replaced, will regain optimal performance sooner than imported soil. Imported topsoils are not as well adapted to your site and will not develop optimal nutrient structure, disease resistance, or hydrologic capabilities for several years.

Performance Requirement: Prepare a Soil Management Plan. Retain native topsoil in place and uncompacted as much as possible. Where it must be removed to expose structural soil, it should be separated, stockpiled and reused on site as a top layer in grading planting areas. Protect stockpiled topsoil from erosion by covering with compost or mulch, surround with a reusable silt fence and inspect regularly for proper coverage or sign of erosion until ready for reuse.

Points Breakdown:

Retain native topsoil outside the building footprint in-situ	5 points
Stockpile and protect topsoil for reuse at final grading	2 points

When Verified: Visually verified during intermediate and final construction inspections.

Resources: King County Erosion & Sediment Control Standards - http://your.kingcounty.gov/dnrp/library/water-and-land/stormwater/surface-water-design-manual/appendix-d.pdf

King County: Achieving the Post-Construction Soil Standard - https://your.kingcounty.gov/solidwaste/greenbuilding/documents/Post-Construction-Soil-Standard.pdf

King County Soil Management Plan - http://your.kingcounty.gov/solidwaste/documents/soil-management-plan.pdf

2-15: Balance cut and fill, while minimizing change to original topography

Responsible Party: Civil Engineer, General Contractor

Intent: Maintain hydrological function of the site and minimize the import and export of structural and organic soils

Performance Requirement: Develop and implement a detailed grading plan that avoids major alterations to the natural topography

Points Breakdown: 3 points

When Verified: Review plan pre-construction, and visually verify during intermediate construction inspections

2-16: Amend disturbed soil with compost to a depth of min. 10 inches to restore soil environmental functions

Responsible Party: Civil Engineer, General Contractor

Intent: Improve soil quality and hydrological function. Compost amendments improve water infiltration and retention, reduce summer irrigation demand, and improve landscape health.

Performance Requirement: Prepare a Soil Management Plan. Amend soil to a depth of 10” or more with mature, stable compost. As a rule of thumb, a 2 to 1 ratio of existing soil to compost, by loose volume, will achieve the desired organics level of 8% to 13% by soil weight. The final depth of the amended soil will be between ten and twelve inches, depending upon the equipment you use.

Points Breakdown: 4 points

When Verified: Visually verify at time of final inspections, with review of soil management plan

Cross-references: Action Item 2-4

Resources: King County: Achieving the Post-Construction Soil Standard - https://your.kingcounty.gov/solidwaste/greenbuilding/documents/Post-Construction-Soil-Standard.pdf

King County Soil Management Plan - http://your.kingcounty.gov/solidwaste/documents/soil-management-plan.pdf

2-17: Replant or donate removed vegetation for immediate reuse

Responsible Party: Landscape Contractor, General Contractor

Intent: Preserve the ecological value of mature plants

Performance Requirement: Identify healthy mature vegetation for removal. Take appropriate steps to ensure plant survival – replant as soon as possible or keep shaded, protect root balls and maintain moisture levels during storage

Points Breakdown: 2 points

When Verified: Review documentation on plant donations or visually verify on site replanting during construction.

Cross-references: Action Item 2-9

2-18: Use plants salvaged from another site

Responsible Party: Landscape Contractor, General Contractor

Intent: Preserve the ecological value of mature plants

Performance Requirement: Install mature plants that have been salvaged from another site, either through a plant salvage program, or through direct collaboration with the owner

Points Breakdown: 2 points

When Verified: Review documentation and visually verify mature plants at final inspection

Cross-references: Action Item 2-17

2-19: Grind land clearing wood and stumps for reuse on site

Responsible Party: General Contractor

Intent: Cost effective way to reduce jobsite waste and amend the soil. Can also be used to protect stockpiled topsoil.

Performance Requirement: Use a chipper and/or tub grinder onsite to convert land clearing waste to mulch for erosion control mulch

Points Breakdown: 3 points

When Verified: Visually verify in early construction or photo documentation

Cross-references: Action Item 2-12, 2-14

2-20: Manage specified percentage of stormwater from roof on site by 60%, 80% or 100%

Responsible Party: Architect, Civil Engineer, Landscape Designer

Intent: Reduce measurable physical, chemical, or biological degradation to streams, lakes, wetlands and other natural aquatic systems from real estate development sites, by limiting and buffering stormwater runoff from the site.

Performance Requirement: Design and install on-site storm water management BMPs that that are sized to retain on-site a percentage of the roof and impervious surface runoff from the 2-year, 24 hour storm event instead of directing it to the municipal storm system.

Points Breakdown:

50%	5-star Requirement
60%	10 points
80%	20 points
100%	30 points

When Verified: Review sizing calculations at completion of design, visually verify BMPs at final inspections

Cross-references: Action Item 2-4

Resources: King County Surface Water Design Manual - http://www.kingcounty.gov/services/environment/water-and-land/stormwater/documents/surface-water-design-manual.aspx

LID Technical Guidance Manual for Puget Sound - http://www.psp.wa.gov/downloads/LID/20121221_LIDmanual_FINAL_secure.pdf

2-21: Design to achieve 50%, 75% or 90% effective pervious surface outside of building footprint

Responsible Party: Architect, Civil Engineer, General Contractor

Intent: Reduce measurable physical, chemical, or biological degradation to streams, lakes, wetlands and other natural aquatic systems from real estate development sites, by limiting and buffering stormwater runoff from the site.

Performance Requirement: Design landscape and engineered stormwater management facilities so that a percentage of the site outside the building footprint is either pervious (vegetated surfaces, pervious paving, etc.) or drains to an engineered facility designed to retain and infiltrate 100% of the runoff from that surface in a 2-year, 24-hour storm event without overflow to the municipal storm system

Points Breakdown:

50% effective pervious surface	5 points
75% effective pervious surface	10 points
90% effective pervious surface	15 points

When Verified: Review of sizing calculations at completion of design. Visually verify BMPs at final inspections

Cross-references: Action Item 2-4, 2-20

2-22: Install vegetated roof system (e.g. green roof) to reduce impervious surface on 25%, 50%, or 90%+ of total roof surface

Responsible Party: Architect, General Contractor

Intent: Reduce stormwater runoff, building heat gain, and urban heat island effect

Performance Requirement: Install vegetated roof system on 25%, 50% or 90%+ of roof surface

Points Breakdown:

25%	10 points
50%	15 points
90%	25 points

When Verified: Review of sizing calculations. Visually verify installation at final inspection

2-23: Integrate landscaping with parking area beyond code

Responsible Party: Architect, Landscape Designer, General Contractor

Intent: Reduce stormwater runoff, enhance appearance, reduce heat island effect, and provide habitat for wildlife and shade for cars

Performance Requirement: Exceed local code requirements for integrating landscaping into parking area by total square footage. Direct stormwater runoff from paving into landscape areas where appropriate.

Points Breakdown: 1 point

When Verified: Visually verify during final inspections

Cross-references: Action Item 2-4, 2-20, 2-21, 2-25

2-24: Install an ENERGY STAR Qualified roof

Responsible Party: Architect, General Contractor

Intent: Using a high-albedo roof, as certified by ENERGY STAR, will reduce heat island effect – where ambient temperatures in built up areas increase due to the absorption and re-radiation of solar energy. In buildings with air conditioning, ENERGY STAR roofing may reduce summertime cooling loads, by reducing direct radiant gain, as well as reducing the temperature of ventilation air drawn through roof-top air handlers.

Performance Requirement: Specify and install an ENERGY STAR qualified roofing product for 90% of the roofing area not covered by vegetated roof, mechanical equipment, and accessible amenity areas.

Building operation and maintenance manuals should include periodic monitoring and cleaning plan (see manufacturer guidelines) to maintain the roof's reflectance.

Points Breakdown: 5 points

When Verified: Visually verified at final inspection

Cross References: Action Item 2-35, 5-69, 5-70, 5-71

2-25: Provide shading for 30% of hardscapes by using landscape, landscape features, or overhangs

Responsible Party: Architect, Landscape Designer

Intent: Reduce heat island effect and building heat gain

Performance Requirement: Install landscape or overhangs to cover at least 30% of hardscapes. Shading should be calculated at 12 noon Pacific Standard Time on June 21, with tree canopy at 5 years growth.

Points Breakdown: 5 points

When Verified: Review of calculations at completion of design and visually verified during final inspections

Cross-references: Action Item 2-23, 3-10c, 4-44g

2-26: For all exterior hardscape, including surface parking, use only light-colored pavement for 90% of project area (Solar Reflective Index of .28 or better)

Responsible Party: Architect, General Contractor

Intent: Using light-colored, high-albedo paving materials will reduce heat island effect – where ambient temperatures in built up areas increase due to the absorption and re-radiation of solar energy. In buildings with air conditioning, light-colored paving around the building may reduce summertime cooling loads, by reducing the ambient temperature of ventilation air drawn into the building.

Performance Requirement: Install paving materials with an aged Solar Reflectance of 0.28 (or initial Solar Reflectance of 0.33) or better, or open pavers that are 50% vegetation, for 90% of the paved hardscape area of the project that will not be shaded by structure or vegetation at 5 year maturity.

Building operation and maintenance manuals should include periodic monitoring and cleaning plan to maintain the reflectance of the paving materials.

Points Breakdown: 5 points

When Verified: Visually verified at final inspection

2-27: Wash out concrete trucks in slab or pavement subbase areas, or use washout boxes

Responsible Party: General Contractor

Intent: Maintain hydrological function of site

Performance Requirement: Either use concrete washout boxes to capture concrete washout and break it up for recycling, or wash trucks out only in sub-base areas that will support impervious surfaces

Points Breakdown: 1 point

When Verified: Visually verified during site construction visits

2-28: Establish and post clean up procedures for spills to prevent illegal discharges

Responsible Party: General Contractor

Intent: Prevent runoff from spills from contaminating the site, local waterways, and surrounding stormwater systems.

Performance Requirement: Create Clean-up Procedures Plan that includes clean up procedures for materials that will be used on site. Post the plan prominently in a central location on site and refer to them regularly during safety meetings.

Points Breakdown: 3 points

When Verified: Visually verified during site construction visits

2-29: Reduce hazardous waste through good jobsite housekeeping

Responsible Party: Architect, General Contractor

Intent: Prevent runoff from hazardous waste from contaminating the site, local waterways, and surrounding stormwater systems; limit worker exposure; and reduce the risk of accidental spills and cleanup liability.

Performance Requirement: Add requirements for use of non-hazardous alternative materials, when available, to Specifications. Create a Good Jobsite Housekeeping Plan. Post the Plan prominently in a central location on site and refer to them regularly during safety meetings.

Points Breakdown: 1 point

When Verified: Review specifications and visually verify during site construction visits

2-30: Construct tire wash, establish and post clean up protocol for use

Responsible Party: Civil Engineer, General Contractor

Intent: Limit the export of site sediments outside the Temporary Erosion and Sediment Control boundary

Performance Requirement: Include on-site tire wash in TESC plan. Tire wash must be well marked as a wash area; be no larger than the largest vehicle; and posted with a sign that forbids washing with solvents or changing oil and indicates nearest oil recycling area. If the wash area is connected to the sanitary sewer, it must be paved and drain to an oil water separator. Otherwise, direct tire wash water to other sediment trap or pond. Provide temporary gravel base on site to keep vehicles clean. Post tire wash protocol for all trades or field labor using vehicles on site.

Points Breakdown: 2 points

When Verified: Visually verified during on site construction visits

2-31: Use slow release organic fertilizers to establish vegetation

Responsible Party: Landscape designer, Landscape Installer

Intent: To protect surface- and ground-water from high concentrations of nutrients in stormwater runoff, which can cause algal blooms, reduce water quality and impede aquatic lifecycles.

Performance Requirement: All fertilizer used to establish newly installed landscaping should meet the following labelled requirements, defined by the Washington State Department of Agriculture:

- Slow release - At least 60% of the available nitrogen should be water insoluble, pelletized or slow release (excluding any coated urea).

Sufficient fertilizer to complete establishment should be provided to the building management (or included with a maintenance contract) and these labeling requirements should be included in the Operation & Maintenance documents.

Points: 2 points

When Verified: Final inspection or photo documentation

Resources: Salmon Safe Urban Standards – October 2014. Page 55
https://www.salmonsafe.org/sites/default/files/file/SS_UrbanStandards_121214.pdf

Grow Smart, Grow Safe -
https://www.growsmartgrowsafe.org/NaturalYardCare/SoilAmendments

WSDA Pesticides and Fertilizer resources - http://agr.wa.gov/Portals/PF/

2-32: Use less toxic form release agent

Responsible Party: Concrete installers

Intent: To maintain site safety standards and protect surface- and ground water from contamination, by avoiding the use of common toxic concrete form release agents, such as diesel fuel, or hydraulic oil, which can contaminate storm water runoff

Performance Requirement: Form release agents must have total VOC levels of 250 g/L or less, and must not contain petroleum solvent as the carrying agent.

Points: 2 points

When Verified: Visual verification during intermediate construction inspections, cut sheet or photo documentation

2-33: Use non-toxic (10 pts) or low-toxic (8 pts) outdoor materials for all landscaping

Responsible Party: Landscape Designer, General Contractor

Intent: Protect soil health and runoff water quality by eliminating toxins in the landscape

Performance Requirement: At least 75% (by cost or square footage) of landscaping structural and retaining materials should be either non-toxic (stone, concrete, naturally rot-resistant wood) or low-toxic (inert plastics, untreated ferrous metals, borate-treated wood).

Points Breakdown:

100% non-toxic: 10 points

Mix of non-toxic and low-toxic: 8 points

When Verified: Installed materials visually verified at final inspection, with review of product documentation if needed.

Cross-references: Action Items 5-15, 5-79, 5-80, 5-81

2-34: Use only "Low Hazard" pesticides and herbicides for landscape installation and in Operations & Maintenance Plan

Responsible Party: Contractor**,** Owner, Property Management

Intent: Avoid the introduction of chemicals that are hazardous to humans, terrestrial and aquatic ecosystems

Performance Requirement: All pesticides and herbicides used in the preparation and installation of landscaping must only contain active ingredients that are rated as "Low Hazard/Green" on www.GrowSmartGrowSafe.org website. Avoid products whose active ingredient is rated "Red" for one or more sub-categories (Human, Pet & Wildlife, Aquatic Life or Water Pollution).

Include GrowSmartGrowSafe documentation for the selected products in the Landscape O&M manual, along with the language of this requirement for replacement products.

Points Breakdown: 5 points

When Verified: Verify product documentation, landscape O&M language, and visually verify use on-site at time of final inspection

Cross-references: Action Items 2-31

Resources: Grow Smart, Grow Safe – www.growsmartgrowsafe.org

2-35: Do not use galvanized metal, EPDM, or PVC roofing materials

Responsible Party: Architect, General Contractor

Intent: Reduce chemical and biological degradation of nearby receiving waters and protect soil health and runoff water quality by reducing toxic chemicals, primarily heavy metals in roof runoff. Galvanized metal, EPDM and PVC roofing membranes have been shown to contribute significant levels of heavy metals to roof runoff water.

Performance Requirement: Project must use no galvanized metal, EPDM or PVC material for roofing.

Points Breakdown: 5 points

When Verified: Visually verified at final inspection, with review of product documentation

Cross-references: Action Item 2-22, 2-24, 5-69, 5-70, 5-71

Resources: Department of Ecology: Toxic chemicals in roof runoff - http://www.ecy.wa.gov/programs/eap/toxics/roofing.html

2-36: Use a modified bitumen built-up or TPO membrane roof

Responsible Party: Architect, General Contractor

Intent: Reduce heavy metal and other contaminants in roof run-off

Performance Requirement: Specify and install either modified bitumen built up roofing, or a TPO membrane roof, as the primary roofing system for the project. Both these roofing materials are proven to contribute fewer contaminants to roof runoff than other flat- or low angle roof products.

Points Breakdown: 2 points

When Verified: Product documentation reviewed and visually verified at intermediate or final site visit

2-37: No clearing or grading during wet weather periods (November – April)

Responsible Party: Owner/Developer, Architect, General Contractor

Intent: Minimize loss of site soils and physical degradation of nearby receiving waters due to erosion and sediment transportation during rainy periods

Performance Requirement: No land clearing or grading work is done between November and April.

Points Breakdown: 5 points

When Verified: Review construction schedule and verify actual clearing and grading dates after these activities are complete.

Cross-references: Action Items 2-12, 2-13, 2-14, 2-15, 2-16

2-38: On-site wastewater treatment for greywater only or for blackwater and greywater, min. 50% captured

Responsible Party: Architect, Plumbing Engineer, Civil Engineer

Intent: Reduce dependence on centralized water treatment facilities

Performance Requirement: Install on-site treatment system sized to manage at least 50% of greywater, or 50% of combined blackwater and greywater generated on-site. Treated water should be reused on-site for irrigation, surface washdown, toilet flushing or other replacement for potable water.

Project teams must check with their local, Health and Building Departments to determine what greywater and blackwater reuse options are allowed BEFORE pursuing this Action Item.

Points Breakdown:

Greywater only:	40 points
Blackwater and greywater:	50 points

When Verified: Review design and sizing calculations and visually verify during site construction visit

Cross-references: Action Items 2-51, 2-52

Resources: Washington State Department of Health - https://www.doh.wa.gov/CommunityandEnvironment/WastewaterManagement/GreywaterReuse (NOTE: Local regulations may vary from State standards)

2-39: Mulch landscape beds with 4 inches of organic mulch

Responsible Party: Landscape designer, General Contractor

Intent: Enhance soil and landscape health, and water retention potential, and limit soil erosion.

Performance Requirement: Mulch all landscape beds with a minimum of 4 inches of organic mulch

Points Breakdown: 2 points

When Verified: Visually verified during final inspection

2-40 Limit use of turf grass, or use no turf grass

Responsible Party: Landscape Designer, General Contractor

Intent: Reduce surface water runoff, protect water quality, and increase wildlife habitat and shading

Performance Requirement: Install landscaping other than turf grass, for a percentage of the landscaped area. Clump grass, legume and wildflower mixes that will be mowed no more than twice per year are an acceptable alternative but should not be used for the entire non-turf area.

Points Breakdown:

25% of landscape not turf grass: 3 points

50% of landscape not turf grass: 6 points

75% of landscape not turf grass: 9 points

100% of landscape not turf grass: 12 points

When Verified: Review calculations and visually verify at final inspection

Cross-references: Action Item 2-4, 2-5, 2-6, 2-9, 2-10, 2-11, 2-18, 2-25, 2-41

2-41: Landscape with plants appropriate for site topography and soil types, emphasizing use of plants with low watering requirements (drought tolerant)

Responsible Party: Landscape Designer, General Contractor

Intent: Reduce water use, maintenance and chemical inputs for landscaping

Performance Requirement: At least 90% of retained existing and newly installed landscaping must be appropriate to the topography and soil types, and be drought tolerant

Points Breakdown: 5 points

When Verified: Review landscape plan and planting lists at completion of design, visually verify at final inspection

Resources: Saving Water Partnership: Plant Lists - http://www.savingwater.org/resources/plantlists/

Seattle Green Factor drought tolerant plant list - http://www.seattle.gov/util/cs/groups/public/@spu/@usm/documents/webcontent/01_012309.pdf

2-42: Install sub-surface or drip systems for irrigation with controls for each zone, including weather or soil moisture-based modulation

Responsible Party: Landscape Designer, General Contractor

Intent: Reduce water consumption for irrigation through the use of appropriate, efficient irrigation systems, with proper controls.

Performance Requirement: Use surface or sub-surface drip irrigation in landscape planting beds (except ground-cover plants). Plantings should be hydro-zoned so that plants with dissimilar watering requirements are not located in the same irrigation zone. Irrigation control must allow for different time and duration of watering for each zone, and should have a soil-moisture sensor, on-site or internet-enabled weather interface to modulate irrigation in coordination with natural precipitation.

Commissioning of irrigation system by the designer or a third-party auditor, prior to turnover, is highly recommended

Points Breakdown: 2 points

When Verified: Visually verified at final inspection

Cross-references: Action Items 2-43, 2-44, 2-45

2-43: Install a WaterSense irrigation system

Responsible Party: Landscape Designer, General Contractor

Intent: Reduce water consumption for landscape irrigation through appropriate irrigation system design.

Performance Requirement: Irrigation system must be designed by a WaterSense certified design professional, and must include a WaterSense certified irrigation controller.

Points Breakdown: 5 points

When Verified: Visually verify at final inspection, with review of designer credential and controller documentation

Commissioning of irrigation system by the designer or a third party WaterSense auditor, prior to turnover, is highly recommended

Cross-references: Action Item 2-42, 2-44, 2-45

Resources: EPA WaterSense Outdoors - www.epa.gov/watersense/outdoors

2-44: Irrigation system commissioned by a professional to ensure no leaks, efficient system

Responsible Party: Owner, Landscape Designer, General Contractor

Intent: Ensure that the irrigation system is installed per the design, is functioning properly and has accurate, understandable operating instructions provided to the property management company.

Performance Requirement: Irrigation designer must specify the basis of design for the operation of the system. At completion of installation and when water is hooked up, the irrigation system must be tested for leaks, for no overspray and head to head coverage of broadcast emitters, proper delivery of water per design, proper setting and operation of the controls (consistent with the WaterSense irrigation audit requirements). Commissioning can be performed by the WaterSense Certified irrigation designer, another WaterSense accredited professional, or equivalent qualified irrigation professional as approved by the BG Program.

Points Breakdown: 3 points

When Verified: Verify the irrigation commissioning report at completion of construction.

Cross-references: 2-43, 2-44

Resources: EPA WaterSense Outdoors - www.epa.gov/watersense/outdoors

2-45: Install landscaping that requires no potable water for irrigation whatsoever after initial establishment period (approximately 2 years)

Responsible Party: Landscape Designer, Plumbing Engineer, General Contractor

Intent: Reduce potable water use for landscaping

Performance Requirement: 100% of landscaping either requires no watering after two years or greywater or rainwater systems are installed for ongoing watering. Landscape designer must provide written statement of design intent to meet this requirement, must confirm the installation meets the design intent, and provide landscape maintenance requirements for the establishment and post-establishment periods.

If using non-potable water for irrigation, landscape designer must also calculate landscape irrigation demand, and show that rainwater harvest/storage, and/or greywater treatment capacity is sufficient to meet demand. Water system designer must provide Operations & Maintenance requirements for the system.

Points Breakdown: 10 points

When Verified: Review statement of design intent and maintenance requirement at time of final inspections. Visually verify salvaged water system and review sizing calculations

Cross-references: Action Item 2-46

2-46: Install rainwater collection system (cistern) that reduces water consumption for irrigation

Responsible Party: Architect, Landscape Designer, Plumbing Designer, General Contractor

Intent: Reduce potable water use for landscaping

Performance Requirement: Install rainwater collection system where the water collected can be used for irrigation for at least 25% of irrigation needs

Points Breakdown:

25% of irrigation needs met by cistern	5 points
50% of irrigation needs met by cistern	10 points
75% of irrigation needs met by cistern	15 points
100% of irrigation needs met by cistern	20 points

When Verified: Review sizing calculations and visually verify at final inspection

Cross-references: Action Item 2-45

2-47: Provide 100% of building and landscaping water use with captured precipitation or reused water purified without the use of chemicals

Responsible Party: Architect, Landscape Designer

Intent: Net zero water! Project lives within the constraints of the site's natural water income from precipitation

Performance Requirement: After an initial startup volume of imported water, the building does not receive any potable water from an outside utility. All water is supplied on site from captured rainwater or reused water purified without the use of chemicals.

Points Breakdown: 50 points

When Verified: Review design and calculations at completion of design, visually verify all components at final inspection

Cross-references: Action Items under Water Conservation, 2-39 through 2-56

Resources: ILFI: Toward Net Zero Water – http://access.living-future.org/ilfi/ideas-action/research/water/toward-net-zero-water

2-48: Install ALL bathroom faucets with 1.0gpm 0.5 gpm, or less, must be WaterSense labelled

Responsible Party: Architect, Plumbing Engineer, Plumbing Subcontractor

Intent: Reduce consumption to conserve water and energy associated with the delivery and treatment of water and wastewater and reduce building operating expenses.

Performance Requirement: All bathroom faucets/aerators (in units AND common areas) should be WaterSense labelled and must deliver 1 gpm or less in normal operating conditions. Rebates may be available for low-flow fixtures.

NOTE: If using 0.5gpm fixtures, ensure that fixture branch lines from hot water source to faucet are small diameter, and as short as possible, to minimize hot water wait times. 50 feet of ½" PEX contains 0.5 gallons of water, which takes 60 seconds to run through to hot.

Points Breakdown:

≤ 1gpm 1 point

≤ 0.5gpm 3 points

When Verified: Verify by flow test at final inspection

Resources:

EPA WaterSense Home - www.epa.gov/watersense

Saving Water Partnership Home – www.savingwater.org

2-49: Install ALL kitchen faucets with 1.8 gpm or less

Responsible Party: Architect, Plumbing Engineer, Plumbing subcontractor

Intent: Reduce consumption to conserve water and energy associated with the delivery and treatment of water and wastewater, and reduce building operating expenses.

Performance Requirement: All kitchen faucets/aerators (in units AND common areas) should be WaterSense labelled and must deliver 1.8 gpm or less in normal operating conditions. Rebates may be available for low-flow fixtures.

Points Breakdown: 3 points

When Verified: Verify by flow test at final inspection

Cross-references: Action Item 2-48

Resources:

EPA WaterSense Home - www.epa.gov/watersense

Saving Water Partnership Home – www.savingwater.org

2-50: Install ALL showerheads with 1.75 gpm, 1.5 gpm or less, must be WaterSense labelled

Responsible Party: Architect, Plumbing Engineer, Plumbing subcontractor

Intent: Reduce consumption to conserve water and energy associated with the delivery and treatment of water and wastewater and reduce building operating expenses.

Performance Requirement: All showerheads (in units AND common areas) should be WaterSense labelled and must deliver 1.75 gpm or less in normal operating conditions. Rebates may be available for low-flow fixtures.

Points Breakdown:

1.75 GPM	5 points
1.5 GPM or less	7 points

When Verified: Verify by flow test at final inspection

2-51: Stub-in plumbing to use greywater for toilet flushing (must test for leaks)

Responsible Party: Plumbing Engineer, General Contractor, Plumbing Subcontractor

Intent: Future-proof the building to preserve potable water sources when greywater treatment becomes more widely available.

Performance Requirement: Keep greywater and blackwater separate until it exits the building and route greywater to a location where it can be tapped for future treatment system. Run purple "reclaimed water" supply piping to all toilet locations and stub out at wall near potable supply, for future switch out. Pressure test and label system. Provide as-built details to owner.

Points Breakdown: 10 points

When Verified: Visually verify during intermediate construction inspections

Cross-references: Action Item 2-38, 2-52

2-52: Use greywater or rainwater for toilet flushing

Responsible Party: Architect, Plumbing Engineer, Plumbing subcontractor

Intent: Reduce use of potable water, and reduce flow volumes in sanitary and storm sewer systems

Performance Requirement: Install an on-site greywater or rainwater collection and storage system that is large enough to provide flushing water for entire project and plumb all toilets to flush from this system, using purple, "reclaimed water" piping, appropriately labelled. Provide specific Operations & Maintenance guidance to owner/property management.

Project teams must check with their local, Health and Building Departments to determine what greywater and rainwater reuse options are allowed BEFORE pursuing this Action Item.

Points Breakdown: 20 points

When Verified: Review of plans and sizing calculations and visually verify plumbing at pre-drywall inspection

Cross-references: Action Items 2-38, 2-45, 2-46, and 2-51

2-53: Provide water sub-metering for each unit

Responsible Party: Owner, Plumbing Designer

Intent: Facilitate water conservation by providing consumption feedback to consumers, and the potential to charge for water based on actual consumption. Also provides greater granularity to leak detection analysis.

Performance Requirement: Install sub-meters on cold water supply to each unit, and hot water if centrally heated. Consumption data must be made available to tenants either via through a direct utility billing service, written statement or access to a web-based utility consumption dashboard.

Points Breakdown: 3 points

When Verified: Visually verified at final inspection, including evidence of consumption data communication system.

2-54: Install WaterSense labelled toilets

Responsible Party: Plumbing Designer, General contractor

Intent: Reduce indoor water consumption through the use of reliable, high efficiency toilets in units and amenity areas.

Performance Requirement: Install WaterSense-labelled, high efficiency toilets in all units and common areas. All toilets must comply to earn the points for each threshold. If using toilets with different flush rates, calculate the weighted average flush rate to demonstrate compliance.

Points Breakdown: Points awarded as follows:

Average 1.28 gallons per flush (gpf)	4 points
Average 1.1 gpf	8 points
Average 0.8 gpf	12 points

(NOTE: At time of publication, WaterSense does not have a labelling standard for flushometer toilets. Therefore, if you install flushometer toilets they are exempt from the WaterSense labelling requirement, but must be specified as 1.28 gpf or less)

When Verified: Visually verified at final inspection, including confirmation that toilets fill to the max water level marked in the tank. Review product documentation.

2-55: Install no-cartridge waterless urinals or 1/8 gallon urinals and 1.28 gpf maximum (WaterSense if not flushometer) toilets in all common areas

Responsible Party: Plumbing Engineer, Plumbing Contractor

Intent: Reduce indoor water consumption through the use of reliable, high efficiency urinals in common/amenity areas

Performance Requirement: Install no-cartridge waterless or 1/8 gallon urinals; and 1.28 gpf WaterSense or flushometer toilets in all common areas.

Points Breakdown: 4 points

When Verified: Visually verify at final inspection, with review of product documentation

2-56: Limit pipe volume between water heat source and furthest fixture

Responsible Party: Architect, Plumbing Engineer, Plumbing Contractor

Intent: Reduce water and energy consumption

Performance Requirement: Pipe run between hot water source (tank, recirc loop, or unit manifold) and furthest fixture should store no more than 0.5 gallons of water. Floorplans must facilitate short pipe runs and plumbing design should use smallest allowable pipe diameter. Document sizing calculations for all typical unit types.

Points Breakdown:

0.5 gallons stored	3 points
0.3 gallons stored	5 points

When Verified: Review sizing calculations at completion of design, and visually verify typical pipe runs during intermediate construction inspections

Cross-references: Action Items 3-35, 3-36

Resources: 0.5 gallons represents the following maximum pipe runs from the hot water source (tank, recirc loop or unit manifold) to the furthest fixture. For 0.3 gallons, multiply run length by 0.6. For a branch with multiple diameters, calculate the aggregate volume.

Type of Pipe	3/8"	½"	¾"	1"
	Max Run (ft)	Max Run (ft)	Max Run (ft)	Max Run (ft)
K copper	75	45	22	12
L copper	60	40	20	12
M copper	60	40	18	11
CPVC	NA	50	24	15
PEX	95	50	26	16

2-57: Do not install garbage disposal

Responsible Party: Architect, General Contractor

Intent: Reduce potable water use and negative impacts on water quality and sewage treatment facilities

Performance Requirement: No garbage disposals are installed in any unit or common area sinks

Points Breakdown: 1 point

When Verified: Visually verified at final inspection

Cross-references: Action Items 5-32, 6-4 and 6-9a

2-58: Follow comprehensive integrated design plan for site and structure

Responsible Party: Owner, Architect, Contractor

Intent: Optimize the water quality and conservation performance outcomes of site and building by setting clear objectives; designing the most effective, constructible solutions; clearly communicating performance objectives and expectations; checking progress and confirming objectives are achieved.

Performance Requirement: At a minimum, maintain a log of the following elements of your development process:

1. A statement of the Owner's functional, environmental, and financial goals for the project.

2. A description of how progress and success towards these goals will be measured through design, construction and operation to ensure that the green features are included and correctly installed.
3. Identify members of the project team, with an explanation of the role of each person, their contribution to the achievement of your Built Green certification, and how and when they will be involved.
4. A summary of the process used to select the green building strategies, systems, and materials that will be incorporated into the project.
5. A description of how achievement of objectives will be monitored in construction and confirmed at completion.
6. A plan for how issues will be resolved, if progress on certain goals are not meeting targets.

Points Breakdown: 10 Points

When Verified: In design and construction, with document review at time of final inspection

2-59: Provide community common areas accessible to all building occupants

Responsible Party: Architect, Landscape Designer

Intent: Provide opportunity to develop a sense of community and security; and reduce transportation to other sites by providing for social interaction on site.

Performance Requirement: Set aside a minimum of 1,000 square feet for common areas, made accessible to all occupants by using universal design standards.

Points Breakdown: 5 points

When Verified: Visually verified at final inspection

2-60: Take advantage of parking reduction credits that are available in your jurisdiction

Responsible Party: Architect

Intent: Reduce impervious surface and excess land usage for surface parking; or materials needed for structured parking

Performance Requirement: Reduce parking below the minimum standard for the zone, by pursuing offered reduction credits. Incorporate into design and operating policies any parking reduction strategies that are offered by local jurisdiction – such as providing

additional affordable units, senior-assisted living, provision of alternate transportation options, etc.

Points Breakdown: 2 points

When Verified: Review documentation, and visually verify any required parking provisions at time of final inspection

2-61: Provide structured parking within the proposed building footprint at a 50% minimum or 100%

Responsible Party: Architect

Intent: Reduce stormwater management and excess land usage of surface parking

Performance Requirement: Provide at least 50% of project parking stalls in structured parking within the building footprint

Points Breakdown:

50% of parking within building footprint	5 points
100% of parking within building footprint	10 points

When Verified: Visually verified at final inspection

2-62: Create a Transit-Oriented Development

Responsible Party: Owner, Architect

Intent: Reduce environmental and social impact of single-occupant vehicle use by locating housing in close proximity to transit stops and providing residents with amenities that support multi-modal transportation solutions, including walkability. Note that jurisdictions may provide additional support to TOD projects that work collaboratively to include transit oriented affordable housing opportunities (particularly at 30% to 60% AMI), and honor diversity principles.

Performance Requirement: Development must be located in a high capacity transit area, within a ½ mile walk (with sidewalks and/or bike lanes) of existing or planned (within 5 years of project completion) Light Rail, Rapid Ride, Swift, other Bus Rapid Transit, Sounder or Sound Transit Express Bus station or a key node for multiple transportation nodes.

Project must be built to the maximum density allowed in the zone, provide no more parking than the minimum published parking requirement, and must provide secure bicycle storage for at least 25% of residents.

Points Breakdown: 15 points

When Verified: Review location in design. Visually verify amenities at final inspection

Cross-references: Action Items 2-64, 2-65, 2-66, 2-65, 2-66, 2-67

Resources: Enterprise Transit Oriented Development Initiative: http://www.enterprisecommunity.org/solutions-and-innovation/equitable-transit-oriented-development

National Resources & Technical Assistance for Transit-oriented Development: https://todresources.org/

2-63: Build within ¼ miles of a transit stop or Park and Ride

Responsible Party: Owner/Developer

Intent: Reduce the environmental impacts of single occupancy vehicles

Performance Requirement: Project boundary must be ¼ mile from an existing transit stop or Park and Ride location

Points Breakdown: 4 points

When Verified: At any time after project site is confirmed. Planned stops will be accepted with documentation that they will be operational within 12 months of project completion

Cross-references: Action Item 2-65 and 2-67

2-64: Create a mixed-use building

Responsible Party: Owner, Architect

Intent: The goal of a "mixed-use" development is to discourage automobile use, to focus foot traffic around the housing community, and to provide infrastructure for services and employment adjacent to housing. Mixed–use, for this credit, is defined as commercial and residential development with at least three stories.

Performance Requirement: Building must be at least three occupiable stories above grade, with at least 30% of at-grade space designed to accommodate retail or commercial occupancies, either immediately, or in the future.

Points Breakdown: 15 points

When Verified: Verify with plan review during design, and visually verify at final inspection

2-65: Provide subsidized bus passes (25% or 50% subsidized)

Responsible Party: Owner, Property Management

Intent: Encourage use of public transportation to reduce environmental impact of single occupancy vehicles

Performance Requirement: Create subsidy policy, publicize to tenants, and include as a selectable option at lease-signing.

Points Breakdown:

25% of cost of pass subsidized	6 points
50% or higher of cost of pass subsidized	3 points

When Verified: Review of policy and promotional materials at occupancy

Cross-references: Action Item 2-62 and 2-63

2-66: Provide bicycle lockers or bicycle storage beyond code

Responsible Party: Architect, General Contractor

Intent: Encourage use of bicycles to reduce the environmental impact of automobile use and to promote healthy lifestyles.

Performance Requirement: Install weather-protected bicycle lockers and/or lockable racks beyond what is required in the local or state code.

Points Breakdown: 2 points

When Verified: Visually verified at final inspection

2-67: Provide bus shelters

Responsible Party: Architect, General Contractor

Intent: Encourage use of buses to reduce the environmental impact of low occupancy automobile use.

Performance Requirement: Where bus stops are located within or near the project property, provide or work with the local jurisdiction to ensure provision of appropriately sized shelters for people waiting to ride the bus.

Points Breakdown: 2 points

When Verified: Visually verified at final inspection

2-68: Provide dedicated parking spots for carpool or car-share vehicles

Responsible Party: Architect, General Contractor

Intent: Promote carpooling and car-sharing to reduce the environmental impact of single occupancy vehicles

Performance Requirement: Install signage for dedicated parking spots for carpool or car-share vehicles.

Points Breakdown:

One stall above code	6 points
Two stalls above code	8 points
Three stalls above code	10 points
Four or more stalls above code	12 points

When Verified: Visually verified at final inspection

2-69: Provide a link to community trails

Responsible Party: Architect, Landscape Designer, General Contractor

Intent: Encourage non-motorized transportation and provide connection to surrounding services and natural environments

Performance Requirement: Install one or more universally accessible connections from the project site to surrounding community trails

Points Breakdown: 2 points

When Verified: Visually verified at final inspection

2-70: Provide EV charging station (5 pts for one station, 3 pts for each additional)

Responsible Party: Owner, Architect, Electrical Designer

Intent: Electrical vehicles are rapidly becoming a significant portion of new vehicle purchases. By installing vehicle charging stations in multi-family buildings, we reduce the barriers to electric vehicle ownership among apartment- and condominium-dwellers, and increase the marketability of Built Green properties to electric vehicle owners.

Performance Requirement: Install one or more Level II vehicle charging outlets in the building parking areas. Outlet can be a free or pay station charger. Credit given based on the number of vehicles that can be charged simultaneously.

Points Breakdown:

First vehicle charging station	5 points
Each additional vehicle charging station	3 points

Maximum 20 points (6 vehicle charging stations)

When Verified: Visually verified at final inspection

2-71: Commit to annual benchmarking of building water consumption using ENERGY STAR Portfolio Manager and to sharing this information with Built Green

Responsible Party: Owner, Property Management

Intent: Increase access to whole building water consumption data for building performance measurement purposes

Performance Requirement: Create a building account in ENERGY STAR Portfolio Manager (ESPM) and set up a system for collecting monthly water consumption data from utility bills and entering it into ESPM. Third-party billing services, and building performance monitoring services can provide this service. Share the ESPM Account with the Built Green Program Manager Account (builtgreen@mbaks.com).

Points Breakdown: 5 points

When Verified: Review ESPM account, and utility data collection plan at time of final inspection

Cross-references: Action Items 3-56, 3-57

Resources: ENERGY STAR Portfolio Manager - www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager

2-72: Install a prominent water use display in high traffic common area

Responsible Party: Owner, Plumbing Designer

Intent: Employ smart technology to raise awareness of distribution and consumption of water resources

Performance Requirement: Track building water use through ENERGY STAR Portfolio Manager or similar tool, and display building water performance prominently on an installed or virtual building performance dashboard.

Points Breakdown: 7 points

When Verified: Visually verify installation and tracking plan at final inspection

SECTION THREE: ENERGY

3-1: Document energy improvements beyond code using approved energy modeling software

Responsible Party: Architect/Designer, Energy Consultant, Mechanical Electrical Plumbing Engineers

Intent: Improve the energy performance of buildings by simulating performance and assessing the cost/benefit of energy conservation measures

Performance Requirement: Complete a whole building energy performance simulation using an approved energy modeling software tool, in accordance with the Built Green Multifamily Energy Modeling Guidelines

Points Breakdown: 1 point per 1% improvement over the WSEC 2015 baseline performance, as specified by the Built Green Multifamily Energy Modeling Guidelines. Up to 70 points may be claimed.

When Verified: The energy model should be completed at the earliest feasible opportunity in order to help inform design decisions. The energy model output reports that document the energy savings beyond code should be reviewed and verified once the design is finalized. In many cases, this may be close to substantial completion, in case of "as-built" changes to the equipment specs.

Cross-references: Cannot be combined with Action Item 3-2

Resources: Built Green Multifamily Modeling Guidelines

3-2: Document building improvements beyond code using a prescriptive approach

Responsible Party: Architect/Designer, Energy Consultant, Mechanical Electrical Plumbing Engineers

Intent: Improving building energy efficiency using the simple, prescriptive options developed for the WSEC. This action item is only for 3-Star projects not using an energy simulation.

Performance Requirement: Provide a narrative description of how the project is meeting the base code compliance R406 Credit or C406 Options selected, the and each Additional Energy Efficiency Package Option the project is claiming credit for. Show the details in the construction documents.

Points Breakdown:

Based on the Residential and Commercial sections of the WSEC 2015, for R-2 occupancies:

Lowrise R406:	
TWO Credits in addition to the code requirement	3-Star Requirement
For each 0.5 Credits in addition to the 3-Star Requirement	5 points
Mid- and Highrise C406:	
TWO Options, in addition to the code required TWO Options	3-Star Requirement
For each Option in addition to the 3-Star Requirement	10 points
Maximum for all building types	20 points

When Verified: Pre-drywall and Final Inspection

Cross-references: Cannot be combined with Action Item 3-1

3-3: Bonus Points: Build a net zero energy building that draws zero outside power or fuel on a net annual basis

Responsible Party: Architect, Energy Consultant

Intent: Design and construct buildings that consume no grid-supplied energy on a net annual basis.

Performance Requirement: Demonstrate that the annual site energy consumption of the building is roughly equivalent to the annual energy production capacity of renewable energy generation systems installed on-site. Buildings must be all-electric, with no fossil-fuel combustion on-site. Modeling must be performed using the Built Green Modeling Guidelines.

Points Breakdown: 50 points

When Verified: Modeling verified at completion of design phase. Energy measures verified in construction and at completion

Cross-references: The key to achieving net zero is to reduce energy demand to the greatest extent feasible. Multiple energy Action Items in Section 3 will be essential to achieve this goal. These points are in addition to points claimed under 3-1. This Action Item cannot be combined with 3-2 but may be combined with 3-1.

Resources: Appropriate energy modeling tools include REMRate and eQuest, depending on building size. Please see the Built Green modeling guidelines. Other tools must be approved in advance by the Built Green Program Manager.

3-4: Provide Fundamental Commissioning of building systems

Responsible Party: Owner, Commissioning Professional

Intent: Ensure that installed building systems are designed to meet the owner's performance requirements, and that they will function as designed when the building is turned over to ownership/occupancy.

Performance Requirement: Contract with a qualified Commissioning Professional (CxP) to provide fundamental commissioning on central systems (including common area and any central HVAC systems, electrical systems, central domestic hot water systems, renewable energy systems, and common area lighting controls) in accordance with accepted process (such as ASHRAE 202 or LEED Fundamental Commissioning).

A qualified CxP must meet the following:

- The CxP must have documented commissioning process experience on at least two building projects with a similar scope of work. The experience must extend from early design phase through at least 10 months of occupancy;
- The CxP may be a qualified employee of the owner, an independent consultant, or an employee of the design or construction firm who is not part of the project's design or construction team, or a disinterested subcontractor of the design or construction team.

Points Breakdown:

Central and Common Area HVAC only 5 points

HVAC, central hot water, common area lighting controls 10 points

HVAC, electrical systems, central hot water, renewable energy, common area lighting controls, any non-utility submeters 15 points

Suggested: CxP reviews systems design against Owners Project Requirements and provides suggested improvements; CxP performs recommissioning prior to 12 months

When Verified: At completion of the building commissioning process

Resources: ASHRAE Guidelines 0 and 202, Building Commissioning Association, www.BCXA.org, LEED v4 Fundamental Commissioning and Verification; Enhanced Commissioning

3-5: Airtight drywall approach for framed structures

Responsible Party: Architect, General Contractor

Intent: Significantly reduce air infiltration and exfiltration through the building envelope

Performance Requirement: Achieve air barrier continuity at the perimeter of drywall assemblies by sealing the edges of the drywall to solid framing materials. This requires a continuous bead of sealant along:

- all exterior wall bottom and top plates,
- all top plates at insulated ceilings,
- rough opening perimeters,
- penetrations through top and bottom plates
- penetrations through drywall (including electrical boxes and recessed can lights), and
- both sides of the first interior stud of partition walls.

Points Breakdown: 3 points

When Verified: Visually verified during intermediate construction inspections. Note: The blower door test is the ultimate verification of effective air sealing.

Cross-references: Action Item 3-6, 3-7

Resources: Building Science Corporation, Info Sheet – 401: Air Barriers—Airtight Drywall Approach

3-6: Use airtight building method, such as SIP or ICF for all walls

Responsible Party: Architect, General Contractor

Intent: Significantly reduce air infiltration and exfiltration through the building envelope

Performance Requirement: Use Structural Insulated Panels, Insulated Concrete Forms or similar air-tight building systems for more than 70% of the above-grade walls of the building/s. Follow manufacturers installation and air-sealing requirements to ensure optimum performance

Points Breakdown: 10 points

When Verified: Visually verified during intermediate construction inspections

Cross-references: Action Item 3-5, 5-46, 5-47

3-7: Eliminate or airtight seal all air pathways between floors and units

Responsible Party: Architect, General Contractor

Intent: Significantly reduce air movement between units and common areas

Performance Requirement: Define where the air barrier runs around typical units on a compartmentalization sheet in the drawings. Ensure air-tight blocking at unit party walls and corridor walls. Eliminate penetrations between floors, and ensure tight air seal at all plumbing, electrical, duct and shaft penetrations between floors and between units.

Points Breakdown: 3 points

When Verified: Review compartmentalization sheet during design. Visually verify air sealing details during intermediate construction inspections.

Cross-references: Action Item 3-5, 3-9, 4-66

Resources: Building Science Corporation publications

- BSI-014: Going to Town - Air Sealing and Compartmentalizing Townhouses and Row Houses…
- BA-1506: Field Testing of Compartmentalization Methods for Multifamily Construction

3-8: Use a dense packed, blown-in wall insulation system

Responsible Party: Architect, General Contractor

Intent: Improve the comfort and energy efficiency of the building envelope by improving thermal performance and air tightness of the building envelope. Dense-packed insulation fills building cavities more effectively and reduces air movement through the wall assemblies.

Performance Requirement: At least 90% of all above grade, exterior wall assemblies should be insulated using dense-packed, blown-in insulation, such as:

- Dense-packed cellulose at around 3.5 lbs/ft^3
- Dense-packed fiberglass at around 2.5 lbs/ft^3

Requires visual inspection and density confirmation by touch or core sample.

Points Breakdown: 5 points

When Verified: Pre-drywall inspection

3-9: Conduct blower door test for the whole building with results better than base code requirement

Responsible Party: Architect, General Contractor

Intent: In the temperate marine climate of King and Snohomish Counties, uncontrolled envelope infiltration can lead to excessive energy consumption for space conditioning and ventilation. It can also result in moisture ingress into building cavities, which may lead to durability issues.

By clearly defining the air barrier at all points in the building envelope, and ensuring its continuity at all transitions and penetrations, with good construction quality assurance and quality control brings control of air movement in and out of the building.

Performance Requirement: Architect must design and communicate to the GC a continuous air barrier at, or in close alignment with the weather resistive barrier (WRB). This is generally achieved with a membrane or wet-applied WRB, or with rigid sheet goods (sheathing, glazing, curtain-wall assemblies) and framing members. The GC must ensure that the sub-contractors responsible for ensuring unit air tightness (those providing plumbing, electrical, fire-stopping, and acoustic as well as thermal sealing details) understand the importance of making clean penetrations and air-tight seals wherever possible.

Performance is confirmed with a blower door test, typically using the WSEC envelope testing protocol, which varies between lowrise (Residential) and Mid/highrise (Commercial) building types. Other, equivalent approaches may be allowed if accepted as an alternate for code compliance.

Points Breakdown: The project must demonstrate compliance with the performance thresholds to earn points:

Lowrise (up to three stories above grade)

- 3.0 Air Changes per Hour at 50 Pascals pressure difference – 5 points
- 2.0 Air Changes per Hour at 50 Pascals pressure difference – 10 points
- 1.5 Air Changes per Hour at 50 Pascals pressure difference – 15 points

Midrise and highrise (four stories or more above grade)

- 0.30 cfm/sqft of building enclosure at 75 pascals pressure difference – 5 points
- 0.25 cfm/sqft of building enclosure at 75 pascals pressure difference – 10 points
- 0.20 cfm/sqft of building enclosure at 75 pascals pressure difference – 15 points

When Verified: Typically, the envelope infiltration test is performed at the time of building completion. Test certificate is required as documentation.

Cross-references: Action Items 3-5, 3-6, 3-7

3-10: Passive solar: three or five of the below strategies, a through e

Responsible Party: Architect, Energy Consultant

Intent: Minimize space heating and cooling loads through the use of synergistic passive solar design strategies

Performance Requirement: Incorporate three or five integrated strategies (see options a – e, below) into the building design. Strategies should impact at least 70% of the building's conditioned floor area.

Points Breakdown: 6 points for three strategies; or 12 points for five strategies

When Verified: Reviewed at completion of design. Visually verified at final inspection.

a: East/West orientation

Responsible Party: Architect

Intent: By orienting the long axis of the building east and west, a larger proportion of glazing can be oriented towards the south and north. This creates the best opportunity to control solar gain through passive strategies, such as exterior shading.

Performance Requirement: Orient the long axis of the building within 22 degrees of East/West.

Points Breakdown: Component of 3-10: One of three strategies for 6 points, or 5 strategies for 12 points

When Verified: During design or in the Construction documents.

Cross-references: Action Item 3-12

b: Optimize glazing – majority within 22 degrees of due south

Responsible Party: Architect

Intent: Optimally orient the majority of glazing in the building to face within 22 degrees of due south, to enable control of solar heat gain through the use of passive architectural features, such as exterior, fixed, horizontal shading.

Performance Requirement: More than 50% of the view glazing area must face within 22 degrees of due south.

South facing glazing must be protected from summertime sun by fixed or operable shading devices designed to automatically shade glazing during the middle of the day from May through August.

Points Breakdown: Component of 3-10: One of three strategies for 6 points, or 5 strategies for 12 points

When Verified: During design or in the Construction Documents

Cross-references: Action Item 3-11

c: Proper overhang sizing

Responsible Party: Architect, Energy Consultant

Intent: For the best performance results from building orientation and optimal glazing design, horizontal shading should be sized appropriately to properly shade the windows during the middle of the day in summertime.

Performance Requirement: Use the shading design guidance below to design and install shading for at least 85% of the south-facing glass, or use a shading model to demonstrate that 85% of the south facing glazing is shaded between 10am and 2 pm on June 21 (Pacific Standard Time, not Daylight Savings Time).

Other passive shading strategies may be used as long as they can be shown to meet the Performance Requirement

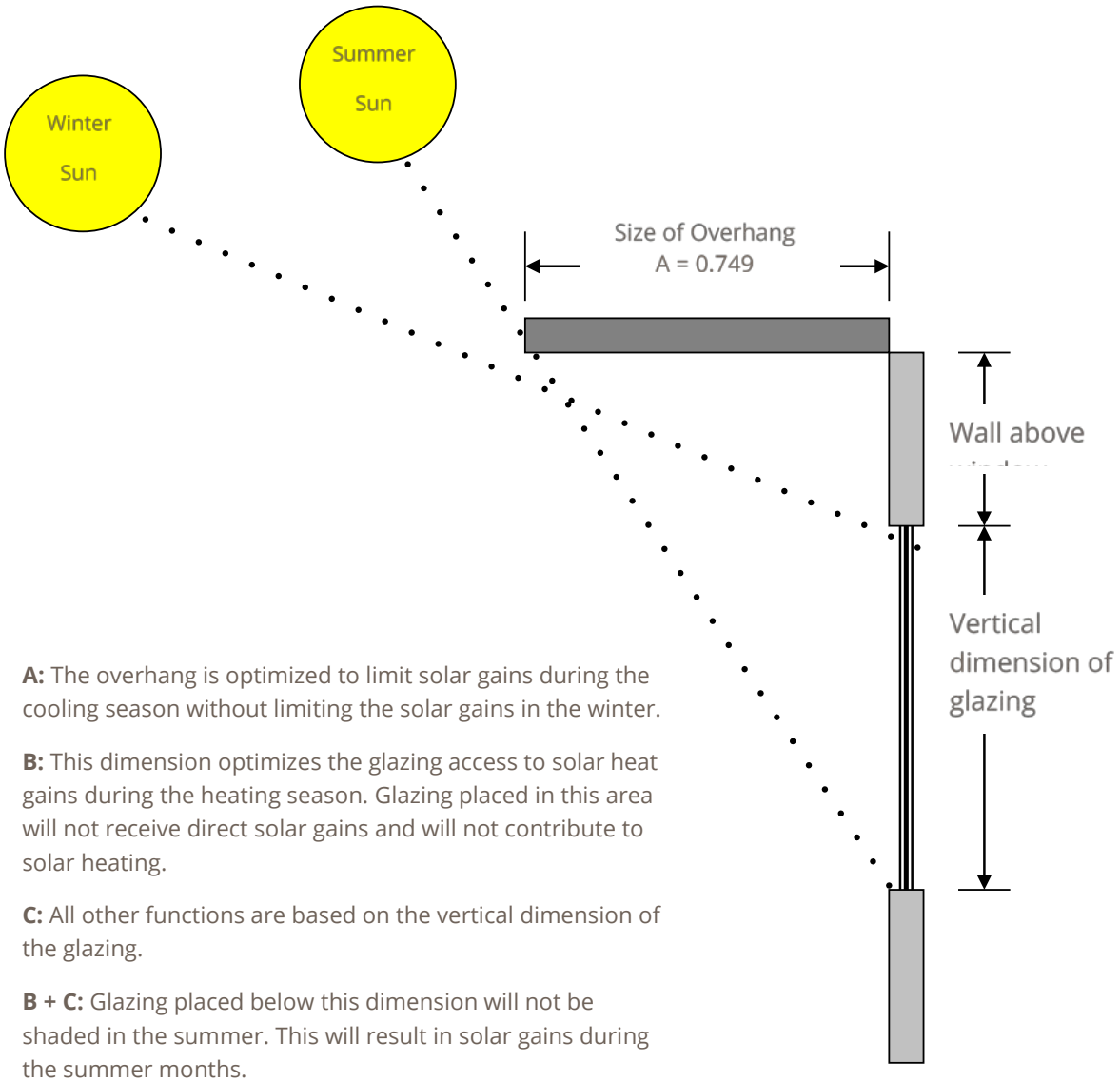
Points Breakdown: Component of 3-10: One of three strategies for 6 points, or 5 strategies for 12 points

When Verified: Verify during design or in the Contract Documents

Cross-references: Action Items 3-11, 3-12

Figure 3-10c —Overhangs

(Source: Washington State University Cooperative Extension Energy Program)



A: The overhang is optimized to limit solar gains during the cooling season without limiting the solar gains in the winter.

B: This dimension optimizes the glazing access to solar heat gains during the heating season. Glazing placed in this area will not receive direct solar gains and will not contribute to solar heating.

C: All other functions are based on the vertical dimension of the glazing.

B + C: Glazing placed below this dimension will not be shaded in the summer. This will result in solar gains during the summer months.

This figure is for buildings built in Seattle, or other sites at 47.5 degrees latitude. The effectiveness of the shading diminishes if the building orientation changes. Within 30 degrees of due south, this formula will provide relatively good results. East and West facing glazing require shading by other means such as exterior blinds, or landscaping.

D: Glazing with Solar Heat Gain Coefficient of less than .40

Responsible Party: Architect, General Contractor

Intent: Reduce cooling loads resulting from solar gain

Performance Requirement: Use glazing with a Solar Heat Gain Coefficient (SHGC) of .40 or less on at least 70% of east, south, and west facing glazing that receives direct solar gain on June 21.

Points Breakdown: Component of 3-10: One of three strategies for 6 points, or 5 strategies for 12 points

When Verified: Visually verified during construction or final inspections

e: Natural shading of walls and windows by retaining mature trees

Responsible Party: Architect, Landscape Designer

Intent: Reduce summertime heat gain by retaining existing mature trees to shade exposed walls and windows facing walls and glazing from summertime solar heat gain.

Performance Requirement: Retain existing mature trees that shade the east, south and/or west sides of the building that are exposed to summertime sun. Horizontal extent of tree canopy (in feet) must be at least 30% of the length of adjacent wall it protects. Establish and enforce Tree Protection Zones at the drip line to protect tree roots from damage and soil compaction during construction.

Points Breakdown: Component of 3-10: One of three strategies for 6 points, or 5 strategies for 12 points

When Verified: In Construction Documents, during construction, and at completion.

Cross-references: Action Items 2-9, 2-10

3-11: Model solar design features using approved modeling software

Responsible Party: Architect, Energy Consultant

Intent: Optimize the integration of passive solar design features to ensure comfort while minimizing building heating and cooling loads

Performance Requirement: Use an approved modeling software to optimize the passive solar design performance of the project. Software must be approved by the Built Green Program Manager in advance.

Points Breakdown: 7 points

When Verified: Verified at completion of design

Cross-references: All measures in Action Item 3-10

Resources: www.BuildingEnergySoftwareTools.com

3-12: Operable window area greater than code

Responsible Party: Architect

Intent: Improve natural ventilation and night cooling

Performance Requirement: Provide windows with operable area at least 30% greater than WSMC code minimum requirement for natural ventilation in at least 70% of residential units

Points Breakdown: 2 points

When Verified: During intermediate construction or final inspections

3-13: Install ENERGY STAR ceiling fans in all units – minimum one per unit

Responsible Party: Architect, General Contractor

Intent: Improve thermal comfort by enhancing air movement and reducing stratification

Performance Requirement: Install at least one ENERGY STAR qualified ceiling fan in each unit (living space or bedroom).

Points Breakdown: 3 points

When Verified: Visually verified at final inspection

Resources: www.energystar.gov/products/lighting_fans/ceiling_fans

3-14: Third-party total duct leakage performance test

Responsible Party: General Contractor, HVAC subcontractor

Intent: Quality control test to ensure minimal waste of energy through duct leakage losses

Performance Requirement: Exceed the WSEC code requirement for total duct leakage (2015 WSEC requirement is ≤4cfm25/100 sqft of conditioned floor area). Contract with a qualified 3rd Party (such as the Built Green verifier, or HERS Rater) to perform duct leakage testing in accordance with WSEC, or ENERGY STAR standards.

Points Breakdown: 5 points if at least 25% less than code, 10 points if at least 50%

When Verified: Testing at rough-in is recommended to allow access for corrective sealing

Resources: www.energystar.gov

3-15: All ducts are in conditioned space

Responsible Party: Architect, Mechanical Designer, General Contractor

Intent: Eliminate loss of conditioned air outside the thermal envelope of the unit or building

Performance Requirement: All conditioned air distribution duct work and air handler must be located inside the thermal and air barrier of the unit or building.

Points Breakdown: 2 points

When Verified: Visually verified during intermediate construction inspections

3-16: Locate heating/cooling equipment inside the conditioned space

Responsible Party: Architect, Mechanical Designer, General Contractor

Intent: Significantly reduce thermal losses outside the thermal envelope of the unit or building

Performance Requirement: All heating and cooling equipment must be located inside the thermal and air barrier of the unit or building. Air conditioning/heat pump condensers should generally be located outside conditioned space. Package Terminal and Vertical Terminal AC/HP units will have the condenser unit inside the thermal envelope, but draw outside air through them via ducting

Points Breakdown: 3 points

When Verified: Visually verified during intermediate construction inspections

3-17: Install programmable thermostats for all individual heating zones

Responsible Party: Mechanical designer, General Contractor, Electrical subcontractor

Intent: Improve the occupant's ability to achieve thermal comfort while minimizing energy waste

Performance Requirement: Install wall mounted, programmable thermostats to control each thermal zone. At minimum, the thermostat must offer at least two programmable heating set points (and two cooling set points, if AC is provided), at least two time or occupancy programs, and allow temporary override without affecting program.

Points Breakdown: 2 points

When Verified: Visually verified at final inspection

3-18: Provide separate switching for bathrooms fan/heat lamp and fan/light combination fixtures

Responsible Party: Electrical Designer, General Contractor, Electrical Subcontractor

Intent: Avoid unnecessary operation of energy-consuming equipment

Performance Requirement: Provide separate switch controls for bathroom fans and lighting in all in-unit bathrooms

Points Breakdown: 1 point

When Verified: Visually verified at final inspection

3-19: Provide electricity and/or natural gas direct metering for each unit

Responsible Party: Owner, Mechanical and Electrical Designers, General Contractor

Intent: Provide residents with direct feedback on their energy consumption

Performance Requirement: Provide electric and/or gas meters for each living unit, directly billed by the utility

Points Breakdown: 3 Points

When Verified: Visually verified at final inspection

3-20: Install heat systems with separate zones for sleeping and living areas

Responsible Party: Mechanical designer, HVAC Subcontractor

Intent: Improve the occupant's ability to achieve thermal comfort while minimizing energy waste in unoccupied zones

Performance Requirement: For heating systems other than zonal-electric resistance, provide separate living and sleep zones with separate controls

Points Breakdown: 5 Points

When Verified: Visually verified at final inspection

Cross-references: Action Item 3-22

3-21: Black or smart switches in all units for turning off associated outlets

Responsible Party: Electrical Designer, Electrical Subcontractor

Intent: Provide a convenient way for occupants to reduce "phantom" electrical loads by turning off a pre-determined set of electrical outlets.

Performance Requirement: Place an identified set of outlets, in one or more rooms, on a single circuit that can conveniently be turned off with a wall switch, be placed on an occupancy sensor or timer, or be "web-addressable" so they can be activated or deactivated from a remote/mobile device. Outlets on this circuit must be clearly identified – color coded, for example, and should include locations where "always on" devices such as televisions, sound systems and other non-essential electronic devices will be used.

Points Breakdown: 3 Points

When Verified: Visual verification and confirmation testing at final inspection

3-22: Install a heat recovery ventilator (HRV) or energy recovery ventilator (ERV)

Responsible Party: HVAC Designer and/or Installer

Intent: Installing an HRV or ERV provides balanced ventilation and reduces the energy penalty associated with providing effective fresh air ventilation, particularly in very air-tight buildings. It also allows for filtration of supplied outside air.

Performance Requirement: Install an HRV or ERV with the following performance specifications (based on ENERGY STAR label thresholds):

- Sensible Recovery Efficiency (SRE) ≥60% at 32F ambient temperature;
- Fan Efficacy ≥0.8cfm/Watt at 0.25" w.c.

System may use dedicated duct work or be connected to central forced air conditioning system. At a minimum, the ventilation system should exhaust from one or more conditioned air sources and supply fresh outside air to one or more living and sleeping zones. The system, including duct design, must be sized and controlled appropriately to meet WSMC requirements.

Points Breakdown:

Common area/corridor system	10 points
Centralized system serving three or more living units per appliance	5 points

When Verified: Visually verified at intermediate or final inspection.

Cross-references: Action Items 3-9, 3-23, 4-66

Resources: Home Ventilating Institute product directory; www.HVI.org

3-23: If HRV or ERV installed, commission and make sure system is balanced, includes fan power

Responsible Party: Mechanical designer, HVAC Installer, Commissioning Professional (CxP)

Intent: Ensure that the investment in energy recovery ventilation yields optimal returns in ventilation performance and energy savings during occupancy.

Performance Requirement: Properly commission HRVs and ERVs prior to occupancy. Confirm:

- Supply and exhaust flows are within 10% of design flows;
- Supply and exhaust are balanced or slightly negative;
- Any timer controls are properly set up and operating to the design;
- Any boost controls, such as occupancy or humidity sensors are functioning to the design.
- Controls are clearly marked, and adequate education is provided to those responsible for maintenance of the equipment, and to occupants to understand the benefits of energy recovery ventilation, and how to optimize performance.

Points Breakdown: 10 points for common area system; 10 points for centralized living unit system, in addition to the points for installing ERVs or HRVs in Action Item 3-22

When Verified: At completion of construction

Cross-references: Action Item 3-22

3-24: Select heat pumps with performance better than ENERGY STAR

Responsible Party: Mechanical Designer, General Contractor, HVAC Installer

Intent: Use high efficiency mechanical equipment to provide year around thermal comfort while reducing energy consumption. ENERGY STAR provides a good baseline for high efficiency equipment. Installing equipment that is more efficient than ENERGY STAR standards reflects commitment to high performance and supports market transformation.

Performance Requirement: Select and install heat pump systems that have HSPF and SEER ratings that are 15% or 20% better than ENERGY STAR standards in force at the time of building permitting.

Split Systems:	Tier 1 – ≥ 9.8 HSPF/17.25 SEER/14.4 EER
	Tier 2 – ≥ 10.2 HSPF/18 SEER/15 EER
	Tier 3 - > Tier 2, with variable speed condenser
Package equipment:	Tier 1 – ≥ 9.4 HSPF/17.25/13.8 EER
	Tier 2 – ≥ 9.8 HSPF/18 SEER/14.4 EER
	Tier 3 - > Tier 2, with variable speed condenser

At time of publication, the ENERGY STAR standard in force, effective from September 2015, is as follows:

- ≥ 8.5 HSPF/ ≥15 SEER/ ≥12.5 EER for split systems
- ≥ 8.2 HSPF ≥15 SEER/ ≥12 EER for single package equipment including gas/electric package units.

ENERGY STAR product specifications are revised periodically. Tiers applicable to earn points for this Action Item should be based on the ENERGY STAR specification effective at the time the project receives its building permit.

Points Breakdown:

- Tier 1 – 3 points
- Tier 2 – 5 points
- Tier 3 – 8 points

When Verified: Visual verification and documentation at final inspection.

Resources: www.EnergyStar.gov.

3-25: Select heating system efficiency (natural gas): 96% AFUE or 96% AFUE + Variable Speed/ECM blower motor

Responsible Party: Mechanical Designer, General Contractor, HVAC Installer

Intent: Optimize the efficiency of forced air heating systems

Performance Requirement: For in-unit and common area/corridor heating systems, use high-efficiency condensing gas furnaces and ECM blower motors in air handler units. No electric pre-heat systems allowed.

Points Breakdown:

Indoor systems (no 100% outside air systems): 2 points for 96% AFUE; or 4 points for 96% AFUE + Variable Speed/ECM blower motor

Roof top systems: 2 points for 90% AFUE; or 4 points for 90% AFUE and variable frequency/ECM blower motor

When Verified: Visually verify from equipment name plates against specification at final inspection

3-26: Select ENERGY STAR heating/cooling equipment

Responsible Party: Mechanical Designer, General Contractor, HVAC Installer

Intent: Install reliable equipment with independently verified efficiency performance

Performance Requirement: All installed heating and cooling equipment must be ENERGY STAR qualified, unless the ENERGY STAR program does not certify the equipment type.

Points Breakdown: 3 points

When Verified: Visually verify from equipment name plates against specification at final inspection

Cross-references: Action Items 3-24, 3-25

Resources: www.energystar.gov/products/heating_cooling

3-27: No gas fireplaces, or use direct vent gas or propane hearth product (AFUE rating)

Responsible Party: Mechanical Designer, General Contractor, HVAC Installer

Intent: Avoid the use of inefficient gas combustion appliances

Performance Requirement: If installing a gas fireplace, specify only closed combustion/direct vent, equipment with an AFUE of 70% or better

Points Breakdown: 2 points

When Verified: Visually verify from equipment name plates against specification at final inspection

3-28: Do not install infrastructure for temporary/portable air conditioners

Responsible Party: Owner, Mechanical Designer

Intent: Avoid the use of inefficient cooling equipment. Building cooling loads should be minimized through passive solar strategies, thermal envelope efficiency, operable windows and installation of ceiling fans to minimize unmet cooling loads. Where needed, efficient, permanent systems should be designed and installed.

Performance Requirement: Do not install wall sleeves or ports for through-wall or portable, ducted air conditioners.

Points Breakdown: 5 points

When Verified: Review during design. Visually verify at final inspection

Cross-references: 3-5 through 3-9, 3-10

3-29: Install drainwater heat recovery system (DHR)

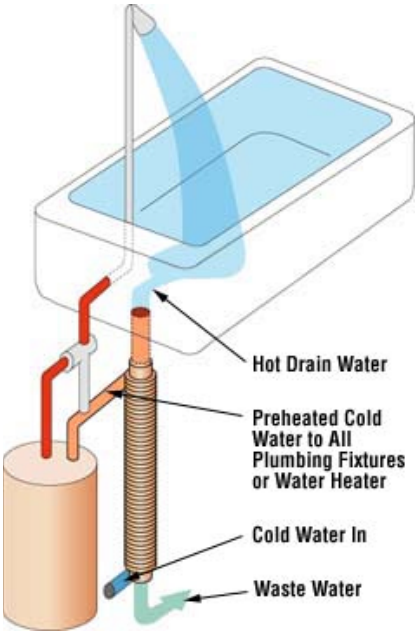
Responsible Party: Plumbing Designer and Installer, General Contractor

Intent: Reduce domestic hot water heating consumption by recovering heat from flowing waste water

Performance Requirement: Install drain water heat recovery systems that serve at least 50% of the shower stalls in the building. Recovered heat should be used to preheat supply water to the water heating system.

Points Breakdown: 5 points

When Verified: Visually verified during intermediate construction inspections



From EERE, from Toolbase Services

3-30: Install whole building "smart" variable-speed recirculation pump

Responsible Party: Plumbing Designer, General Contractor

Intent: Reduce domestic hot water distribution loses and associated pump energy consumption by optimizing the recirculation of hot water in the building

Performance Requirement: Install a hot water recirculation system that has both thermal and demand controls, which monitors and responds to building demand patterns, and which has a variable-speed/ECM pump motor for efficient operation. System must be included in system commissioning scope under Action Item 3-4 to earn credit.

Points Breakdown: 2 points

When Verified: Visually verified at final inspection

Cross-references: Action Item 3-35

3-31: Install ultra-high efficiency central (gas) water heater with 92% or 96% thermal efficiency

Responsible Party: Plumbing Designer and Subcontractor

Intent: Optimize the efficiency of domestic hot water heating systems

Performance Requirement: Install ultra-high efficiency central gas water heating system serving 100% of residential units.

Points Breakdown: 2 points for 92% Thermal Efficiency; or 4 points for 96% Thermal Efficiency

When Verified: Visually verified from equipment name plates against specification at final inspection

Resources: www.energystar.gov/products/water_heaters

3-32: Install the water heater inside the heated space (electric, direct vent, or sealed venting only)

Responsible Party: Architect, Plumbing Designer

Intent: Minimize the loss of heat from the water heating system outside the thermal envelope of the building

Performance Requirement: Install all water heating equipment inside the thermal and air barriers of the building. (Electric, and closed combustion/direct vent gas equipment only)

NOTE: Heat pump water heater storage tanks should be located inside, with exhaust ducted outside, or condenser unit may be located outside

Points Breakdown: 2 points

When Verified: Visually verified at intermediate or final inspections

3-33: Install one or more Heat Pump Water Heaters with EF 2.0 or greater

Responsible Party: Owner, Property Management, Plumbing Designer

Intent: Incentivize developers and designers to try newer technologies and improve the efficiency of domestic water heating through the use of heat pump equipment

Performance Requirement: Install a minimum of one individual unit heat pump water heater (EF 2.0 or greater) in the building. Develop and implement a plan with Property Management to monitor energy performance during occupancy, compared to a conventional water heater.

Points Breakdown: 8 points

When Verified: Visually verified from equipment name plates against specification at final inspection

Resources: www.energystar.gov/products/water_heaters/heat_pump_water_heaters

3-34: Install a centralized Heat Pump or Reverse Cycle Chiller to heat the domestic hot water

Responsible Party: Owner, Mechanical and Plumbing Designers, General Contractor, Mechanical and Plumbing Subcontractors

Intent: Optimize the efficiency of domestic hot water heating systems

Performance Requirement: Design and install a central hot water system using heat pump or reverse cycle chiller (RCC) water heaters. The modeled annual COP of the system, excluding circulation losses, should be 2.5 or better. System must be included in system commissioning scope under Action Item 3-4 to earn credit.

It is strongly recommended that the design team review the referenced *RCC Best Practices Design Guidelines* before pursuing this Action Item.

Points Breakdown: 25 points

When Verified: Equipment type should be visually verified, and modeled energy performance documentation reviewed at time of final inspections

Resources: Reverse Cycle Chiller Best Practices Design Guidelines, Ecotope/Seattle City Light, 2015: https://www.bpa.gov/EE/Technology/EE-emerging-technologies/Projects-Reports-Archives/Documents/Dec2015_RCC_Best_Practices.pdf

3-35: Insulate all hot water recirculation lines

Responsible Party: Architect, Plumbing Designer, Plumbing Subcontractor

Intent: Minimize thermal losses from the distribution of hot water

Performance Requirement: Domestic hot water risers and returns must be insulated with foam insulation with thickness equal to the nominal diameter of the pipe, max 2”. Full insulation is required at elbows, junctions and support clamps. Pipes embedded in walls filled with fiberglass or densepack cellulose are also accepted.

Points Breakdown: 10 points

When Verified: Visually verified during intermediate construction inspections

Cross-references: Action Item 3-36

3-36: Install heat traps on cold inlet pipes at hot water storage tank

Responsible Party: Plumbing Designer, Plumbing Subcontractor

Intent: Reduce standby losses from storage tank water heaters

Performance Requirement: In addition to code-required insulation on lines, install heat traps in inlet lines on all water heaters in the building to prevent heat energy from migrating up the lines.

Points Breakdown: 1 point

When Verified: Visually verified at intermediate or final inspection

3-37: Light-colored interior finishes

Responsible Party: Interior Designer, General Contractor

Intent: Reduce the need for electric lighting by increasing the reflectance of interior wall finishes

Performance Requirement: Use wall finishes with Light Reflectance Value (LRV) of 60% or higher, and ceiling finishes with LRV of 80% or higher. Adjust lighting fixture type and spacing to optimize illumination and lighting power density.

Points Breakdown: 1 point

When Verified: Review specification at completion of design

3-38: Install lighting dimmer, photo cells, timers, and/or motion detectors for high efficiency fixtures - common areas and in-unit lighting

Responsible Party: Lighting Designer, Electrical/Lighting Subcontractor

Intent: Reduce unnecessary lighting energy consumption

Performance Requirement: Install appropriate lighting controls to reduce unnecessary lighting of unoccupied spaces.

Points Breakdown:

Common areas – at least 80% of residential corridors and stairwells (by fixture count or total power) – 1 point

In-unit – vacancy sensor on any one or more occasionally occupied space (such as laundry or storage closet or bathroom) in at least 90% of units – 1 point

When Verified: Visually verified

Cross-references: Action Item 3-4, 3-40

3-39: Install motion detectors for minimum 90% of exterior fixtures

Responsible Party: Lighting Designer, Electrical/Lighting Subcontractor

Intent: Reduce unnecessary lighting energy consumption

Performance Requirement: Install motion sensors on at least 90% or exterior lighting sensors, in addition to photocell and/or timer controls

Points Breakdown: 2 points

When Verified: Visually verified at final inspection

Cross-references: Action Item 3-4, 3-40

3-40: Install high efficacy lighting that is listed on an approved "Qualified Products List"

Responsible Party: Lighting Designer, Electrical/Lighting Subcontractor.

Intent: Using efficacy lighting provides appropriate levels and quality of lighting while reducing energy consumption.

Performance Requirement: Select and install high efficacy lighting, defined as follows:

- 60 Lumens/Watt for LED Fixtures (no Edison base fixtures)
- 80 Lumens/Watt for LED Lamps in Edison base fixtures
- 60 Lumens/Watt for CFL Fixtures.

Qualified Products Lists include only the following lists:

- EnergyStar: https://www.energystar.gov/products/lighting_fans and https://www.energystar.gov/productfinder/product/certified-light-fixtures/
- Design Lights Consortium: https://www.designlights.org/QPL
- Lighting Design Lab: https://www.lightingdesignlab.com/led-qualified-products-lists (expires July 31, 2018)

At the time of publication, the ENERGY STAR list only covers "residential" lighting fixtures. The Design Lights Consortium "Qualified Products List" covers commercial lighting fixtures. The Lighting Design Lab list was curated as an interim measure because the other lists were incomplete. This list was "suspended" in April 2017, as the other two lists became more complete. It will remain searchable until July 31, 2018, but is no longer being updated.

Points Breakdown: Percentage of installed lighting (by lamp count) that is high efficacy and "Qualified:"

- 80% - 2 points
- 90% - 5 points
- 100% - 7 points

When Verified: Review lighting documentation and visually verify installation at final inspection.

Resources: See Qualified Product list resources above.

3-41: Avoid excessive outdoor light levels while maintaining adequate light for security and safe access, meet IESNA Levels

Responsible Party: Lighting Designer, Electrical/Lighting Subcontractor

Intent: Avoid nuisance lighting pollution

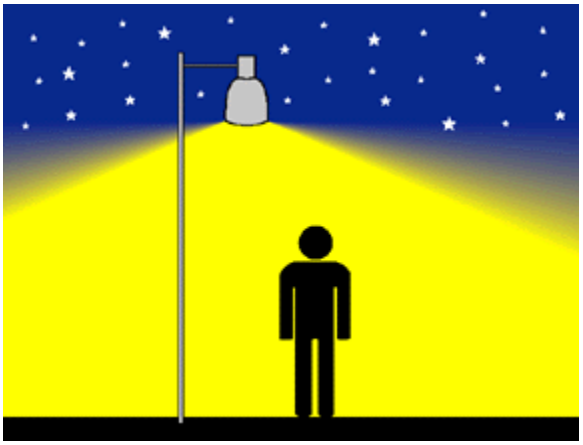
Performance Requirement: Avoid uplighting. Use pole heights and fixture designs that direct sufficient light to meet IESNA lighting levels, while limiting light trespass off-site or into residential units and common areas.

Points Breakdown: 5 points

Resources: Illuminating Engineering Society of North America (IESNA) Recommended Practice Manual. www.IES.org

- **Figure 3-7—Good Outdoor Lighting**

(Source: MacDonald Observatory in Fort Davis, Texas, http://vc.as.utexas.edu/home.html. *Reprinted with permission.)*



3-42: Install ENERGY STAR clothes washers in all units

Responsible Party: Owner, General Contractor

Intent: Optimize the use of reliable, energy efficient domestic appliances

Performance Requirement: Install ENERGY STAR clothes washers in all residential units with laundry hook-ups. (CEE Tier 1 clothes washers MAY be accepted in up to 10% of locations, such as small ADA units that lack floor space for side-by-side appliances).

Points Breakdown: 2 points

When Verified: Visually verified at final inspections

Cross-references: Action Item 3-44

Resources: www.energystar.gov/products/appliances/clothes washers

3-43: Install ENERGY STAR clothes washers in common laundry facilities instead of in each unit

Responsible Party: Owner, General Contractor

Intent: Optimize the use of reliable, energy efficient domestic appliances

Performance Requirement: Install commercial ENERGY STAR clothes washers in all central laundry facilities.

Points Breakdown: 3 points

When Verified: Visually verified at final inspections

Cross-references: Action Item 3-42

Resources: www.energystar.gov/products/appliances/commercial_clothes_washers

3-44: Install ENERGY STAR clothes dryers in all units

Responsible Party: Owner, General Contractor

Intent: Optimize the use of reliable, energy efficient domestic appliances

Performance Requirement: Install ENERGY STAR clothes dryers in all residential units. These will be heat pump or hybrid electric or gas dryers.

Points Breakdown: 1 point

When Verified: Visually verified at final inspection

Cross-references: Action Item 3-45

Resources: www.energystar.gov/products/appliances/clothes_dryers

3-45: Install ENERGY STAR clothes dryers in common laundry facilities instead of in each unit

Responsible Party: Owner, General Contractor

Intent: Optimize the use of reliable, energy efficient domestic appliances

Performance Requirement: Install ENERGY STAR clothes dryers in all common laundry facilities

Points Breakdown: 2 points

When Verified: Visually verified at final inspections

Cross-references: Action Item 3-44

Resources: www.energystar.gov/products/appliances/clothes_dryers

3-46: Provide clotheslines to each tenant and "wet room" or outside space in unit or common area for hang drying clothes

Responsible Party: Architect, Owner/Property Manager

Intent: Providing facilities for air-drying laundry can significantly reduce the energy consumed to operate an electric or gas tumble dryer. It is vital to ensure adequate ventilation and moisture-resistant flooring to prevent condensation and moisture-related problems during occupancy.

Performance Requirement: In at least 90% of units in the building, install a retractable clothesline or drying rack in a “wet room” or outside space (such as a patio or balcony). Indoor clothesline location must include water-resistant floors and a humidistat-controlled exhaust fan, which is commissioned prior to occupancy. Ensure that air-drying clothes is

explicitly allowed and encouraged in the lease language. Provide tenant education about the safe and effective use of drying equipment.

Points Breakdown: 5 points

When Verified: Visually verified at final inspection, including fan flow test. Review lease and education materials.

3-47: Install an ENERGY STAR dishwasher in all units

Responsible Party: Owner, General Contractor

Intent: Optimize the use of reliable, energy efficient domestic appliances

Performance Requirement: Install ENERGY STAR dishwashers in 100% of residential units

Points Breakdown: 1 points

When Verified: Visually verified at final inspection

Resources: www.energystar.gov/products/appliances/dishwashers

3-48: Install an ENERGY STAR, or better, refrigerator in all units

Responsible Party: Owner, General Contractor

Intent: Optimize the use of reliable, energy efficient domestic appliances

Performance Requirement: Install ENERGY STAR qualified refrigerators, with CEEE Tier 1 or Tier 3 documentation in 100% of residential units.

Points Breakdown:

ENERGY STAR & CEE Tier 1	2 points
ENERGY STAR & CEE Tier 3	4 points

When Verified: Review documentation from ENERGY STAR Product Finder and visually verify at final inspection

Resources: Consortium for Energy Efficiency - https://www.cee1.org/content/cee-program-resources

www.energystar.gov/products/appliances/refrigerators

3-49: Install induction cooktop in all units

Responsible Party: Owner, General Contractor

Intent: Reduce energy consumption for cooking, and avoid combustion hazards associated with gas stoves

Performance Requirement: Install electric induction cooktops in all residential units.

Points Breakdown: 2 points

When Verified: Visually verified at final inspection

3-50: Install ENERGY STAR exhaust fans in all units, with fan sone rating of 0.3 or less at or above the design CFM

Responsible Party: Mechanical/Electrical Designer, Electrical Subcontractor

Intent: Reduce the energy used to provide quiet, effective ventilation

Performance Requirement: Install ENERGY STAR qualified exhaust fans in all bathroom and laundry locations where fans are required in 100% of units. Ducts must be designed in accordance with WSMC and manufacturers installation guidance. Sone rating at the design flow rate (at 0.1" w.c.) must be documented

NOTE: Remotely-mounted inline fans are exempt from this requirement

Points Breakdown: 2 points

When Verified: Visually verified from equipment nameplates against specification at final inspection

Resources: ww.energystar.gov/products/heating_cooling/fans_ventilating

3-51: Participate in the local utility's electricity program for renewable electricity sources (covers minimum 25% of energy used)

Responsible Party: Owner

Intent: Reduce the use of fossil-fuel derived electricity

Performance Requirement: Write a minimum 2-year renewable energy program participation agreement to cover a minimum of 25% of the project's annual house meter electricity consumption. Document estimated project house meter electricity consumption as basis for agreement.

Points Breakdown: 7 points

When Verified: Verify agreement documentation at time of final inspections

3-52: Develop incentive program for tenants to purchase Green-e certified RECs

Responsible Party: Owner

Intent: Facilitate support for the development and expansion of renewable energy generation

Performance Requirement: Provide an opportunity to residents at time of lease/renewal or sale, to sign up to purchase Renewable Energy Credits to offset their individual energy consumption. Promote the program in marketing and new resident orientation materials, and resident events

Points Breakdown: 4 points

When Verified: Verify program details at time of final inspections

Resources: www.Green-e.org

3-53: Solar-powered or low-voltage walkway or outdoor area lighting

Responsible Party: Landscape Designer, Installation Subcontractor

Intent: Reduce use of grid electricity for lighting

Performance Requirement: Install solar powered or low-voltage lighting in at least one significant location in the project landscaped area.

Points Breakdown: 1 points

When Verified: Visually verified at final inspection

3-54: Install photovoltaic system (excluding solar hot water)

Responsible Party: Architect, Mechanical, Electrical, Plumbing Engineers and Subcontractors

Intent: Include renewable energy systems to reduce non-renewable fuel consumption and minimize operating expenses

Performance Requirement: Install a photovoltaic array, sized at a minimum of 300W per 1000 sqft of conditioned floor area (CFA) in the building. This will require approximately 20 - 25 sqft of roof area per 1000 sqft of CFA, depending on module efficiency. (in Western Washington, assume 1 kW installed peak capacity will generate 1,000 kWh/year)

Points Breakdown: 5 pts for 300 W/1000 sq ft and 5 pts for each additional 150 W/1000 sq ft.; up to 25 points

NOTE: 5-Star Requirement – 150 W/1000 sq ft.

When Verified: Visually verified at final inspection, including review of sizing calculations

Cross-references: Action Item 3-4

3-55: Install solar thermal for space heating or hot water

Responsible Party: Architect, Mechanical, Electrical, Plumbing Engineers and Subcontractors

Intent: Include renewable energy systems to reduce non-renewable fuel consumption and minimize operating expenses

Performance Requirement: Install a solar thermal collector array, sized to provide at least 1,000 kBtu/yr for every 1000 sqft of CFA. This will require approximately 6 sqft of roof area per 1000 sqft of CFA

Points Breakdown: 5 pts for 1000 kBtu/1000 sq ft. and 5 pts for each additional 500 kBtu/1000 sq ft.; up to 25 points

NOTE: 5-Star Requirement – 500 kBtu/1000 sq ft.

When Verified: Visually verified at final inspection, including review of sizing calculations

Cross-references: Action Item 3-4

3-56: Include provisions in tenant leases releasing utility consumption and billing data to building owner and authorized agents

Responsible Party: Owner, property manager

Intent: Increase access to unit by unit energy consumption data for building performance measurement purposes

Performance Requirement: Include utility billing release as the default in apartment leases, requiring the tenant to choose to opt out. Secure release forms from your electric and gas utilities (and water if units are direct billed for water/sewer). Use ENERGY STAR Portfolio Manager (ESPM) to track building performance.

Points Breakdown: 5 points

When Verified: Review lease language and ESPM account at time of final inspection

3-57: Commit to performing a post-occupancy comparison of modeled vs. actual energy performance and to sharing with Built Green

Responsible Party: Owner/Property Management

Intent: Comparing the occupancy-phase performance of a building to the pre-construction energy model by normalizing the energy model to the actual weather data for the performance period, analyzing the building's energy profile and adjusting the model to match the building profile is called energy model validation. This improves the accuracy of energy modeling. A validated energy model allows the building owner/manager to more

accurately predict the performance impacts of changes to equipment specifications, occupancy schedules and other variables, and may help identify the cause of excessive energy consumption when the building is underperforming.

Performance Requirement: The project team commits, in writing, to perform a post-occupancy comparison of modeled vs actual performance, in accordance with ASHRAE Std 209, Post Occupancy Modeling guidance. A report of the process and results of the study must be shared with the Built Green Program Manager, to help inform the program about the performance benefits of Built Green certification.

Points Breakdown: 10 points

When Verified: The written commitment to meeting the requirements of this action item should be submitted and reviewed as part of the project certification submittal. The report should be submitted no more than 3 years after project certification.

Cross-references: Action Item 3-1

Resources: ASHRAE Std. 209.

SECTION FOUR: HEALTH AND INDOOR AIR QUALITY

4-1: Builder or architect certified to have taken a minimum 8-hour IAQ training approved by Program Manager

Responsible Party: Architect or General Contractor

Intent: Equip the project team with accurate and up-to-date information on indoor air quality issues and strategies for improving indoor air quality and occupant health

Performance Requirement: Builder or architect holds a certificate of completion of an 8-hours IAQ training course from the American Lung Association or other program approved by the Built Green Program Manager

Points Breakdown: 5 points

When Verified: Course must be completed prior to the certificate holder's active role on the project

4-2: Certify building under an IAQ program approved by Program Manager

Responsible Party: Owner/Developer

Intent: Improve indoor air quality with certification in IAQ specific programs

Performance Requirement: Provide certification documentation under approved IAQ program

Points Breakdown: 15 points

When Verified: Document review at time of project completion. Evidence of certification in progress may be accepted in lieu of final certificate

Resources: EPA Indoor airPLUS - www.epa.gov/indoorairplus

WELL Building Standard - www.wellcertified.com/

4-3: Building is designated non-smoking

Responsible Party: Owner, Property Manger

Intent: Reduce exposure to secondhand tobacco smoke

Performance Requirement: The entire building must be designated as non-smoking. If there are multiple buildings, at least 80% of the conditioned floor area of the facility shall be designate as non-smoking. Designated smoking areas shall be in a fully separate building, full compartmentalized and with a separate HVAC system. For privately owned condominiums, the non-smoking provision shall be incorporated into the covenants and by-laws; and for rental properties, similar language should be incorporated into leases. An outdoor designated smoking area, if included, must be located no less than 25ft from any window, door or ventilation intake, and restrictions clearly communicated with signage.

Points Breakdown: 1 point

When Verified: Review of policy prior to occupancy

Cross-references: Action Item 4-2

4-4: Use less-toxic cleaners

Responsible Party: Owner, Property Manager, General Contractor

Intent: Reduce worker and occupant exposure to potentially harmful chemicals, and reduce chemical degradation of nearby aquatic systems

Performance Requirement: Create a green housekeeping plan for construction clean-up, and for building operation and maintenance. Include plan requirements in any property management and maintenance service agreement.
Avoid products that are given a health hazards rating higher than “1” in the product MSDS. In addition, avoid as much as possible products with ingredients that the MSDS classifies as toxic (poisonous), flammable, caustic (causes burns), or chemically reactive. Leftovers of these products will be hazardous waste. Use environmentally friendly alternatives, including biodegradable products and those that are zero VOC or low VOC (no to low volatile organic compounds).

Points Breakdown: 1 point

When Verified: Review of green housekeeping plan prior to occupancy

Cross-references: Action Items 2-28 and 2-29

4-5: Require workers to use VOC-safe masks when applying VOC containing wet products and N-95 dust masks when generating dust

Responsible Party: General Contractor

Intent: Protect worker health by limiting exposure to VOCs and dust

Performance Requirement: Require workers to use VOC-safe masks when applying wet products containing VOCs and N-95 dust masks when generating dust.

Points Breakdown: 1 point

When Verified: Review of policy requiring use of masks and visually verified during intermediate construction and final inspections

Cross-references: 3-Star requirements for IAQ, Action Item 4-13

4-6: Take measures during construction operations to avoid moisture problems later

Responsible Party: Architect, General Contractor

Intent: Reduce the risk of moisture-related indoor air quality and durability issues during building occupancy

Performance Requirement: Do one or more of the following measures:

- Keep stored materials dry with tarps or in a protected place, or use "just in time" delivery to avoid problems with stored materials
- Use a moisture meter to make sure moisture content of underlayment, sheathing, and framing materials does not exceed 15%. If readings exceed 15%, dehumidify before installing insulation and drywall
- Pump or drain standing water out of the structure immediately after major rainstorms
- Hook up installed rain gutters to temporary pipes to draw water away from foundation
- Install dimpled drainage mats at foundation walls

- Use flashing instead of caulking to seal above doors, windows, and other openings
- Properly counter-flash chimneys, and build a cricket above chimney to divert water
- Properly flash all roof to wall intersections
- Pitch all roofs at 2:12 or steeper
- During construction, do not use direct combustion heaters in the building. Remove unwanted moisture with a dehumidifier.

Points Breakdown: 1 point per action, up to 5 points

When Verified: Visually verified at intermediate construction and final inspections

4-7: Take measures to avoid problems due to construction dust

Responsible Party: General Contractor

Intent: Avoid introducing dust into HVAC systems and building cavities that could negatively impact indoor air quality during occupancy, and may protect warranties and extend the operating life of HVAC equipment

Performance Requirement: Implement a minimum of four (4) of the following measures:

- Train all subs on healthy jobsite practices, and include in regular safety meetings
- Clean/vacuum up dirt, dust, and wood shavings as you go – use vacuums instead of brooms
- Cover all duct openings and air handlers/fans during construction, both staged and installed, and mask floor registers after installation to prevent debris from accumulating prior to move-in
- Vacuum stud bays before sheetrocking
- Use wet sanding for gypsum board assemblies; or
- If dry sanding, use vacuum-assisted drywall sanding equipment*
- Vacuum the floors before final flooring installation
- Install construction filters—change them after construction is done, then flush and change them again.

** Use wet sanding for gypsum board assemblies. Dry sanding is acceptable if the following measures are taken:*

1. *Full isolation of space under finishing*

2. *Plastic protection sheeting is installed to provide air sealing during the sanding*
3. *Closure of all air system devices and ductwork*
4. *Sequencing of construction precludes the possibility of contamination of other spaces with gypsum dust*
5. *Worker protection is provided. Use safety meetings, signage, and subcontractor agreements to communicate the goals of the construction indoor air quality plan.*

Points Breakdown: 0.5 points per measure; minimum of four measures. 2 to 4 points available

When Verified: Visually verified at intermediate construction and final inspections

Cross-references: Action Item 4-10

4-8: Ventilate during all new wet finish applications

Responsible Party: Architect, General Contractor

Intent: Protect worker health and prevent interior materials from absorbing contaminants during finish curing

Performance Requirement: Require an indoor air quality management plan in the construction documents. Complete most wet applied finishing before installing "soft" finishes such as carpet and acoustic tiles. Use box fans or purpose-built ventilation equipment to provide fresh outside air to wet work areas, and exhaust contaminants to the outside.

Points Breakdown: 3 points

When Verified: Visually verified during intermediate construction inspections, or photo documentation

4-9: No use of unvented combustion heaters during construction

Responsible Party: Architect, General Contractor

Intent: Protect workers from hazardous fumes and prevent excess moisture from being absorbed by structure during construction

Performance Requirement: Create policy prohibiting the use of unvented combustion heaters during construction. Construction heaters must not blow combustion air directly into the building. Communicate policy to all sub-contractors impacted by policy. Use dehumidifiers if a "dry-out" is needed.

Points Breakdown: 2 points

When Verified: Visually verified at intermediate construction inspections

Cross-references: Action Item 4-6

4-10: Clean duct, furnace, and filter thoroughly before occupancy

Responsible Party: Architect, General Contractor

Intent: Remove fine particles that can become respiratory irritants from ducts

Performance Requirement: Thoroughly clean and vacuum ducts after final construction stages and prior to occupancy; replace all filters that were in place during construction. Include in construction IAQ plan where feasible

Points Breakdown: 3 points

When Verified: Visually verified at final inspection

Cross-references: Action Item 4-6

4-11: Institute a jobsite anti-idling program for construction vehicles

Responsible Party: General Contractor

Intent: Prevent unnecessary idling and consequent emissions. Idling of non-road equipment wastes an average of one gallon of fuel per hour, increases wear-and-tear on the engine, and harms the vehicle's operator and the people who live and work near the construction site. Eliminating unnecessary idling saves money, increases the life of your equipment, and helps everyone breathe easier!

- Diesel exhaust includes sooty particles layered in heavy metals and toxic gases including formaldehyde and benzene.
- Diesel exhaust can contain up to 40 hazardous substances including many of Washington's worst toxic air pollutants.
- Diesel's sooty particles (PM 2.5) are more toxic than particles from wood smoke or car exhaust.
- Soot ranges in size from a sand grain to "nano-particles" so small they can move from lungs to the bloodstream.

Performance Requirement: Enforce a policy that does not allow construction vehicles to idle for more than five (5) consecutive minutes if the vehicle is not in motion. Examples include hydraulic lifts, cranes, cement mixers, cherry pickers, boom lifts, excavation equipment, skid steers, or similar equipment.

Points Breakdown: 3 points

When Verified: Review policy and verify practice on-site during intermediate construction inspections

Resources: https://fortress.wa.gov/ecy/publications/documents/0602022.pdf

https://www.oregonlegislature.gov/dembrow/workgroupitems/5-27%20OEC%20Dirt%20on%20Diesel%20Report%202016.pdf

4-12: Use non-diesel alternative fuels in construction equipment: electricity, propane, or natural gas (3 pts per 25% of equipment using alternative fuels)

Responsible Party: Owner/architect (include expectation and submittal requirements in specifications or contract documents), General Contractor

Intent: Protect human health by reducing local and regional pollution due to diesel exhaust; reduce dependency on imported fossil fuels.

Performance Requirement: Contractor to distribute a letter to all subcontractors to encourage use of non-diesel alternatives; contractor to provide a table to the verifier that lists all construction equipment used on site, fuel type

Points Breakdown: 25% = 3 points, 50% = 6 points, 75% = 9 points, 100% = 12 points

When Verified: Visual verification during intermediate construction inspections. Review of completed table at final inspection

4-13: Require healthy jobsite plan for workers' compliance

Responsible Party: Architect, General Contractor

Intent: To protect workers' health and safety; and improve indoor air quality and durability during occupancy

Performance Requirement: Include healthy job site plan requirements in contract documents

Points Breakdown: 4 points

When Verified: Review plan requirement language in CDs

Cross-references: Action Item 4-7, 4-9, 4-12, 4-13,

4-14: Implement construction management plan to ensure healthy jobsite plan is implemented optimally and adhered to

Responsible Party: General Contractor

Intent: To protect workers health and safety; and improve indoor air quality during occupancy

Performance Requirement: Integrate health jobsite plan requirements in the construction safety and quality management systems to make construction management team accountable and actively engage sub-contractors in following healthy jobsite practices

Points Breakdown: 4 points

When Verified: Review of healthy jobsite plan and visually verified during intermediate construction and final inspections

Cross-references: Action Item 4-7, 4-9, 4-13,

4-15: Inside the building envelope use only low-VOC products for various applications when wet-applied on site

Responsible Party: General Contractor

Intent: Protect workers and occupants from potential negative respiratory health impacts

Performance Requirement: To earn credit, compliant materials should be used for 100% of an application when wet-applied on site. Pre-finished materials are outside the scope of this Action Item

NOTE: All Built Green certified projects are required to use low-VOC/low-toxic interior paints, primers, and finishes for ALL surface areas

Points Breakdown: See individual Action Items

When Verified: Product cut sheets generally reviewed during procurement, and visually verified during intermediate construction and final inspections

Cross-references: Three-star IAQ Requirements

Resources:

An accepted industry standard for "low-VOC," is the State of California, South Coast Air Quality Management District (SCAQMD) Rule #1168. Based on these guidelines, Table 4-1 provides recommended limits for VOCs in adhesives. Table 4-2 provides recommended limits for VOCs in Sealants

Table 4-1—Recommended Limits for VOC's in Adhesives
(in grams per liter, less water and Exempt compounds)
(Source: State of California, South Coast Air Quality Management District Rule #1168 Amended January 2005)

Adhesives	Current VOC Limit

Indoor Carpet Adhesives	50
Carpet Pad Adhesives	50
Outdoor Carpet Adhesives	150
Wood Flooring Adhesive	100
Rubber Floor Adhesives	60
Subfloor Adhesives	50
Ceramic Tile Adhesives	65
VCT and Asphalt Tile Adhesives	50
Dry Wall and Panel Adhesives	50

Table 4-2—Recommended Limits for VOC's in Sealants
(in grams per liter, less water and Exempt compounds)
(Source: State of California, South Coast Air Quality Management District Rule #1168 Amended January 2005)

Sealants	**Current VOC Limit**
Architectural*	250
Non-membrane Roof	300
Single-Ply Roof Membrane	450
Other	420

***Architectural Sealants refer to the use of an adhesive, sealant, or adhesive or sealant primer on stationary structures and their appurtenances, including, but are not limited to: hand railings, cabinets, bathroom and kitchen fixtures, fences, rain gutters and downspouts, and windows.**

Other IAQ standards to consult are the SCAQMD 2007/2008 standards or the State of California 01350 standards.

4-15a: Tiling

Performance Requirement: Use compliant low-VOC, low-toxic adhesives, mortars, grouts and sealers in all tiling applications inside the weather resistive barrier. GreenGuard Gold certification is an easy way to select products.

Points Breakdown: 2 points

When Verified: Product cut sheets generally reviewed during procurement, and visually verified during intermediate construction and final inspections

4-15b: Framing

Performance Requirement: Use compliant low-VOC, low-toxic adhesives, caulks and sealers in all framing and sheathing applications inside the weather resistive barrier. GreenGuard Gold certification is an easy way to select products.

Points Breakdown: 2 points

When Verified: Product cut sheets generally reviewed during procurement, and visually verified during intermediate construction and final inspections

4-15c: Flooring

Performance Requirement: Use compliant low-VOC, low-toxic adhesives, and sealers in all flooring applications inside the weather resistive barrier. GreenGuard Gold certification is an easy way to select products.

Points Breakdown: 4 points

When Verified: Product cut sheets generally reviewed during procurement, and visually verified during intermediate construction and final inspections

4-15d: Plumbing

Performance Requirement: Use compliant low-VOC, low-toxic adhesives, and caulks in all plumbing applications inside the weather resistive barrier. GreenGuard Gold certification is an easy way to select products.

Points Breakdown: 4 points

When Verified: Product cut sheets generally reviewed during procurement, and visually verified during intermediate construction and final inspections

4-15e: HVAC

Performance Requirement: Use compliant low-VOC, low-toxic adhesives, caulks, and sealers in all HVAC applications inside the weather resistive barrier. GreenGuard Gold certification is an easy way to select products.

Points Breakdown: 2 points

When Verified: Product cut sheets generally reviewed during procurement, and visually verified during intermediate construction and final inspections

4-15f: Insulating

Performance Requirement: Use compliant low-VOC, low-toxic adhesives, caulks, and sealers in all envelope insulation applications inside the weather resistive barrier. GreenGuard Gold certification is an easy way to select products.

Points Breakdown: 2 points

When Verified: Product cut sheets generally reviewed during procurement, and visually verified during intermediate construction and final inspections

4-15g: Drywalling

Performance Requirement: Use compliant low-VOC, low-toxic adhesives, caulks, and sealers in all drywall applications inside the weather resistive barrier. Consider products that do not contain biocides. GreenGuard Gold certification is an easy way to select products.

Points Breakdown: 2 points

When Verified: Product cut sheets generally reviewed during procurement, and visually verified during intermediate construction and final inspections

4-16: Use urea formaldehyde-free or Greenguard Gold certified insulation product

Responsible Party: General Contractor

Intent: Protect workers, occupants and the environment from the negative impacts of urea formaldehyde

Performance Requirement: All insulation must be certified urea formaldehyde free or Greenguard Gold certified; rigid insulation used inside the weather resistive barrier must comply with this requirement

Points Breakdown: 3 points

When Verified: Review product documentation and visually verify at intermediate construction inspections

Cross-references: Action Item 5-72, 5-73

4-17: Do not install insulation or carpet padding that contains brominated flame retardant (BFR)

Responsible Party: Architect, General Contractor

Intent: Reduce the introduction of persistent, bioaccumulative toxins into the environment, which poses a risk of causing adverse impacts on human and wildlife health

Performance Requirement: Do not specify or install insulation or carpet padding that contains BFR

Points Breakdown: 1 points

When Verified: Review product documentation and visually verify during intermediate construction inspections

4-18: Use plywood and composites of exterior grade that is NAF, NAUF, or ULEF (for interior use)

Responsible Party: General Contractor

Intent: Protect worker and occupant health from harmful off-gassing from formaldehyde

Performance Requirement: Specify and use only NAF, NAUF or ULEF plywood and composites for interior application

Points Breakdown: 3 points

When Verified: Review of product documentation and visually verify during intermediate construction inspections

Cross-references: Action Items 4-19, 4-20

4-19: Use only shelving, window trim, door trim, base molding, etc., that is NAF, NAUF, or ULEF

Responsible Party: Interior Designer, General Contractor

Intent: Protect worker and occupant health from harmful off-gassing from formaldehyde

Performance Requirement: Specify and use only NAF, NAUF or ULEF plywood and composites; or solid wood for shelving, window trim, door trim and base molding

Points Breakdown: 5 points

When Verified: Review of product documentation and visually verify during intermediate construction inspections

Cross-references: Action Items 4-18 and 4-20

4-20: Install cabinets made with board that is NAF, NAUF, or ULEF and has low-toxic finish

Responsible Party: Architect, General Contractor

Intent: Protect worker and occupant health from harmful off-gassing from formaldehyde

Performance Requirement: Specify and use only NAF, NAUF or ULEF plywood and composites; or solid wood for cabinets. Finish should be low-toxic.

Points Breakdown: 5 points

When Verified: Review of product documentation and visually verified at final inspection

Cross-references: Action Items 4-19, 4-20

4-21: Use pre-finished flooring

Responsible Party: Architect, General Contractor

Intent: Reduce construction and occupancy impacts of wet applied and field finished floors

Performance Requirement: All wood finish flooring installed is pre-finished off site.

Points Breakdown: 1 point

When Verified: Visually verified at final inspection

4-22: Use hard surface flooring without orthophthalate plasticizers

Responsible Party: Architect, General Contractor

Intent: Reduce installer and occupant exposure to persistent bioaccumulative toxins

Performance Requirement: Specify and install resilient sheet, plank and tile flooring that does not contain orthophthalate plasticizers. Required Health Product Declaration or other documentation with submittal.

Points Breakdown: 5 points

When Verified: Review product documentation and visually verified at final inspection

Resources: Home Free - https://homefree.healthybuilding.net/products

4-23: No carpet in units

Responsible Party: Architect

Intent: Reduce off-gassing from carpets and carpet pads; and negative indoor air quality impacts of dust and allergens during occupancy. Reduce disposal of carpet at unit turnovers

Performance Requirement: Do not install carpet in residential units

Points Breakdown: 10 points. Mutually exclusive with 4-24.

When Verified: Visually verified at final inspection

Cross-references: Action Items 4-21, 5-58, 5-59, 5-60

4-24: Limit use of carpet to one-third of unit's square footage

Responsible Party: Architect

Intent: Reduce off-gassing from carpets and carpet pads; and negative indoor air quality impacts of dust and allergens during occupancy. Reduce disposal of carpet at unit turnovers

Performance Requirement: Install carpets on 1/3 or less of each unit's square footage

Points Breakdown: 2 points. Mutually exclusive with 4-23.

When Verified: Visually verified at final inspection

Cross-references: Action Items 4-20, 5-58, 5-59, 5-60.

4-25: If installing carpet system (carpet, pad, and adhesive), specify and use CRI Green Label Plus or Greenguard certified products

Responsible Party: Architect, General Contractor

Intent: Protect worker and occupant health from harmful off-gassing from formaldehyde and VOCs

Performance Requirement: Specify and install only CRI Green Label Plus carpet and pad, and Greenguard Gold certified carpet adhesives

Points Breakdown: 1 point

When Verified: Review of product documentation and visually verify at final inspection

4-26: If installing carpet system (carpet, pad, and adhesive), specify and use carpet that does not contain fly ash filler in backing

Responsible Party: Architect, General Contractor

Intent: Protect worker and occupant health from harmful heavy metals and other toxins

Performance Requirement: Specify and install only carpet that is free of fly ash. Provide Health Product Declaration or equivalent documentation with submittal.

Points Breakdown: 5 points

When Verified: Review of product documentation and visually verify at final inspection

Resources: Home Free - https://homefree.healthybuilding.net/products

4-27: If using carpet, install by dry method

Responsible Party: General Contractor

Intent: Protect worker and occupant health from harmful off-gassing from VOCs

Performance Requirement: Use tack strips for installing all broadloom carpet

Points Breakdown: 1 point

When Verified: Visually verified at final inspection

4-28: Install low pile or less allergen-attracting carpet and pad

Responsible Party: Architect, General Contractor

Intent: Reduce the build-up of harmful allergens in carpet pile

Performance Requirement: Specify and install only low-pile or uncut pile carpet

Points Breakdown: 1 point

When Verified: Visually verified at final inspection

Cross-references: Action Items 4-24, 4-25, 4-26, 4-27, 5-55, 5-56

4-29: Install untreated natural fiber carpet

Responsible Party: Architect, General Contractor

Intent: Carpets made with natural fibers have less noxious off-gassing than those made with synthetic materials, if the wool carpet is not treated for moth-proofing. Wool carpets need to be replaced less because they are stain resistant; retain color, texture and appearance longer; are naturally flame and mildew resistant; and water repellant. They are also non-allergenic. These features lead to improved indoor air quality and less waste from replacement.

Performance Requirement: Install wool or cotton floor coverings with no chemical treatments for at least 50% of non-hard surface floors in the project.

Points Breakdown: 2 points

When Verified: Review product documentation and visually verify at final inspection

4-30: Avoid carpet in environments where it can get wet (kitchen, bathroom, near entries)

Responsible Party: Architect, General Contractor

Intent: Decrease chance of moisture related problems, including mold and mildew

Performance Requirement: No carpets installed in basements, bathrooms, kitchens, near entryways or areas that are frequently wet

Points Breakdown: 1 point

When Verified: Visually verify at final inspection

4-31: Select materials such that the building is free from all of the materials and chemicals listed in the handbook. Please discuss with Program Manager before claiming this point

Responsible Party: Architect, General Contractor

Intent: Improve indoor air quality by avoiding the use of materials and material additives that contain chemicals and toxins know to be hazardous to harmful to human and environmental health

Performance Requirement: Develop and implement a strategy to ensure and demonstrate that none of the materials used in the project contain any of the following chemicals:

- added formaldehyde
- halogenated flame retardants
- PVC
- mercury
- CFCs
- HCFCs
- neoprene (chloroprene)
- cadmium
- chlorinated polyethylene
- xylene

- tolulene

Please discuss with Program Manager before claiming this point. Project team must propose a strategy for tracking and documenting compliance. At a minimum, this should include a complete inventory of materials to be used in the project, with compliant examples, and clear documentation submittal requirements in the Project Specifications, and a comprehensive documentation tracking system, with QC checks of installed materials.

Points Breakdown: 50 points

When Verified: Product inventory reviewed at completion of design; qualifying submittals log reviewed at completion of construction, with supporting documentation available on request

4-32: Use Building Envelope Consultant during design

Responsible Party: Owner/Developer or Architect

Intent: To ensure that the envelope design controls rain water shedding, air flow, and vapor diffusion; which will decrease the chance of moisture related problems and improve air quality and building durability

Performance Requirement: Contract with a Building Envelope Consultant who provides, or conducts a thorough review of, envelope assemblies and design details that will effectively eliminate potential moisture problems related to the building envelope, and provides a report of findings

Points Breakdown: 5 points

When Verified: Review of Building Envelop Consultant's report and check if any recommended design changes are incorporated into the final design

Cross-references: Action Item 4-33

4-33: Envelope inspection at various stages of envelope installation by a qualified professional

Responsible Party: Owner, Architect, General Contractor

Intent: To ensure that envelope design features are properly installed and will actually control rain water absorption, air flow, and vapor diffusion; which will decrease the chance of moisture related problems and improve air quality and building durability

Performance Requirement: A qualified envelope consultant inspects construction elements that can impact the building envelope's ability to control and manage moisture intrusion. Qualifications include Building Envelope Commissioning Professional (BECxP) or

equivalent, approved by Built Green program, and must not be an employee or sub-contractor of the General Contractor. Site inspection schedule must be determined in advance, based on envelope assembly details and sequencing, and must be coordinated appropriately during construction; reports must be submitted for each visit. Credit will not be earned if Owner or General Contractor chooses not to correct any substantive issues reported during these inspections

Points Breakdown: 5 points

When Verified: Review of site visit reports and visual verification of recommended corrections and changes

Cross-references: Action Item 4-32

4-34: Grade to drain away from buildings

Responsible Party: General Contractor

Intent: Minimize soil saturation, which improves site stability; and moisture intrusion into the building, which improves indoor air quality and building durability

Performance Requirement: Slope soil adjacent to the building for a 6-inch drop in the first 10 feet. At the foundation footing, install drain tile so water will flow down the drainboard and drain away from the building. Garage floor and driveways are sloped to drain out. Provide a combined length of at least two feet of extenders and splash blocks on downspouts.

Points Breakdown: 1 point

When Verified: Visually verified at final inspection

4-35: Provide 2:12 (9.5 degree) pitch sloped roof surface for at least 50% of roof

Responsible Party: Architect

Intent: Decrease the change for potential moisture issues by using roof angles that shed water effectively.

Performance Requirement: Provide a 2:12 (9.5 degree) pitch roof for a minimum of 50% or 100% of roof area

Points Breakdown:

- 50% 6 points
- 100% 10 points

When Verified: Visually verify at final inspection

Cross-references: Action Item 4-6

4-36: Provide continuous air- and weather resistive barrier, installed to manufacturer's requirements

Responsible Party: Architect, General Contractor

Intent: Protect the building envelope from exterior moisture intrusion, and uncontrolled air infiltration and exfiltration

Performance Requirement: Include air barrier continuity sheets and details in the construction documents, clearly showing which materials make up the continuous air and weather resistive barriers, and how continuity is maintained through all key transitions. Products used must be warranted by the manufacturer as suitable as an air barrier material, and manufacturers air-barrier installation requirements must be fully implemented in construction, unless superseded by the project's envelope consultant of record.

Points Breakdown: 3 points

When Verified: Continuity sheets reviewed at completion of design; installation visually verified during intermediate construction inspections

4-37: Use prefabricated, liquid applied, or self-adhering flashing at siding transitions and penetrations

Responsible Party: Architect, Envelope Consultant, General Contractor

Intent: Protect the building envelope from exterior moisture intrusion, and uncontrolled air infiltration and exfiltration

Performance Requirement: Specify and use a system of compatible prefabricated, liquid-applied and/or self-adhering flashing products to ensure continuity of the air- and weather resistive barriers, and water-shedding layer at all transitions, penetrations and openings in the building envelope

Points Breakdown: 3 points

When Verified: Visually verified at intermediate construction and final inspections

Cross-references: Action Items 4-32, 4-33, 4-34

4-38: Install rainscreen siding

Responsible Party: Architect, General Contractor

Intent: Protect the building envelope from exterior moisture intrusion, and enhance drying potential of exterior wall assembly

Performance Requirement: Provide a space between the water shedding layer (the cladding) and the weather resistive barrier to allow water that gets behind the cladding to drain down and out of the assembly, and allow air movement to enhance drying of sheathing, WRB and cladding. On taller buildings, this space should be interrupted/ventilated every two or three floors to prevent excessive stack effect behind the cladding, including a properly lapped weep control system at each ventilation level.

Points Breakdown: 6 points

When Verified: Visually verified during intermediate construction or final inspections

Cross-references: Action Item 4-36, 4-37

4-39: In wood-framed structures, use low-toxic mold-inhibitor product

Responsible Party: General Contractor

Intent: Reduce the risk of mold growth in the structural wood framing and sheathing

Performance Requirement: Treat framing and sheathing with low-toxic product to inhibit mold growth. Lumber materials may be pre-treated or site-treated. Silver and borate are acceptable active agents. Other alternatives will need to be approved by the Program Manager

Points Breakdown: 3 points

When Verified: Review of product documentation

4-40: For slab on grade, use 10 mil polyethylene vapor barrier or equivalent performance, directly under slab

Responsible Party: General Contractor

Intent: Avoid moisture related problems by keeping water vapor and water in the ground and out of the slab; and provide sufficient drying of the water already in the slab

Performance Requirement: Use 10 mil polyethylene vapor barrier or equivalent performance, directly under slab. Depending on weather conditions during curing, it may be necessary to slow the drying rate of the exposed surface of the slab (by wetting out, use of burlap covering, etc.) to accommodate the slower curing of the lower surface. This will prevent cracking of the slab.

Points Breakdown: 3 points

When Verified: Visually verified during early construction inspection or photo documented

Cross-references: Action Item 4-41

4-41: Perform moisture test for any slab on grade prior to installing any finish to manufacturer's specifications

Responsible Party: General Contractor

Intent: Decrease potential for mold growth and installed floor failure from buckling or lifting

Performance Requirement: Follow the protocols in ASTM F1869-04 for the use of the calcium chloride test.

Points Breakdown: 2 points

When Verified: Review results of calcium chloride test

Cross-references: Action Items 4-38 and 4-40

4-42: Install mechanical ventilation system to control moisture in crawl space

Responsible Party: Mechanical Engineer, General Contractor

Intent: Keeping moisture and soil gasses away from and out of building, improving indoor air quality and building durability

Performance Requirement: Install mechanical ventilation system to improve moisture management in the crawl space or depressurization system below the vapor barrier membrane under the building

Points Breakdown: 2 points

When Verified: Visually verified at final inspection

Cross-references: Action Items 4-38 and 4-39

4-43: Install a rigid perforated footing drain at foundation perimeter, not connected to roof drain system

Responsible Party: Architect, Envelope Consultant, General Contractor

Intent: Divert rainwater away from foundation of building which will decrease chance of moisture issues

Performance Requirement: Install perforated footing drainage along the foundation perimeter and tie them into an appropriate drainage system at least 5' from the building to help control moisture in the building. Check with your local jurisdiction. Use soils report to determine degree of backfill compaction plus minimum slope to achieve adequate drainage. Perforations point down to allow water to enter the drainpipe. Drain discharges by gravity (preferable) or mechanical means into the approved drainage system. Roof water drains should be kept separate and tight-lined until well clear of the foundation.

Points Breakdown: 1 point

When Verified: Visually verified at early construction inspection or photo documented

Cross-references: Action Item 4-42

4-44: Install moisture management system for below grade walls beyond code, i.e., drainage mat

Responsible Party: Architect, Envelope Consultant, General Contractor

Intent: Minimize the risk of moisture issues by improving drainage of water away from foundation assemblies

Performance Requirement: Fully waterproof the exterior of foundation and below grade walls, and install a dimpled drain mat from 6" above grade down to the footing to protect the waterproofing and facilitate free drainage of water down to the footing drain. Install at 100% of foundation and below grade walls for credit

Points Breakdown: 3 points

When Verified: Visually verified at early construction inspection or photo documented

Cross-references: Action Item 4-6, 4-41

4-45: Properly seal building openings and penetrations against moisture and air leaks

Responsible Party: General Contractor

Intent: Conserve energy by decreasing conditioned air loss and improve indoor air quality and durability by decreasing air-transported moisture

Performance Requirement: Take steps to ensure that proper sealing of building openings and penetrations is part of the quality management plan, that responsibility is clearly assigned to members of the GC team or sub-contractors, and that the standard of air-tightness is understood by all involved.

Points Breakdown: 1 point

When Verified: Verify through questions to the construction team during intermediate construction inspections, and visual verification of air sealing work.

Cross-references: Action Items 4-34, 4-35

4-46: Install additional moisture control measures

Responsible Party: Architect, General Contractor

Intent: Reduce risk of moisture-related negative indoor air quality and durability problems

Performance Requirement: Design and install "best practice" measures to minimize or eliminate the risk of exterior water intrusion into the building envelope assemblies.

Points Breakdown: See Action Items below

When Verified: Measures typically verified during intermediate construction and/or final inspections

Cross-references: Action Items 4-34, 4-35

4-46a: Sill pans with back dams or slope at windows

Responsible Party: Architect, Envelope Consultant, General Contractor

Intent: Reduce risk of moisture-related negative indoor air quality and durability problems

Performance Requirement: Design and implement window installation details that include pre-fabricated, wet applied or self-adhered flashing that forms a back dam and end dams at the window sill, with a slope to drain water from the opening to the outside. Window is air sealed to the dam on the inside.

Points Breakdown: 5 points

When Verified: Measures typically verified during intermediate construction inspections

Cross-references: Action Items 4-34, 4-35

4-46b: Door pans with back dams at doors

Responsible Party: Architect, Envelope Consultant, General Contractor

Intent: Reduce risk of moisture-related negative indoor air quality and durability problems

Performance Requirement: Design and implement door installation details that include pre-fabricated, wet applied or self-adhered flashing that forms a back dam and end dams at the door sill, with a slope to drain water from the opening to the outside. Window is air sealed to the dam on the inside.

Points Breakdown: 3 points

When Verified: Measures typically verified during intermediate construction inspections

Cross-references: Action Items 4-34, 4-35

4-46c: Sill flashing extending up sides of windows

Responsible Party: Architect, Envelope Consultant, General Contractor

Intent: Reduce risk of moisture-related negative indoor air quality and durability problems

Performance Requirement: Design and implement window installation details that include wet applied or self-adhered flashing that extends up the sides of the rough opening from the sill pan, improving integration with the weather resistive barrier.

Points Breakdown: 5 points

When Verified: Measures typically verified during intermediate construction inspections

Cross-references: Action Items 4-34, 4-35

4-46d: Threshold protection at doors

Responsible Party: Architect, Envelope Consultant, General Contractor

Intent: Reduce risk of moisture-related negative indoor air quality and durability problems

Performance Requirement: Specify and install weatherproof door threshold hardware to protect door thresholds from wind, water and snow intrusion.

Points Breakdown: 3 points

When Verified: Measures typically verified during intermediate construction inspections

Cross-references: Action Items 4-34, 4-35

4-46e: Metal head flashing at windows

Responsible Party: Architect, Envelope Consultant, General Contractor

Intent: Reduce risk of moisture-related negative indoor air quality and durability problems

Performance Requirement: Design and implement window installation details that include sheet metal head flashing, properly lapped into the weather resistive barrier and protecting the joint between the head of the window and the wall.

Points Breakdown: 1 point

When Verified: Measures typically verified during intermediate construction or final inspections

Cross-references: Action Items 4-34, 4-35

4-46f: Metal head flashing at doors

Responsible Party: Architect, Envelope Consultant, General Contractor

Intent: Reduce risk of moisture-related negative indoor air quality and durability problems

Performance Requirement: Design and implement door installation details that include sheet metal head flashing, properly lapped into the weather resistive barrier and protecting the joint between the head of the door and the wall.

Points Breakdown: 1 point

When Verified: Measures typically verified during intermediate construction or final inspections

Cross-references: Action Items 4-34, 4-35

4-46g: Min. 18" overhangs at entryways

Responsible Party: Architect

Intent: Decreasing moisture intrusion by protecting entryways from rainwater

Performance Requirement: At least 25% (by number of entries) of the building's entries have overhangs that are 18" or deeper

Points Breakdown: 1 point

When Verified: Visually verified at final inspection

Cross-references: Action Items 3-10c

4-47: Provide hose testing or negative pressurization testing to pre-installed sample of each window type to test assembly for moisture control protection - ASTM E1105 or equal

Responsible Party: Architect, General Contractor

Intent: Quality assure the effectiveness of both the window installation details as installed, and the window frames themselves

Performance Requirement: Perform test on the first installed window of each type in the project. If intrusion occurs during test, perform root cause analysis, modify installation and retest. When successful completion of the test, modify installation details for all future installations accordingly

Points Breakdown: 3 points

When Verified: Review test report at time of final inspections

Cross-references: Action Items 4-34, 4-35, 4-44

4-48: No stud or joist cavities used for air conveyance

Responsible Party: Architect, Mechanical engineer

Intent: Protect quality of conditioning and ventilation air from dirt, dust, mold, moisture and other indoor air contaminants from the joist cavities, and ensure a more efficiently controlled distribution system

Performance Requirement: Use sheet metal or flex duct for all forced air distribution – supply, return, and exhaust

Points Breakdown: 2 points

When Verified: Visually verified during intermediate construction inspections

4-49: Do not install electronic, metal mesh, horse hair, or non-pleated fiberglass filters

Responsible Party: Mechanical Engineer, HVAC sub-contractor

Intent: Use effective, high-efficiency filtration to remove smaller particles from the air handling system

Performance Requirement: Install high-efficiency pleated filters, for reliable passive performance and reliability with minimal maintenance

Points Breakdown: 2 points

When Verified: Visually verify at final inspection

Cross-references: Action Item 4-52

4-50: Make sure air intakes are placed to avoid intake from air pollutant sources (beyond code)

Responsible Party: Architect, Mechanical Engineer

Intent: Avoid introducing pollutants to indoor air environment

Performance Requirement: All outside air intakes are located with spacing at least 20% greater than required by applicable code for any given contaminant source. Take prevailing winds and other relevant environmental factors into account when determining spacing requirements

Points Breakdown: 1 point

When Verified: Visually verified at final inspections

Cross-references: Action Item 4-49, 4-52

4-51: No parking within 40 feet of building air intakes

Responsible Party: Architect

Intent: Avoid introducing pollutants to indoor air environment

Performance Requirement: No parking is installed within at least 40 feet of intake vents, operable windows or doors. Where appropriate, install "No Parking or Idling" signage adjacent to air intakes.

Points Breakdown: 1 point

When Verified: Visually verified at final inspection

Cross-references: Action Item 4-50

4-52: Use effective media air filter, ensuring the HVAC system is designed for the static pressure drop of the filter (MERV 8 or MERV 12+)

Responsible Party: Mechanical Engineer, Mechanical sub-contractor, Operations and Maintenance staff

Intent: Optimize HVAC performance while removing harmful particulates from supplied air

Performance Requirement: Specify high efficiency pleated media filters and design HVAC system to function optimally with the specified filter installed. Filter housings should be designed to deter the use of inappropriate filters, and access hatches should be marked with the correct filter type and size.

Points Breakdown: Medium efficiency pleated (4"+ filter), MERV 8 – 2 points

High efficiency filter, MERV 12+ – 5 points

When Verified: Visually verified at final inspection

Cross-references: Action Item 6-2

4-53: Install operable windows in all occupied spaces, minimum 4% of floor area

Responsible Party: Architect

Intent: To promote health with improved indoor air quality with cross-ventilation, daylighting and views

Performance Requirement: In all occupiable spaces in residential units and common areas (excluding corridors and stair wells), the area of window that is operable must be no less than 4% of floor area of that space. Where possible, operable windows should be placed on opposite or adjacent walls to facilitate cross-ventilation

Points Breakdown: 2 points

When Verified: Review sizing calculations and visually verify at final inspection

4-54: Install CO_2 detectors in community rooms

Responsible Party: Mechanical Engineer, HVAC Sub-contractor, Property Management

Intent: Raise awareness of inadequate ventilation

Performance Requirement: Install wall-mounted CO_2 detectors with clear digital readouts. Place signage indicating that levels around 500 are ideal and above 800 ppm are undesirable. Consider a visual or audible warning for room occupants and/or building management at levels above 1,200 ppm

Points Breakdown: 2 points

When Verified: Visually verify at final inspection

4-55: Demand controlled ventilation in all rooms designed for high occupancy

Responsible Party: Mechanical Engineer, HVAC Sub-contractor

Intent: Decrease energy use by minimizing unnecessary ventilation

Performance Requirement: Design and install CO_2-based, demand controlled ventilation in community rooms, and other spaces designed for high occupancy but with intermittent use

Points Breakdown: 2 points

When Verified: Visually verify at final inspection

4-56: Utilize a balanced ventilation approach (supply + exhaust/return) in residential units

Responsible Party: Mechanical Engineer, HVAC Sub-contractor

Intent: Improve the effectiveness of in-unit ventilation systems

Performance Requirement: Design and install a ventilation system for 100% of residential units that provides balanced outside air supply and return, rather than an exhaust only system. System may serve individual units or be centralized. In either case, supply and return flows should be tested and balanced to be neutral or provide slight depressurization of the unit, and should be commissioned prior to occupancy

Points Breakdown: 10 points

When Verified: Visually verify at final inspection and review Test & Balance report.

Cross-references: Action Items 3-22, 3-23

4-57: Design to ensure accessibility of all system components

Responsible Party: Architect, Mechanical Engineer

Intent: Providing good indoor air quality by facilitating inspection, cleaning, maintenance and repair of systems

Performance Requirement: All installed systems should allow easy access to building management for all maintenance, repair and replacement tasks

Points Breakdown: 1 point

When Verified: Visually verify at final inspection

4-58: Design to prevent standing water in ducted HVAC systems

Responsible Party: Mechanical Engineer, Mechanical Sub-contractor

Intent: Minimize HVAC system conditions that could negatively affect indoor air quality

Performance Requirement: Ensure all drain pans and condensate lines have adequate slope to ensure good drainage, and an air gap at pipe termination to allow inspection. Humidification and cooling coils must be installed to ensure water droplets do not collect on duct surfaces

Points Breakdown: 1 point

When Verified: Visually verified during final inspections

4-59: Commission all spot ventilation fans in all units

Responsible Party: Owner, General Contractor

Intent: To ensure ventilation is programmed to meet code requirements

Performance Requirement: Fans must be properly sized for the static pressure conditions of the connected duct work, and controls must be programmed to meet or exceed code requirements. Control sequence and delivered flow rate must be tested and confirmed (at 90% or more of design flow) on all units prior to occupancy. This may be included in the scope of the Commissioning Professional or Built Green Verifier

Points Breakdown: 3 points

When Verified: Air flow tested at final inspection

4-60: Use heating system controls that are free of mercury

Responsible Party: General Contractor

Intent: Eliminate the chance of mercury exposure to manufacturers, installers and end-users.

Performance Requirement: Install only mercury-free heating system controls

Points Breakdown: 1 point

When Verified: Review of production documentation and visually verified at final inspection

4-61: Range exhaust hoods shall be ENERGY STAR rated and have a maximum flow rate less than or equal to 300 cfm

Responsible Party: General Contractor

Intent: Ensure effective removal of contaminants from cooking through installation of quiet, energy efficient, effective range hoods

Performance Requirement: All installed range hoods shall be Energy Star qualified, with a maximum flow rate of no less than 100 cfm and no more than 300 cfm, and vented to the exterior. Flow rates will be tested and confirmed on a 15% sample of units

Points Breakdown: 1 point

When Verified: Review of product documentation and verify with fan flow testing at final inspection

4-62: Install an automatic fan control with 20-minute delay timer, motion sensor, or humidistat for bath exhaust fans

Responsible Party: Mechanical Engineer, General Contractor

Intent: Reduce moisture buildup and possible mildew problems by using automatic controls for exhaust fans

Performance Requirement: All bathroom exhaust fans must activate automatically with each use (fan tied to light switch or motions sensor) and include a 20-minute delay timer (runtime after occupancy) or a humidistat that will maintain Relative Humidity below 60%

Points Breakdown: 2 points

When Verified: Review of product documentation and visually verify at final inspection

Cross-references: Action Item 4-63

4-63: Install quiet bath exhaust fan with smooth ducting, minimum 4 inch, with a fan sone rating of .3 or less at or above the design CFM

Responsible Party: Mechanical Engineer, General Contractor

Intent: Enhance occupant comfort and encourage use of bath exhaust fans

Performance Requirement: All bath exhaust fans must have a sone rating of 0.3 or less, when operating at the design flow rate. Ducts must be smooth, sheet metal or plastic, at least 4" diameter and no elbow for at least 12" from the fan box

Points Breakdown: 2 points

When Verified: Duct type, size and layout visually verified at intermediate construction inspections. Review of fan product and documentation at final inspection

Cross-references: Action Item 4-62

4-64: No sound insulation or other fibrous materials installed inside ducting

Responsible Party: Mechanical Engineer, General Contractor, HVAC Sub-contractor

Intent: To avoid restricting airflow, or introducing contaminants, including moisture, into supplied air

Performance Requirement: No sound insulation should be installed inside forced air duct work

Points Breakdown: 1 point

When Verified: Visually verify or verbally confirm during intermediate construction inspections

4-65: Install sealed combustion heating and hot water equipment

Responsible Party: Mechanical Engineer, General Contractor

Intent: Limit combustion pollutants in occupied spaces

Performance Requirement: Specify and install only closed-combustion, direct vent space and hot water heating equipment inside the building envelope

Points Breakdown: 3 points

When Verified: Review of product documentation and visually verified at final inspection

4-66: Compartmentalization testing of sampling of units

Responsible Party: Owner, General Contractor, Built Green Verifier

Intent: Confirm effectiveness of unit air sealing measures

Performance Requirement: Units must be blower door tested, using either a single-point or multi-point depressurization test in accordance with the RESNET blower door testing protocol or ASTM E-779 (but depressurization only). The unit must be tested in the normal

operating condition (no taping of exhaust ducts other penetrations, EXCEPT supply and exhaust registers of balanced, continuously operating whole-unit ventilation systems), but with ventilation and HVAC fans disabled.

Points Breakdown: 3-5

For units of 1200 sqft or less

- ≤ 0.3 CFM50/sqft 3 pts
- ≤ 0.23 CFM50/sqft 5 pts

For units of more than 1200 sqft

- ≤ 0.23 CFM50/sqft 3 pts
- ≤ 0.15 CFM50/sqft 5 pts

When Verified: Testing should be performed at the earliest feasible opportunity after the unit air barrier is complete. Sampling may be used if the Verifier has been approved for sampling in advance by the Built Green Program Manager. The sampling rate will be 1 in 7 or 15%, with units selected at random, based on the RESNET sampling protocol. To qualify the project for sampling, the Verifier must test 7 completed units (of varying sizes and conditions/locations) and get 7 consecutive passes at the lower performance threshold.

Resources: RESNET Sampling Protocol Guidance

4-67: Install biodegradable carbon filter at sink

Responsible Party: Plumbing Engineer, Plumbing Sub-contractor

Intent: Improve quality of drinking water

Performance Requirement: Install a biodegradable, activated carbon filter at the kitchen sink, on a separate drinking water faucet

Points Breakdown: 1 point

When Verified: Review of product documentation and visually verify at final inspection

4-68: Install showerhead filter in all units, include information in the tenant handbook

Responsible Party: Plumbing Engineer, Plumbing contractor

Intent: Protect occupants from absorbing chlorine through the skin during showering

Performance Requirement: Install showerhead filters in all units and common area showers. Provide information to tenants about the benefits of showerhead filters; with details of how to maintain them.

Points Breakdown: 1 point

When Verified: Visually verify at final inspection

4-69: Provide track-off mats, carpets, and/or shoe grates at principle entryways to building

Responsible Party: Architect, General Contractor

Intent: Decrease the number and volume of particles and pollutants brought into the living space

Performance Requirement: Install permanent track-off matts or slotted grates, at least 10 feet long, at all regularly used entryways to the building. Include instructions in the O&M manual regarding period emptying of grate collection areas. Roll-out mats are acceptable only if they are provided under a contract that requires weekly replacement. Any units that have direct entry from outside need a permanent track off mat, 4 feet in the direction of travel, at the main entry.

Points Breakdown: 3 points

When Verified: Visually verified at substantial completion

Cross-references: Action Item 4-70

4-70: Provide a shoe removal and storage area at the entrance to each unit

Responsible Party: Architect

Intent: Decrease the number and volume of particles and pollutants circulated within the unit

Performance Requirement: Provide a built in feature at each unit entry, where occupants and visitors can sit to remove their shoes, with storage space for two pairs of shoes per bedroom in the unit

Points Breakdown: 2 points

When Verified: Visually verify at substantial completion

Cross-references: Action Item 4-69

4-71: Do not install gas-burning appliances inside unit or building

Responsible Party: General Contractor

Intent: Limit exhaust combustion pollutants in living space

Performance Requirement: No gas-burning appliances installed inside any units or building common areas.

Points Breakdown: 1 point

When Verified: Visually verified at final inspection

Cross-references: Action Item 3-27, 3-32

4-72: Install floor drain or catch basin with drain under washing machines (and condensing/heat pump dryers if applicable)

Responsible Party: General Contractor

Intent: Avoid moisture problems if washing machines overflow

Performance Requirement: Install a floor drain or catch basin with drain under all washing machines and condensing dryers

Points Breakdown: 1 point

When Verified: Visually verified at final inspection

4-73: Use radon resistant construction using EPA standards (passive) or test for radon and install active system after building is complete

Responsible Party: General Contractor

Intent: Reduce risk of exposure to radon gas

Performance Requirement: For passive approach, use of all the techniques currently recommended by the EPA to prevent radon from entering the house (see Radon Resistant Construction Techniques at https://www.epa.gov/radon/radon-resistant-construction-basics-and-techniques). For testing approach, after substantial completion, perform a test for radon for a minimum of 48 hours (or the minimum required by the test manufacturer), using two similar, EPA-approved test kits in the same location, or hire a qualified radon test professional. If the averaged result between the two tests is higher than 2 pCi/L, install the inline fan to activate the radon mitigation system. NOTE: The EPA threshold for action is 4 pCi/L, but concentrations below this level may still pose a health risk. Built Green requires the lower threshold of 2 pCi/L to earn credit.

Points Breakdown:

Passive	1 point
Test and install radon extraction fan	2 points

When Verified: For passive approach, visually verified during construction inspections. For testing approach, review of test results and visually verify installed system.

Resources:

EPA's Radon-Resistant Construction Basics and Techniques:
https://www.epa.gov/radon/radon-resistant-construction-basics-and-techniques

SECTION FIVE: MATERIALS EFFICIENCY

5-1: Design and build for deconstruction concept

Responsible Party: Architect, General Contractor

Intent: To increase resource and economic efficiency, and reduce waste and pollution impacts at the end of the building lifecycle.

Performance Requirement: Design and construct the building using components and fastening systems that facilitate disassembly and deconstruction, including modular framing, prefabricated structural elements, pre-cast panels, glue- and nail-free assemblies, mechanical connectors instead of glued or soldered joints, and centralized, accessible wiring and utilities.

Project team must describe the systems that facilitate deconstruction and demonstrate what percentage of total building they constitute, by cost, surface area or other metric approved by the Built Green Program Manager. Information on these systems must be included in the As Built documents, and project Operations & Maintenance manual.

Points Breakdown:

- 50% of building 10 points
- 75% of building 15 points
- 90% of building 20 points

When Verified: Since this strategy must be fully integrated into the design and construction process, the plan and approach should be reviewed by the verifier in the design phase. As built and O&M content should be visually verified at the time of final inspections.

5-2: Eliminate materials and systems that require finishes or finish materials on a minimum of 100 square feet in common areas

Responsible Party: Architect, General Contractor

Intent: To reduce the consumption of material resources, and improve indoor air quality by choosing materials that do not require additional finishing.

Performance Requirement: In common areas, use structural materials, such as wall panels floor decking, and ceiling assemblies that do not require additional hard (such as finish flooring), soft (such as carpet) or wet-applied (such as paint) finish materials.

Pre-finished materials do not apply to this credit.

Points Breakdown: 1 point per 100 sqft of finish-free, exposed material. Maximum 5 points

When Verified: Visually verified at final inspection

5-3: Provide protection for stored and installed materials

Responsible Party: General Contractor

Intent: Minimize or eliminate absorptive stored and installed building materials from contamination and/or damage from exposure to moisture, dust, other pollutants, and construction activities. This practice will reduce wasted materials and save cost on replacement. Over the building's life, this will help maintain building durability and indoor air quality.

Performance Requirement: Protection of stored and installed materials should be planned as part of sequencing of materials before they arrive on site.

Measures taken should include:

- Storing materials in dry conditions indoors, under cover, and off the ground or floor;
- Consider "Just in time" delivery;
- If materials are exposed to moisture:
- Dry wood to 15% moisture or less prior to enclosing;
- Replace drywall and/or insulation;
- No smoking in the building during construction, or within 25 feet of an entrance;
- Apply high-VOC products in areas where absorptive materials have not been installed yet. Ventilate the area well during application;

- Plan for higher-impact weather events: check weather protection measures at the end of the week (covers, downspouts).

Points: 1 Point

When verified: Visually verified during intermediate construction inspections

Resources: Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008–2008, Chapter 3.

5-4: Purchase a one-time carbon offset to account for carbon footprint of materials, minimum of 50% of project footprint

Responsible Party: Owner, General Contractor

Intent: Reduce the impact of the carbon dioxide emitted during the production and transportation of your materials, and construction of your project. There are a number of organizations that can help you calculate your carbon footprint – the amount of carbon the project will produce during construction– and then direct you to credible, high-quality offsets. Examples of offset programs include an industry switching to cleaner fuel sources, the capturing of carbon emissions with landfills or dairy farms, and reforestation projects.

Performance Requirement: To earn credit, the project must use a credible carbon footprint calculator and offset at least 50% of the project's footprint, using certified offsets. Green-e is an approved source.

Points Breakdown: 15 points

When Verified: Verify offset calculation and purchase agreement at time of final inspection

Resources: Green-e: www.Green-e.org

5-5: Use suppliers who offer reusable or recyclable packaging

Responsible Party: General Contractor

Intent: Reduce or eliminate material wasted on-site that is not intended for installation through policies and practices.

Material and product packaging makes up a substantial percentage of construction material waste. Reusing packaging in the construction supply chain can cut cost, waste, and carbon emissions compared with single trip packaging. Keeping material out of the waste stream helps to preserve landfill space and lower your disposal fees. Construction product suppliers can realize these benefits by working with the supply chain and using various types of reusable, recyclable packaging. When possible, consider no packaging.

Performance Requirement: Require subcontractors to adhere to reusable or recyclable packaging purchasing practices. Specify in the contract that the subcontractor will purchase and deliver products/materials in recycled content or reusable packaging whenever feasible. Consider requiring the subcontractor to take back and recycle packaging materials.

- Use minimal packaging, providing materials in bulk packaging, on pallets, in blankets, etc.
- Take back, for reuse or recycling, all packaging for your product.
- At a minimum, provide your product in easy to recycle packaging, such as cardboard, wood, or metal.
- Offer "just in time" delivery to minimize damage to materials during on-site storage.

Points: 2 points

When Verified: Verify packaging requirements in CWM Plan at pre-construction, visually verify during intermediate construction inspections

Cross-references: Action Item 5-6, 5-7

5-6: Implement comprehensive construction waste reduction and management plan

Responsible Party: Contractor, subcontractors

Intent: Planning can reduce costs associated with wasted materials; mitigate the pollution and costs of trucking waste; and keep construction and demolition materials out of landfills

Performance Requirement: Provide draft and then revised version (as necessary) of a Comprehensive Construction Waste Reduction and Management Plan. The Plan requirements include:

- Identifying who is responsible for implementing the plan and what the objectives and metrics are
- Identifying waste materials generated by the project and ways to reduce waste through smart procurement choices and resource efficient practices
- Staging, storage and removal of waste materials to be reused, recycled or landfilled

- Engagement with all subcontractors to participate fully in the plan, with incentives and penalties
- Tracking and reporting to document all waste materials by type, disposal method and weight or volume

Points Breakdown: 5 points

When Verified: Pre-construction

Cross-references: Action Item 5-8, 5-10

Resources: King County C&D requirements:
https://your.kingcounty.gov/solidwaste/greenbuilding/construction-demolition.asp

King County Letter to Vendor sample:

https://your.kingcounty.gov/solidwaste/greenbuilding/documents/letter_to_vendor.pdf

5-7: Reduce total waste generated on site

Responsible Party: Contractor, subcontractors

Intent: Reduce costs associated with wasted materials; mitigate the pollution and costs of trucking waste; and keep construction materials out of landfills

Performance Requirement: Using co-mingled waste disposal, reduce total waste generated on site below national average for residential construction. Count landfilled material at 100% of weight. Material that is recycled at a facility on the Built Green Approved list can be calculated using the average facility wide diversion rate during the time of construction. Count 50% of weight of recycled material. The denominator is the conditioned floor area of the project, including leasable commercial space, whether finished or not. Formula: [Weight of landfilled material + (Weight of Recycled Material * (1 - diversion rate of facility)) + (Weight of recycled material * diversion rate of facility * 50%)] / Conditioned Square Footage

Points Breakdown:

- ≤4.2 lbs./sq. ft 5 points
- ≤3 lbs./sq. ft 10 points
- ≤2.0 lbs./sq. ft 15 points
- ≤1.5 lbs./sq. ft 20 points

When Verified: Review completed waste tracking log at time of final inspection

Cross-references: Action Item 5-8, 5-9

5-8: Use deconstruction to dismantle and reuse existing building components on site

Responsible Party: Architect, General Contractor

Intent: Increase the reuse of high-value salvaged materials from the site, eliminating transportation and storage costs

Performance Requirement: Deconstruct and salvage all useable building components from existing buildings on the project site. Reuse at least 50% of salvaged components in the new project

Points Breakdown:

- Architectural elements and fixtures only 15 points
- Architectural elements and fixtures plus large pieces 20 points
- everything salvageable (at least 20% of total deconstruction waste, excluding concrete) 30 points

When Verified: Visually verified at intermediate or final inspections, review salvage documentation

Cross-references: Action Item 5-12

5-9: Sell, give away, or reuse wood scraps, lumber and land clearing debris

Responsible Party: General Contractor

Intent: Optimize the utilization of building material resources

Performance Requirement: Include steps for this Action Item in the Construction Waste Management Plan, provide infrastructure and require all on-site personnel to participate.

Points Breakdown: 1 point

When Verified: Visually verified at intermediate or final inspections, review CWM Plan

Cross-references: Action Item 5-8

5-10: Donate, sell, or give away reusable finish items

Responsible Party: General Contractor

Intent: Optimize the utilization of building material resources

Performance Requirement: Include steps for this Action Item in the Construction Waste Management Plan, provide infrastructure and require all on-site personnel to participate.

Points Breakdown: 1 point

When Verified: Visually verified at intermediate or final inspections, review CWM Plan

Cross-references: Action Item 5-9

5-11: Reuse salvaged materials (1 pt per material)

Responsible Party: General Contractor

Intent: Reusing building materials provides wide-ranging environmental benefits including, reducing waste, avoiding disposal costs, preserving embodied energy, reducing pollution, and preserving natural resources and habitats.

Performance Requirement: Purchase materials from salvage and reuse operations, re-use materials from other jobsites, or use reclaimed items from demolition. Credit will be awarded to salvaged materials used for 33% of a building component either in the shell, circulation, or in every unit. Possible components are listed here.

- Interior doors
- Flooring
- Fixtures
- Hardware
- Cabinets
- Siding
- Decking
- Trim
- Countertops
- Wood flooring
- Landscape material

Points: 1 point per material, Maximum 20 points

When Verified: Visually verify at final inspection, review receipt of purchase, etc.

Cross-references: Action Items 5-9, 5-10, 5-11, 5-12

5-12: Use salvaged lumber, 1 pt per 100 board feet

Responsible Party: General Contractor, Structural Engineer

Intent: Reduce pressure on virgin timber resources. According to EPA statistics, a 2000 square foot residential project generates 127 tons of demolition debris. Ten percent of this is recoverable framing lumber, which averages 6,000 board feet or 33 mature trees.

Performance Requirement: Use framing lumber from salvage and reuse operations, re-used from other jobsites, or reclaimed in demolition. When reusing or repurposing lumber for structural purposes, check with your local building authority regarding grading requirements, strength restrictions or limits. Code may require some downgrading of structural capacity. In some cases, such as old heavy timbers, structural capacity may be increased.

Points are awarded for the quantity of salvaged lumber from lumber from an existing on-site, deconstructed building or commercially salvaged, and reused building material sources. This does not apply to new wood from trees cut on site or off-cuts produced on site during framing.

Points Breakdown: 1 point per 100 board feet. Maximum 20 points.

When Verified: Intermediate Verification – receipt of sale

Cross-references: Action Item 5-11

Resources: Ballard Reuse, Seattle: www.BallardReuse.com

Duluth Timber Company, Bow-Edison: www.duluthtimber.com

Earthwise Architectural Salvage, Seattle: www.ewsalvage.com

Pacific Northwest Timbers, Port Townsend: www.pacificnorthwesttimbers.com

Second Use, Seattle: www.seconduse.com

Northwest Building Salvage Network: www.nbsnseattle.org

5-13: Recycle cardboard by source separation, 90% minimum recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for dry staging and removal of materials, and document throughout construction

Points Breakdown: 1 point

When Verified: Visually verify during intermediate construction inspections, and review documentation at time of final inspection

Cross-references: Action Item 5-6

5-14: Recycle metal scraps by source separation, 90% minimum recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for dry staging and removal of materials, and document throughout construction

Points Breakdown: 2 points

When Verified: Visually verify during intermediate construction inspections, and review documentation at time of final inspection

Cross-references: Action Item 5-6

5-15: Recycle clean scrap wood and broken pallets by source separation, 90% minimum recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for dry staging and removal of materials, and document throughout construction

Points Breakdown: 5 points

When Verified: Visually verify during intermediate construction inspections, and review documentation at time of final inspection

Cross-references: Action Item 5-6

5-16: Recycle package wrap and pallet wrap by source separation, 90% minimum recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for dry staging and removal of materials, and document throughout construction

Points Breakdown: 2 points

When Verified: Visually verify during intermediate construction inspections, and review documentation at time of final inspection

Cross-references: Action Item 5-6

5-17: Recycle drywall by source separation, 90% minimum recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for dry staging and removal of materials, and document throughout construction

Points Breakdown: 3 points

When Verified: Visually verify during intermediate construction inspections, and review documentation at time of final inspection

Cross-references: Action Item 5-6

5-18: Recycle concrete/asphalt rubble, masonry materials, or porcelain by source separation, 90% minimum recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for dry staging and removal of materials, and document throughout construction

Points Breakdown: 2 points

When Verified: Visually verify during intermediate construction inspections, and review documentation at time of final inspection

Cross-references: Action Item 5-6

5-19: Recycle paint by source separation, 90% minimum recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for dry staging and removal of materials, and document throughout construction

Points Breakdown: 1 point

When Verified: Visually verify during intermediate construction inspections, and review documentation at time of final inspection

Cross-references: Action Item 5-6

5-20: Recycle asphalt roofing by source separation, 90% minimum recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for dry staging and removal of materials, and document throughout construction

Points Breakdown: 4 points

When Verified: Visually verify during intermediate construction inspections, and review documentation at time of final inspection

Cross-references: Action Item 5-6

5-21: Recycle carpet padding by source separation, 90% minimum recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for dry staging and removal of materials, and document throughout construction

Points Breakdown: 2 points

When Verified: Visually verify during intermediate construction inspections, and review documentation at time of final inspection

Cross-references: Action Item 5-6

5-22: Recycle carpet by source separation, 90% minimum recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for dry staging and removal of materials, and document throughout construction

Points Breakdown: 2 points

When Verified: Visually verify during intermediate construction inspections, and review documentation at time of final inspection

Cross-references: Action Item 5-6

5-23: Recycle glass by source separation, 90% minimum recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for dry staging and removal of materials, and document throughout construction

Points Breakdown: 1 point

When Verified: Visually verify during intermediate construction inspections, and review documentation at time of final inspection

Cross-references: Action Item 5-6

5-24: Recycle land clearing and yard waste, food waste, soil and sod by source separation, 90% minimum recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for dry staging and removal of materials, and document throughout construction

Points Breakdown: 3 points

When Verified: Visually verify during intermediate construction inspections, and review documentation at time of final inspection

Cross-references: Action Item 5-6

5-25: Recycle electronics and batteries

Responsible Party: General Contractor, Sub-contractors

Intent: Prevent the introduction of heavy metals and other hazardous properties of electronics and batteries from entering the environment

There are many options to recycle dry cell batteries in King and Snohomish Counties because they are regulated as universal waste. Universal waste is not counted toward waste generation totals and does not need to be manifested. If you send your batteries to a Universal Waste Handler, be sure the batteries end up at a treatment, storage, disposal or recycling facility. Different vendors accept different types of batteries; call for more specific information.

Performance Requirement: Develop a strategy to collect and store material on site and where each item will be taken to recycle. Identify a receiver that handles the materials in an environmentally sound manner, in the U.S. or developed countries. Include details in the Construction Waste Management (CWM) Plan. Provide a bin, communicate where it is located on site and what is collected. Include in waste tracking documentation.

Points Breakdown: 3 points

When Verified: Review CWM plan pre-construction, and tracking documentation at time of final inspection

Cross-references: Action Item 5-6

Resources: King County's Take It Back Network:
https://your.kingcounty.gov/solidwaste/takeitback/electronics

King County's What do I do with …
https://your.kingcounty.gov/solidwaste/wdidw/category.asp?CatID=8

Snohomish County recycling information

https://snohomishcountywa.gov/530/Recycling

5-26: Provide bin during construction for miscellaneous household waste

Responsible Party: Contractor, waste hauler

Intent: Household waste on a construction site (personal lunch waste, jobsite office waste, etc.) can potentially contaminate comingled bins of C&D recycling and therefore decrease the recycling rate.

Performance Requirement: Contract with a waste hauler to provide a separate bin and regular collection for regular household waste.

Points Breakdown: 1 point

When Verified: Visually verify during intermediate construction inspections

Cross-references: Action Item 5-6

5-27: Send at least 90% of jobsite recyclables (by weight excluding concrete) to an approved commingled recycling facility with 50% recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Arrange for your construction waste to be hauled to an approved recycling facility as listed in the Built Green Program Recycling Guidelines. Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for staging and removal of materials, and document throughout construction.

Points Breakdown: 10 points

When Verified: Confirm approved receiver at pre-construction. Review documentation at time of final inspections, and confirm average facility diversion rate during construction.

Cross-references: Action Item 5-6

Resources: Built Green Program Recycling Guidelines

5-28: Send at least 90% of jobsite recyclables (by weight excluding concrete) to an approved commingled recycling facility with 75% recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Arrange for your construction waste to be hauled to an approved recycling facility as listed in the Built Green Program Recycling Guidelines. Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for staging and removal of materials, and document throughout construction.

Points Breakdown: 18 points

When Verified: Confirm approved receiver at pre-construction. Review documentation at time of final inspections, and confirm average facility diversion rate during construction.

Cross-references: Action Item 5-6

Resources: Built Green Program Recycling Guidelines

5-29: Send at least 90% of jobsite recyclables (by weight excluding concrete) to an approved commingled recycling facility with 90% recycling rate

Responsible Party: General Contractor

Intent: Reduce pressure on virgin resources and decrease the volume of material disposed of in the landfill

Performance Requirement: Arrange for your construction waste to be hauled to an approved recycling facility as listed in the Built Green Program Recycling Guidelines. Include all necessary steps in CWM plan to recycle at least 90% of waste generated, provide suitable facilities for staging and removal of materials, and document throughout construction.

Points Breakdown: 24 points

When Verified: Confirm approved receiver at pre-construction. Review documentation at time of final inspections, and confirm average facility diversion rate during construction.

Cross-references: Action Item 5-6

Resources: Built Green Program Recycling Guidelines

5-30: Use standard dimensions in design of structure

Responsible Party: Architect

Intent: Reduce waste of construction materials

Performance Requirement: Use two foot and four foot increments where possible in floor plans and framing layouts, and place door and window openings to avoid additional framing or additional cuts. Coordinate with subcontractors to optimize design to most common material dimensions.

Points Breakdown: 1 point

When Verified: Review at completion of design phase

5-31: Design and install recycling stations on each floor, including a maintenance service plan

Responsible Party: Owner, architect, property manager

Intent: Improve resident participation in municipal recycling and reduce contamination of recyclables

Performance Requirement: Provide a recycling station on each floor of the building, with clear (preferably graphic or multi-lingual) signage that is consistent with the local municipality's recycling program. Include recycling station management/maintenance in property maintenance service plan, and educational materials in resident orientation packets

Points Breakdown: 10 points

When Verified: Visually verified and reviewed at time of final inspections

5-32: Design and install food waste management system on each floor, including a maintenance service plan

Responsible Party: Owner, architect, property manager

Intent: Reduce the amount of compostable food waste in the solid waste stream. Over 20% of what we throw away in our garbage is compostable.

Performance Requirement:

Provide kitchen collection vessels in 100% of units, and a central collection area with appropriate signage that is maintained for cleanliness and odors. Include management/maintenance measures in the property maintenance service plan, and communicate food waste composting requirements in the resident orientation and manual.

The majority of King and Snohomish Counties can now recycle food scraps, food soiled paper, and other compostable containers and materials in their curbside yard waste bin.

Food waste recycling in multi-family facilities presents unique challenges and may not be easy to establish currently due to the nature of multi-family unit occupancy, or even because of the current culture regarding food waste collection. Therefore, good signage and communication with an easily accessible central collection area is paramount.

Points Breakdown: 8 points

When Verified: Final Verification

Resources: Seattle Public Utilities site: http://www.seattle.gov/util/ForBusinesses/SolidWaste/FoodYardBusinesses/BldgOwnersManagers/index.htm

City of Kirkland – great resource for multifamily:

http://www.kirklandwa.gov/depart/Public_Works/solidwaste/resources/multifamily-toolkit.htm

Snohomish County – Waste Management information:

http://wmnorthwest.com/ssnohomishcounty/yardwaste.html

5-33: Install materials with longer life cycles

Responsible Party: Owner, architect, general contractor

Intent: Reduce the future consumption of raw materials for the replacement of short service life building components

Performance Requirement: Install at least one major building component that has a life expectancy and warranty at least 30 years (roofing, siding, windows, cabinetry, counter tops, flooring). Include expectation and submittal requirements in specifications or contract documents

Points Breakdown: 1 point per significant material with 30+ year warranty. Maximum 3 points

When Verified: Final Verification (include product warranty information)

5-34: Install locally/regionally produced materials

Responsible Party: Architect, general contractor

Intent: Reduce the carbon footprint of materials resulting from transportation from source to processing and to project site

Performance Requirement: Install materials (costing no less than 2% of the materials budget) that are both harvest/extracted, and processed/manufactured within 500 miles of the project site.

Points Breakdown: 1 point per compliant material up to 10 points

When Verified: Review at final verification (include product submittal with documentation of extraction, production, and manufacture)

5-35: Use rapidly renewable building materials and products made from plants harvested within a ten-year cycle or shorter

Responsible Party: Owner/architect (include expectation and submittal requirements in specifications or contract documents), contractor, subcontractors

Intent:

Performance Requirement: Install materials (costing no less than 2% of the materials budget) that are made from plants harvested within a ten-year cycle or shorter

Points Breakdown: 2 points per compliant material up to 6 points

When Verified: Final Verification (include product submittal with documentation of extraction, production, and manufacture)

5-36: Use no endangered species or old growth wood

Responsible Party: Architect, General Contractor

Intent: Avoid the use of endangered wood species or old growth timber

Performance Requirement: Use no species on the Convention on International Trade in Endangered Species (CITES) list (See Wood Database in References, below), or wood harvest from old growth forests (never previously harvested - check with supplier). Wood species on the list represents plant species determined to be endangered or threatened if international trade were left unrestricted or where international trade could threaten their survival. resource.

Points Breakdown: 3 points

When Verified: Verify documentation for any wood that appears to be tropical or old growth

Resources:

CITES: International Union for Conservation of Nature: IUCN Red List of Threatened Species
www.cites.org

Wood Database: www.wood-database.com/wood-articles/restricted-and-endangered-wood-species/

Also, International Union for Conservation of Nature (IUCN) Red List of Threatened Species: http://www.iucnredlist.org/

5-37: Use no PVC, CPVC, or ABS piping for plumbing or sprinklers within the building envelope

Responsible Party: Architect, plumbing designer, plumbing subcontractor

Intent: Minimize the use of plastics containing high levels of toxic chemicals

Performance Requirement: Use no PVC, CPVC or ABS piping for plumbing or sprinkler within the building envelope.

Give preference copper, PEX, cast iron, steel, and polypropylene pipe

Points Breakdown: 3 points

When Verified: Visually verified during intermediate construction inspections

5-38: Create detailed take-off and provide as cut list to framer

Responsible Party: Architect, General Contractor

Intent: Minimize lumber waste by ensuring dimensional lumber sizes are used for their intended purpose

Performance Requirement: Create a detailed lumber take-off from the plans as part of the lumber ordering process. Provide to framer as a cut list, to ensure long studs and joists are not cut short by mistake.

Points Breakdown: 2 points

When Verified: Review documents at preconstruction, or at time of final inspection

5-39: Use central cutting area or cut packs

Responsible Party: General Contractor

Intent: Minimize lumber waste by ensuring dimensional lumber sizes are used for their intended purpose, and off-cuts are used to best advantage

Performance Requirement: Restrict all dimensional lumber cutting to a central area, and retain off-cuts nearby for reuse. Alternately, order dimensional lumber in pre-cut packages as much as possible.

Points Breakdown: 2 points

When Verified: Visually verify cutting areas or pre-cut framing packages during intermediate construction inspections

5-40: Use dimensional lumber that is third-party certified sustainably harvested wood that meets the Tier 1 or Tier 2 requirements, 50% minimum

Responsible Party: Architect, General Contractor

Intent: Reduce pressure on forest resources by increasing demand for sustainably managed and harvest wood products

Performance Requirement: Use dimensional lumber that is third-party certified sustainably harvested wood that meets the Tier 1 or Tier 2 requirements (outlined in Table 5-1) for at least 50% of framing lumber

Points Breakdown:

- Tier 1 lumber 10 points
- Tier 2 lumber 6 points

When Verified: Visually verified at final inspection, with product documentation review

TABLE 5-1

WOOD CERTIFICATION GUIDELINES

Certified Wood Products Tier 1 Requirements:

- Independently third-party audited chain of custody. Chain of custody refers to a certification that guarantees a wood product has been tracked from a certified forest to the final product to ensure it came from a sustainable forestry source. Tracking also guarantees that products will not be mixed with non-certified products during processing, manufacturing and distribution.
- No conversion of natural forest to plantation
- No mass harvest of old growth trees
- No GMOs/Pesticides (GMO = genetically-modified organisms)
- Multi-stakeholder governance with transparent decision-making process
- Rules for control of non-certified components in certified products
- Supported by leading environmental and social organizations
- Policy of removal for non-compliance.

Certified Wood Products Tier 2 Requirements:

- Independently third-party audited chain of custody
- No conversion of natural forest to plantation
- No mass harvest of old growth trees
- Rules for control of non-certified components in certified products
- Policy of removal for non-compliance.

As of November 2017, Forest Stewardship Council (FSC) certification is accepted for Tier 1 and no certifications were accepted for Tier 2. Please contact the Built Green program for the most recent information.

5-41: Use sheathing that is third-party certified sustainably harvested wood that meets the Tier 1 or Tier 2 requirements, 50% minimum

Responsible Party: Architect, General Contractor

Intent: Reduce pressure on forest resources by increasing demand for sustainably managed and harvest wood products

Performance Requirement: Use sheathing that is third-party certified sustainably harvested wood that meets the Tier 1 or Tier 2 requirements (outlined in Table 5-1for at least 50% of exterior sheathing

Points Breakdown:

- Tier 1 lumber 7 points
- Tier 2 lumber 4 points

When Verified: Visually verified at final inspection, with product documentation review

5-42: Use beams that are third-party certified sustainably harvested wood that meets the Tier 1 or Tier 2 requirements, 50% minimum

Responsible Party: Architect, General Contractor

Intent: Reduce pressure on forest resources by increasing demand for sustainably managed and harvest wood products

Performance Requirement: Use beams that are third-party certified sustainably harvested wood that meets the Tier 1 or Tier 2 requirements (outlined in Table 5-1) for at least 50% of wood beams

Points Breakdown:

- Tier 1 lumber 5 points

- Tier 2 lumber 3 points

When Verified: Visually verified at final inspection, with product documentation review

5-43: Use factory framed wall panels (panelized wall construction)

Responsible Party: Architect, General Contractor

Intent: Improve the efficient use of framing lumber. Manufacturing of wall panels in the controlled environment of a factory, using computer-controlled material optimization can significantly reduce wood waste.

Performance Requirement: Use panelized wall construction for at least 90% of wood-framed exterior walls, based on linear feet of one-story above-grade walls.

Points Breakdown: 6 points

When Verified: Visually verified during intermediate construction inspections

Cross-references: Action Item 5-6

5-44: Use advanced wall framing – 24-inch OC, with double top plate

Responsible Party: Architect, general contractor

Intent: Reduce the consumption of framing lumber by eliminating unnecessary framing for structural and infill purposes, through Optimum Value Engineering

Performance Requirement: Use 24" on center framing for at least 50% of exterior and interior walls, based on linear feet of one-story wall, where structurally feasible. Double top plates or equivalent are allowed to remove the need to stack vertical framing members

Points Breakdown: 5 points

When Verified: Visually verified during intermediate construction inspections

5-45: Use engineered structural products and use no 2xs larger than 2x8, and no 4xs larger than 4x8

Responsible Party: Architect, General Contractor

Intent: Reduce demand for dimensional lumber from large, mature trees by using engineered products that can be made from smaller trees with shorter harvesting cycles

Performance Requirement: Design for, and specify engineered products, such as open web trusses, I-joists, glue-lams and Laminated Veneer Lumber (LVL) for all structural joists and beams greater than 8" wide. Clearly communicate to lumber yard and framer that no dimensional lumber greater than 2x8 and 4x8 is to be used in the project

Points Breakdown: 3 points

When Verified: Visually verified during intermediate construction inspections

5-46: Use structural insulated panels (SIPs)

Responsible Party: Architect, General Contractor

Intent: Reduce demand for dimensional lumber from large, mature trees by using engineered products that can be made from smaller trees with shorter harvesting cycles

Performance Requirement: Use structural insulated panels for at least 80% of the exterior above grade walls, and/or 80% of the roof.

Points Breakdown:

At least 80% of above grade walls	4 points
At least 80% of the roof	4 points
At least 80% of the above grade walls and roof	8 points

When Verified: Visually verified during intermediate construction inspections

Cross-references: Action Item 3-6, 3-9

5-47: Use insulated concrete forms (ICFs)

Responsible Party: Architect, General Contractor

Intent: Reduce demand for dimensional lumber by using non-wood wall systems

Performance Requirement: Use insulated concrete forms for at least 75% of the exterior above grade walls.

Points Breakdown: 5

When Verified: Visually verified during intermediate construction inspections

Cross-references: Action Item 3-6, 3-9

5-48: Use finger-jointed framing material (e.g. studs)

Responsible Party: Architect, General Contractor

Intent: Reduce demand for dimensional lumber from larger trees by using engineered products that can be made from scrap wood and smaller trees with shorter harvesting cycles

Performance Requirement: Use finger-jointed studs for at least 50% of wood-framed walls, based on linear feet of one-story wall.

Points Breakdown: 1 point

When Verified: Visually verified during intermediate construction inspections

Cross-references: Action Item 3-6, 3-9

5-49: Use Cross Laminated Timber in place of steel or concrete

Responsible Party: Architect, general contractor

Intent: Reduce the embodied carbon of buildings by avoiding the use of materials with high energy inputs during production

Performance Requirement: Use Cross Laminated Timber (CLT) for at least 20% of the project's structural materials budget. CLT is made into structural panels that can be used for load-bearing walls and floors, among other uses.

Points Breakdown: 8 points

When Verified: Visually verified during intermediate construction

Resources:

Cross-laminated timber guide: www.rethinkwood.com

Wood Products Council: www.woodworks.org

5-50: Use fly ash or blast furnace slag for 25% by weight of cementitious materials for all concrete

Responsible Party: Architect, general contractor

Intent: Reduce the embodied carbon footprint of the project by using recycled cementitious materials

Performance Requirement: Use concrete mixes with at least 25% of cementitious content from fly ash or slag, for at least 90% of the poured-in-place concrete in the project.

Points Breakdown: 6 points

When Verified: Review concrete mix documentation at time of final inspections

5-51: Use recycled concrete, asphalt, or glass cullet for base or fill

Responsible Party: Architect, general contractor

Intent: Optimize the use of material resources by repurposing waste/salvaged materials

Performance Requirement: Use recycled concrete, asphalt, or glass cullet for at least 30% of base or fill aggregate in foundations or paved areas

Points Breakdown: 2 points

When Verified: Visually verified during intermediate construction inspections, review documentation at final inspections

5-52: Use recycled content sub-floor

Responsible Party: Architect, General Contractor

Intent: Reduce pressure on virgin materials, by increasing demand for products with high recycled content

Performance Requirement: Use an engineered sub-floor or underlayment product, that is certified to have at least 20% total recycled content, for at least 50% of the framed floor in the project

Points Breakdown: 1 point

When Verified: Visually verified during intermediate construction inspections, with review of documentation

5-53: If using vinyl flooring, use product with recycled content

Responsible Party: Architect, General Contractor

Intent: Reduce the negative environmental impacts of manufacturing and disposing of materials with toxic components, by increasing demand for products with high recycled content

Performance Requirement: For at least 90% of the vinyl flooring used in the project, use a product that is certified to have at least 10% total recycled content.

Points Breakdown: 2 points

When Verified: Visually verified during final inspections, with review of documentation

Cross-references: Action Item 5-54

5-54: No vinyl flooring

Responsible Party: Architect, General Contractor

Intent: Reduce the negative environmental and human health impacts of manufacturing, using and disposing of materials with toxic components, by using alternatives that are environmentally-preferable

Performance Requirement: Install no vinyl flooring in the project.

Points Breakdown: 4 points

When Verified: Visually verified during final inspections, with review of documentation

Cross-references: Action Item 5-58

5-55: Use recycled content carpet pad

Responsible Party: Interior Designer, General Contractor

Intent: Reduce pressure on virgin materials, by increasing demand for products with high recycled content

Performance Requirement: Use a carpet pad, that is certified to have at least 40% total recycled content, for at least 90% of the carpeted in the project (excluding carpet tile areas). Product also must not contain brominated flame retardants to earn this point.

Points Breakdown: 1 point

When Verified: Visually verified during final inspections, with review of documentation

Cross-references: Action Items 4-17, 4-24, 4-25

5-56: Use recycled content carpet

Responsible Party: Interior Designer, General Contractor

Intent: Reduce pressure on virgin materials, by increasing demand for products with high recycled content

Performance Requirement: Use carpet that is certified to have at least 40% total recycled content in the pile or the backing (or both), for at least 50% of the carpet in the project. Preference should be given to suppliers with “take-back” programs, which help to close the loop of manufacturer responsibility.

Points Breakdown: 2 points

When Verified: Visually verified during final inspections, with review of documentation

Cross-references: Action Items 4-17, 4-24, 4-25

5-57: Use replaceable carpet tile for 50% or 100% of carpeted area (minimum of 50 sqft)

Responsible Party: Interior Designer, General Contractor

Intent: Reduce unnecessary waste generated from the replacement of full widths of broadloom carpet, when limited areas are worn or stained

Performance Requirement: Install replaceable carpet tile in the project

Points Breakdown:

- 50% of carpeted area 2 points
- 100% of carpeted area 4 points

When Verified: Visually verified during final inspections

Cross-references: Action Items 4-17, 4-24, 4-25

5-58: If using tile, use hard surface tile that is 40% recycled content

Responsible Party: Interior Designer, General Contractor

Intent: Reduce pressure on virgin materials, by increasing demand for products with high recycled content

Performance Requirement: Use hard-surface tile that is certified to have at least 40% total recycled content. Preference should be given to high levels of post-consumer recycled content.

Points Breakdown: 5 points

When Verified: Visually verified during final inspections, with review of documentation

Cross-references: Action Items 4-21, 4-22, 4-23

5-59: Use natural linoleum

Responsible Party: Interior Designer, General Contractor

Intent: Reduce environmental impact and carbon footprint by using natural materials with low embodied energy in place of synthetics

Performance Requirement: Use natural linoleum in place of synthetic resilient flooring products.

Points Breakdown: 5 points

When Verified: Visually verified during final inspections, with review of documentation

Cross-references: Action Items 4-21, 4-22, 4-23

5-60: Use flooring that is third-party certified sustainably harvested wood for at least 50% of hard surface flooring

Responsible Party: Interior Designer, General Contractor

Intent: Reduce pressure on forest resources by increasing demand for sustainably managed and harvest wood products

Performance Requirement: Use flooring made from wood that is third-party certified sustainably harvested in accordance with Tier 1 or Tier 2 requirements (outlined in Table 5-1) for at least 50% of the hard surface flooring in the project

Points Breakdown:

- Tier 1 lumber 5 points
- Tier 2 lumber 3 points

When Verified: Visually verified at final inspection, with product documentation review

Cross-references: Action Items 4-21, 4-22, 4-23

5-61: Use spot-repairable floor finish

Responsible Party: Interior Designer

Intent: Increase the service life of finish flooring, reducing waste and maintenance cost

Performance Requirement: For wood, cork and other natural surface flooring, use penetrating oil or wax finishes instead of polyurethane. Wear and tear in a penetrating finish can be spot repaired instead of skimming and refinishing the whole area.

Include clear instructions for floor finish maintenance and repair in the Operations & Maintenance Manual

Points Breakdown: 1 point

When Verified: Visually verified at final inspections, with review of O&M manual

5-62: Use drywall with a minimum of 95% recycled content synthetic gypsum or 10% if non-synthetic gypsum

Responsible Party: Architect, general contractor

Intent: Reduce pressure on virgin materials, by increasing demand for products with high recycled content

Performance Requirement: Use at least 30% of drywall with a minimum of 95% recycled content synthetic gypsum or 10% if non-synthetic gypsum. Gypsum board manufacturers employ various levels of recycled content (pre- and post-consumer) in the production of gypsum board through either the use of flue-gas desulfurization (FGD) (also known as synthetic) gypsum or post-consumer gypsum collected from construction and demolition projects used in new product board core and recycled paper for board facing. These higher recycled content boards are commonly available at most building material suppliers and are cost-competitive with conventional drywall. Non-synthetic recycled gypsum content

industry standard is around 5%, therefore specifying a higher content product with your vendor is necessary. Some products are locally sourced/manufactured

Points Breakdown: 2 points

When Verified: Final Verification

5-63: Use recycled or "reworked" paint and finishes on main surfaces or all surfaces

Responsible Party: Interior Designer, General Contractor

Intent: Reduce pressure on virgin materials, by increasing demand for products with high recycled content

Performance Requirement: Use recycled or reworked paints and coatings on large interior surfaces (not trim, doors, etc.) of the project

Points Breakdown: 2 or 3

- Main interior surfaces 2 points
- All interior surfaces 3 points

When Verified: Visually verified at final inspection, with product documentation review

5-64: If installing acoustical ceiling tiles, select a recycled content product

Responsible Party: Interior Designer, General Contractor

Intent: Reduce pressure on virgin materials, by increasing demand for products with high recycled content

Performance Requirement: Install acoustical tile that contains recycled content for at least 90% of the acoustical tile in the project, based on area.

Points Breakdown: 1 point

When Verified: Visually verified at final inspection, with product documentation review

5-65: Use all-wood, composite, or fiberglass windows

Responsible Party: Architect, General Contractor

Intent: Reduce the environmental impact of vinyl during manufacture, use, and disposal by sourcing alternate materials with lower impact

Performance Requirement: Install all-wood, plastic composite (no vinyl), or fiberglass windows in at least 90% of window locations (storefront window systems excluded)

Points Breakdown: 8 points

When Verified: Visually verified at final inspection

5-66: If using wood trim: one or more of the below strategies, a through c

Responsible Party: Interior Designer, General Contractor

Intent: Reduce pressure on forest resources by increasing demand for sustainably managed and harvest wood products and engineered products that can be made from scrap wood and smaller trees with shorter harvesting cycles

5-66a: Use trim that is third-party certified sustainably harvested wood, 50% minimum

Responsible Party: Interior Designer, General Contractor

Performance Requirement: At least 50% of interior trim (by cost or linear footage) must be from sustainably harvest wood that meets the Tier 1 or Tier 2 requirements outlined in Table 5-1

Points Breakdown:

Tier 1	3 points
Tier 2	2 points

When Verified: Visually verified at final inspection, with product documentation review

Cross-references: Action Items 4-19

5-66b: Use finger-jointed or MDF trim with no added urea formaldehyde, 90% minimum

Responsible Party: Interior Designer, General Contractor

Performance Requirement: At least 90% of interior trim (by cost or linear footage) must be finger jointed, or MDF that is certified as No Added Urea Formaldehyde (NAUF)

Points Breakdown: 3 points

When Verified: Visually verified at final inspection, with product documentation review

5-66c: Use wood veneers that are third-party certified sustainably harvested woods, 50% minimum

Responsible Party: Interior Designer, General Contractor

Performance Requirement: At least 90% of interior trim (by cost or linear footage) must be from sustainably harvest wood that meets the Tier 1 or Tier 2 requirements outlined in Table 5-1

Points Breakdown:

Tier 1 2 points

Tier 2 1 points

When Verified: Visually verified at final inspection, with product documentation review

Cross-references: Action Items 4-19

5-67: For cabinets: one or more of the strategies below, a through c

Responsible Party: Interior Designer, General Contractor

Intent: Reduce pressure on forest resources by increasing demand for sustainably managed and harvest wood products and engineered products that can be made from scrap wood and smaller trees with shorter harvesting cycles

5-67a: Use third-party certified sustainably harvested wood for at least 75% of cabinet casework

Responsible Party: Interior Designer, General Contractor

Performance Requirement: At least 90% of cabinetry must be from sustainably harvest wood that meets the Tier 1 or Tier 2 requirements outlined in Table 5-1

Points Breakdown:

- Tier 1 3 points
- Tier 2 1 points

When Verified: Visually verified at final inspection, with product documentation review

Cross-references: Action Items 4-19

5-67b: Use recycled-content cabinet casework for at least 75% of all case work

Responsible Party: Architect, general contractor

Intent: Reduce pressure on virgin materials, by increasing demand for products with high recycled content

Performance Requirement: At least 75% of cabinet case work in the project (based on cost or linear feet of cabinet) must be certified to contain recycled content

Points Breakdown: 3 points

When Verified: Visually verified at final inspection, with product documentation review

5-67c: Use cabinet casework and shelving made with agricultural fiber that is NAUF, NAF, or ULEF for at least 75% of all cabinetry

Responsible Party: Interior Designer, General Contractor

Intent: Reduce pressure on forest resources by using non-wood alternatives with short harvesting cycles

Performance Requirement: At least 75% of installed cabinetry is made of engineered wood products that are certified NAUF, NAF or CARB II ULEF.

Points Breakdown: 1 points

When Verified: Visually verified at final inspection, with product documentation review

Cross-references: Action Item 4-18, 4-20

5-68: Use resource efficient countertop material in lobby/reception areas (1 pt) or in all areas (4 pts)

Responsible Party: Interior Designer, General Contractor

Intent: Reduce pressure on virgin materials, by increasing demand for products with high recycled content

Performance Requirement: Install countertops that are resource efficient in their raw materials, manufacture, and/or transportation

Points Breakdown: 1 or 4 points

- In lobby/reception area only 1 point
- In all locations 4 points

When Verified: Visually verified at final inspection, with product documentation review

Cross-references: Action Item 5-35

5-69: Use recycled content roofing material

Responsible Party: Architect, General Contractor

Intent: Reduce pressure on virgin materials, by increasing demand for products with high recycled content

Performance Requirement: Use a roofing material that is certified to contain recycled content for at least 75% of the roof area

Points Breakdown: 2 points

When Verified: Visually verified at final inspection, with product documentation review

Cross-references: Action Item 2-24, 2-35

5-70: Use a modified bitumen built-up roof

Responsible Party: Architect, General Contractor

Intent: Optimize roof service life with durable, repairable materials

Performance Requirement: Specify and install modified bitumen built up roofing as the primary roofing system for the project.

Points Breakdown: 2 points

When Verified: Product documentation reviewed and visually verified at intermediate or final site visit

5-71: Protect at least 90% of built-up and membrane roofing with ballast, pavers, or vegetated roof systems

Responsible Party: Owner, Architect, General Contractor

Intent: Increase service life of roof by protecting it from solar radiation and friction wear and tear.

Performance Requirement: At least 90% of low angle, built up or membrane roofing is covered with ballast, elevated pavers, of a vegetated roofing system

Points Breakdown: 5 points

When Verified: Visually verified at final inspection

Cross-references: Action Item 2-22

5-72: All cavity insulation must have minimum 40% post-consumer recycled content

Responsible Party: Architect, General Contractor

Intent: Reduce pressure on virgin materials, by increasing demand for products with high recycled content

Performance Requirement: All cavity-installed insulation must be certified to contain at least 40% post-consumer recycled content

Points Breakdown: 4 points

When Verified: Visually verified at final inspection, with review of product documentation

Cross-references: Action Item 3-8, 4-15f

5-73: Use environmentally friendly foam building products (CFC-, HFC-, HCFC-free)

Responsible Party: Architect, General Contractor

Intent: Reduce the greenhouse gas emissions and other atmospheric impacts associated with foam product manufacture, by using products made with more benign blowing agents

Performance Requirement: All rigid foam insulation and spray foam used in the building must be documented to use no CFC-, HFC-, or HCFC blowing agents during manufacture or installation

Points Breakdown: 5 points

When Verified: Review of product documentation at time of final inspection

5-74: Use recycled content sheathing (OSB does not apply)

Responsible Party: Architect, General Contractor

Intent: Reduce pressure on virgin materials, by increasing demand for products with high recycled content

Performance Requirement: Install sheathing that is certified to contain recycled content (OSB does not apply)

Points Breakdown: 2 points

When Verified: Visually verified during intermediate construction inspections, with review of product documentation

5-75: Use exterior cladding with reclaimed or recycled material on at least 20% of solid wall surface

Responsible Party: Architect, general contractor

Intent: Reduce pressure on virgin materials, by increasing demand for products with high recycled content

Performance Requirement: Select and install exterior cladding which is reclaimed or has recycled content on at least 20% of the area of opaque, above-grade walls

Points Breakdown: 3 points

When Verified: Visually verified at final inspection, with review of product documentation

5-76: No vinyl siding or exterior trim

Responsible Party: Architect, General Contractor

Intent: Reduce the environmental impact of vinyl during manufacture, use, and disposal by sourcing alternate materials with lower impact

Performance Requirement: Use no vinyl siding/cladding or exterior trim products in the project

Points Breakdown: 4 points

When Verified: Visually verified during final inspections

5-77: Use 50-year siding product (minimum 20% of solid wall surface)

Responsible Party: Architect, General Contractor

Intent: Reduce the future consumption of raw materials for the replacement of short service life building components

Performance Requirement: Use a siding/cladding product with a 50-year service life (based on warranty/manufacturers documentation) on at least 20% of the opaque, above-grade walls of the project

Points Breakdown: 3 points

When Verified: Visually verified at final inspection, with documentation review

5-78: Use wood siding that is third-party certified sustainably harvested wood on at least 20% of solid wall surface

Responsible Party: Architect, General Contractor

Intent: Reduce pressure on forest resources by increasing demand for sustainably managed and harvest wood products

Performance Requirement: Use wood siding that is third-party certified sustainably harvested wood that meets the Tier 1 (5 pts) or Tier 2 (3 pts) requirements (outlined in Table 5-1) on at least 20% of solid wall surface

Points Breakdown:

- Tier 1 lumber 5 points
- Tier 2 lumber 3 points

When Verified: Visually verified at final inspection, with product documentation review

5-79: Use 100% recycled content HDPE or lumber that is third-party certified sustainably harvested wood for decking and porches

Responsible Party: Architect, General Contractor

Intent: Reduce pressure on forest resources by increasing demand for sustainably managed and harvest wood products, or non-wood, recycled product alternatives

Performance Requirement: Use 100% recycled content HDPE or lumber that is third-party certified sustainably harvested wood that meets the Tier 1 or Tier 2 requirements (outlined elsewhere in the Handbook) for decking and porches

Points Breakdown:

- 100% recycled HDPE product 3 points
- Tier 1 lumber 3 points
- Tier 2 lumber 2 points

When Verified: Visually verified at final inspection, with product documentation review

Cross-references: Action Item 5-81

5-80: Use post-consumer recycled content plastic lumber for decking

Responsible Party: Architect, General Contractor

Intent: Reduce pressure on forest resources by increasing demand for non-wood, recycled product alternatives

Performance Requirement: Use plastic lumber containing post-consumer recycled content for at least 75% of decking

Points Breakdown: 2 points

When Verified: Visually verified at final inspection, with product documentation review

Cross-references: Action Item 5-79

5-81: If lumber is used, use no pressure treated lumber

Responsible Party: Architect, Landscape Architect, General Contractor

Intent: Minimize the use of toxic chemicals that may impact soil and surface water ecosystems

Performance Requirement: When including wood on the exterior of the building or in the landscape, do not specify or install pressure treated lumber. Instead, use naturally rot resistant materials.

Points Breakdown: 5 points

When Verified: Product documentation reviewed and visually verified at final site visit

Cross-references: Action Item 5-36, 5-40, 5-41, 5-42, 5-66a, 5-79, 5-80

5-82: Commit to annual tracking of building trash using ENERGY STAR Portfolio Manager (ESPM) and to sharing with Built Green

Responsible Party: Owner

Intent: Improve understanding of solid waste management performance in Built Green certified buildings

Performance Requirement: Include building solid waste tracking and reporting in property management service plan. Established ESPM account, "Share Building" with Built Green program account and include agreement to track solid waste for a minimum of two years in project verification binder

Points Breakdown: 5 points

When Verified: Final Verification

Resources:
https://www.energystar.gov/buildings/owners_and_managers/existing_buildings/use_portfolio_manager/track_waste_materials

SECTION SIX: OPERATION, MAINTENANCE & TENANT EDUCATION

6-1: Provide educational materials designed for the public that highlight the green building features and their performance that are included in the project

Responsible Party: Owner or General Contractor

Intent: Increase market awareness, interest, and the value of green building by educating the public about green building strategies, benefits, and the specific approaches in your project.

Performance Requirement: Create signage on the jobsite, signage for a model unit, brochures for tours or passersby, or a webpage to educate the public about your project. At a minimum, the materials must highlight the features and benefits from at least two

Built Green Action Items per each of the following sections (a minimum of 10 features and associated benefits):

- Site Protection
- Water Conservation
- Energy Improvement
- Health and Indoor Air Quality
- Materials Efficiency.

Points Breakdown: 7 points

When Verified: Visually verified during construction or at the time of final inspection

Cross-references: Action Item 6-9

Resources: DOE's Better Buildings Solution Center Marketing and Outreach Handbook , Enterprise Green Communities Tools to Engage Residents in Green & Healthy Living

6-2: Prepare an environmentally friendly operations and maintenance plan for common area facilities

Responsible Party: Owner or General Contractor

Intent: Protect your investment by empowering staff to take ownership of long-term durability, efficiency, and health through best O&M practices.

Performance Requirement: The maintenance plan should include, at a minimum:

- Product Manuals and clear operating instructions for:
- Common area HVAC equipment and controls
- Central water heating (if applicable)
- Common area plumbing and water heating
- Common area lighting
- Exterior lighting
- Building exterior components

- Monthly and annual maintenance checklists for all common area systems and equipment, the building envelope (foundation, walls, roof) including rainwater management, and exterior lighting
- A plan that states how each staff member will be introduced to the materials

Points Breakdown: 5 points

When Verified: Visually verified during construction or at the time of final inspection

Cross-references: Action Item 6-7

Resources: Enterprise Tools to Engage Staff in Green Operations & Maintenance

6-3: Prepare an environmentally friendly landscape operations and maintenance plan

Responsible Party: Owner, General Contractor, or Landscape Professional

Intent: Keep your residents, your landscaping, and your building healthy and resource efficient through ongoing landscape O&M best practices.

Performance Requirement: At a minimum, your landscape operations and maintenance plan needs to include the following:

- Integrated Pest Management (IPM) strategies that list regular tasks to minimize the use of chemicals and mitigate pest risk
- Weekly, monthly, and annual checklists
- List of chemicals or types of products that should not be used or purchased by onsite staff or contracted service providers
- Monthly and annual checklists that include all of the following as applicable to your property:
- Erosion Control
- Hardscapes
- Stormwater management system
- Irrigation system
- Tipsheet for all staff that indicates:
- Materials and equipment storage requirements

- Best practices to reduce emissions from site maintenance equipment
- Considerations when contracting service providers

Points Breakdown: 5 points

When Verified: Visually verified during construction or at the time of final inspection

Cross-references: Section 2

Resources: Healthy landscape guidelines for property owners, designers, and contractors: http://www.seattle.gov/Util/ForBusinesses/Landscapes/LandscapeMaintenancePlans/index.htm

6-4: Develop and provide a building-wide food waste management strategy

Responsible Party: Owner

Intent: Whether your municipality requires food waste to be managed or not, providing the infrastructure and encouragement for your residents will keep valuable nutrients in our local ecosystem and reduce the waste sent to landfills.

Performance Requirement: Provide all of the following:

- Central food waste receptacle easily accessible by all residents.
- Regular, scheduled pick-up for food waste and compostables that is frequent enough to accommodate food waste from all residents.
- Signage at the receptacle that clearly indicates in picture form what can and cannot be composted.
- Information to all residents at move in where to take food waste and what is accepted and prohibited.
- Optional, but recommended: Provide each resident with a kitchen compost bin and a start-up kit with compostable bags.

Points Breakdown: 6 points

When Verified: Visually verified at the time of final inspection

Cross-references: Action Item 5-32

Resources: Seattle Municipal Code sections 21.36.082 and 21.36.083 require that residents and businesses do not put food scraps, compostable paper, yard waste, and recyclables in their garbage.

Seattle Public Utilities Food and Yard Waste for Apartment and Condo Owners

Food Too Good To Waste

6-5: Request residents sign an energy consumption data release form (if separately metered)

Responsible Party: Owner or Property Manager

Intent: "You can't manage what you don't measure" and this holds true for all resources in your building. By monitoring resource use, you can trouble shoot problems more quickly and help you and your residents save money.

Performance Requirement: Include in the lease language a utility release as a default. Include an opt-out field for residents who do not want to sign the release.

Points Breakdown: 7 points

When Verified: Visually verified at the time of final inspection

Cross-references: Action Items 3-56

Resources: Check with your utility provider to determine if they have a template or online form to share with residents

6-6: Request residents sign a water consumption data release form (if separately metered)

Responsible Party: Owner or Property Manager

Intent: "You can't manage what you don't measure" and this holds true for all resources in your building. By monitoring resource use, you can trouble shoot problems more quickly and help you and your residents save money.

Performance Requirement: Include in the lease language a utility release as a default. Include an opt-out field for residents who do not want to sign the release.

Points Breakdown: 5 points

When Verified: Visually verified at the time of final inspection

Cross-references: Action Item 2-71

Resources: Check with your utility provider to determine if they have a template or online form to share with residents.

6-7: Conduct training sessions for maintenance staff and/or residents

Responsible Party: Owner or Property Manager

Intent: Extend the value of your investment by providing training sessions that describe building components, ongoing operations and maintenance (O&M) needs and staff or resident expectations.

Performance Requirement: Create and implement a plan that includes the following:

- Learning objectives for the participants
- Agenda with topics covered and delivery format+
- Associated training materials or references
- Sign-in sheet*

+Training sessions for staff should be at least 2 hours and cover all of the topics listed in 6-2 and 6-3. Resident training should cover all benefits and operating instructions of the key features within their unit.

*Plan should include a target attendance of at least 75% of staff or 100% of residents (during move-in walks or combined with other events) within 3 months of move-in

Points Breakdown: 7 points

When Verified: Visually verified at the time of final inspection

Cross-references: For Staff: Action Items 6-2, 6-3

For residents: Action Items 6-9f, 6-9g

6-8: Give individual feedback to all residents about their energy consumption in comparison to others and/or building average

Responsible Party: Owner, Property Manager, or Utility (if applicable)

Intent: Engaging and educating residents about their relative energy use is a powerful way to grab their attention in order to find approaches to save money and energy.

Performance Requirement: Create a reporting plan, or contract with a service provider, to communicate unit-level energy consumption to all residents.

The reporting plan must include quarterly reports for all residents with a comparison of their energy use to the appropriate building averages.

Points Breakdown: 5 points

When Verified: Visually verified at the time of final inspection

Cross-references: Action Item 6-5

Resources: Check with your utility to determine if they provide this service or can help connect you to someone that can.

HUD Exchange Multifamily Utility Benchmarking Toolkit

6-9: Provide residents with materials including information on (see following action items):

Responsible Party: Owner or Property Manager

Intent: Optimize the benefits of your building through resident education and engagement.

Performance Requirement: The following seven action items contain suggested strategies for promoting and prolonging lasting value within your building associated with resident behavior.

* Not required, but suggested for 6-9a through 6-9g: when possible, provide information sheets and flyers in languages that your residents speak. Check with your municipality, or utility (electricity, gas, water, or waste hauler) for existing resources, or ask one of your residents to translate the materials for individual cultural and language groups.

Points Breakdown: N/A (see below action items)

When Verified: Visually verified at the time of final inspection

Resources: Enterprise Green Communities Tools to Engage Residents in Green & Healthy Living

6-9a: Where to dispose of food waste (compost)

Responsible Party: Owner or Property Manager

Intent: Encourage better composting rates by educating residents about what goes where.

Performance Requirement: Provide all residents with information that clearly indicates what can and cannot be put in the food waste bin, where the food waste bin is located, and suggestions for minimizing food waste.

Points Breakdown: 1point

When Verified: Visually verified at the time of final inspection

Cross-references: Action Item 5-32

Resources:
http://www.seattle.gov/util/MyServices/Recycling/BldgOwnersManagers_Recycling/HelpResidentsRecycle/index.htm

Food Too Good To Waste (both EPA and King County campaigns)

6-9b: Where to dispose of recyclables

Responsible Party: Owner or Property Manager

Intent: Encourage better recycling rates by educating residents about what goes where.

Performance Requirement: Provide all residents with information that clearly indicates what can and cannot be recycled, where to take all recyclables, what to do if the recycling containers are full, and suggestions for minimizing total waste (including recyclables and landfill-bound materials).

Points Breakdown: 1 point

When Verified: Visually verified at the time of final inspection

Cross-references: Action Item 5-31

Resources:
http://www.seattle.gov/util/MyServices/Recycling/BldgOwnersManagers_Recycling/HelpResidentsRecycle/index.htm

6-9c: General practices to conserve water and energy

Responsible Party: Owner or Property Manager

Intent: Help residents save money and minimize the environmental impact of your building by providing explicit ways residents can save water and energy.

Performance Requirement: Provide all residents with specific actions they can take to save energy and water within their units.

Points Breakdown: 1 point

When Verified: Visually verified at the time of final inspection

Resources: *Energy Efficiency*

ENERGY STAR, Department of Energy (DOE) Energy Saver's

Water Efficiency

WaterSense

6-9d: Transportation options and resources

Responsible Party: Owner or Property Manager

Intent: Buildings use significant amounts of energy and contribute substantially to greenhouse gas emissions. In addition, occupant transportation choices to and from buildings contribute significantly to health and environmental outcomes. Carpooling, riding public transit, biking, or walking can greatly reduce per person emissions.

Performance Requirement: Include within a resident manual OR as a poster in the entry/lobby, OR within a move-in packet: information that informs residents about nearby transportation options, such as:

- Public transit (nearby bus and train stops, related apps, where to purchase fare / tickets, etc.)
- Bicycle resources (storage options, repair stations or nearby repair shops, bike route maps, bike sharing programs, etc.)
- Car sharing programs
- Walking maps

Points Breakdown: 1 point

When Verified: Visually verified at the time of final inspection

Cross-references: Action Items 2-62, 2-63, 2-65, 2-65, 2-66, 2-67, 2-68, 2-69

Resources:

- Metro's Trip Planner, Sound Transit's Trip Planner, Community Transit, Everett Transit
- One Bus Away app - shows real-time information about bus schedules in Seattle
- Depending on your project's location, include links to services such as car2go, ReachNow, Zipcar, and bike sharing programs.

6-9e: EVs, their benefits, and where to charge them

Responsible Party: Owner or Property Manager

Intent: Support the use of electric vehicles to reduce direct fossil fuel consumption and the associated carbon emissions.

Performance Requirement: Provide all residents with information about electric vehicles (EVs), the benefits of EVs, and where to charge them.

Points Breakdown: 3 points

When Verified: Visually verified at the time of final inspection

Cross-references: Action Item 2-70

Resources:
https://www.seattle.gov/light/electricvehicles/docs/Electric_Vehicle_Service_Equipment_for_Multi.pdf

6-9f: Green features and benefits of the buildings

Responsible Party: Owner or Property Manager

Intent: Educate and empower residents to know and optimize the benefits of the valuable investments you've made to protect health, efficiency, durability, and the environment.

Performance Requirement: Provide all residents with information about the green features on the site and within the building. At a minimum, list at least two features from each of the following Built Green Sections along with the associated benefits and any O&M expectations for each feature:

- Site Protection
- Water Conservation
- Energy Improvement
- Health and Indoor Air Quality
- Materials Efficiency

Points Breakdown: 2 points

When Verified: Visually verified at the time of final inspection

Cross-references: Action Item 6-1
Resources: Utilize your Built Green checklist and the Intent subsection of checklist items to create this tipsheet for residents.

If you are pursuing 6-1, you can utilize the same list but will need to add the ongoing O&M expectations associated with each feature.

Enterprise Green Communities Tools to Engage Residents in Green & Healthy Living

6-9g: Maintenance checklists for their unit

Responsible Party: Owner or Property Manager

Intent: Encourage residents to take responsibility for ongoing easy-to-implement maintenance tasks that will save hassle, work orders, and long-term equipment and maintenance costs.

Performance Requirement: Provide all residents with a tipsheet that, at a minimum, includes: monthly activities (such as cleaning dishwasher filter, cleaning kitchen exhaust filter, inspecting all plumbing fixtures for leaks, confirming exhaust and whole house fan operation, etc.)

Points Breakdown: 3 points

When Verified: Visually verified at the time of final inspection

Cross-references: Action Items 6-1, 6-7

Resources: Consider sending email reminders with the checklist on the first of the month or the date that rent is due.