Earth Advantage® Multifamily Homes 2012 Standard

Measures Resource Guide (Modified)

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1.0 Site Planning

1.1 Site Protection

1.1.1	Accountability Form		Energy	Health	Land	Materials	Water
Access to Public Transit: within ½ mile			0	1	1	0	0

Description: Locating the house within walking distance to public transportation (public shuttle, bus, train, park & ride, or light-rail) allows household members to more easily use the system. This measure rewards projects that are within a ½ mile walk of a public transit stop and is accessible to pedestrians.

Benefit: Use of public transportation reduces the number of daily auto trips. Studies have shown that people who have accessibility to public transportation are more likely to use the system. Benefits include reduced energy consumption and a reduction of other environmental concerns associated with vehicle transportation. Walking also promotes good health.

Verification: This measure is accomplished by the building team documenting the availability of public transportation options that meet the requirement. The builder or responsible party will complete the Accountability Form for this measure and forward it to the EA Rater.

1.1.2	Accountability Form		Energy	Health	Land	Materials	Water
Access to Household Services: Min. 6 within ½ mile			0	1	1	0	0

Description: Locating the house within walking distance of essential services allows household members to more easily access these services by walking to them. This measure rewards projects that are within ½ mile of a minimum of six (6) household services. Note: Only two of each service type may count toward the total, for example, if there are three restaurants within ½ mile of the house, only two will count towards the total of six services.

Household Services:

Arts and Entertainment Centers	Pharmacy
Banks	Police Station
Community or Civic Center	Post Office
Convenience Store	Place of Worship
Daycare Center	Restaurant
Fire Station	School
Fitness Center/Gym	Supermarket or Grocery Store
Laundry or Dry Cleaner	Other neighborhood-serving retail
Library	Other office building or major employment center
Medical or Dental Office	

Benefit: The availability of household services can reduce the number of daily auto trips. Studies have shown that when household services are accessible by walking, people are less likely to drive, and more likely to access them by walking. Benefits include reduced energy consumption and a reduction of other environmental concerns associated with vehicle transportation. Walking also promotes good health.

Verification: This measure is accomplished by the building team documenting the availability of qualified household services that meet the requirement. The project team needs to sign an Accountability Form attesting to the fact that the project meets the requirements of the measure.

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1.1.3	Accountability Form	Required Measure	Energy	Health	Land	Materials	Water
Develop, Post and Implement Erosion Control Site Plan			0	0	0	0	0

Description:

The goal of this measure is that no visible and measurable sediment or pollutant shall exit the site, enter the public right-of-way or be deposited into any water body or storm drainage system. Depositing or washing soil into a water body or the storm drainage system is prohibited.

Possible options to meet the purpose of this measure, the builder can choose from the following actions:

- Remove any soil that enters the sidewalks, streets and other areas within the public right-of-way through mechanical means other than flushing with water.
- Protect stormwater inlets that are functioning during the course of the development so that sediment-laden water cannot enter the inlets without first being filtered.
- Replace plant cover with species not listed in either the Nuisance or the Prohibited Plant List, as set forth by the local jurisdiction or the State of Oregon.
- Secure or protect soil stockpiles throughout the project with temporary or permanent soil stabilization measures.
- Cover stock piles with weighted plastic or a 3" layer of mulch or straw during wet weather (October 1 – April 30).
- Mark construction limits with sediment fences, berms or construction fencing.
- Install straw wattles or mulch berms where sediment fencing is not practical.
- Install vehicle travel lanes that will serve the site during the entire course of construction.
- Lay rock on the area necessary for contractor parking.
- Coordinate the application of groundcover (straw, mulch, or compost) with landscape plans.
- Protect area under eaves with heavier material (e.g., straw).
- Stabilize soil as soon as grading is complete.
- Install and maintain catch basin inserts in high traffic areas. Use bio-bags to protect irregular shaped inlets.
- Install sediment retention facilities before grading
- Perimeter protection to filter sediment shall be located downslope of all disturbed areas and properly installed prior to upslope grading

Benefit: It is important to set the tone for those working on the site. During the construction of a home, scores of contractors, subcontractors, and vendors will visit the site. Concern for avoiding erosion should be everyone's priority.

Workers and visitors should not park their vehicles on the exposed dirt, because it compacts soil and tracks mud into the street and catch basins.

Verification: The EA Rater will verify that the goals of this measure have been met. The builder or responsible party will complete the Accountability Form taking responsibility for the implementation of the appropriate erosion control measures and forward it to the EA Rater.

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1.1.4	Accountability Form	Energy	Health	Land	Materials	Water
Existing Trees: Number of trees 4" caliper or larger saved		0	0	1/2	0	1

Description: This measure rewards you for taking care of the trees already on site. Points are awarded for one mature tree saved. Mature tree is defined as a tree in good health that is not considered a nuisance or invasive species, 4" caliper or larger at 4 feet above the ground. A second point can be awarded for three or more trees saved on the lot. This measure is awarded on a per lot basis. A typical application would be fencing at the drip line of a mature tree or fencing off the area around the tree to remain undisturbed by equipment.

Benefit: Many of us are familiar with the idea of trees as a site amenity, but few of us know just how much trees contribute to the economic and ecological values of a site. In addition to their physical beauty, trees provide wildlife habitat, they help manage the flow of stormwater, they clean the air we breathe, and they protect critical features such as stream buffers or hillsides. In addition, properly trimmed and positioned shade trees protect the house from the hot summer sun, reducing cooling loads. Considering the effects on energy usage, erosion control, pollution, and wildlife habitat, a single mature tree provides nearly $300 annually in value. (Cooling Our Communities, A Guidebook on Tree Planting and Light-Colored Surfacing, U.S. Environmental Protection Agency, 1992.) Builder is to plan for preservation of trees. A typical application would be fencing at the drip line of a mature tree or fencing off the area around the tree to remain undisturbed by equipment.

Verification: EA Rater will verify the species present are not on a local, regional or state list of nuisance and invasive plants. The builder or responsible party will complete the Accountability Form taking responsibility for the implementation of the appropriate measures

1.1.5		Energy	Health	Land	Materials	Water
Stormwater Control: Bio-retention system onsite – 100 percent of site/development		0	0	2	0	2

Description: Develop an on-site infiltration system for rainwater for the lot and development, exclusive of the footprint of the building roof. This is a water drainage system that routes water into the soil and groundwater of the house site. Bio-swales and rain gardens are examples of this approach. The main goal is to keep rainwater that arrives on the site to stay on the site. An additional goal is to maintain runoff flows, runoff durations and runoff volumes after construction as closely as possible to the natural condition of the site and minimize adverse effects on stream flows. System should be sized to hold the runoff of a 2-year 24hour storm event.

Benefit: Every building affects the natural function of a site's hydrology**,** particularly its processing of stormwater and the way in which groundwater is replenished. One way to reduce this impact is to allow the water from downspouts to soak into the soil instead of redistributing it off-site. This can decrease annual runoff volume by as much as 50 percent.[1] It also reduces the potential for flooding and erosion and helps recharge groundwater sources for streams and wells. On-site infiltration protects the water quality in local streams by preventing silt, pollutants, and untreated sewage from washing into these bodies during heavy rains. This helps protect the habitats of trout and salmon which have been listed under the Endangered Species Act. In addition to being environmentally responsible, allowing water to soak into the ground is resource efficient. Re-use of this water could lower irrigation bills. Stormwater effluent that is allowed to infiltrate on site is not treated in the municipal system, and a discount on sewer fees may be offered to the homeowners by the city through a "downspout disconnect" program.

Verification: EA Rater will visually inspect stormwater storage features on the site. In subdivisions, EA Rater will locate all retention systems and verify how many exist.

[1] Rapid Watershed Planning Handbook, Center for Watershed Protection, www.cwp.org, October 1998, p. 2.17.

1.1.6	Accountability Form	Energy	Health	Land	Materials	Water
Onsite Infiltration System: For roof drains		0	0	1	0	1

Description: On-site infiltration for roof drains is a water drainage system that routes water away from rooftops to the soil and groundwater. Bio-swales, rain gardens, drywells and French drains are examples of this approach. The main goal is to keep rainwater that arrives at the site to stay at the site. An additional goal is to maintain runoff flows, runoff durations and runoff volumes after construction as closely as possible to the natural condition of the site and minimize adverse effects on stream flows.

Benefit: Wherever we build, we impact the natural function of that site's hydrology, particularly its processing of stormwater, and the way in which groundwater is replenished. One way to reduce this impact is to allow the water from downspouts to soak into the soil instead of washing away off-site. This can decrease annual runoff volume by as much as 50 percent. It also reduces the potential for flooding and erosion and helps recharge groundwater sources for streams and wells. On-site infiltration protects the water quality in local streams by preventing silt, pollutants, and untreated sewage from washing into these bodies during heavy rains. This helps protect the habitats of trout and salmon, which were recently listed under the Endangered Species Act. In addition to being environmentally responsible, allowing water to soak into the ground is resource efficient. The practice may lower irrigation bills. Stormwater effluent that is allowed to infiltrate on site is not treated in the municipal system, and a discount on sewer fees may be offered to the homeowners by the city through a "downspout disconnect" program.

Verification: Landscaping plans and onsite inspection. This will need to be inspected at foundation stage. In subdivisions it is acceptable to look at a nearby new housing start for verification. The builder or responsible party will complete the Accountability Form for this measure and forward it to the EA Rater.

1.1.7	Energy	Health	Land	Materials	Water
Compostable Erosion Control Amendment: 2-inch minimum, spread over all exposed soil at the beginning of the construction cycle.	0	0	1	0	1

Description: This measure provides for erosion control at the beginning of the construction cycle and provides amendments to the soil after the house is complete. Amendments are typically compost, shredded leaves, or other fine organic matter. If compost is used, it may be tilled in as a soil amendment as landscaping begins. See additional points for the Soil Amendment measure in the Outdoor Water and Landscaping section of this document. These measures are separate and the points may be added.

It is recommended that the compost be certified under the US Composting Council Seal of Testing Assurance program. This test examines the following criteria: 1) pH; 2) soluble salts (conductivity); 3) nutrient content (N-P-K); 4) organic matter; 5) moisture percent; 6) maturity; 6) stability; 7) inerts; 8) trace metals; and 9) weed seeds and pathogens.

Information can be found at: http://tmecc.org/sta/compost_attributes.html

Sources of product: http://tmecc.org/sta/participating_STA_Facilities.html#OR

It is recommended that an application of 2-inches of compost be applied rather than straw or sawdust to control erosion and for mitigation of erosion on construction sites after some damage is done.

Benefit: Spreading compost on the exposed soil at the beginning of the construction process helps protect the soil from erosion. Preservation of top soil influences how well plants adapt and survive. Healthier soil promotes plant growth and holds water better.

Verification: The EA Rater will look for compost on the ground around the house. All areas of disturbed soil must be covered.

1.1.8	Energy	Health	Land	Materials	Water
Preserve Natural Features:	0	0	1	0	0

Description: Preserve natural features of the site from ground disturbance by equipment, vehicles, and material staging as well as topsoil removal. The protected area must be identified with construction fencing, flagging, or a similar method.

Benefit: An essential characteristic of healthy soil is air space within the soil structure. These soil pores transport air, water, and allow plant roots to grow more easily. Equipment on a jobsite compacts the soils, lessening their ability to absorb rainwater. Damage to existing root structures can occur if equipment and vehicles move too close to trees or other natural features including wetlands, rock outcroppings and streams or creek beds.

Verification: EA Rater will visually identify protected areas and that fencing or flagging is installed.

1.1.9	Energy	Health	Land	Materials	Water
Label Storm Drain or Inlets: discourages dumping of pollutants	0	0	0	0	1

Description: Acceptable labeling includes plaques, tiles, or stenciled paint. Messaging should seek to inform citizens that storm drains are directly connected to local bodies of water, and that dumping will pollute these waters. To prevent any harmful materials from entering the storm drain use only paints that are low in Volatile Organic Compounds. If a non-permanent labeling method is chosen, provide a plan for routine re-application. Some municipalities will provide this service at no cost.

Benefit: Raising awareness of the connection between storm drains and natural water sources discourages dumping of pollution. Before making its way down the drain, rainfall passes over impervious surfaces like driveways, sidewalks, and roads. The water that eventually makes it to the storm drain picks up a number of pollutants such as gasoline, motor oil, and trash. Water runoff from lawns can also carry pesticides and fertilizers into the water system. These pollutants degrade local watersheds and increase the need for energy intensive water treatment facilities.

Verification: EA Rater will visually inspect to make sure drains are labeled.

1.1.10	Energy	Health	Land	Materials	Water
Pervious Surfaces: Percentage of Hardscapes – 25% - 50% / >51%	0	0	1/2	0	2

Description: Impervious surfaces, such as conventionally paved surfaces, asphalt or concrete, or other surfaces through which water cannot infiltrate are replaced by pervious surfaces or impermeable surfaces that direct the rainfall into a design feature that retains the water on the house site.

One point is awarded for 25% - 50% of the total hardscape being permeable surfaces or impermeable surfaces that direct water into a design feature that retains the water on the house site. Two points are awarded for greater than 51% of the hardscape being permeable surfaces or impermeable surfaces that direct the water into a design feature that retains the water on the house site.

Description: continued
Pervious surfaces include pervious concrete, porous asphalt, permeable interlocking concrete pavers, vegetated or gravel-filled plastic grids, and porous gravel surfaces. Rock layers beneath the surface must be properly sized to hold appropriate amount of runoff. Spaces between pavers (if used) must be filled with rock, not sand, so that underlying material remains pervious. Overflow or perforated pipes may be required in poor soils. In poorly draining soils, it is suggested the builder consult with a geotechnical engineer. No fine-grained materials should be stored on or adjacent to a pervious paved area, nor should they be used where they can wash onto a pervious surface. Examples of such materials include bark dust, compost, topsoil, and other material stockpiles. Pervious materials should be installed after the remainder of the site is stabilized to avoid clogging during construction.

Benefit: Groundwater is replenished by rainwater that soaks into the ground. Covering the ground with impermeable materials interrupts the natural recharging of ground water. One way to reduce this impact is to replace impervious surfaces, such as driveways, sidewalks, roofs, and patios with pervious surfaces that allow the surface water to percolate into the ground on site. Replacing impervious areas with pervious surfaces reduces the potential for flooding, both on and off-site, by allowing more water to soak directly into the ground. Also, replacing impervious surfaces like concrete or asphalt with pervious surfaces is more resource efficient since it takes less material to cover the same area.

Verification: EA Rater will identify the pervious surfaces and visually estimate the amount of the hardscape that qualifies. If available, landscape or site plans can assist. On-site verification at final inspection.

1.1.11	Accountability Form	Required Measure	Energy	Health	Land	Materials	Water
EA Specifications Included in Construction Documents			0	0	0	0	0

Description: EA specifications for required and selected measures need to be shown in projects architectural specifications and/or submittals when applicable.

Benefit: Specifications are a useful and necessary tool in communicating plans to subcontractors; by including the EA specifications in these documents it insures the correct materials and equipment are installed. This practice also reduces the opportunity of error and provides a resource for subcontractors.

Verification: EA Rater will verify the inclusion of information on construction documents. The builder or responsible party will complete the Accountability Form for this measure and forward it to the EA Rater.

1.1.12	Accountability Form		Energy	Health	Land	Materials	Water
Tree Preservation Plan			0	0	1	0	1

Description: Submit tree preservation plan that demonstrates effort to accommodate existing trees into the design of the project. Before construction begins, clearly mark all trees not slated for removal. Protect trees from potential damage during construction by placing a barrier that fully encompasses the tree's drip line. Direct impacts to the tree with heavy equipment will obviously damage trees, but compacting or excavating soil too close to the root structure may also cause harm. Protective barriers may include but are not limited to the following: tarps, netting, stakes, straw bale.

Benefit: Preserving trees on-site provides substantial erosion control, especially on steeper grades, or where vegetation is scarce. Existing trees offer built-in natural filtration that helps manage storm water runoff. Their root structures are denser than newly planted vegetation and boast higher filtration capacity. Trees provide a buffer for noise pollution, protection from strong winds, and a habitat for birds and other wildlife.

Verification: EA Rater will verify the inclusion of information on construction documents. The builder or responsible party will complete the Accountability Form for this measure and forward it to the EA Rater.

1.1.13			Energy	Health	Land	Materials	Water
Reduced Onsite Parking: Choose one of the following			0	0	1/2	0	0

Description: (1) Parking facility must not exceed the minimum requirement set by building code.
Or (2) Submit a request for variance on parking requirements by providing plan to manage transportation of residents via public transportation. Such a plan must demonstrate easy access to public transportation within a walkable distance. Transportation will be more easily accessible within dense urban areas.

Benefit: Keeping parking to a minimum creates a disincentive to drive. Automobiles are a major source of air pollution, and rely heavily on petroleum products that contribute to global climate change. Methods of public transportation like bus and rail reduce energy use and emissions per passenger. Pedestrians and cyclists cut out energy use and emissions altogether. Building and maintaining infrastructure for cars is very resource intensive and encroaches on natural areas. Automotive transportation requires roads and parking lots, which disrupt the natural water cycle and contribute to storm water runoff.

Verification: EA Rater will verify the number of parking spaces and review necessary site plans at final.

1.1.14			Energy	Health	Land	Materials	Water
Alternative Transportation Accommodation: bike racks / flex car / electric charging station one point for each.			0	1/2/3	0	0	0

Description: Provide covered storage facilities for securing bicycles for 15% or more of building occupants. Storage capacity should accommodate 125% of peak demand. Storage facility must provide theft protection measures such as a permanently fixed bicycle post or rack, or locked gate or door.

Provide Flex Car access and/or electric charging station

Benefit: Promoting travel via bicycle as an alternative to an automobile offers many environmental benefits. Automobiles are a major source of air pollution, and rely heavily on petroleum products that contribute to global climate change. Bicycling produces zero carbon emissions, reduces traffic congestion, and increases the health and wellness of the cyclist. People tend to use bicycles for short trips – the range at which vehicle emissions tend to be highest due to cold engine starts. Building and maintaining infrastructure for cars is very resource intensive and encroaches on natural areas. Automotive transportation requires roads and parking lots, which disrupt the natural water cycle and contribute to storm water runoff.

Verification: EA Rater will identify the space. If available, landscape or site plans can assist. On-site verification at final inspection

1.1.15	Energy	Health	Land	Materials	Water
Shared Spaces: laundry / guest quarters - one point each	0	0	1	1/2	0
Description: Architectural drawings must include a common laundry room to accommodate the need of the occupant's. Management identifies one unit, which is not leasable but instead is available and furnished for the use of visiting guests of current tenants.					
Benefit: Shared laundry reduces water usage and the need for multiple in unit clothes washers. it improves community and ensures longevity because commercial equipment is typically more durable. Guest quarters provide temporary accommodations for friends and family, which eliminates the need for additional square footage in each unit.					
Verification: EA Rater will identify spaces. If available, floor plans can assist. On-site verification at final inspection.					

1.1.16	Energy	Health	Land	Materials	Water
Community Gathering Space: community room / outdoor community space / work out room / community garden	0	1/2/3/4	1	2	0
Description: Architectural and/or landscape plans must include one or more of these amenities.					
Benefit: Creating community gathering space improves overall mental health of tenants by providing a platform for neighbor interactions. It reduces the need for additional square footage in the space, reduces any travel and improves the community connectivity.					
Verification: EA Rater will identify the space. If available, landscape or site plans can assist. On-site verification at final inspection					

1.1.17 Accountability Form — Required Measure	Energy	Health	Land	Materials	Water
Green Team Meetings: 2 meetings per project req.	0	0	0	0	0
Description: Early Design: Recommended participants include Owner/Developer, Designer/Architect, General Contractor, MEP/HVAC, Landscape Architect, and Green Building Consultant(s). This meeting shall take place between Schematic Design and Construction Document completion. The project team will establish its' goals for certification, understand the project must meet at minimum the EAMF certification program prerequisites to be eligible and assign champions for required and optional measures. Pre-Construction Meeting: Owner/Developer, Designer/Architect, General Contractor, Green Building Consultant(s), and the following Subcontractors (e.g. framing, electrical, HVAC, air-sealing, insulation, landscaper) participate in the meeting and cover the green or otherwise unusual aspects of the project, including specific detailing to meet Thermal and Durability Checklist requirements, EAMF prerequisites, and the expectations for ensuring certification. The Trades mangers for each trade contractor may be an ideal audience so long as they are involved throughout the construction and provide explicit instructions to explain and review what was included in the training with their crew members. These meetings must take place before construction begins. At this meeting the project team has the opportunity to discuss the goals of the project, and provide the sub-contractors with the information necessary to complete their roles and responsibilities effectively. Subcontractors should be informed that Earth Advantage and/or and Earth Advantage Representative will be testing the building envelope for air tightness and other measures unique to the project.					
Benefit: Meeting where the project team gathers to review the project goals and specific green building measures to help ensure success of the project.					
Verification: EA Staff and/or Rater needs to be present at these Green Team meetings to verify measure compliance.					

1.1.18	Required Measure	Energy	Health	Land	Materials	Water
Energy Modeling: 10% better than energy code.		Model	0	0	0	0

Description: The minimum requirement for meeting our Energy pillar is a building that is 10% more efficient then applicable building code.

Using a computer model, either a building design or completed structure is compared to a reference unit of the same size and shape as the rated home. Performance testing involves a blower door and in certain circumstances duct blaster testing. Results from performance testing, along with inputs derived from the plan, are entered into a computer simulation program to generate the buildings estimated annual energy use including heating, cooling, water heating, and other energy requirements.

For buildings over 100K sq ft eQuest or another approved software product may be used contact EA representative for approval.

Benefit: Energy modeling verifies that a building is on track to be at least 10% more efficient than code and meets the Earth Advantage minimum requirements for the energy pillar. The information gained from this process can help to refine the building design, select higher performing building materials and systems.

Verification: Submit an energy model showing actual building performance compared to code minimum.

1.2 Land Use

1.2.1	Energy	Health	Land	Materials	Water
Infill Site: Build project(s) on open lot in existing neighborhood	0	0	1	0	0

Description: Build project(s) on an open or reclaimed lot within an existing neighborhood. Infill areas are vacant or under-utilized lots of land served by existing physical assets such as roads, power lines, sewer and water, and other infrastructure. An infill lot is defined as a lot or development where 75% of the border of the property is next to or adjacent to previously developed property.

Benefit: Building on an infill site utilizes existing infrastructure, maximizing the current community investment. It can also help reduce the environmental stress of developing on "green-field" sites.

Verification: EA Rater can verify that the lot is sited in an existing neighborhood or surrounded by at least 75% of previously developed property. Local jurisdiction's Urban Growth Boundary Plan, the Wetland Institute, and the site foot-printing process. Verify on site.

1.2.2 Accountability Form	Energy	Health	Land	Materials	Water
Site Size: 1/20th / 1/30th / 1/40th acre of developable land	0	0	2/3/4	1	0

Description: Building multi-family units to a higher average density. 1 acre = 43,560 sq. ft.; 1/20 acre = 2,178 sq. ft.; 1/ acre = 1,452 sq. ft.; 1/40 acre = 1,089 sq. ft.

Benefit: Sometimes building codes and land use planning prohibit higher residential density, but when available, this measure should be investigated. Higher residential densities allow for a greater opportunity for efficient use of available land. Larger green spaces can be developed, more units can be built, and less infrastructure used for each unit developed.

Verification: The builder or responsible party will complete the Accountability Form for this measure and forward it to the EA Rater.

1.2.3	Energy	Health	Land	Materials	Water
Unit Size: No larger than 1000/750/500 sq. ft.	0	0	1/2/3	2/3/4	0

Description: Unit average square footage is no more than 1000 sq. ft. for the first level of points, 750 sq. ft. for the second level of points, 500 sq. ft. for the third level of points.

Benefit: This measure is intended to encourage smaller, space-efficient designs. The size of the average house in the United States has grown to almost 2,500 sq. ft. At the same time, households have fewer people. House size affects every aspect of energy and resource efficiency, including energy use, material use, furnishings, and even the quantity of cleaning chemicals. House size is the most significant environmental issue, so smaller houses are rewarded with significant points in Land and Materials.

Verification: EA Rater will determine conditioned floor area from house plans measurements made at the site.

1.2.4 Accountability Form	Energy	Health	Land	Materials	Water
Build on Greyfield or Brownfield Site	0	0	2/4	0	0

Description: Targeting greyfields or brownfields reduces development pressure on undeveloped areas, including farmland, forests, etc.

Greyfield: A greyfield site is traditionally defined as an area that has been previously developed, with at least 50 percent of the surface area covered with impervious material.

Brownfield: A brownfield is an abandoned, idle, or under-used industrial or commercial site, where construction is complicated by real or perceived environmental contamination. This measure develops a site that has been classified as a brownfield and provides remediation as required by EPA's Brownfield Redevelopment or other applicable Federal program requirements.

Benefit:

Greyfield: Redevelopment of a greyfield site can provide an efficient use of land and infrastructure. Greyfield development allows for the preservation of open space and wildlife habitat in the midst of growth.

Brownfield: Brownfield development provides an efficient use of land and infrastructure while allowing for the preservation of open space and wildlife habitat in the midst of growth. The EPA estimates there are 450,000 to 1,000,000 such sites around the country. Grants, loans, and training are available through the EPA's Brownfield Initiative to assist builders and developers in the remediation of brownfield sites.

Verification:

Greyfield: Documentation or photographs of previous site's characteristics noted on Accountability Form

Brownfield: Confirmation from a federal, state or local brownfield's site inventory that the site is designated as a brownfield.

The builder or responsible party will complete the Accountability Form for this measure and forward it to the EA Rater.

1.2.5	Energy	Health	Land	Materials	Water
Mixed Use Building	0	1	2	1	0

Description: A typical mixed-use project consists of ground floor retail and/or offices, with housing above. This type of development was prevalent until the early twentieth century when municipalities adopted zoning codes that segregated residential from commercial and industrial uses.

Benefit: Mixed-use development creates a sense of place and provides more opportunities for social interaction. It also helps to reduce the regional imbalance between jobs and housing; uses land, public infrastructure, and facilities more efficiently; and increases options for walking, biking, and public transportation. It can also increase the neighborhood's economic vitality, strengthening and diversifying the municipal tax base.

Verification: EA Rater will review building plans and verify on site.

2.0 Waste Management

2.1 Waste Management

2.1.1	Accountability Form	Required Measure	Energy	Health	Land	Materials	Water
Develop and Implement a Waste Management Reduction Plan			0	0	0	0	0

Description: Develop and follow a Waste Management Reduction Plan. This is a document that specifically lists the actions the builder and all trades will take to reduce waste. This document is to be provided to the builder, by an EA representative.

Benefit: A job-site Waste Management Reduction Plan promotes good environmental stewardship by making sure that all members of the construction team understand how their actions affect the use of natural resources. Reducing construction waste on the job site is good for the environment for several reasons. First, reducing waste limits the pressure on local landfills where more than one-third of the annual volume is made up of construction debris. Second, re-using construction waste provides an alternative source of construction material, decreasing demand on limited natural resources. For example, reusing construction materials avoids the need for additional virgin timber. This is significant when you consider that 25% of all wood harvested from forests is used in construction. Third, reducing waste lowers the embodied energy of the project by avoiding the harvesting, manufacture, transportation and disposal of raw materials needed to build it. Fourth, by re-using construction materials on site, you save money twice. You avoid the expense of buying new materials to do the same job, and you avoid the expense of disposing the old materials.

Verification: Builder will provide a copy of the Waste Management Plan. EA Rater will verify that the plan is being implemented by identifying examples of action items in the field. In addition, the builder or responsible party will complete the Accountability Form for this measure and forward it to the EA Rater.

2.1.2	Accountability Form	Required Measure	Energy	Health	Land	Materials	Water
Recycle 95% of Wood & Cardboard			0	0	0	0	0
Description: The goal is to recycle 100% of all wood and cardboard waste. Wood waste can be composted into soil amendments or used as fuel. Cardboard is generally recycled into other paper products. The outcome of this measure is to divert construction related items from landfills and move them into the appropriate recycling stream.							
Benefit: Wood is a major component of job waste. Because it is a biological material, it can be safely returned to the land. Many local waste facilities offer wood recycling services.							
Verification: EA Rater should look for evidence that wood and cardboard are being separated for recycling. Most projects have labeled containers. The contractor or responsible party will complete the Accountability Form for this measure and forward it to the EA Rater.							

2.1.3	Accountability Form		Energy	Health	Land	Materials	Water
Recycle Jobsite Waste: 95% of drywall			0	0	1	0	0
Description: The goal of this measure is to recycle 95% of all drywall. One point is awarded for recycling 95% of the projects drywall. The outcome of this measure is to divert construction related items from landfills.							
Benefit: Drywall represents a large volume of the waste generated by each project. Generally, drywall hangers haul away their own scraps, so the effect of drywall is often hidden. Because drywall is made from natural gypsum and recycled paper, it can be ground into soil amendments. Drywall scraps can also be returned to factories and used in making new drywall if the job site is near an existing drywall factory.							
Verification: Drywall subcontractor or responsible party will complete the Accountability Form for this measure and forward it to EA and/or Rater.							

2.1.4		Energy	Health	Land	Materials	Water
Concrete Clean Out Pit: Install a concrete clean out pit onsite, above grade or below, before construction begins.		0	0	1	0	0
Description: The U.S. Environmental Protection Agency (EPA) does not allow the discharge of concrete wash water into the groundwater, storm drains, or waterways. Concrete wash water is generated by the cleaning of concrete trucks, chutes, pump trucks, and equipment of the trade. Concrete wash out areas allow for the evaporation and eventual safe removal of solid material. Washout facilities can be prefabricated containers, or they can be built on site either above grade or below grade with a liner.						
Benefit: Installing concrete wash out areas not only prevents pollution, it contributes to a professional appearance for the job site. The recycling of this concrete into crushed aggregate is highly encouraged. Concrete wash water is alkaline, contains high levels of chromium, and can increase the pH of waterways. It is toxic to fish, can cause storm drain clogging, and can contaminate drinking water supplies.						
Verification: The EA rater will confirm that a concrete wash out area has been installed on site, is being used, and that there is no apparent leaching of liquids into the ground and does not connect to a storm drain or drain into a waterway.						

2.1.5	Accountability Form		Energy	Health	Land	Materials	Water
On-Site Recycling and Reuse			0	0	1	0	0
Description: Benign materials, such as land clearing debris and drywall are ground and mixed into soil on the site. Rock excavated from the site is used for site amenities. Must occur in "substantial" amounts.							
Benefit: Reusing materials on site reduces landfill waste and transportation of debris.							
Verification: Contractor will complete an Accountability form specifying the material and approximate quantity. EA rater will attempt to confirm that materials were reused on site.							

3.0 Building Envelope and Systems

3.1 Durability Strategies

3.1.1	Energy	Health	Land	Materials	Water
Wall Sheathing: Plywood	0	0	0	1	0
Description: Plywood materials for wall sheathing.					
Benefit: Plywood is generally more durable than other products, such as oriented strand board (OSB). When plywood gets wet, it expands evenly throughout the panel, dries more quickly, and shrinks down to its original size more rapidly than OSB.					
Verification: EA Rater will visually identify plywood sheathing and check the grading stamp during construction.					

3.1.2	Accountability Form	Required Measure	Energy	Health	Land	Materials	Water
Weather Barrier with Window and Door Flashing System: Installed properly			0	0	0	0	0
Description: A weather barrier is part of the water management system that creates the drainage plane in exterior wall assemblies. This system consists of a code approved house wrap or building paper that is installed so that the upper sheets overlap the lower sheets. All systems must be installed according to the manufacturer's instructions. Fully flash all window and door openings, including pan flashing at sills, side flashing that extends over pan flashing, and top flashing that extends over side flashing.							
Benefit: Proper installation is important to ensure that any water that penetrates the exterior siding is directed down and out of the wall assembly. House wrap that has been installed incorrectly can channel water into the interior of the wall assembly. Water that is allowed to penetrate the exterior wall assembly can degrade the performance of the insulation, damage the exterior sheathing, interior wall board, and potentially, the interior flooring and other assemblies. Chronic moisture in wall assemblies can also support the growth of mold and fungi that damage the building and can seriously harm the occupants.							
Verification: EA Rater will verify that a house wrap or building paper layer is installed. It must cover the entire outside wall surface. Sheets must be installed such that the sheets higher up overlap the ones below. Window and door flashing must also overlap properly to shed water. Manufacturer's installation specifications must be followed.							

3.1.3	Accountability Form	Required Measure	Energy	Health	Land	Materials	Water
Rainscreen Wall System: Airspace under masonry cladding			0	0	0	3	0
Description: A rainscreen wall is a moisture-management system, incorporating exterior cladding, an air cavity (typically 3/8 inch), flashings, a drainage plane (building paper or housewrap) with drainable openings at flashings and bottom terminations, and an airtight support wall to offer multiple moisture-shedding pathways. When used behind masonry, cultured stone, stucco or brick cladding, the air space must be kept free of mortar droppings with a drainage mat to receive this credit, and the bottom course must have open head joints at every other unit. When combined with top venting (screened vent with siding or open head joints at every other masonry unit), the rainscreen also accelerates cavity drying.							
Benefit: This technique helps extend the life of the masonry and the exterior walls of the home under the masonry. It also prevents moisture from entering the wall cavity. This is accomplished by neutralizing wind-driven rain, offering multi-layered redundancy, and integrating drainage and ventilation to accelerate cavity moisture removal.							
Verification: EA Rater will verify the presence of a properly constructed rain screen. Critical details are at least 3/8-inch air space between the siding and the drainage plane and have an insect screen at the openings of the airspace.							

3.1.5	Energy	Health	Land	Materials	Water
Low-point Drain: Mechanical Room and crawl space	0	0	0	1	0
Description: A low point drain removes water that collects in the crawlspace during construction and in the event of a plumbing leak or high water event. The floor of the crawlspace is graded to one or more low points. Provide a drain at each low point that slopes to daylight or to a sump pump with a sealed cover. Use a backflow valve to prevent reverse flow of outside water into the crawl space, and to reduce the chance of vermin entry. Gutter drains and foundation drains must not be connected to the crawl space drain.					
Benefit: Standing water in crawlspaces is a common source of moisture problems in buildings. Water vapor rises from the crawlspace and permeates the building. This can lead to a variety of structural and health problems.					
Verification: EA Rater will identify the presence of the drain and verify that the waste line opens to daylight in a way that provides proper drainage.					

3.2 Foundation Systems

3.2.1	Required for basements	Energy	Health	Land	Materials	Water
Wall Below Grade: Fiberglass only / Rigid foam with fiberglass		Model	0	0	0	0

Description: Insulate the basement walls to R19 or better with an appropriate system for a below grade application. Careful attention to air sealing around the rim of the first floor is important.

R19 Fiberglass only: Basement stud wall insulated with R19 fiberglass insulation. An air space between the framing and cement wall blocks required. Insulation batts must be kraft back, and be stapled to the face of the framing members. A cavity-insulated stud wall with a polyethylene vapor retarder has a very high risk for condensation and is not recommended.

Description:
Rigid Foam used with fiberglass cavity insulation: Rigid foam insulation is used between stud wall and concrete foundation wall. This will act as a capillary break between the studs and the concrete. This type of installation will also function as the vapor barrier between the warm, moist air, in the home and the cooler, condensing surface of the concrete foundation wall. This is the preferred method because of the added moisture protection benefits. Rigid foam should account for 40% or more of the total R-Value to avoid condensation in winter if used without an interior vapor retarder. Seams of foam should also be taped.

Benefit: Insulating the walls of a basement has several advantages. It is easier to seal the foundation walls than the floor. There is no need to insulate the HVAC system or pipes in a conditioned basement. Warm basements are much less likely to have condensation-related mold and mildew problems. It is preferred that insulation on basement walls never has a plastic vapor retarder. Code may require insulation to have a vapor retarder on the "warm in winter" side. However, this may be eliminated if rigid foam is used between studs and concrete wall.

Verification: EA Rater will verify that R19 insulation is installed. The R-value of batt insulation is marked on the paper facing or ink-jet printed on un-faced batts.

3.2.2	Accountability Form	Energy	Health	Land	Materials	Water
Slab Insulation: Concrete slab fully insulated (R10)		Model	0	0	0	0

Description: Insulate the entire slab-on-grade to a minimum of R10. The insulation material should be rigid foam boards with the appropriate compressive strength and approved for below grade use. Generally, this is extruded polystyrene (XPS). The use of foil-faced "bubble-wrap" insulation or other "radiant" insulation products does not qualify.

Benefit: Heat loss from the underside of the slab is high, particularly at the edge. Insulating the slab prevents the loss of heat.

Verification: The contractor or responsible party will complete the Accountability Form indicating the R-value, insulation material, and insulation thickness and forward it to the EA Rater.

3.2.3	Energy	Health	Land	Materials	Water
Slab on Grade: Slab on grade	0	1	0	0	0

Description: This floor system is a standard concrete slab on grade installation. It must cover the entire footprint of the building to obtain the points for this measure.

Benefit: A slab on grade can reduce the risk from radon and potential VOC's, as compared to a crawl space foundation. Though insulation is covered under a separate measure (3.2.2) for this system, it is recommended that both measures be done for maximum value.

Verification: EA Rater will confirm the floor construction on building plans. On site, the rater will visually identify the slab and confirm that it covers the entire footprint.

3.3 Wall Framing and Insulation

3.3.1	Required Measure	Energy	Health	Land	Materials	Water
Intermediate Framing: Insulated corners and headers		Model	0	0	0	0

Description: Intermediate framing improves two thermal weaknesses of typical wood frame construction. The first provides a method to insulate corners. Typically, each corner needs solid wood backing to support the drywall. In this measure, instead of framing the typical "box," which is inaccessible to insulation, other methods of supporting the drywall can be used. The most common method is to turn a stud lengthwise to the wall so that insulation can be placed behind it. Other methods include ladder blocking and drywall clips.

The second provides a method to insulate the headers, another area where insulation is needed. Exterior walls are now framed with 2x6 lumber, but most headers don't need to be 5½-inches thick. A 4x header leaves room for 1.5 inches of rigid insulation over the entire surface.

Benefit: Intermediate framing uses less wood, requires less labor, produces less waste, and improves overall insulation value of the wall assembly.

Verification: EA Rater will verify that 80 percent of all corners and headers have insulation. In some cases, a corner may be required to be solid wood to meet seismic requirements. For example, an outside corner may be two or more studs nailed together with a metal bracket that connects this build up to the foundation. Full-thickness headers might be required for wider window or door openings.

3.3.2		Energy	Health	Land	Materials	Water
Advanced Framing Techniques		Model	0	0	2	0

Description: Advanced framing means using less wood to frame a house. This technique eliminates wood where it is structurally unnecessary, or where its use is likely to cause other problems such as drywall cracks. The advanced framing technique uses 2 x 6 studs, 19.2 or 24 inches on-center to frame the exterior walls as well as follows all other requirements of Intermediate Framing (see measure 3.3.1). Ladder blocking and the use of hardware like drywall clips, in place of lumber, are common elements in this technique. The following are additional elements that can be implemented in advanced framing:

- Design buildings on 2-foot modules to make the best use of common sheet material sizes and reduce waste and labor. This includes overall dimensions, partitions, and aligning window locations with stud spacing.
- Space floor joists and roof rafters 19.2-inches or 24-inches on-center.
- Use two-stud corner framing and inexpensive drywall clips or scrap lumber for drywall backing instead of studs.
- Use one-stud framing at partitions with ladder blocking, drywalls clips, or scrap lumber for drywall backing.
- Use a precut framing package.
- Eliminate headers in non-load-bearing walls.
- Eliminate unneeded cripple studs under window ends.
- Size headers to their actual loads.
- Use single top plates when appropriate.
- Fill in any blind spaces during framing with rigid insulation.

Benefit: A typical wall assembly can be as much as 25 percent wood. The insulating value of wood is R1 per inch. Fiberglass, cellulose and other materials have insulating values that range from 2.8 to 4 per inch. It is easy to see that reducing the percentage of wood will increase the percentage of insulation. The result is a wall assembly that will lose much less heat and require less labor and material to build. Advanced framing is one green building technique that reduces construction costs.

Verification: EA Rater will visually inspect the framing to see that the techniques listed above were employed.

3.3.3	Energy	Health	Land	Materials	Water
Engineered Wood Studs: Studs	0	0	0	2	0
Description: Finger-joined wood members are produced by gluing short lengths of wood together. Finger-joined lumber is milled to the same dimensions as traditional lumber.					
Benefit: Finger-joined studs are straighter, stronger, and reduce waste. This technique is used to replace large dimensional lumber, typically cut from single trees or larger pieces of wood. Finger-joined lumber uses raw materials more efficiently. By combining together smaller pieces of wood to form a single piece, less of the log is wasted. This reduces the pressure on forest resources. In addition, because it is a more consistent product (fewer warped or split pieces), using finger-joined lumber means less wood is scrapped. This decreases the demand on local landfills. Using this form of lumber may also lower the embodied energy of a home by eliminating the energy needed to harvest, mill, transport and dispose of the lumber scrapped or otherwise wasted.					
Verification: EA Rater will visually inspect the glue joints where smaller pieces of wood have been mated.					

3.3.4	Energy	Health	Land	Materials	Water
Foam Exterior Insulation: (R2.5 / R5)	Model	0	0	0	0
Description: Rigid foam sheets, with an R2.5 – R5 value, installed on the exterior of the house's structural wall system. Energy points are determined by modeling the building.					
Benefit: Rigid foam insulation provides a thermal break between framing members and external conditions, improving the thermal performance of the wall structure. The same nominal R-value in continuous rigid foam also provides much more net R-value to the wall because it covers the thermal "bridge" of the framing. Foam board insulation is commonly attached to the structural wall sheathing, over a traditional moisture barrier, with the exterior siding nailed over it. Some systems use the foam as the moisture barrier. For best results, the seams are taped to prevent air leakage and rain penetration, and a moisture barrier should be installed.					
Verification: EA Rater will visually inspect the presence of foam sheathing and measure the thickness.					

3.3.5	Energy	Health	Land	Materials	Water
Increased Wall Cavity Insulation:	Model	0	0	0	0
Description: Install blown-in fiberous insulation or sprayed-in-place foam (SPF). Insulation must fill the cavity and touch all six surfaces.					
Benefit: Insulation in wall cavities has two performance issues: quality and quantity. At minimum, Earth Advantage suggests blown-in or sprayed-in-place foam that fill the cavity without leaving voids. Insulation levels above the code minimum are encouraged.					
Verification: EA Rater will visually verifier the insulation material. However, the density cannot be established accurately by visual inspection. (Low-density foam yields to the touch, while high-density products are rock-hard.) The contractor or responsible party may be asked to document the density and R-value.					

3.3.6	Energy	Health	Land	Materials	Water
Spray-in-Place Foam Insulation: Low Density/High Density	Model	1	0	0	0
Description: Spray-in-place foam insulation is applied on-site to the interior side of wall, roof, or floor sheathing. Ozone-friendly foam insulation includes no chlorofluorocarbons (CFC's) and no hydrochlorofluorocarbons (HCFC's).					
Benefit: Spray-in-place foam is usually a polyurethane material that is applied in a variety of densities. Low-density (0.5 lbs./cu. ft.) products have an insulating value of about R-3.5 per inch, which is similar to fiberglass insulation. High-density (2.0 lbs./cu. ft.) products can be up to R-6.8 per inch and are often called "closed-cell" foam. All spray foams share the benefit of filling cavities completely and providing superior air tightness. In addition, two-part/high density/closed cell foams are not permeable to liquid water or vapor. Care should be taken in selecting products that have low global warming potential (GWP) and are not ozone depleting.					
Verification: EA Rater will easily identify the presence of spray foam, however, the density cannot be established accurately by visual inspection. (Low-density foam yields to the touch, while high-density products are rock-hard.) The contractor or responsible party may be asked to document the density and R-value.					

3.3.7		Energy	Health	Land	Materials	Water
Structural Insulated Panel System (SIPS)		Model	1	0	1/2	0

Description: Structural Insulated Panels (SIPS) usually consist of expanded polystyrene panels, faced on each side with oriented strand board (OSB). The entire assembly is glued together in a press at the manufacturing plant. The panels are typically pre-cut at the factory and brought to the job site where they are assembled by a team within a short period of time. Roof only is one health point and one material point. Constructing both the roof and walls with SIPS qualifies for one health point and two material points.

Benefit: SIPS wall panels provide a continuous insulation system. This reduces heating and cooling costs, and if carefully sealed during installation, helps control air movement within the structural shell. When this system is used for walls and ceilings, they eliminate 1/2 - 2/3 of the traditional dimensional lumber.

These panels are typically made from expanded polystyrene (EPS) or isocyanurate foams. EPS contains no chlorofluorocarbons (CFC's) or chlorine, and do not outgas harmful chemicals.

These panels have several benefits. They are pre-cut to the house plan so they can go up very fast. Since little cutting is needed, less waste is produced. They contain about 75 percent less wood than a framed wall. Panels have higher insulation value, reduce air leakage (when installed and sealed properly), and resist moisture and rot. Some panels are treated with borates to keep insects from burrowing into them. Siding and drywall can be nailed onto the panels.

Projects cannot count points from Advanced Framing 3.3.2; Engineered Wood Studs 3.3.3: Panelized Wall System 3.3.8, and Blown-in Insulation System 3.10.3.

Verification: EA Rater can easily identify SIPS on the site and should record the thickness of the panels used for the walls.

3.3.8	Accountability Form		Energy	Health	Land	Materials	Water
Panelized Wall Systems			0	0	0	2	0

Description: Panelized wall systems are individual sections of wall manufactured off-site and delivered to the jobsite for final assembly. Panels are usually built with dimensional lumber and oriented strand board sheathing and can be delivered with doors and windows installed.

Benefit: A higher level of quality control and consistency can be achieved by producing the panels at a manufacturing facility. Material waste is greatly reduced since shorter pieces can be stored and used for future projects. This system works well for projects with limited staging areas since the panels are delivered on a truck and can be immediately lifted into place by a crane.

Verification: The builder or responsible party will complete the Accountability Form for the panelized wall system and forward it to the EA Rater.

3.3.9	Energy	Health	Land	Materials	Water
Insulating Concrete Forms (ICF's): Foam / Recycled	Model	0	0	0	0

Description: Insulating concrete forms are typically made from EPS (expanded polystyrene) foam insulation with cavities for holding poured concrete. The forms remain in place to serve as insulation for the walls. Some ICF's are made with post-consumer recycled foam while others are made with mineralized wood from post-consumer sources. These recycled products gain an additional point under Materials. The insulating value of ICF's can vary depending on the unique characteristics of each product, including the thickness of the foam and the type of ties used to hold the structure together. In order to give proper credit, check manufacturer's literature for the static R-value of the specific unit.

Description:
Projects cannot count points from Advanced Framing 3.3.2; Engineered Wood Studs 3.3.3, and Blown-in Insulation System 3.10.3.

"Dynamic" R-value and "thermal mass effect" are not accepted for expressing heat loss. The air leakage benefits are included in air leakage testing.

Benefit:
ICF's reduce the use of wood framing, provide exceptionally air tight walls, offer uniform insulating value without thermal bridging, and, in most cases, have a higher insulating value than a typical wood-framed wall. They offer exceptional noise reduction qualities even when located in noisy areas. A skilled crew may be able to erect ICF walls quickly. ICF homes are very strong and stand a better chance of surviving strong winds and earthquakes.

ICF products with post-consumer recycled content also reduce solid waste.

Verification: EA Rater will readily see that ICF's have been installed. The specific type and dimensions of the ICF units should be noted. If necessary, manufacturers' literature will be used to establish the static R-value.

3.4 Attic Framing and Insulation

3.4.1	Energy	Health	Land	Materials	Water
Increased Ceiling Insulation	Model	0	0	0	0

Description: Increase insulation levels in flat ceilings. Attic insulation is typically blown-in-place by a professional contractor. Blown insulation is preferred, because it can be uniformly installed to cover framing members. This eliminates gaps and compression that is characteristic of batt insulation in an attic application.

Benefit: Additional insulation levels in the attic can improve the energy performance of the home and is one of the easiest ways to improve a project's energy performance at a minimal cost.

Verification: EA Rater will measure the depth of insulation and confirm that the particular material installed offers adequate insulating value at that depth. The installer's insulation certificate can also be used. The rater should also look for portions of the attic where the depth may be inadequate.

3.4.2	Energy	Health	Land	Materials	Water
Extended Eaves: Minimum extension – 24" from vertical	Model	0	0	2	0

Description: The eaves are extended to 24 inches, instead of the typical 12 to 14 inches. This can be done with trusses or stick-framing. An exception will be made for Rakes and fly-rafters which only need to extend from the face of a gable-end 12 inches.

Benefit: Extended eaves block summer sun and reduce the need for mechanical cooling. They shield furnishings and building materials from exposure to the sun's damaging UV rays. Extended eaves protect the home's exterior from the elements, lengthening its service life. They also help reduce the potential for health risks caused by unwanted moisture. Extended eaves protect the wall, as well as window and door openings, from rainfall.

Verification: EA Rater will measure the distance from the exterior wall to the outer most point of the roof, including the gutter.

3.4.4		Energy	Health	Land	Materials	Water
Energy or Raised Heel Truss		Model	0	0	1	0
Description: The raised heel truss is designed so that increased levels of insulation around the attic perimeter (near the exterior walls) can be installed. The heel height will allow for the full thickness of attic insulation. Baffles that follow the contour of the raised heal are to be used to ensure maximum insulation at these points as well. In other words the baffle is to be vertical at the edge of the wall and then make the angle with the pitch of the roof.						
Benefit: Typical trusses for low-slope roofs severely restrict the amount of space available for attic insulation. This can allow considerable heat loss and cause ice dams to form in cold climates.						
Verification: The EA Rater will confirm that the raised heel trusses have been incorporated into the house plans and measure the heel depth during the onsite inspection.						

3.5 Floor Framing and Insulation

3.5.1		Energy	Health	Land	Materials	Water
Increased Floor Insulation		Model	0	0	0	0
Description: Upgrade under-floor insulation to R-38. Nominal 12-inch floor joists provide enough depth to install a standard density R-38 batt. If there is not enough room for the 12-inch batt, a high-density product can be installed to achieve R-38 in the space available in a nominal 10-inch joist. In all cases, insulation should fill the entire cavity, touching the subfloor above. Other techniques may involve furring down the beams or joists to accommodate the 12-inch batts, rigid foam, spray foam, blown-in-batt (BIB), or any combo there of.						
Benefit: Wood-framed floors typically account for a large percentage of the surface area of the building. At R38 this component has now achieved the maximum feasible insulation level. Additional insulation also improves the comfort of adjacent interior spaces.						
Verification: EA Rater will examine the floor insulation to check for proper depth, subfloor contact and complete cavity filling. The installer's insulation certificate may also be used.						

3.5.2		Energy	Health	Land	Materials	Water
Flooring Support System: I-joists used in all floors		0	0	0	1	0
Description: I-joists are used for **all** floor framing.						
Benefit: I-joists are composite, engineered wood products made from smaller dimension trees and mill scraps. Using this material dramatically reduces the demand on forest timber and eliminates many large- dimension wood beams. They also support longer spans and allow greater depth to hold floor insulation.						
Verification: EA Rater will visually confirm the subfloor material during the rough inspection.						

3.5.3	Energy	Health	Land	Materials	Water
Flooring Support System: Open-web joist system used in building	0	0	0	2	0

Description: Open-web joists are parallel chord trusses designed to support floors and can be used in the same way as I-joists or dimensional lumber. The top and bottom chord of each truss is usually 2x4 dimensional lumber or laminated veneer lumber (LVL). Metal or wood web members connect the top and bottom chords. Like all trusses these are designed to match the structural requirements of each job.

Benefit: Open-web trusses are a very economical floor and roof system when compared to other construction materials--especially when ceiling, decking, flooring materials, and labor costs are considered. Open-web trusses allow longer spans. Utilizing these lighter weight systems will generally result in reduced size of bearing walls, foundations, and footings.

Ducts, plumbing, electrical, and other utilities can easily run across the joists. The space between webs facilitates installation of ductwork, wiring, and plumbing to significantly reduce the system depth and cost.

Open-web joist trusses are unobstructed construction as defined by the 1991 edition of NFPA 13 for Fire Sprinkler Construction which eliminates sprinkling in each truss space.

Verification: EA Rater can visually confirm open-web joist trusses.

3.6 Roofing Material

3.6.1	Energy	Health	Land	Materials	Water
Eco-Roof: Vegetated / green roof (1-25%/26-50%/51-75%/76-100%)	0	0	1	0	1/2/3/4

Description: An eco-roof is a lightweight, low-maintenance vegetated roof system, used in place of a conventional roof.

Benefit: An eco-roof provides for stormwater retention, improved water quality through filtering, and improved air quality through evapotranspiration and carbon storage. Energy conservation, sound reduction, reduced glare from the roof surface, slower roof degradation, and animal habitat, are other benefits attributable to eco-roofs. Not all people find an eco-roof a visually appealing choice, and there may be community covenants or code issues that need to be addressed during the design of an eco-roof.

Verification: EA Rater will verify the presence of the green roof during onsite inspection.

3.6.2 Accountability Form	Energy	Health	Land	Materials	Water
Recycled Content: Composite or Metal (50% post-consumer)	0	0	0	2	0

Description: Metal roofing comes in several forms, including standing seam and shingles. Most steel contains recycled content, generally assumed to be about 60 percent industry-wide. Some roofing products come with high-quality finishes that protect them from moisture and ultraviolet degradation. Other forms of composite roofing can also contain recycled content. This is generally a mix of wood waste and recycled plastic or rubber. These composite materials are relatively new in the market, so the actual durability is unknown. However, most products carry a 40 or 50-year warranty

Benefit: The main environmental benefit of metal roofing is durability. The longer a roof stays in service, the less material goes to the landfill. Metal roofing has the additional benefit of a well-established system for collecting and recycling steel. Longer life also means less embodied energy for each year of service. Metal roofing is a good investment in the long run because it tends to require less maintenance and fewer repairs.

Composite roofing that contains recycled material is expected to serve longer than composition roofing. However, composites are unlikely to be recyclable themselves when it is time to replace them.

Verification: EA Rater can easily identify standing seam metal roofing. The builder or responsible party will complete the Accountability Form for metal and composite shingles and forward it to the EA Rater.

3.6.3 Accountability Form		Energy	Health	Land	Materials	Water
Durable Roof: 40-years or greater warranty		0	0	0	1	0
Description: Composition three-tab roof shingles are made with asphalt and fiberglass. The manufacturer's warranty must be at least 40 years or stated as a limited lifetime warranty.						
Benefit: Installing longer-lasting shingles is better for the environment than cheaper, less-durable shingles. Durable materials are environmentally preferable for several reasons. First, durable materials limit the demand for scarce resources and the pressure on local landfills for disposal of used products. In the case of forty-year warranted shingles, they presumably will be replaced less often than the typical 20-year-warranted products, reducing waste and demand for new materials proportionally. Second, because they must be replaced less often, durable materials avoid the embodied energy costs incurred by the replacement of the shorter lived products. Finally, durable materials are a better investment in the long run because they tend to require less maintenance and fewer repairs. Composition shingles are made using asphalt, a petroleum-based product. This requires significant energy resources to manufacture and generates VOC's when installed. VOC's pose a health risk to construction personnel and contribute to ground level ozone, a major component of smog. By using the most durable products available, these impacts can be reduced. All other things being equal, the more durable the product, the better its overall resource efficiency.						
Verification: The builder or responsible party will complete the Accountability Form, attesting to the 40-year or longer warranty of the product, and forward it to the EA rater.						

3.7 Exterior Materials Selected siding systems require properly installed weather barrier

3.7.1		Energy	Health	Land	Materials	Water
Fiber Cement: (50-80% /81-100%)		0	0	0	1/2	0
Description: Wall cladding product made of fiber reinforced cement, cementitious stucco, masonry, spandrel glass, exterior insulated finished system (EIFS) , or metal panels.						
Benefit: Installing inorganic wall cladding is better for the environment because it is very durable and requires less or no painting and fewer repairs. However, the embodied energy in some products can be high such as Portland cement in fiber cement products.						
Verification: EA Rater will verify that the material used is durable and inorganic.						

3.7.2		Energy	Health	Land	Materials	Water
Exterior Surface not Field Painted: 50-80% /81-100%)		0	0	0	1/2	0
Description: This measure refers primarily to stone, masonry; stucco and metal siding and other factory-finished materials that do not need additional paint. Clear penetrating masonry sealers are acceptable. Masonry reserve cladding must be installed over a rain screen system (measure 3.1.3).						
Benefit: Exterior painting is perhaps the most common maintenance task required by any building. This consumes a considerable amount of material over the life of the building. By selecting cladding materials that do not need re-painting, this material can be eliminated. Stucco with integral pigment also requires no paint. Metal siding is awarded points because of its recycled content, durability and recyclability.						
Verification: EA Rater will estimate the amount of exterior surface covered by the un-painted surface.						

3.7.3		Energy	Health	Land	Materials	Water
Durable Exterior Trim		0	0	0	1	0
Description: Use inorganic materials or code-recognized water-resistant woods for exterior trim.						
Benefit: Installing inorganic trim is better for the environment because it is very durable and requires less or no painting and fewer repairs. However, the embodied energy in some products can be high, such as Portland cement in fiber cement products. Spruce, Pine, Fir (SPF) wood product is commonly used for trim work but SPF wood is not very water-resistant and may prematurely rot. The IRC recognizes water-resistant wood species. If wood is used all surfaces should be primed on all sides including end cuts.						
Verification: EA Rater will verify the presence of eligible exterior trim. Project team to provide product data sheet indicating type of trim used.						

3.7.4	Accountability Form	Energy	Health	Land	Materials	Water
Outdoor Decking: Recycled plastic lumber for deck top (50% post-consumer)		0	0	0	1	0
Description: Recycled plastic lumber or plastic/wood composite lumber provides a durable alternative to solid wood for exterior applications. These products are weather and insect resistant. Plastic lumber is also rot and corrosion proof, and will not crack, splinter, or chip. Although not generally used for structural applications, specific products can be used in structural, below-grade, or marine applications. Not all plastic lumber contains post-consumer recycled material. For a list of products that could potentially earn points visit www.buildinggreen.com						
Benefit: Using lumber made from plastic and wood glued together is good for the environment primarily because it is so durable. Also, because it requires no painting and resists rot and damage, it will outlast other forms of lumber, particularly when exposed directly to the ground. Since a single piece of plastic lumber replaces many boards that would rot over its extended lifetime, it may lower the embodied energy of a home project. Recycled plastic lumber lowers the demand for scarce virgin materials and limits the impact upon local landfills. Plastic lumber used in place of pressure-treated lumber avoids the use of hazardous chemicals. This helps to maintain a healthier environment inside the home and lowers the impact that such chemicals have on the environment at large.						
Verification: EA Rater will verify the presence of plastic lumber. Specific products such as Trex and ChoiceDek are well-known to contain recycled content. Other brands may require documentation to establish the percentage of recycled content.						

3.7.5		Energy	Health	Land	Materials	Water
Outdoor Patio: Concrete or pavers		0	0	0	1	0
Description: Patio area made with concrete and/or pavers.						
Benefit: Wood decks require maintenance and do not last as long as harder, more durable options such as concrete or pavers.						
Verification: EA Rater will visually verify presence of concrete or pavers used for an outdoor patio.						

3.8 Exterior Coatings

3.8.1	Energy	Health	Land	Materials	Water
Exterior Paint Or Stain: Low VOC (150/gpl or less) / Lifetime warranty	0	1	0	0/2	0
Description: Low-toxic and low-VOC paints/stains/clear finishes are alternatives to conventional solvent-based products such as alkyd-based paint, lacquer, shellac, silicone, and linseed oil. Paint manufacturers are offering lifetime warranties on exterior-grade paint. This type of paint usually incorporates different ingredients than typical exterior house paints.					
Benefit: The primary reason for using low-VOC paints and sealers is to maintain air quality. Use of these products can minimize air contamination. For most applications, low-toxic, low-VOC clear finishes are safer to handle and just as, or more durable than, conventional products. Factory workers and painters are exposed to fewer toxic materials when making and applying low-VOC paint. (See glossary for information on VOC's.) Paint with a lifetime warranty is typically permeable, hydrophobic, contains ceramic filler pigments, and has a high-solids volume. This helps the paint last longer than other exterior paints.					
Verification: EA Rater will examine paint containers to determine the level of VOC's in the paint used on site. The builder should save containers until the final inspection for this purpose.					

3.8.2	Energy	Health	Land	Materials	Water
Exterior Paint: Recycled content (50% post-consumer)	0	0	1	2	0
Description: Recycled latex paint is made from unused latex paint collected from households, government, businesses, and painting contractors. New materials are sometimes added to improve the paint's consistency and to make standard colors. Recycled paint can contain up to 100 percent post-consumer content.					
Benefit: Using recycled content latex paint offers a number of environmental and economic benefits. First, by incorporating used paint, the manufacturer diverts it from taking up space in hazardous waste facilities. Second, using recycled content products lowers the demand on limited new resources. Third, using recycled content paint reduces the embodied energy of a home and the amount of pollution that results from the extraction, transportation, and disposal of the materials necessary to build it. Fourth, recycled paint costs less than virgin paint, and its performance is the same. Finally, in addition to the environmental benefits of its recycled content, choosing paints with low-VOC content also helps protect air quality both indoors and out.					
Verification: EA Rater will examine paint containers to confirm that the material comes from Metro Paint or another known source of recycled paint.					

3.9 Windows

3.9.1	Required Measure	Energy	Health	Land	Materials	Water
Window Efficiency – U-Value 0.32		Model	0	0	0	0
Description: Windows are a major source of energy loss in building shells therefore it is best to use high-performing window systems.						
Benefit: Window with lower U-Values provide better energy performance. Low-emissivity coatings that contribute to the lower heat loss also block much of the ultraviolet radiation that passes through the window. This also reduces fading in interior furnishings and finishes.						
Verification: EA Rater will look at the NFRC sticker on typical windows. Project team to provide area-weighted U-value such as from window distributor's takeoff.						

3.9.2	Energy	Health	Land	Materials	Water
Window Framing Material: Composite or Wood with clad exterior	0	1	0	1	0
Description: Composite (fiberglass composite) and wood windows with an exterior cladding.					
Benefit: Composite framing uses a fiberglass composite that is very stable under extreme conditions. Wood framing is a natural product, and the exterior cladding eliminates maintenance. Neither product contains compounds that are toxic during manufacturing or when burned.					
Verification: EA Rater will visually verify the window frame material and the presence of exterior cladding.					

3.10 Shell Resource Efficient Measures

3.10.1		Energy	Health	Land	Materials	Water
Exterior Doors: Steel and/or Fiberglass, insulated to R-5 min. (28 ft^2 exempt)		Model	0	0	1	0
Description: This ENERGY STAR measure requires that all openings be insulated to R-5. Insulated doors generally have an exterior skin made of steel or fiberglass. One door, up to 28 ft^2, is exempt. Doors that are mostly glass are considered windows. Whenever possible, insulated doors with thermally-broken frame should be specified. Note: The house entry door from an attached garage is defined as an exterior door.						
Benefit: The stable nature of steel and fiberglass doors reduces the demands for coatings throughout their life. Wood flaws are eliminated, and their foam core provides better R-value and more positive sealing. These products are very durable and reusable.						
Verification: Manufacturer product specifications and on-site inspection.						

3.10.2	Accountability Form	Energy	Health	Land	Materials	Water
Recycled Content Insulation: Cellulose, Cotton or Fiberglass (25% - 50% / 51% and greater – Post-consumer)		0	0	1	1/2	0
Description: At least all of one component is to meet this spec to be eligible for the points. (E.G. – Floors, attic, walls) **Cellulose:** Cellulose insulation is made from about 75 percent post-consumer recycled newspapers or telephone books. The other 25 percent is borate that repels insects, deters mold, and resists fire. Cellulose is a loose material that can be dry-blown or dense-packed into enclosed cavities, or wet-sprayed into open wall cavities. It is commonly blown into attics. **Cotton:** Cotton insulation is made from 100 percent recycled cotton. The insulation comes in batt form and is currently available in R-13, R-19, R-21 and R-30 products. **Fiberglass:** Fiberglass insulation is made from either post-industrial or post-consumer parent material. Points are only awarded for post-consumer recycled content.						
Benefit: **Cellulose:** Cellulose insulation is environmentally preferable for several reasons. First, it is an excellent insulator. In addition, because of its loose design, it fills oddly shaped cavities well. This feature improves its energy efficiency by preventing "cold spots" in the building shell. Second, cellulose is made from 75 percent post-consumer recycled paper, typically from phone books or newspaper. This limits the pressure on scarce natural resources, as well as the demand for space in local landfills. Third, cellulose may also lower the overall embodied energy of the home if used instead of insulation made from virgin materials.						

Benefit:

Cotton: Cotton insulation is environmentally preferable for several reasons. First, it is an excellent insulator. Second, cotton insulation is made from 100 percent recycled cotton. This limits the pressure on scarce natural resources, as well as the demand for space in local landfills. Third, cotton may also lower the overall embodied energy of the home if used instead of insulation made from virgin materials.

Fiberglass: Fiberglass might be considered the industry standard when it comes to insulation. All fiberglass insulation contains some recycled content, although the amount and the sources vary between manufacturers. A product that is made from recycled bottles and other post consumer glass goods helps promote recycling, as well as supplementing the production of new products by using what was once in the market.

Verification: EA Rater will verify the type of insulation present. The amount of post-consumer recycled content for cellulose and cotton will be assumed to be greater than 50 percent. The builder or responsible party will sign an Accountability Form attesting to the recycled content of the product.

3.10.3	Energy	Health	Land	Materials	Water
Blown-in Insulation System: High density in enclosed cavities	Model	0	0	1	0

Description: Insulation can be blown into closed building cavities at a density of about 3.5 pounds per cubic foot density. Blown-in insulation is most common in walls, where it yields an R-value of about R-22 in a 5½" wall cavity. At least all of one component is to meet this spec to be eligible for the points. (E.G. – Floors, attic, walls)

Benefit: This system increases the insulation R-value. Blown-in insulation also fills the cavity more effectively around obstructions, such as pipes and wires. This method also tends to reduce air leakage through the building shell, which is reflected in a better air leakage test (Measure 5.1.1).

Verification: EA Rater will check to be sure that insulation fills the cavity. If the insulation is installed behind netting, the netting should be taught and firm to the touch.

3.10.4	Energy	Health	Land	Materials	Water
Certified No Added Urea Formaldehyde Insulation (100%)	0	1	0	0	0

Description: Install insulation that has been rated as Urea Formaldehyde-Free Insulation.

Benefit: The primary purpose of this measure is to limit the presence of formaldehyde in the home. Unfortunately, standard insulations contain formaldehyde, which is unhealthy. (See the glossary for more information on formaldehyde.)

Verification: EA Rater will identify the brand of insulation and confirm it is on the list of qualifying products.

3.10.5	Accountability Form		Energy	Health	Land	Materials	Water
Concrete with Fly Ash or Slag: (15% - 24% mix / 25% or greater)			0	0	1/2	1/2	0
Description: Fly ash, a coal-fired power plant waste product, or blast furnace slag, a by-product of iron manufacturing, can be used as a substitute for up to 60 percent of the Portland cement in a concrete mixture.							
Benefit: Portland cement requires huge amounts of energy to make, and is responsible for about five percent of the total greenhouse gas emissions worldwide. Using fly ash or slag in the concrete mix reduces the impact of Portland cement. Replacing Portland cement with fly ash reduces the energy used to produce cement, reduces emissions, diverts waste materials from landfills, and increases long-term durability. Slag promotes better concrete workability, easier finish-ability, higher compressive and flexural strength, lower permeability, improved resistance to aggressive chemicals, more consistent plastic and hardened properties, and lighter color. See www.slagcement.org for more information.							
Verification: The concrete supplier or responsible party will complete an Accountability Form, identifying the percentage of fly ash or slag and forward it to the EA rater.							

3.10.6	Accountability Form		Energy	Health	Land	Materials	Water
FSC Certified Wood Products: Can include Windows/Siding/Flooring/Framing (5-25%/26-50%/51-75%/76-100%)			0	0	2/4/6/8	0	0
Description: Wood material used in wall framing, siding, windows, or flooring which is certified to come from well-managed forests by the Forest Stewardship Council (FSC). The percentage is based on all materials for that category, including but not limited to walls, floors and roofs. While dimensional lumber is the most common product to carry FSC certification, it is also possible to buy siding, windows and flooring products that are certified.							
Benefit: See the glossary for information on the benefits of FSC-certified wood.							
Verification: The builder or supplier will complete an Accountability Form showing the percentage of wood that is FSC certified. This calculation is based on volume, not cost. An invoice that reflects board feet or another metric of volume may be used for accountability.							

4.0 Heating and Cooling Systems

All combustion systems within the thermal envelope must have their own fresh air inlets

4.1 Fireplaces (Unvented fireplaces not allowed)

4.1.1	Required Measure	Energy	Health	Land	Materials	Water
Gas Fireplace/Heater: Sealed combustion, Direct Vent with electronic ignition		2	1	0	0	0
Description: This is a gas fireplace that is controlled by an electronic ignition system rather than a pilot. This system also uses outside air for combustion and vents the combustion materials outside effectively sealing the living area from any combustion by-products.						
Benefit: Using an electronic ignition system reduces the amount of fuel that is normally consumed by the fireplace while it is idle. Sealed combustion units vent all combustion gasses, including the nitrogen oxide, nitrogen dioxide, and carbon monoxide to the outdoors.						
Verification: EA Rater will examine the fireplace for an electronic ignition device. In most cases, wiring and a battery holder (that operates the EI during a power outage) is a good indication that EI is present. Back up documentation can be provided by manufacturer product literature. EA Rater will also examine the vent pipe for combustion supply air.						

4.2 High Efficiency Heating and Cooling Equipment

All combustion space heating equipment within the thermal envelope must be direct vent or sealed combustion.

4.2.1	Accountability Form	Required Measure	Energy	Health	Land	Materials	Water
Design Heating /Cooling Loads Using Appropriate Industry Guidelines: Manual J and Manual S or equivalent			0	0	0	0	0
Description: Heating and cooling loads are calculated according to the Air Conditioning Contractors of America (ACCA) Manual J for each building using the actual heat loss characteristics of the building, especially window orientation. Equipment is sized and selected according to procedures identified in ACCA Manual S. This applies to all forced air heating and cooling systems. Homes with radiant floor heat must show building heat load calculations and system designs in accordance with accepted industry practices.							
Benefit: Proper sizing of heating and cooling equipment is essential for efficient operation. Common practices often use the "rule of thumbs" with very large safety factors to estimate equipment size. This leads to over sizing equipment. Oversized equipment will cycle on and off frequently and seldom reach standard operating efficiency. Excessive cycling can also increase wear and reduce service life. Finally, Earth Advantage homes tend to be far more efficient than typical homes and require smaller equipment. Right sizing equipment also saves money.							
Verification: HVAC contractor or responsible party will sign an Accountability Form attesting that Manual J and Manual S or equivalent calculations have been performed. Per EA Rater's request, the HVAC contractor will provide the modeling runs for the house.							

4.2.2		Energy	Health	Land	Materials	Water
Forced Air Gas: 0.90 AFUE furnace		Model	0	0	0	0

Description: Install a forced-air gas furnace with an energy efficiency rating of 90 percent or better. When a gas furnace is installed, Northwest Energy Star Homes program requires 90 percent efficiency.

Benefit: Typical gas furnaces are rated at 80 percent efficiency. Installing a unit that has higher energy efficiency improves the HVAC performance and lowers operational costs. These high-efficiency models also have sealed combustion, so they draw combustion air from outside and are less vulnerable to back-drafting of combustion gasses.

Verification: EA Rater will record the model number of the furnace and note the efficiency, if it is shown on the unit. The model number can be used to find equipment efficiency in the Gas Appliance Manufacturers Association directory.

4.2.3		Energy	Health	Land	Materials	Water
Heat Pump: With FAE-Split System min. HSPF 8.5 with SEER 13+		Model	0	0	0	0

Description: Install a high-efficiency heat pump. When a heat pump is installed, back up heat may be provided by an 80 AFUE furnace. However, it is suggested that a 90 AFUE (or greater) is used.

Benefit: Space heating and cooling can account for as much as 50 percent of the total energy usage of the home. Installing a high efficiency heat pump improves the energy efficiency and comfort of the house. With a heat pump installation, less carbon pollution is released into the air from the home heating system, causing less atmospheric deterioration. Compared to an electric resistance furnace, an air-source heat pump can deliver two to three times as much heat for each unit of electricity consumed.

Verification: EA Rater will record the model number and serial number of the outdoor unit. HVAC contractor will supply the heat pump commissioning report from either CheckMe! or PTCS. HVAC contractors must be trained and certified by Northwest ENERGY STAR Homes to conduct the commissioning procedure.

4.2.4		Energy	Health	Land	Materials	Water
Ductless Heat Pump System: HSPF 8.5 with SEER 13+		Model	0	0	0	0

Description: Ductless heat pumps use refrigerant to distribute heating and cooling to the building without the use of air handlers and ductwork. To qualify for this measure, the heat pump must use "inverter" technology, which makes the system capable of variable speed operation. If a ductless heat pump is installed, it must meet the Northwest ENERGY STAR Homes requirements.

Benefit: Ductless heat pumps are well-suited to multi-family and townhome dwellings that do not have space available for HVAC ducts. They are also appropriate for smaller homes with smaller heating and cooling loads. In larger homes, multiple units can provide zoning capability. Because they do not require ducts, they don't suffer from duct losses. Most ductless heat pumps use ozone-friendly R-410A refrigerant (E.G. Puron). Ductless heat pumps offer a method for adding cooling to homes with radiant floor heat.

Verification: EA Rater will record the model number and serial number of the outdoor unit. HVAC contractor will supply documentation that the refrigerant charge meets manufacturer's specifications. HVAC contractors must be trained and certified by Northwest ENERGY STAR Homes to conduct the commissioning procedure.

4.2.5		Energy	Health	Land	Materials	Water
Heat Pump: Geothermal, Groundwater, or Water Source		Model	0	0	0	0
Description: High efficient heat pumps use the stable temperature of the earth (below frost line) or water in the earth as a heating or cooling resource. The heat pump needs to be Energy Star labeled and/or operate at 3.0 COP or greater.						
Benefit: Energy savings are from high efficiency equipment and a steady heating/cooling source (geothermal). While the system is more expensive than other heating and cooling means, it can greatly reduce heating and cooling costs over the lifetime of the house.						
Verification: EA Rater will record the model number and serial number of the outdoor unit. HVAC contractor will supply documentation that the refrigerant charge meets manufacturer's specifications.						

4.2.6		Energy	Health	Land	Materials	Water
Package Terminal Heat Pump: Recommended minimum efficiencies of 3.3 COP and 12.3 EER		Model	0	0	0	0
Description: Ductless heat pumps use refrigerant to distribute heating and cooling to the building without the use of air handlers and ductwork. High efficient heat pumps use the stable temperature as a heating or cooling resource. The heat pump needs to be Energy Star labeled and/or operate at 3.0 COP or greater and 12.3 or greater EER.						
Benefit: Energy savings are from high efficiency equipment and a steady heating/cooling source. While the system is more expensive than other heating and cooling means, it can greatly reduce heating and cooling costs over the lifetime of the house.						
Verification: EA Rater will record the model number and serial number of the outdoor unit. HVAC contractor will supply documentation that the refrigerant charge meets manufacturer's specifications.						

4.2.7	Energy	Health	Land	Materials	Water
Integrated Space / Water Heating System: Turbonic/Hydronic	Model	0	0	0	0
Description: A home uses the same heating equipment to serve space heating and domestic water heating needs. Typical systems include: a boiler that also heats a tank of water for household use, a high-performance water heater that also provides heat to a hydronic space heating system, or an active solar water heating system that provides pre-heated water for both space heating and domestic hot water. These points are for the space-heating portion of the system, additional points for water heating are applied in section 6.3. Equipment efficiency must meet the same level as required in other sections for boilers, water heaters, etc.					
Benefit: High efficiency homes can often use a single smaller heating plant for both space and water heating. This reduces the amount of equipment needed and the floor space dedicated to mechanical systems. In many cases, combustion equipment intended for this use are highly efficient. Boiler systems may require maintenance by specialty certified technicians. Contractors may be unfamiliar with this type of system, and installation costs may be higher than a more conventional system.					
Verification: EA Rater will record the brand and model number of the heating equipment.					

4.3 Ductwork max leakage <.06 per CFM ft² of floor OR 75 CFM total @ 50 pa

4.3.1	Accountability Form	Required Measure	Energy	Health	Land	Materials	Water
Design Duct System Using Appropriate Industry Guidelines: Manual D or equivalent			0	0	0	0	0
Description: The ducts for each building plan must be designed according to industry procedures in ACCA Manual D.							
Benefit: Following these established industry standards ensures proper sizing for air distribution in each room of the house. This has a direct relationship to comfort, efficiency, and equipment durability. Most HVAC contractors use computer software for this purpose.							
Verification: HVAC contractor will provide an Accountability Form before ductwork is installed. A summary report prepared according to Manual D will be attached.							

4.3.2		Required Measure	Energy	Health	Land	Materials	Water
Duct Leakage Test: Max Leak < .06 CFM per sq. foot OR 75 CFM loss @ 50 Pa or whichever is greater, and all ducts sealed with water based mastic.			Model	2	0	0	0
Description: HVAC contractors must seal all joints and openings in the forced air heating system's ductwork with mastic paste. Tape of any kind is not allowed. (Tape may be used on access panels that are removed to perform regular maintenance, such as the filter rack and the panel covering the blower and control wiring.) Duct leakage is tested according to Northwest ENERGY STAR guidelines. Target leakage in cubic feet per minute is equal to the conditioned floor area of the home times 0.06 (square feet x 0.06 = cfm). Testing must be completed by an ENERGY STAR certified Performance Tester (PT). When forced air ducts or air handling equipment is installed, the Northwest Energy Star Homes program requires duct sealing and testing.							
Benefit: Typical forced air heating systems can lose up to 30 percent of the heated air before it reaches the building. Sealing ducts reduces this loss to 6 percent or less and saves a significant amount of energy. Return ducts that pull air from the house to the furnace are under a suction (negative pressure) so any leakage in a return duct pulls air in. Returns typically run through attics or crawlspaces where air is contaminated by dust, soil gasses, and moisture. Duct sealing reduces the amount of these contaminants that enter the building. Finally, sealed ducts deliver conditioned air more effectively and increase occupant comfort.							
Verification: EA Rater will visually confirm that all visible openings and joints are sealed with mastic. HVAC contractors will perform a duct test on each house and report the results to the EA Rater.							

4.3.3	Required Measure	Energy	Health	Land	Materials	Water
Zonal Pressure Relief (ZPR)		0	1	0	0	0

Description: A properly-installed HVAC duct system balances house pressures through all living spaces of the house. Air must have an unobstructed path from each supply register to the return grille. Zonal pressure relief is required in any room that is 75 square feet or larger, has a supply register, and has a door. Pressure relief can be provided in several ways. 1) Cut the bottom of the door to allow a full one-inch space between the bottom of the door and the top of the finished flooring. 2) Install a transfer grille through the wall. 3) Install a transfer duct from the room into the central zone. 3) Install a direct return in each room. The goal of pressure relief is to maintain a pressure difference across the door of no more than 3 Pa.

Door undercuts are effective only in smaller rooms with only one supply. In rooms with more than one supply, a transfer duct or direct return is usually the most effective method.

When forced air ducts are installed, the Northwest Energy Star Homes program requires zonal pressure relief. See the Northwest ENERGY STAR Homes specifications for details.

Benefit: Forced-air heating systems include large blowers to move conditioned air through the house. Ideally, all the air that is delivered to the house through supply registers flows through the house to the central return. Unfortunately, interior doors block the ideal air flow and create severe pressure imbalances. Air is "bottled up" behind bedroom doors. Pressure problems in houses can also caused naturally-vented combustion appliances to back-draft, which brings harmful flue gasses into the building. Systems with adequate pressure relief provide better safety, comfort, and efficiency.

Verification: EA Rater will identify the method of zonal pressure relief for each room (usually bedrooms) and will measure zonal pressure. The pressure difference of each bedroom with respect to the main living area (or hallway) should not exceed +/-3 Pa.

4.4 Additional Ductwork Measures

4.4.1	Required Measure	Energy	Health	Land	Materials	Water
Protect Duct Vents: Cover supply boots during construction and install temporary filter on cold return		0	0	0	0	0

Description: Cover supply register boots in the floors during construction with a durable material that will prevent dirt, dust or construction debris from entering the duct system. In addition, a temporary filter must be installed on the cold air return grille to keep debris and small particles from entering the ducting system. This measure is required of all Earth Advantage projects that utilize a ducted system for heating and cooling air distribution. The best approach is to totally cover the supply ducts.

Benefit: Duct vents and returns can collect a lot of dust, dirt, and construction debris. Covering the vents and returns during construction protects the HVAC equipment and improves the indoor air quality.

Verification: EA Rater will confirm that supply registers in the floor are covered and that a temporary filter is placed over the cold return opening.

4.4.2 Accountability Form	Energy	Health	Land	Materials	Water
Building Dry-out: No central heating, Gas or propane used	0	1	0	2	0
Description: This measure rewards methods other than using the house's forced air system or portable propane heaters for house dry out. Suggested methods include large fans, dehumidifiers, and portable electric heaters. Temporary gas furnaces are also NOT recommended.					
Benefit: Drywall compound brings a large quantity of water into the building. Drying out the project is typically done by running the forced air heating system. This practice draws dust debris and moisture into the ducts and reduces indoor air quality for the occupants. Portable propane heaters are sometimes used, but combustion can add several gallons of water vapor to the air for each gallon of fuel burned.					
Verification: EA Rater will visit the home during the dry out period to confirm the method used. (This will likely be an unscheduled visit when the rater is nearby.)					

4.4.3	Energy	Health	Land	Materials	Water
Non-ducted System	Model	2	0	0	0
Description: Designing the house with a non-ducted heating or cooling system. This may include mini-split heat pumps, radiant floor heating, and sealed combustion gas fireplaces. Other technologies may be eligible for these points as well.					
Benefit: Duct systems account for a very large amount of the energy used in buildings. Much of the impact is direct heat loss and air leakage from the ducts. However, large furnace blowers also create pressure differences throughout the building that contribute to building air leakage. These imbalances can also pull moisture, allergens, and harmful soil gases into the house or create moisture problems in building cavities. Forced air heating systems and the associated ductwork also consume a considerable amount of valuable space.					
Verification: EA Rater will confirm a non-ducted heating system on the plans and during site visits.					

5.0 Infiltration / Air Sealing / Ventilation

5.1 Infiltration / Sealing

5.1.1	Required Measure	Energy	Health	Land	Materials	Water
Building Air Tightening Measures: Blower Door Test		Model	0	0	0	0

Description: Reduce building air leakage to 4.0 air changes per hour (ACH) at 50 Pascals or less. A sampling of units will be tested and averaged to meet this requirement. NOTE: measure modified to ≤ 0.30 CFM50 per square foot of enclosure to address variances in unit-size.

Benefit: Air tightening reduces the use of energy for heating and cooling. A tight building saves energy.

Air sealing prevents drafts. Buildings that are drafty in the winter tend to be very dry and uncomfortable. A tight building is more comfortable.

A tightly constructed home also reduces unwanted flow of air from outside the living space that can carry toxins such as pesticide treatments, soil gases, and ground moisture.

Cracks and openings that allow drafts also allow warm moist air from the interior to seep into building cavities where it can encounter cold surfaces. This causes condensation that can promote the growth of mold and decay. A tight house is better protected against moisture damage.

Air tightening also improves the performance of mechanical ventilation systems by reducing random leakage that can "short-circuit" mechanical air distribution. Mechanical systems perform better in a tight building.

Techniques to accomplish air tightening:

- All exterior wall bottom plates need to be caulked on the inside before drywall is installed.
- Any penetrations of pipes, wires or HVAC ducting from a heated to a non-heated area must be foamed or caulked to prevent air infiltration.
- All windows and door rough openings must be sealed from the inside.
- Tub, shower, and toilet drain access must be patched and sealed as well as possible.
- All recessed light fixtures must be sealed where the can meets the drywall on the interior of the house. Better yet, eliminate all recessed lights in insulated ceilings.

Other areas to consider may include: Cantilever floors, pocket doors, walls between garage and living space, common walls in attached product, fire places, and between the metal and dry wall of spot ventilation fans.

Verification: EA Rater will conduct a blower door test to measure the air leakage rate.

5.1.2	Required Measure	Energy	Health	Land	Materials	Water
Thermal Bypass Checklist: Energy Star Checklist		Model	0	0	0	0

Description: A comprehensive checklist prepared from ENERGY STAR guidelines to ensure all potential air leaks are sealed. The checklist is available from your Earth Advantage Representative or it can be downloaded from the ENERGY STAR web site (www.energystar.gov). **Requires an additional inspection.** Ask your Earth Advantage/ENERGY STAR rep for details.

Benefit: The Thermal Bypass Checklist is a comprehensive list of all potential air leakage sites. Using the list makes it easier to achieve very high levels of air tightness.

Verification: EA Rater will make additional site visits in order to view specific air sealing measures. (Additional fees may apply.)

5.2 Whole House Ventilation

Automatically controlled mechanical ventilation is required. The goal is to provide a whole-house mechanical ventilation system capable of providing fresh air to the occupant. Two occupants are assumed in the first bedroom and one in each subsequent bedroom. Operable windows shall not be used to meet mechanical ventilation requirements. A variety of methods may be selected to satisfy the mechanical ventilation requirement for your project. Four options are described below. The intent of this ventilation section may also be satisfied with any system that complies with American Society of Heating and Refrigeration Engineers (ASHRAE) Standard 62.2. ***Use the following formula to determine maximum flow rate: (7.5 CFM x number of occupants) + (0.01 CFM x sq ft). It is required as per ASHRAE 62.2 2009.***

5.2.1			Energy	Health	Land	Materials	Water
Exhaust Only: Non-ducted heating system only			Model	1	0	1	0

Description: Exhaust-only ventilation systems are allowed in homes containing non-ducted heating systems. An ENERGY STAR rated exhaust fan is required. (It is highly recommended that the fan be rated for continuous use; the sone rating of **1.0 or less** is required.) The fan should be located in a central location (preferably in a hallway or laundry). Exhaust duct should be installed as described in EA Measure 7.1.7. Install a programmable timer that is capable of setting the time of operation in 15-minute increments.

Benefit: This system improves indoor air quality of the house by exhausting stale, moisture-laden indoor air to the exterior of the house.

Verification: EA Rater will record the brand and model of the whole-house exhaust fan. The fan's airflow will be tested by the EA Rater to meet compliance.

5.2.2			Energy	Health	Land	Materials	Water
Spot HRV/ERV: Whole house fan			Model	2	0	1	0

Description: One spot HRV/ERV per approximately 1000 sq ft is required in order to have sufficient ventilation capacity. HRV's and ERV's typically operate continuously on a low speed. Some have the ability to boost flow when more ventilation is needed. These may be used in place of local ventilation in bathrooms, provided they deliver enough ventilation at high speed to meet local ventilation requirements, usually 80 CFM for a full bathroom and 50 CFM for a half bath.

Benefit: HRV's and ERV's are considered the premium ventilation systems. They are highly effective and reduce the energy penalty associated with all fresh air ventilation. By tempering incoming air, these units provide greater comfort in extreme climates than other types of ventilation systems.

Verification: EA Rater will record the brand and model of the HRV/ERV. The fan's airflow will be tested by the EA Rater to meet compliance.

5.2.3		Energy	Health	Land	Materials	Water
Premium Package: HRV/ERV in units or rooftop systems		Model	4	0	2	0

Description: One drawback to fresh air ventilation is that fresh air pulled into the building must be heated or cooled to the comfort temperature. Heat recovery ventilators (HRV's) address this issue by capturing from 50 percent to 75 percent of the heat or cooling from the units and transfer it to the supply feeding corridors and common space. TheEnergy Recovery Ventilators (ERV's) take the idea one step further by recapturing the moisture from the outgoing air as well. This increases overall efficiency up to 85 percent and can prevent excessive dryness that sometimes occurs.

Description:
HRV's and ERV's typically operate continuously on a low speed. Some have the ability to boost flow when more ventilation is needed. These may be used in place of local ventilation in bathrooms, provided they deliver enough ventilation at high speed to meet local ventilation requirements, usually 80 CFM for a full bathroom and 50 CFM for a half bath.

Benefit: HRV's and ERV's are considered the premium ventilation systems. They are highly effective and reduce the energy penalty associated with all fresh air ventilation. They are well-matched to radiant heating systems because they promote a small amount of air movement. By tempering incoming air, these units provide greater comfort in extreme climates than other types of ventilation systems.

Verification: EA Rater will record the brand and model of the HRV or ERV along with the rated air flow.

5.2.4	Required Measure	Energy	Health	Land	Materials	Water
Bath Fans: Fans in full baths meet ENERGY STAR and ASHRAE 62.2 requirements		0	0	0	0	0

Description: All bath fans in full bathrooms must carry the ENERGY STAR label. ENERGY STAR qualified fans use less energy and are more than 50 percent quieter than standard models. They feature high performance motors and improved blade design, providing better performance and longer life.

Benefit: Typical low-cost bath fans are not effective for two reasons. They are so loud that people are annoyed and turn them off, and they don't move as much air as they need to. Installing an ENERGY STAR labeled fan will provide more effective ventilation. These fans are tested to meet specific air flow and noise requirements. The lower sound level should encourage occupants to operate the fan for longer periods of time which provides more effective ventilation.

Effective local ventilation using exhaust fans helps to maintain a healthy living environment by removing stale air and odors. It also helps control mold and mildew growth by removing excess humidity. Specifying quiet fans increases the likelihood that they will be used as often as needed. However, exhaust fans do have an energy penalty. It takes a relatively small amount of energy to power the fan itself, but somewhat more energy to heat or cool the fresh air that is pulled in to replace the air removed from the home. Because of the improved air quality, health risks can be reduced. On the whole, tight construction with controlled ventilation gives better energy performance and comfort than leaving a house "leaky".

A list of ENERGY STAR labeled fans can be found at http://energystar.gov/index.cfm?c=vent_fans.pr_vent_fans

Verification: EA Rater will record the brand name and model number of each fan, as well as noting the presence of an ENERGY STAR logo. The model number will be checked against the current list of ENERGY STAR products.

5.2.5			Energy	Health	Land	Materials	Water
Full Bath Fan Controls: All controls – Occupancy Automatic / Timer / Humidistat			0	1	0	1	0
Description: Timer switches, humidity controls, or occupancy sensors are installed to control the operation of individual exhaust fans in each bathroom.							
Benefit: Spot ventilation is an effective method of controlling indoor air contaminants. Automatic controls improve air quality and save energy by ensuring that ventilation will not be left on for long periods when it is not necessary.							
Verification: EA Rater will inspect each bath control and record the brand name and model number (if visible) of the control.							

5.2.6	Accountability Form	Required Measure	Energy	Health	Land	Materials	Water
Kitchen Exhaust Fan: Meet ASHRAE 62.2 requirement			0	0	0	0	0
Description: Test the air flow the kitchen range hood for compliance with the requirements of Section 5 of ASHRAE Standard 62.2-2010. The minimum air flow is 100 cfm, but the actual requirement may be higher depending on the size of the kitchen.							
Benefit: Kitchen range hoods remove odors and moisture from the living space of homes. Many fans are installed that meet the stated requirements of air flow for the area, but do not actually perform at their rated capacity due to poor installation practices, long exhaust duct runs or mechanical problems with the fan. Conducting performance testing of these exhaust fans can verify that a minimum required air flow is met to ensure that the installed fans will actually perform as intended.							
Verification: EA Rater will test the exhaust air flow rates for kitchens and bathrooms and verify that the requirements of ASHRAE Std. 62.2 are met.							

5.2.7			Energy	Health	Land	Materials	Water
Exhaust System for Attached & Fully Enclosed Parking Garage: Automatic control on sensor			0	2	0	0	0
Description: A through-the-wall or ceiling-mounted exhaust fan is installed in the garage to remove unhealthy gases from the air. It can be set to begin when the garage door closes, and automatically shut-off after after it has operated for one-hour each time the system is actuated. Fans should be installed in the ceiling or sidewall and vented to the exterior. Fans should be a minimum 70 cfm if it does not have a duct and 100 cfm if the fan is ducted.							
Benefit: Unhealthy gases in an attached garage have been shown to migrate into the house. An automatically controlled fan can reduce exposure to these gases. Automobile exhaust contains many hazardous chemicals. Running an internal combustion engine, especially small engines, for even a short period will fill the space with an unhealthy level of carbon monoxide and other gases. The garage is usually the storage place of a wide range of herbicides, pesticides, paints, adhesives, and petroleum products. Any home with an attached garage is a candidate for a garage exhaust fan. Protecting good indoor air quality means removing pollutants before they can enter the living area.							
Verification: EA Rater will identify the exhaust fan and test the control to be sure it works as intended.							

6.0 Lighting, Appliances, and Water Heating

6.1 Lighting

Lighting Products Description

Energy Efficient Bulb & Fixture Descriptions: Compact fluorescent lights (CFL's) are available with the same type of base as an incandescent bulb, so they can be used in all standard light fixtures. A dedicated fixture is hard-wired and uses pin-based bulbs (GU24). Linear fluorescent tubes come in a variety of sizes T2, T5 and T8, all of which are thinner than the old-fashioned T12 tubes. Fixtures are good in high use areas (four or more hours of use per day), examples are kitchen, bathroom, hallway or family room.

Fluorescent lights use about one-third the energy as incandescent bulbs to produce the same amount of light. Fluorescent lights last thousands of hours instead of hundreds of hours for incandescent lights. Light-emitting diodes (LED's) are even more efficient and last even longer than fluorescents.

6.1.1	Required Measure	Energy	Health	Land	Materials	Water
ENERGY STAR Lighting Package: 75 percent or more of fixtures are fitted with ENERGY STAR products		Model	0	0	0	0
Description: Install ENERGY STAR rated fluorescent lighting products or LED products in 75 percent or more of the lighting fixtures of the house. These may be dedicated fixtures or standard fixtures with screw-in CFL's or ENERGY STAR LED's.						
Benefit: Dedicated (GU-24) and screw-based CFL's, and linear fluorescent lighting as well as LED lights are an energy efficient alternative to standard incandescent and T-12 fluorescent lighting.						
Verification: EA Rater will count the number of installed fixtures to determine if at least 75 percent of the fixtures have been installed with qualified products.						

6.1.2	Energy	Health	Land	Materials	Water
ENERGY STAR Premium Lighting Package: 100 percent of sockets are fitted with ENERGY STAR lights	Model	0	0	0	0
Description: Install 75 percent plus 15 bulbs or install 100 percent of all lights in the house with ENERGY STAR labeled fluorescent or LED products.					
Benefit: Dedicated and screw-based CFL's and linear fluorescent lighting as well as LED lights are an energy efficient alternative to standard incandescent and T-12 fluorescent lighting.					
Verification: EA Rater will count the number of installed fixtures to determine if at least 75 percent of the lights plus 15 bulbs **or** 100 percent of sockets are installed with qualified products.					

6.1.3	Energy	Health	Land	Materials	Water
Screw in LED ENERGY STAR: 5% to 25%/26 to 50%- Can include common area and exterior	1	0	0	0	0
Description: LEDs will be used for 5-25%, or 26-50% of the building's total lighting needs, inside and outside. Lights must be ENERGY STAR approved.					
Benefit: LEDs offer much greater efficiency than incandescent light bulbs, and even CFLs. LEDs can perform at roughly 80% efficiency, meaning that 80% of electrical energy is emitted as light, with only 20% lost as heat. Incandescent bulbs convert just 20% of electrical energy as light. In addition to greater efficiency, LEDs have a very long lifespan. The lifespan of a current LED lamp is 100,000 hours, or nearly 11.5 years. Though LEDs are initially more expensive than other types of lights, they can result in significant long-term savings on utility bills and maintenance costs.					
Verification: EA Rater will count the number of installed fixtures to determine if at least 75 percent of the lights plus 15 bulbs **or** 100 percent of sockets are installed with qualified products.					

6.1.4	Energy	Health	Land	Materials	Water
Lighting Controls: Interior and/or exterior. Minimum two lighting zones.	1	0	0	0	0
Description: Devices that limit or control the operating time and energy use can be installed wherever lighting is needed. Sensors can control either interior or exterior lights. Interior motion sensors will automatically sense when an occupant enters or leaves a room, which minimizes the amount of time the lights are left on in an unoccupied room. Exterior sensors will automatically turn security lights on when it detects motion. It's not a good idea to control fluorescents with motion sensor. This measure doesn't include dimmers. Points are awarded for each application. One point for one type of installation, with a maximum of two points.					
Benefit: Lighting controls reduce energy use by limiting the amount of time lights are burning unnecessarily. Outdoor lights often run the longest hours and are excellent candidates for lighting controls. Fluorescent lights should not be installed in applications with frequent cycles and short on times. These applications are best suited to LED's.					
Verification: EA Rater will count the number of lighting controls or confirm the presence of a home automation system that controls at least two independent light zones. For example, three pendants over a counter is one zone.					

6.2 Appliances (ENERGY STAR requires that all built-in appliances must be ENERGY STAR rated and labeled)

6.2.1	Required Measure (when applicable)	Energy	Health	Land	Materials	Water
Dishwasher: ENERGY STAR specs		Model	0	0	0	0
Description: Dishwasher must qualify under the current ENERGY STAR requirements at the time of the final inspection. For a list of qualifying models, visit the ENERGY STAR website (www.energystar.gov).						
Benefit: Models that qualify for the ENERGY STAR label are some of the most energy and water efficient models available.						
Verification: EA Rater will record the brand and model number and check it against the list of qualifying products.						

6.2.2	Required Measure (when applicable)	Energy	Health	Land	Materials	Water
Clothes Washer: ENERGY STAR specs/CEE Tier 1/2/3		Model	0	0	0	0
Description: Clothes washers in common areas and in-unit must qualify under the ENERGY STAR requirements. For a list of qualifying models, visit the ENERGY STAR website (www.energystar.gov).						
Benefit: The models that qualify for the ENERGY STAR label are some of the most energy and water efficient models available.						
Verification: EA Rater will record the brand and model number and check it against the list of qualifying products.						

6.2.3	Required Measure (when applicable)	Energy	Health	Land	Materials	Water
Refrigerator: ENERGY STAR specs		Model	0	0	0	0
Description: Refrigerators must qualify under the ENERGY STAR requirement. For a list of qualifying models, visit the ENERGY STAR website (www.energystar.gov).						
Benefit: The models that qualify for the ENERGY STAR label are some of the most energy-efficient models available.						
Verification: EA Rater will record the brand and model number and check it against the list of qualifying products.						

6.3 Water Heating

All combustion systems within the thermal envelope must have their own combustion air supply

6.3.1		Energy	Health	Land	Materials	Water
Gas High Efficiency: <60 gal. - .62 EF, >61 gal. – see approved list of water heaters		Model	0	0	0	0
Description: Install a gas-fired water heater tank with the Energy Factors (EF's) above. The EF rating is given only to water heaters that are classified as residential products. Large volume water heaters are classified as commercial products and are not given an EF rating. If the project includes a water heater that is 70 gallons or more, contact Earth Advantage for advice on finding a qualifying model. For water heaters over 60 gallons see the approved product list.						
Benefit: Water heating is the second largest use of energy in a typical home. The amount of energy used to heat water is closely associated with the number of people in the household.						
Verification: EA Rater will record the brand and model number and check it against the list of qualifying products.						

6.3.2		Energy	Health	Land	Materials	Water
Electric High Efficiency: 70 gal. or less - .93 EF, 71 gal. or larger - .91 EF		Model	0	0	0	0
Description: Install an electric water heater tank with the Energy Factors (EF's) above. Electric water heaters with a high-energy factor rating generally use foam insulation that resists heat loss better than standard fiberglass insulation.						
Benefit: Water heating is the second largest use of energy in a typical home. The amount of energy used to heat water is closely associated with the number of people in the household.						
Verification: EA Rater will record the brand and model number and check it against the list of qualifying products.						

6.3.3		Energy	Health	Land	Materials	Water
Tankless Gas: 0.82 EF or greater		Model	0	0	0	0
Description: Gas-fired tankless water heaters are about 20 percent more efficient than gas-fired water heater tanks. This is a combination of more efficient burners and the lack of stand-by losses that would occur from a tank. For best efficiency, a tankless water heater should be located as close to the end use as possible. It may be better to install two or more smaller units rather than one large unit to serve all the fixtures in the building.						
Benefit: The higher efficiency of tankless saves a significant amount of energy and money for water heating, which is the second largest use of energy in a typical home.						
Verification: EA Rater will record the brand and model number and check it against the list of qualifying products.						

6.3.4	Required Measure	Energy	Health	Land	Materials	Water
Sealed Combustion Water Heater: If located in conditioned space		Model	0	0	0	0
Description: Install a sealed combustion water heater inside the conditioned space of the building. The unit must meet the efficiency requirements in Section 6.3.1.						
Benefit: Water heaters are often located in garages where cold temperatures can accelerate stand-by losses from the tank. Locating a water heater inside the conditioned space reduces the stand-by loss and allows the waste heat into the building. Earth Advantage requires that all combustion equipment located in the conditioned space be sealed combustion, which means that a dedicated source of combustion air is piped directly to the unit. However, with this measure, Power venting is allowed.						
Verification: EA Rater will record the brand and model number and check it against the list of qualifying products. The rater will also confirm that the combustion air source is directly connected to the outside.						

6.3.5		Energy	Health	Land	Materials	Water
Heat Pump Water Heater: COP 2.0		Model	0	0	0	0
Description: Install a heat pump water heater with a COP rating of 2.0 or higher. Because the HPWH draws heat from space that it's located in, placement is very important. Unheated garages and basements are best. They should not be located inside the conditioned space of the building in heating climates.						
Benefit: Uses refrigeration technology to heat water at greater efficiency.						
Verification: EA Rater will record the brand and model number and check it against the list of qualifying products.						

6.3.6		Energy	Health	Land	Materials	Water
High Efficiency Central Boiler System: Greater than .82 EF		Model	0	0	2	0
Description: Large capacity gas hot water heaters are called condensing boilers.						
Benefit: Gas is a highly efficient fuel, so you get a good return on every unit of energy in addition this removes the need for smaller hot water heaters typically installed in individual units. A central system increases the livable space inside each unit.						
Verification: EA Rater will record the brand and model number and check it against the list of qualifying products.						

7.0 Indoor Air Quality

7.1 Project-Wide Air Quality Measures

7.1.1	Required Measure	Energy	Health	Land	Materials	Water
Third-Party Framing Lumber Moisture Test: 19% or lower		0	0	0	0	0
Description: Have a framing lumber moisture content (MC) test performed by a third-party. Moisture content (MC) of the lumber must be 19 percent or lower.						
Benefit: Lumber that is moist (higher than 19 percent moisture content) has a much greater chance that it will foster the growth of mold in the cavity of the wall after it is covered by drywall and other materials. Moist lumber can shrink slightly as it dries out, potentially causing cracks in drywall and other materials that have been attached to the framing lumber.						
Verification: EA Rater or a third-party uses a moisture meter to measure the moisture content (MC) of framing and sheathing lumber. The most important locations to test are framing members and subfloors around window and door openings, base plates, as well as larger dimension lumber (beams and posts). Builder will be notified if any areas do not meet the requirement of 19%. Testing will be conducted at five (5) window areas and an additional fifteen (15) random areas within the house.						

7.1.2	Energy	Health	Land	Materials	Water
Air Filter: MERV 8 or higher	0	1/2	0	0	0

Description: Air filters are given a Minimum Efficiency Reporting Value (MERV) rating number, which describes a filter's ability to trap particles ranging in size from 3.0 microns to 10.0 microns. Points are awarded in one of two ranges of filter efficiencies. Filters with MERV ratings up to 12 receive one Health point, while filters with MERV ratings of 13 or higher receive 2 Health points.

Description:

Residential filters commonly have MERV ratings of 1-12 but can go as high as MERV 16. The higher the MERV rating, the more efficient the filter is, and the more particles it can filter.

- A MERV rating of 8 means the filter is about 35 percent efficient at capturing the measured particles.
- A MERV rating of 9 means the filter is about 40 percent efficient at capturing the measured particles.
- A MERV rating of 12 means the filter is about 75 percent minimum efficient at capturing the measured particles.

MERV is an industry standard rating, so it can be used to compare filters made by different companies. Some manufacturers also have their own rating systems.

Filters must be matched to air handling equipment.

Benefit: Most furnaces contain filters which collect particulates from the air and protect the furnace from excessive wear. However, standard fiberglass filters remove less than 8 percent of airborne dust. (http://www.warmair.com/html/air_filters.htm, 26 Feb 02) Pleated media filters remove significantly more contamination than standard fiberglass filters and are as much as 95 percent effective. (http://www.ces.ncsu.edu/depts/fcs/housing/docs/fcs3606.html 26 Feb 02). Better filters remove more particulate matter, pollen, dust, and mold before they enter the building. Installing pleated media filters in the furnace can improve the quality of indoor air in your heating system. However, installing improved filters requires attention during duct design due to the added static pressure required to pull air through them.

Verification: EA Rater will visually inspect the filter. Record the model number of the filter rack on the EA inspection form and verify that the appropriate filter is in place. Also check for filter loading and construction dust and recommend changing the filter if necessary. The MERV rating is often printed on the filter itself. Additional documentation (product literature, invoice, or spec. sheet) from the HVAC contractor or the builder will often be required.

7.1.3 Accountability Form	Energy	Health	Land	Materials	Water
Low VOC Sealants/Caulking: 50 gpl or less	0	1/2	0	0	0

Description: Use only low-VOC sealants/caulking which outgasses less volatile chemicals than conventional adhesives. The performance of low-VOC caulking is similar to conventional products.

Benefit: Unlike conventional products, low-VOC sealants/caulks release fewer solvents during the curing process, protecting indoor air quality. Low-VOC sealants/caulks help protect workers who make them and those that use them during construction. Conventional caulks require hazardous solvents during clean up, such as acetone, turpentine, xylene and paint thinner. Using low-VOC sealants/caulking helps maintain a healthy living environment, and is environmentally responsible because it avoids much of the ecological costs of using conventional sealants.

Verification: EA Rater will check the VOC rating on containers found at the job site. If containers are not present, the builder must provide documentation in the form of a receipt showing purchase of a particular product. If there is any doubt that a particular product meets a specific VOC rating, the builder must provide an MSDS.

7.1.4	Accountability Form		Energy	Health	Land	Materials	Water
Low VOC Multipurpose Construction Adhesives: VOC content 70 gpl or less			0	1	0	0	0
Description: Low-VOC multipurpose construction adhesives release fewer volatile chemicals than conventional adhesives. The performance of low-VOC adhesives is similar to conventional products.							
Benefit: Unlike conventional products, low-VOC construction adhesives release fewer solvents during the curing process, protecting indoor air quality. Low-VOC construction adhesive helps protect workers who make them and those that use them during construction. Conventional construction adhesive requires hazardous solvents during clean up, such as acetone, turpentine, xylene and paint thinner. Using low-VOC construction adhesives helps maintain a healthy living environment, and is environmentally responsible because it avoids much of the ecological costs of using conventional construction adhesives.							
Verification: EA Rater will check the VOC rating on containers found at the job site. If containers are not present, the builder must provide documentation in the form of a receipt showing purchase of a particular product. If there is any doubt that a particular product meets a specific VOC rating, the builder must provide an MSDS.							

7.1.5	Accountability Form		Energy	Health	Land	Materials	Water
Low VOC Indoor Carpet Adhesive or Pad Adhesive: VOC content 50 gpl or less			0	1	0	0	0
Description: Low-VOC multipurpose construction adhesives release fewer volatile chemicals than conventional adhesives. The performance of low-VOC adhesives is similar to conventional products.							
Benefit: Unlike conventional products, low-VOC adhesives release fewer solvents during the curing process, protecting indoor air quality. Low-VOC adhesive helps protect workers who make them and those that use them during construction. Conventional adhesive requires hazardous solvents during clean up, such as acetone, turpentine, xylene and paint thinner. Using low-VOC adhesives helps maintain a healthy living environment, and is environmentally responsible because it avoids much of the ecological costs of using conventional construction adhesives.							
Verification: EA Rater will check the VOC rating on containers found at the job site. If containers are not present, the builder must provide documentation in the form of a receipt showing purchase of a particular product. If there is any doubt that a particular product meets a specific VOC rating, the builder must provide an MSDS.							

7.2 Interior Surface Coatings

7.2.1		Required Measure	Energy	Health	Land	Materials	Water
Wall & Ceiling Latex Paint: Low VOC (150 grams per liter)			0	0	0	0	0
Description: Low-VOC paints are water-based with fewer indoor air quality impacts than solvent-based paints. For most applications there is little or no difference in performance.							
Benefit: Low-VOC paint reduces harmful substances in the air for home occupants and workers. See definitions for more information.							
Verification: EA Rater will visually check the VOC rating on containers found at the job site. In subdivisions, it is acceptable to look at nearby jobs to locate containers. The builder can provide documentation in the form of a receipt showing purchase of a particular product. If there is any doubt that a particular product meets a specific VOC rating, the builder must provide an MSDS.							

7.2.2		Energy	Health	Land	Materials	Water
Wall & Ceiling Latex Paint: Low VOC (<50 grams per liter)		0	1	0	0	0
Description: Low-VOC paints are water-based with fewer indoor air quality impacts than solvent-based paints. For most applications there is little or no difference in performance.						
Benefit: Low-VOC paint reduces harmful substances in the air for home occupants and workers. See definitions for more information.						
Verification: EA Rater will visually check the VOC rating on containers found at the job site. In subdivisions, it is acceptable to look at nearby jobs to locate containers. The builder can provide documentation in the form of a receipt showing purchase of a particular product. If there is any doubt that a particular product meets a specific VOC rating, the builder must provide an MSDS.						

7.2.3		Energy	Health	Land	Materials	Water
Trim Paint: Low VOC (150 Grams per liter or less)		0	1	0	0	0
Description: Apply glossy trim paint with a VOC rating of 150 GPL or less.						
Benefit: Low-VOC paint reduces harmful substances in the air for home occupants and workers. See the glossary for more information.						
Verification: EA Rater will visually check the VOC rating on containers found at the job site. In subdivisions, it is acceptable to look at nearby jobs to locate containers. The builder can provide documentation in the form of a receipt showing purchase of a particular product. If there is any doubt that a particular product meets a specific VOC rating, the builder must provide an MSDS.						

7.2.4	Accountability Form	Energy	Health	Land	Materials	Water
Clear Wood Finish: Low VOC (550/350 grams per liter or less)		0	1/2	0	0	0
Description: Low-toxic and low-VOC clear sealers are alternatives to conventional solvent-based products such as lacquer, shellac, silicone, and linseed oil.						
Benefit: Low-VOC paint reduces harmful substances in the air for home occupants and workers. See the glossary for more information.						
Verification: EA Raters visually check the VOC rating on containers found at the job site. The builder can provide documentation in the form of a receipt showing purchase of a particular product. If there is doubt that a particular product meets a specific VOC rating, the builder must provide an MSDS.						

7.2.5	Energy	Health	Land	Materials	Water
Recycled Content Paint (min 50% post-consumer)	0	0	1	2	0
Description: Recycled latex paint is made from unused latex paint collected from households, government agencies, businesses, and painting contractors. New materials are sometimes added to improve the paint's consistency and make standard colors. Recycled paint can contain up to 100 percent post-consumer content. Points in this category are granted in addition to points for low-VOC.					
Benefit: Using recycled content latex paint offers a number of environmental and economic benefits. First, by incorporating used paint, it doesn't use space in hazardous waste facilities. Second, using recycled content products lowers the demand for limited new resources. Third, using recycled content paint reduces the embodied energy of a home and the amount of pollution that results from the extraction, transportation, and disposal of the materials necessary to build it. Fourth, recycled paint costs less than new paint. Finally, in addition to the environmental benefits of its recycled content, choosing paints with a low-VOC content also helps protect air quality both indoors and out.					
Verification: EA Raters visually check labels on containers found at the job site. The builder can provide documentation in the form of a receipt showing purchase of a particular product. In Oregon, Metro Paint is a well-recognized brand of recycled paint.					

8.0 Resource Efficient Building Materials

8.1 Locally Sourced Materials

8.1.1 Accountability Form	Energy	Health	Land	Materials	Water
Local Materials: Within 500 miles – 1 point each - up to 4 items	0	0	1/2/3/4	0	0

Description: To qualify for these points the raw materials must be extracted, refined, processed, and assembled within a 500 mile radius of the building site. One point is awarded for each item from the list below. The percentage of local material used in the building for that component is listed next to the item to earn the point.

All wood framing (walls, ceilings, and floors): 80 percent
Flooring: 100 percent of each application. For example, all wood flooring or all tile flooring.
Siding: 90 percent
Insulation: 100 percent cellulose or fiberglass
Wood window frames and sashes: 90 percent
Paint: 50 percent of material
Roofing material: 90 percent
Interior Doors: 90 percent
Interior Trim: 90 percent
Masonry: 50 percent
Other: (make a suggestion)

Benefit: Transportation increases the environmental impact of building products. Raw materials that originate and are processed within 500 miles of the building site are considered to be local materials. Local products also reflect bioregional architecture that helps the home fit with the landscape and local vernacular. Local materials also support local businesses.

Verification: In the Pacific Northwest most dimensional lumber can be assumed to be local. Manufactured products must contain local raw materials and be manufactured within the 500 mile radius. The builder should provide documentation for materials claimed to be local. Percentages are calculated by weight or volume, not cost.

8.1.2	Energy	Health	Land	Materials	Water
Cradle-to-Cradle Certification: Product receives minimum Silver certification	0	0	1/2/3/4	1/2/3/4	0

Description: Cradle-to-Cradle is a system where products are designed based on patterns found in nature, eliminating the concept of waste entirely and using the product at the end of its life cycle as feed stock for either nature or other human industrial systems.

Points are determined by the number of "built in" products (I.E. Carpet, paint, etc…) that have received the Cradle-to-Cradle Certification designation. Currently only one organization is certifying products. A total of up to four (4) products can receive this designation and be awarded Earth Advantage points. A list of certified products is available at the Cradle-to-Cradle website, www.c2ccertified.com .

Benefit: Products that receive this designation have a reduced environmental impact because they do not enter the waste stream and end up in landfills. These products also reduce the amount of new material used in assembling building products, lowering the impact on extraction and or harvesting requirements.

While this certification effort is fairly new and not very many products have yet received Cradle-to-Cradle Certification, the Earth Advantage team feels that the inclusion of this measure in our program helps raise the awareness of this important concept on how products are designed, built, and eventually recycled.

Verification: Builder team presents documentation showing the Cradle-to-Cradle certification for each product submitted for approval to the EA Rater.

8.2 Cabinets / Countertops

8.2.1 Accountability Form	Energy	Health	Land	Materials	Water
Plywood: Base cabinet formaldehyde free	0	0	0	1	0
Description: Use exterior grade plywood for the construction of cabinet carcasses, shelves and/or closet storage. Plywood is granted one Materials category point for durability.					
Benefit: Exterior grade plywood is made with moisture-resistant adhesive that lasts longer than typical particle board.					
Verification: Cabinet supplier or builder must provide an Accountability Form indicating the type of material used.					

8.2.2 Accountability Form	Energy	Health	Land	Materials	Water
Urea-Formaldehyde Free: Shelves and/or cabinets	0	1/2	0	0	0
Description: Storage shelving and cabinet cases are made from urea-formaldehyde free particleboard or MDF. Points are awarded if all cabinetry in kitchens and bathrooms qualify as formaldehyde free. An additional point is awarded under the Health category if closet shelving and storage is also made with this material. Garage storage is not included.					
Benefit: The most common material for a cabinet carcass is interior grade particleboard, which contains a volatile urea-formaldehyde binder. Alternative binders, such as exterior grade phenol-formaldehyde, methyl-diisocyanate (MDI) and newer soy-based binders do not contain volatile formaldehyde. Cabinet makers who use one of these alternatives are improving the indoor air quality of the home. Exposure to formaldehyde is unhealthy (see Glossary), so points are awarded for reducing the presence of materials containing formaldehyde.					
Verification: Builder or responsible party must sign an Accountability Form attesting that the product is formaldehyde free.					

8.2.3 Accountability Form	Energy	Health	Land	Materials	Water
Recycled Content Countertops: 25% post-consumer waste	0	0	1	1	0
Description: A variety of countertop materials are now available that contain post-consumer recycled content. This might be stone chips, paper, minerals, or fly-ash. The material must have 25 percent post-consumer recycled content.					
Benefit: Countertops are a very prominent feature in most homes. Typical plastic laminate materials are easily worn, stained and scarred, needing to be replaced frequently. To gain points under this measure, countertop material must contain 25 percent post-consumer recycled content. Examples of products that meet this measure would be certain brands of porcelain tile, Richlite, Paperstone, glass, terrazzo, wood, bio-composites and concrete counters containing fly-ash.					
Verification: EA Rater can visually identify known products. If the type of material is not known, the builder must provide product literature or an Accountability Form that specifies product name and the amount of recycled content. Hard surface materials, such as stone, tile, and solid surfaces are assumed to meet the durability requirement.					

8.2.4	Energy	Health	Land	Materials	Water
Built-in Recycling Center: Min. 2 major receptacles	0	0	1	0	0
Description: Install a built-in space located conveniently near where recyclable materials are generated, such as in the kitchen. The measure requires that dedicated bins or receptacles be present that are clearly distinct from household waste receptacles.					
Benefit: This measure rewards building a designated recycling center. Doing so avoids the messy clutter of loose cans and paper by providing a neat, orderly place for all recyclables. Placing it with easy access to the kitchen encourages everyone to use it.					
Verification: EA Rater will verify the presence of at least two bins or receptacles dedicated to recyclable materials.					

8.2.5	Required Measure	Energy	Health	Land	Materials	Water
Project Wide Recycling Center		0	0	0	0	0
Description: Incorporate a project wide recycling center in a central location to facilitate recycling efforts for tenants. The measure requires that dedicated bins or receptacles be present that are clearly distinct from household waste receptacles.						
Benefit: This measure rewards building a designated recycling center. Placing it with easy access to the units encourages everyone to use it.						
Verification: EA Rater will verify the presence of the project wide recycling center.						

8.3 Millwork and Interior Trim

8.3.1	Accountability Form	Energy	Health	Land	Materials	Water
Engineered Wood Trim: finger-jointed		0	0	0	1	0
Description: Finger-jointed wood trim is made by taking short pieces of wood and edge-gluing them together for a straight and knot-free product.						
Benefit: Engineered trim makes efficient use of wood that otherwise would have been disposed of as waste. Finger-jointed products are also generally straighter and stronger than solid wood. When installing this product, nails seat better than with other engineered products. Finger-jointed wood products offer similar product performance.						
Verification: The finger-jointed trim may need an Accountability Form signed by the builder or responsible party if it cannot be visually verified by the EA Rater.						

8.3.2		Energy	Health	Land	Materials	Water
Urea-Formaldehyde Free Trim Material		0	1	0	0	0
Description: Trim material can be a significant source of urea-formaldehyde when adhesive binders are used. This measure recognizes trim materials that don't contain formaldehyde. One obvious material is solid wood trim. Engineered products might also use binders that do not contain formaldehyde or formaldehyde formulas that are not water-soluble and therefore do not escape the product.						
Benefit: Formaldehyde is a serious irritant and probably carcinogenic. (See glossary for more detail.)						
Verification: EA Rater will visually identify solid wood trim. Some MDF may have a Green Guard designation as formaldehyde-free. If visual verification is not possible, the builder must supply product literature or an Accountability Form to the EA Rater.						

8.4 Finished Flooring

8.4.1	Accountability Form	Energy	Health	Land	Materials	Water
FSC Certified Flooring / Reclaimed Flooring: 20% or greater of floor area		0	0	2	0/1	0
Description: Solid wood flooring or laminate flooring made from FSC certified wood. Reclaimed wood floor also satisfies this measure and receives one Materials point. This material must cover at least 20 percent of the home's total floor area.						
Benefit: Wood is a renewable resource if proper forest management practices are followed. This measure recognizes FSC certified wood flooring. It can be either solid wood or laminate with FSC content. Reclaimed wood floors also satisfy this measure because they avoid the need to harvest timber. (See glossary for more information on FSC.)						
Verification: Builder or flooring supplier will provide Accountability Form that shows the product's brand name. EA Rater can visually identify reclaimed wood flooring by its aged appearance or the presence of nail holes. Floor area can be visually estimated or measured.						

8.4.2	Energy	Health	Land	Materials	Water
Hard Surface: Finished Floor (25-50 percent/51-75 percent/76-100 percent)	0	1/2/3	0	1/2/3	0
Description: Install hard surface floor instead of wall-to-wall carpet.					
Benefit: Most carpet contains a number of harmful chemicals resulting from its manufacture, such as formaldehyde and VOC's. It also harbors organisms such as dust mites and mold that can affect health. Carpet collects household dust and debris, such as human skin, pet dander, along with food and drink residue that support these organisms. In addition, carpet wears out quickly, contributing to solid waste. Hard surface floors avoid all of these issues. They are more durable and longer lasting. Hard floors are easier to clean and less prone to promote the growth of harmful organisms.					
Verification: EA Rater will visually identify areas with hard surface flooring and estimate the percentage needed for the appropriate point allocation. Exact measurements may be required if a visual estimate cannot reliably place the percent of floor area into a specific size class.					

8.4.3	Energy	Health	Land	Materials	Water
Alternative Flooring: Finished slab on grade and others	0	0	0	1	0
Description: One way to reduce materials is to choose structural elements that also serve as the finish layer. One example would be a slab-on-grade floor that is colored to provide an attractive finished surface. Other examples include earthen floors and plywood or OSB structural subfloor that is highly finished. The main requirement is that at least one layer that would occur in a typical floor assembly has been eliminated.					
Benefit: This measure recognizes efforts to improve the resource efficiency of floor systems by reducing materials. Typical floor systems have wood framing, structural subfloor, and one or more finish layers (underlayment, pad, and carpet, for example). Fewer resources are used by eliminating entire layers. This measure is most often accomplished by fashioning a structural component to serve as an aesthetic function as well.					
Verification: EA Rater will visually inspect the floor.					

8.4.4 **Accountability Form**	Energy	Health	Land	Materials	Water
Tile and/or Carpet: Post consumer recycled content (20-50 percent / 51-100 percent)	0	0	1/2	1/2	0
Description: Recycled-content in fibers and carpet backing may be comprised of post-industrial waste, carpet manufacturing waste product, post consumer polyethylene, and post-consumer waste from carpet. Tile must be at least 25% post-consumer recycled content Tile. Points are awarded for different amounts of floor area covered by recycled content tile and/or carpet.					
Benefit: Using recycled content removes a significant source of solid waste from landfills and reduces the use of new resources, primarily petroleum.					
Verification: Provide Accountability Form that identifies the tile and/or carpet manufacturer, product brand, whether content is post-consumer or post-industrial, and the percentage of recycled content.					

8.4.5/ 8.4.6/ 8.4.9 Accountability Form	Energy	Health	Land	Materials	Water
8.4.5 Carpet: Carpet & Rug Institute (CRI) Green Label = 1pt, or **8.4.6 Carpet Pad:** Carpet Rug Institute Green Label = 1pt or **Carpet & Pad:** Carpet & Rug Institute (CRI) Green Label = 2pt; Green Label Plus = 3pts.	0	1/1/2/3	0	0	0
Description: Carpet and/or Carpet Pad carrying the Carpet and Rug Institute's (CRI) Green Label or Green Label Plus designation receive these points in addition to any other carpet points. For a list of qualifying products, visit CRI's website (www.carpet-rug.org).					
Benefit: Carpet and/or Pad: Carpet manufacturers submit their products to an independent laboratory that tests the carpet against established criteria for harmful emissions. The label is the industry's assurance that the product is a responsible, low-emitting carpet.					
Verification: Provide Accountability Form showing the product manufacturer, product name and CRI number, which can be verified on the CRI website.					

8.4.7 Accountability Form	Energy	Health	Land	Materials	Water
No Added Urea-Formaldehyde Underlayment: OSB, MDF, Exterior grade plywood	0	1	0	0	0
Description: If an additional layer of substrate is required under finish flooring, use urea-formaldehyde free oriented strand board (OSB), plywood, or medium density fiberboard (MDF). Exterior grade products are also acceptable due to the low emission of formaldehyde. Measure is achieved if underlayment is eliminated and finish flooring or carpet and pad are placed directly on exterior-grade structural subfloor.					
Benefit: Interior-grade underlayment that include added urea-formaldehyde binder emits significant quantities of formaldehyde which is unhealthy for occupants. No Added Formaldehyde MDF and ag-fiber board are available.					
Verification: Provide Accountability Form.					

8.4.8	Energy	Health	Land	Materials	Water
Renewable Materials: Linoleum, Cork or Bamboo 5-20% / 21-100%	0	0	0	1/2	0
Description: Materials that qualify for natural flooring credit include natural linoleum (not vinyl), cork, and bamboo. Points are awarded based on the percentage of the total flooring area covered. 25% post-consumer recycled content Tile, will also be accepted.					
Benefit: Linoleum is a resilient flooring product made of linseed oil, pine rosin, sawdust, cork dust, limestone, natural pigments, and jute (backing). Cork is the outer bark of an oak tree, Quercus Suber, which is grown primarily in the Mediterranean region. Bamboo is a rapidly growing grass originating primarily in Asia. All these products originate outside the United States, so there are some transportation impacts. However, less processing is required than petroleum-based flooring materials. These materials are very durable and will last for decades with minimal care. They are even biodegradable. If flooring adhesive is required, a low-toxic adhesive is recommended to follow through on the environmental benefits of the flooring.					
Verification: EA Raters will visually identify linoleum, cork, or bamboo in the field and assess the area coverage.					

9.0 Water Efficiency and Landscaping

Water efficiency has many benefits. Lowering the volume of hot water consumed in homes also lowers the amount of energy needed for heating the water. Heating less water requires less energy. Similarly, using less water limits the energy and pollution associated with treating it and transporting it to homes. Finally, using less water creates less sewage, which reduces the energy and expense of pumping and treating it. Sewer fees are often based on water use and would be reduced, as well. More information on water efficient products is available at the Environmental Protection Agency's Water Sense website (www.epa.gov/watersense/). The savings in energy use, water usage, and sewage volume all result in a significant cost savings to individuals and communities.

9.1 Indoor Water

9.1.1	Required Measure	Energy	Health	Land	Materials	Water
Water Efficient Showerheads: 2 gpm or less or Water Sense label (one showerhead per stall)		1	0	0	0	0
Description: Install showerheads limiting water flow to a maximum of 2 gallons per minute (gpm) or use Water Sense labeled products. Only one shower head can be installed in each shower enclosure in order to claim this water measure.						
Benefit: Showering consumes a significant amount of water, accounting for about 17 percent of indoor water use.						
Verification: EA Rater will read flow rates stamped on showerhead or measure the flow rate directly. Water Sense labeled products can be identified on the EPA website.						

9.1.2		Energy	Health	Land	Materials	Water
Efficient Lavatory Faucet: <=1.5 / 0.5 gpm		1	0	0	0	0
Description: Install **all** lavatory faucets with aerators which limit flow to 1.5 gallons per minute or use Water Sense labeled products.						
Benefit: See introduction to Section 9 above.						
Verification: EA Rater will read flow rates stamped on faucet aerators or measure the flow rate directly. Water Sense labeled products can be identified on the EPA website.						

9.1.3		Energy	Health	Land	Materials	Water
Efficient Kitchen Faucet: 1.5 gpm or less		1	0	0	0	0
Description: Install kitchen faucet with aerators which limit flow to 1.5 gallons per minute or use Water Sense labeled products.						
Benefit: See introduction to Section 9 above.						
Verification: EA Rater will read flow rates stamped on faucet aerators or measure the flow rate directly. Water Sense labeled products can be identified on the EPA website.						

9.1.4	Energy	Health	Land	Materials	Water
High-Efficiency Toilet: WaterSense qualified toilet – 1.28 gpf	0	0	0	0	3
Description: Water Sense qualified toilets (1.28 gpf) or dual flush toilets meet the requirement. Dual flush toilets use two flush modes. The first mode uses the full 1.6 gallons per flush for flushing solid waste; the second mode uses fewer gallons per flush (usually 0.6 - 1.1 gallon) for flushing liquid waste. Another method of achieving lower flush volumes is a pressure assist model. All toilets in the home must meet this spec to achieve measure points.					
Benefit: Toilets consume more clean water than any other plumbing fixture, accounting for about 30 percent of indoor water use.					
Verification: EA Rater will read flow rates stamped on the toilet and verify that all toilets meet this spec. Water Sense labeled products can be identified on the EPA website.					

9.1.5	Energy	Health	Land	Materials	Water
Rainwater Collected: For non-potable indoor water use	0	0	1	0	4
Description: Rainwater is collected from a roof and stored for use in the home. Typically the captured rainwater is used to flush toilets or wash laundry, but not for showers or sinks. Using rainwater for domestic uses can significantly reduce total household water consumption. [Rainwater collection for potable use will be considered under the Innovative Measures Section.]					
Benefit: The collection of rainwater reduces the amount of potable water required to operate a home. By requiring less water it limits the energy and pollution associated with filtering and transporting water to your home. Another benefit is less stormwater leaving the site which reduces flooding and erosion in natural systems.					
Verification: EA Rater will visually identify the equipment for collecting, storing, and distributing rainwater to specific plumbing fixtures.					

9.2 Irrigation

9.2.1 Accountability Form	Energy	Health	Land	Materials	Water
Low-volume Irrigation System	0	0	0	0	2
Description: Low-volume irrigation is the slow application of water to a plant's root zone. It is a form of micro-irrigation that includes drip and low volume irrigation systems.					
Benefit: Up to 50 percent of municipal water use in the summer is for outdoor irrigation. Low-volume irrigation systems can use 75 percent less water than sprinkler systems. Installing a low-volume system requires the thoughtful use of drought-tolerant and low-water plants appropriate to your bio-region. Appropriate plants have a higher success rate and generally require fewer fertilizers and other artificial aids to establish themselves.					
Verification: Project team to provide accountability form attesting to irrigation compliance with measure.					

9.2.2 Accountability Form Required Measure	Energy	Health	Land	Materials	Water
Hydro Zoning: Grouping of plants and lawn for watering	0	0	0	0	0
Description: Separate watering zones are established for lawn and plants.					
Benefit: An irrigation system that has been zoned to provide separate watering patterns for shrubs and lawn will use less water than non-zoned systems. Because lawn requires more water to survive, the over watering of plants will occur if separate systems are not installed.					
Verification: Project team to provide accountability form attesting to hydro zoning compliance with measure.					

9.2.3 Accountability Form	Energy	Health	Land	Materials	Water
Weather Based Irrigation Controller	0	0	0	0	3
Description: Weather based irrigation controllers use information about plant water demand to regulate irrigation and avoid watering when there has been adequate rainfall. Satellite data, onsite weather stations, and soil sensors may be considered for satisfying measure.					
Benefit: The amount of water plants need is determined by temperature, relative humidity, and soil moisture. The typical irrigation timer knows nothing about these factors. A smart irrigation control is a simple, economical and useful tool in preventing irrigation that would be wasteful. Over watering of landscape is common without the use of climate sensing/tracking systems. Local rain episodes are acknowledged by these systems to account for natural watering of landscape.					
Verification: Project teams to provide an accountability form attesting to installation of weather based irrigation controller programed to comply with this measure.					

9.2.4 Accountability Form	Energy	Health	Land	Materials	Water
No Permanent Irrigation Installed:	0	0	0	1	4
Description: Designing the landscape plant selection to minimize watering needs is required for the success of this measure. This may be accomplished through the use of drought tolerant plants or ground-cover. Temporary irrigation (up to 3 years) may be installed to help plants get established. Temporary systems need to be installed so that they may be easily removed after landscape is established.					
Benefit: With successful implementation, all permanent landscape water requirements are eliminated.					
Verification: Landscaper will provide an Accountability Form indicating that plant selection and other measures will ensure that no additional irrigation will be needed.					

9.3 Landscaping

9.3.1 Accountability Form	Energy	Health	Land	Materials	Water
Organic Matter: 2" Added to Soil and Tilled to 6"- 8" Depth	0	0	1	0	3
Description: At final grading applying 2-3 inches of amendments and work it into the soil to the entire landscape area to a depth of approximately 6 to 8 inches. Peat moss, Douglas Fir, or cedar chips are not recommended because they draw water from the soil and can negatively affect soil PH and nitrogen levels. **It is recommended that a soil test be conducted on the soil to determine what mix of amendments should be used.**					
Benefit: By adding soil amendments and tilling the soil, plant and grass root systems will get established quicker and deeper in the soil. Amendments will also reduce the amount of fertilizers required to meet the plant's nutritional requirements. Proven benefits are reduced summer irrigation demand, healthier plants, and reduced stormwater run-off.					
Verification: Project team s to provide an accountability form attesting to amendments and soil preparation to comply with this measure.					

9.3.2 Accountability Form	Energy	Health	Land	Materials	Water
Test Soil: Implement recommendations	0	0	2	0	2
Description: Soil test is performed by soil testing lab and recommendations are implemented with appropriate soil amendments to entire landscaped area. Soil samples should be taken from a variety of areas throughout the site. Determine appropriate soil amendments and applying in accordance with Organic Matter measure 9.3.1.					
Benefit: Soil tests will ensure that nutritional requirements of landscape plants are addressed. This will help plants to become established quickly. Over the long term the plants will use less water and require less fertilizer to remain healthy.					
Verification: Landscaper will provide an Accountability Form attesting to testing and implementation of recommendations according to measure requirements.					

9.3.3 Accountability Form	Energy	Health	Land	Materials	Water
Low Water-Use Plants: Drought Tolerant – 50 percent/80 percent	0	0	0	0	1/2
Description: Select plants whose needs (sun/shade, moisture, drainage, etc.) are appropriate for the site. Exclude local or state agency's invasive or nuisance plants.					
Benefit: Low water-use plants inherently require little supplemental watering (native or adapted plants) and/or those that can be established within 1-3 years where they no longer require regular supplemental watering. Such plants have a higher success rate and generally require fewer fertilizers and artificial aids like pesticides to establish themselves.					
Verification: Landscaper will provide an Accountability Form as well as a planting plan and materials list that includes descriptions of low water-use plants.					

9.3.4 Accountability Form	Energy	Health	Land	Materials	Water
No Lawn or Low Water-Use Lawn: 5-15% / great than 15% total site area.	0	0	0	0	2
Description: Do not install any lawn or install lawn that is low water use in landscaped, vegetated site areas. Non-lawn planted areas must have at least 80% low water-use plants as per measure 9.3.3. 1 pt = 5-15% of total site area. 2pts = greater than 15% of total site area. Low water use lawn refers to a balanced blend of grass seeds that require less water once they are established. Typically low-water use species are seeded instead of applied as rolled turf, which is rarely grown using water grass seeds.					
Benefit: One recommended mix is composed of fescue grasses. Fescue grasses have deeper roots systems that require less water to keep them alive/green. Most rolled turf is seeded using winter rye grass which requires large amounts of water and fertilizers to keep it green. Once an eco-lawn is established it should only need to be watered once per week.					
Verification: Landscaper will provide an Accountability Form that includes percentage or total site area meeting this measure and descriptions of seed mixes used for turf.					

9.3.5	Energy	Health	Land	Materials	Water
One Tree per 1000 sq. ft. of Landscape	0	0	1	0	0
Description: Plant at least one tree for each 1,000 sq. ft. of vegetated landscaped area. The number of trees planted or on site is determined by adding up all of the area to be developed for landscaping and dividing it by 1000 to determine the number of trees to claim this measure. Trees meeting this measure must be a minimum of 2" caliper.					
Benefit: Trees contribute significantly to the economic and ecological value of a site. In addition to their physical beauty, trees provide wildlife habitat and they help manage the flow of stormwater. They clean the air, and they protect critical features such as stream buffers or hillsides. In addition, properly trimmed and positioned trees protect the building from the cold winter winds and the hot summer sun, reducing heating and cooling bills. Select trees appropriate for the climate and are not invasive or nuisance trees.					
Verification: EA Rater will count the number of newly planted trees and estimate the area of developed landscape in order to calculate the 1 tree per 1,000 sq. feet target.					

10.0 Solar Measures

10.1 Solar Thermal and Photovoltaic

10.1.3	Energy	Health	Land	Materials	Water
Photovoltaic (PV) Systems	Model	0	0	0	0
Description: Photovoltaic (PV) panels convert the sun's energy to electricity. PV systems can be connected to the utility distribution system (grid-tied) or off the grid. Points will be calculated as part of the energy model.					
Benefit: PV Systems and other renewable power systems offset energy otherwise generated by carbon-emitting, fossil-fuel sources of power. Onsite renewables have the added advantage of no "line loss" to get the energy to the point of use.					
Verification: EA Rater will identify the PV system components.					

10.1.2	Energy	Health	Land	Materials	Water
Solar Ready for Photovoltaic: Pre-wired or conduit in place for future photovoltaic hookup	0	0	0	1	0
Description: Even if a photovoltaic system is not installed at the time of construction, one can be added later. Proper planning will increase system production and improve the aesthetic fit with the building. Follow the installation requirements of EPA's Renewable Energy Ready Homes to meeting this measure. Project team should also consider how to optimize solar access during the design phase.					
Benefit: Planning the building to accommodate a PV system will reduce the disruption associated with installing one later. This can mean fewer materials, less demolition waste, and better aesthetic integration with the building's architecture.					
Verification: EA Rater will visually inspect that the project meets the EPA requirements.					

10.1.3	Energy	Health	Land	Materials	Water
Solar Water Heater System (Solar Thermal)	Model	0	0	0	0
Description: Install a solar water heater. Points will be awarded based on energy model. A solar water heater consists of a solar panel facing south or within 30° of south. A collection fluid (water or anti-freeze) is heated in the collector and circulates to a storage tank. The pre-heated water from that tank flows into the main water heater, which allows the primary tank to use less energy to heat the water.					
Benefit: Solar water heaters have been proven over time and are relatively simple. Water heating is the second largest use of energy by a typical household, so reducing water heating has a major impact on overall household energy use.					
Verification: EA Rater will visually verify the presence of system components.					

10.1.4	Energy	Health	Land	Materials	Water
Solar Ready Water Heater: Pre-plumbed piping for future hookup	0	0	0	2	0
Description: Installing the water lines to serve a solar water heater during construction so that a complete system can be installed later. Follow the installation requirements of EPA's Renewable Energy Ready Homes to meeting this measure. Project team should also consider how to optimize solar access and additional structural loads for a future system during the design phase.					
Benefit: Pre-plumbing reduces the cost to retrofit the building for solar water heat panels in the future. Pre-plumbing also reduces the potential waste of materials during the retrofit process over installing at the time of building construction.					
Verification: EA Rater will visually inspect that the project meets the EPA requirements.					

11.0 Bonus and Innovative New Measures

11.1 Innovative new measures: Points determined by Earth Advantage staff analysis

11.1.1 Accountability Form	Energy	Health	Land	Materials	Water
Green Cleaning Products and Methods: Green Guard products used on project during construction cleanup	0	1	0	0	0
Description: The builder's cleaning crew will use Green Guard or equivalent labeled cleaning products during the construction and the final preparation of the house for display or home owner move-in. See the Green Guard website for more information (www.greenguard.org).					
Benefit: Cleaning products can contain a number of chemicals that can cause lung and skin irritations and possibly serious health problems. By using more benign cleaning products, workers will be exposed to fewer irritants on the job. This will also reduce the potential for contaminating the home with toxic cleaning materials.					
Verification: Builder will provide an Accountability Form attesting to the cleaning products on the job site.					

11.1.2 Accountability Form	Energy	Health	Land	Materials	Water
Occupant Guide	0	1	0	1	0
Description: The guidebook is designed to serve as a reference tool to assist occupants with proper care, use and understanding of their Earth Advantage Certified Home. It should be contained in a binder, which includes general care, and maintenance of appliances, approved cleaning products, water saving and energy savings ideas. It must also contain a section on the value and use of ventilation controls as well as list specific features of the Earth Advantage program.					
Benefit: Education is a fundamental aspect of encouraging tenants and staff to use the newly installed sustainable technology most effectively. If tenants do not understand why it is important for them to reduce their energy use or how the technology works					
Verification: Responsible Party will complete Accountability Form taking responsibility for the implementation of the appropriate measure. EA and/or Rater reserve right to review documentation and award points.					

11.1.3 Accountability Form	Energy	Health	Land	Materials	Water
Building Manager Manual	1	0	0	0	1
Description: The guidebook is designed to serve as a reference tool to assist building managers at answering occupant's inquiry's regarding proper care, use and understanding of their Earth Advantage Certified Building. It should be contained in a binder, which includes general care, and maintenance of appliances, approved cleaning products, water saving and energy savings ideas. It must also contain a section on the value and use of ventilation controls as well as list specific features of the Earth Advantage program.					
Benefit: Education is a fundamental aspect of encouraging tenants and staff to use the newly installed sustainable technology most effectively. If tenants do not understand why it is important for them to reduce their energy use or how the technology works, they will not change their habits or use the technology.					
Verification: Responsible Party will complete Accountability Form taking responsibility for the implementation of the appropriate measure. EA and/or Rater reserve right to review documentation and award points.					

11.1.4			Energy	Health	Land	Materials	Water
Wall Mock-Up: Provide a mock-up prior to installing WRB and siding/cladding			0	0	0	2	0
Description: Build a sample portion of the exterior wall including siding/cladding and trim systems. Include typical details at weather-resistive barrier (WRB), windows, and corners. It is recommended to include parapet or coping detail(s) for walls that do not have roof overhangs. Mock-up shall be built prior to installation of WRB, window, door, roofing and siding/cladding systems and available on-site during construction of the exterior enclosure systems. Include rigid insulation if rigid insulation is installed on the exterior of the wall sheathing system.							
Benefit: Constructing a wall mock-up prior to the start of weather-resistive barrier, window, door, roofing and siding/cladding systems allows the project team to address potential detail issues prior to starting the work. The mock-up also helps illustrate proper detailing to the sub-contractors working on those trades.							
Verification: EA Rater will verify the presence of a wall mock-up on-site at rough inspection.							

11.1.5	Accountability Form		Energy	Health	Land	Materials	Water
Preoccupancy Flush.			0	2	0	0	0
Description: Flush each unit with fresh air, according to the following guidelines: a) flush prior to occupancy but after all phases of construction completed. b) flush the entire unit, keeping all interior doors open c) flush for 48 total hours; the hours may be nonconsecutive, if necessary. d) keep all windows open and run a fan (e.g. HVAC system fan) continuosly or flush the home will all HVAC fans and exhaust fans operating continuously at the highest flow rate. e) use additional fans to circulate air within the home.							
Benefit: Reduce occupant's exposure to indoor airborne contaminants through removal.							
Verification: Responsible Party to complete Accountability form and remit to Rater and/or EA.							

11.1.6			Energy	Health	Land	Materials	Water
Innovate New Measure: Propose a new measure			0	0	0	0	0
Description: Points will be determined by comparing the value of existing measures that are similar in nature. If the measure being proposed does not have any comparable Earth Advantage measure, then a study will need to be done to determine the point value of the proposed measure. A total of 2 innovative new measures can be awarded per project							
Benefit: TBD							
Verification: On site inspection to verify and/or Accountability Form.							

11.1.7			Energy	Health	Land	Materials	Water
Innovate New Measure: Propose a new measure			0	0	0	0	0
Description: Points will be determined by comparing the value of existing measures that are similar in nature. If the measure being proposed does not have any comparable Earth Advantage measure, then a study will need to be done to determine the point value of the proposed measure. A total of 2 innovative new measures can be awarded per project							
Benefit: TBD							
Verification: On site inspection to verify and/or Accountability Form.							