Site Management & Landscaping Practices

Protect Native Soil/ Minimize Disruption of Existing Plants/Trees

Definition: Soil is a valuable, living resource that should be protected. Through careful planning and construction practices, valuable soil as well as mature trees and other plants can be preserved.
Advantage: Plants thrive in healthy soil. Healthy soils can also significantly reduce storm runoff, reduce fertilizer and pesticide requirements, improve water quality and conserve irrigation water. Protection of existing mature landscape features helps prevent soil erosion, keeps the home and surrounding environment cooler in the summer, keeps plant waste out of landfills, preserves nature and adds value to the community.

Erosion Controls During Construction

Definition: Sedimentation of drainages, creeks, and rivers is not permitted under state and federal law. When the earth is disturbed to build, it makes the site vulnerable to erosion. Valuable nutrients can be lost, making landscaping a challenge. Use best practices in setting up erosion control devices surrounding the job site, and also utilize a driveway mat to protect the entrance to the site.
Advantage: Prevents culverts and drainage ways from clogging which reduces the chances for flooding. Erosion controls also have environmental benefits for aquatic species.

Excavated Topsoil Reused on Site

Definition: Excavated topsoil is the top 6-12 inches of earth that is removed for construction.
Advantage: By re-using the topsoil on site, it eliminates the need to truck in soil for landscaping.

Developments and Building Sites Located Close to Public Transportation

Site is within 1/4 Mile of Public Transportation or a public trail system will offer the residents or tenants an opportunity to utilize public transportation or alternative means of transportation without the need to use a vehicle.
Definition: Community centers are those existing areas that have commercial uses, services, activities, and public facilities.
Advantage: Americans drive an average of 24 miles to work every day. Constructing in areas that are within walking distance to public transportation and community centers allows homeowners to cut back on automobile and oil dependency.

Recycle Green Waste

Definition: Green waste is the clippings, shrubs, and any trees that have been cut, torn down, or pulled up for clearing the construction site.
Advantage: Re-use of organic material on site and keeps waste out of landfills

Recycled-Content Aggregate

Definition: Virgin aggregate comes from sources such as riverbeds and quarries where mining activities may disturb the environment. Recycled aggregate consists mainly of reused concrete and asphalt pavement that has been crushed to 3/4-inch.
Advantage: Protects sources of virgin aggregate and reuses a waste material keeping it out of the waste stream.

Concrete Curing Process Avoiding Cold Months

Definition: During the colder months throughout Routt County, the common practice has been to heat the concrete foundations for quicker curing times. This uses unnecessary amounts of energy that could be avoided if concrete were poured during the warmer months of the year or appropriate admixtures were used.
Advantage: Saves energy.

Pervious Materials

Definition: Pervious materials are those that permit the passage of water through the paved area to the soil below. These materials are used to replace asphalt or concrete paving for driveways, parking surfaces, patios and walkways. Stone, pavers, brick and gravel are all examples of pervious materials.
Advantage: Installing pervious materials in paved areas allows rainwater to penetrate the soil reducing demand on using potable water for irrigation.

Fossil Fueled Snowmelt System

Definition: A typical practice in Colorado mountain towns is a snowmelt system in the driveways and walkways to keep them clear of snow and ice. This practice uses excessive amounts of energy. Some homes can be found with running snowmelt systems even when the home is unoccupied for weeks at a time.
Advantage: Lowers energy costs and demand of local energy supply.

Engineered/Vegetated Swales to Filter Stormwater Runoff

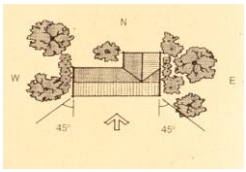
Definition: A vegetated swale is a broad, shallow channel with a dense stand of vegetation covering the side slopes and bottom. Swales serve as short-term retention areas providing water to vegetation and keeping storm water from flooding streets and roads.
Advantage: Allowing the water to percolate into the soil on site filters out pollutants and improves water quality, it promotes infiltration and keeps storm water from flooding streets and roads.

Use Fire-Safe Landscaping Techniques per Fire Wise

Definition: Routt County's hot, dry summer climate makes fire protection an important consideration for landscape design, especially because new home developments are increasingly located adjacent to areas that may be prone to wildfires. Simple landscaping design practices can help defend the homes by reducing fuel accumulation and interrupting the fire path. Understanding the topography, fuel, and local weather are critical to designing and maintaining a landscape that reduces the potential for loss to fire. Dense vegetation in hedges, screens or espaliers can be a fire hazard because the competition for limited water, nutrients and space results in a large amount of dry twiggy material.
Advantage: Fire-safe landscaping reduces the fire hazard and risk of harm to residents and firefighters, and protects valuable personal and community assets.

Passive Solar Design

Plant Shade Trees



Definition: In the hot summer months the sun is higher in the sky and therefore the east and west facing glazing gets the most solar gain when the sun is rising and setting. Shading these facades helps cut down on solar gain in the home and lowers the cooling load of the home. Augment the existing tree cover on the site, particularly to the west of the building, by planting Colorado native tree species that are drought tolerant and appropriate for the site's soil and microclimates. Plant a variety of deciduous trees and choose as large a tree as possible but be sure it will be allowed to grow to its natural shape and size in the allotted space. Choose trees with root systems that do not sucker or damage the pavement.
Advantage: Shade trees can create a microclimate that is up to 15°F cooler than the surrounding area, and can reduce summer air-conditioning costs by 25 to 40%. Peak electricity demand is at its highest during late afternoons in the summer; shade trees play an important role in reducing this demand. Trees provide numerous additional benefits including absorbing carbon dioxide, cleansing the air, creating habitats for birds and other creatures, providing play places for children, making neighborhood more beautiful and increasing property values.

Design Vegetative Wind Breaks or Channel as Appropriate to Local Conditions

Definition: Dense conifers to the north and west helps reduce wind speed of winter storms. They can also spread the wind around the house to reduce drafts and air infiltration inside. .
Advantage: Trees planted a distance from the house can be an effective buffer against winter winds, reducing heating loads and making the house more comfortable.

Xeriscaping

Addition of Compost to and Aeration of Soil

Definition: Compost is thriving with microorganisms – one teaspoon can have more than one billion beneficial microbes. Adding good quality compost before planting turf, annuals, perennials, trees and shrubs brings life to the soil and feeds existing soil organisms. Compost is effective in improving problem soils – in particular those that are compacted, heavy clay or sandy, poor in nutrients, or lead contamination. It is one of the most important practices for a healthy, thriving, landscape. After construction is over, it is important to till organic material into the soil of the site to ready it for landscaping.
Advantage: Compost fosters a divers, fertile, and disease suppressive soil. It can improve structure, aeration and water holding capacity. You and your clients may see both long and short-term benefits, including faster plant establishment, decreased fertilizer & pesticide use and lower water bills.

Compost from Local Landfills

Definition: Compost is high in nutrients and oxygen needed for healthy landscaping.
Advantage: Using compost from local landfills uses local waste and makes a beautiful site. It creates a demand for compost in the area, encouraging local homeowners and businesses to compost their biodegradable waste, keeping it out of the landfill.

Mulch All Planting Beds to the Greater of 2 Inches

Definition: Mulch is any organic material spread evenly over the surface of the soil. Organic materials, including chipped landscape debris, are preferable over inorganic materials because they supply nutrients over time. Nitrogen 'drag' is usually not a problem, even when woody materials are used.
Advantage: Mulch conserves water, enhances the growth of plants and the appearance of the landscape. It can also simplify your operations – thereby lowering your costs – by suppressing annual weed growth and reducing the need for trimming around trees and poles.

Construct Water-Efficient Landscapes

Definition: Conventional residential landscapes are often designed without regard for climate and soil conditions. Typically, they require high inputs of water and chemicals and produce excessive plant debris from pruning and mowing activities. Invasive plants used in landscaping often escape into natural areas, where they can spread rapidly, crowd out native plants, degrade wildlife habitat and increase the wildfire fuel load. Resource-efficient landscapes use plants and techniques that are better suited to local soils, wildlife, rainfall and climate.
Advantage: A diverse landscape of native species supports beneficial birds, bees and other insects and may resist disease and other pests better than one with little variety. Choosing and placing plants appropriately will also reduce the amount of plant debris sent to landfills and water used for irrigation.

Group Plants by Water Needs (Hydrozoning)

Definition: Different plants have different water requirements. Hydrozoning involves dividing the landscape into zones of low, medium and high water use to prevent over watering.

Advantage: Hydrozoning matches irrigation to the plants' water requirements, conserving water and fostering resistance to pests and disease. Plant mortality is also reduced, saving time and money.

Minimize Turf Areas in Landscape Installed by Builder

Definition: Lawns (or turf) are useful for recreation and relaxation, but installing large turf areas solely for their looks is resource inefficient, requiring frequent cutting, watering and application of fertilizers or other chemicals to stay green during Colorado's hot, dry summers. One study estimated that over a 20 year period, the cumulative cost of maintaining a prairie or a wetland totals $3,000 per acre versus $20,000 per acre for non-native turf grasses.

Advantage: Minimizing turf conserves water. If a 1,000-square-foot lawn needs 1 inch of water per week, reducing it to 500 square feet can save approximately 10,000 gallons of water per dry season. Minimizing turf reduces the need for mowing and removing grass clippings. Chemical use may also be decreased, thereby protecting the quality of local waterways and aquifers.

Install High-Efficiency Irrigation Systems

Definition: With increasing demand on supplies of fresh water, efficient landscaping irrigation is vital in Colorado. Efficient irrigation systems apply only the amount of water that the plants need, with little or no waste through runoff, over watering or misting. Drip and bubbler irrigation technologies apply water to the soil at the plant root zones at the rate the soil can absorb it, and are often more appropriate than overhead sprinklers in areas that are narrow, oddly shaped or densely planted, or in areas such as parking lots and medians. Low-flow sprinkler heads apply water uniformly and slowly. Smart controllers regulate the irrigation program based on weather or moisture sensors, historic data or a signal. A rain sensor overrides the system in the event of rainy weather.

Advantage: High efficiency irrigation systems minimize overspray and evaporation and reduce runoff, dramatically reducing landscape water use while preventing disease and minimizing weed growth that results from overwatering.

Site-rock Reclaimed

Definition: Rock that has been dug up or moved for construction can be beneficial in creating retaining walls or fenced off areas. In a dry climate like Colorado it makes sense to utilize rock wherever possible in the landscape to avoid potential fire hazards.

Advantage: Little or no cost for landscaping rock, use of local material cutting out the time, money, and labor to haul rock to the site.

50% Salvaged or Recycled-Content Materials for 50% of Non-Plant Landscape Elements

Definition: Salvaged materials are not remanufactured between uses. Finding and using them takes time and ingenuity but in the long run, salvaging conserves resources, can save money and adds interesting elements to the design. Recycled content materials such as plastic or composite lumber make very durable decks or raised garden beds that do not rot, crack or splinter.

Advantages: Lower maintenance costs can recover the added cost of plastic or composite lumber within a year. Waste can be reduced, natural resources conserved, markets for recycled products strengthened.

Renewable Energy

Sun Tempered Design

Definition: Sun tempering incorporates more windows on the south side of the home to reduce fossil fuel heating requirements without requiring extra thermal mass inside the home. Not to be confused with passive solar heating which includes shading and thermal mass.
Advantage: The sun's free energy can reduce the need for fossil fuels with little or no added cost.

Passive Solar Space Heating That Includes: A) South facing glazing, B) Properly sized overhangs and C) Installation of appropriately sized thermal mass for glazing

Definition: Passive solar space heating requires the appropriate balance of south-facing glazing, thermal mass and summer shading. Sizing the glazing properly allows the right amount of the suns heat into the home during the winter months. Shading blocks out the heat in the summer months. Installing appropriately sized thermal mass in the room adjacent to the south facing wall allows for the suns heat to be captured during the day and will be radiated back into the room at night when it is cooler.
Advantage: A passive solar home is the least expensive way to dramatically reduce heating costs. Heating costs can be reduced 20-50%. Points are awarded based on the percentage of the heating load that is covered by passive solar space heating.

Passive Cooling

Definition: Air conditioners can use up to 1/6th of U.S. electricity and, on hot summer days, consume 43% of the U.S. peak power load. According to the U.S. Department of Energy, heating and cooling systems in the U.S. emit over a half billion tons of carbon dioxide into the atmosphere each year, adding to global warming. They also generate about 24% of the nations' sulfur dioxide, a chief ingredient in acid rain.
Natural (Passive) cooling of the home consists of using passive cooling techniques such as blocking the heat coming into the home, reducing internal heat loads, and removing heat from the home.
Advantage: Keeps the home cool without the need for mechanical cooling. Saves energy and reduces CO2 emitted into the atmosphere which contributes to global warming.

Provide 200ft² of South-Facing Roof

Definition: Making provisions during construction for installing future PV or solar thermal systems can significantly lower the cost when systems are installed later. Allow space for installation of PV modules on south-facing roofs, and ensure that roof trusses are adequate to accommodate any added roof loads.
Advantage: Net metering rules and time-of-use electric rates are improving the economics of photovoltaic systems, which can provide much of the electrical energy needed by a home on a net annual basis. PV-generated electricity produces no air pollution and reduces the need for building new power plants. Photovoltaic panels and systems may drop in price over the next few years.

Install Wiring Conduit for Future Photovoltaic Installation

Definition: Making provisions during construction for installing future PV systems can significantly lower the cost when systems are installed later. Install conduit from the attic to a location near the electric service entrance/circuit breaker panel.
Advantage: Net metering rules and time-of-use electric rates are improving the economics of photovoltaic systems, which can provide all of the electrical energy needed by a home on a net annual basis.

Install Solar Water Heating System

Definition: Solar water heating systems use solar panels and water storage to collect and store heat from the sun for domestic hot water use or space heating. Solar water heating systems are typically used to deliver preheated water to a standard water heater. Solar water heating is more cost effective than ever, as a result of new technologies, reliable products, and rising energy prices.
Advantage: Many solar water heating systems can provide all the hot water needed during summer months. For many households, these energy savings can offset the cost of the system in less than five years.

Install Photovoltaic (PV) Panels

Definition: PV systems convert solar energy into electricity when sunlight strikes the PV cells. Most residential systems are grid connected; when the PV system is providing more power than the home uses, additional electricity is fed back into the utility grid. This effectively spins the home's electricity meter backward in what is known as net metering. When the sun is not shining or when the home requires more electricity than the PV system can produce, the home draws power from the grid. If there is a power outage, a home with a grid-connected PV system will lose power just like homes without PV systems. Adding battery back-up to the PV system is expensive but allows the homeowner to keep some electrical systems running during power outages.
Advantage: Benefits include lower utility costs, reduced greenhouse gas and other emissions from fossil fuel–burning power plants, reduced need to develop new power plants, and improved national energy security.

Purchase of 100% Renewable Power

Definition: Renewable power is either wind or solar power. Purchasing renewable power reduces smog, acid rain, and air pollution. Each cent you spend on renewable power keeps one pound of carbon dioxide, the chief greenhouse gas, out of the air. This translates to just a few dollars more on your bill monthly.
Advantage: Reduces smog, acid rain, and air pollution.

Pellet Stove (rated for 2.0 grams per hour of particulate or less)

Definition: Pellet stoves utilize a salvage/recycled renewable fuel source, are clean burning, cost effective, energy efficient, and are considered a carbon-neutral energy source.
Advantage: Pellet stoves may be a good use for beetle-kill trees.

Recycle and Reuse

Deconstruction Plan for Existing Building Demolition

Definition: Create a site-specific program to reduce the deconstruction waste stream by dismantling the structure for reuse of valuable building materials. The plan requires a description of the materials to be recovered, designation of deconstruction contractor, site plan for collection bins, and destination designation of all materials expected to be recycled, reused, or resold. Materials from the following categories should be considered: doors, windows, cabinets, wood flooring, plumbing fixtures, framing materials, concrete, and brick.
Advantage: Preserves natural resources and diverts material from the landfill.

Recycle Job Site Construction Waste

Definition: A typical new home creates anywhere from 3.0 to 5.2 pounds of waste per square foot, and roughly 80% of a homebuilder's waste stream is recyclable. The primary components of this waste stream are wood, drywall, cardboard, metals and other materials. The minimization of construction waste through strategies that prevent the generation of waste at its source can provide significant cost savings to both the builder and solid waste management agencies.
Advantage: Reuse and recycling of construction debris conserves natural resources and slows the rate at which landfills reach capacity. In addition, builders can save money by lowering disposal fees.

Install Built-In Recycling Center

Definition: To encourage homeowners to recycle their waste, install a built-in recycling center into the home for plastic, glass and cardboard. Adding a built-in composting center encourages kitchen waste is recycled.
Advantage: Will encourage homeowners to recycle, cutting down the load on the landfills and closing the loop on recycled products.

Foundation

Pre-pipe under Slab for Radon Resistant Construction

Definition: Radon is a clear, odorless gaseous by-product of the natural breakdown of uranium in soil, rock, and water. While radon gas dissipates in open spaces, it tends to cling to particulate matter and accumulates when enclosed. The Surgeon General has stated that radon exposure is second only to tobacco smoke as a cause of lung cancer. In Colorado many homes have radon levels above the recommended mitigation level (4 picocuries per liter). Radon mitigation systems are designed to ventilate this gas out of the house before it has a chance to accumulate and apply to both crawl spaces and slab-on-grade.
Action: Install a Radon System in accordance with Appendix F 2015 IRC.
Advantage: Pre-piping a radon mitigation system will significantly reduce the occupants' cost of future radon exposure.

Conditioned Crawlspace

Definition: Traditionally, crawlspaces are uninsulated and have vents that allow air to pass through, with the intent of keeping them dry. During the winter, when moist air can enter the cool crawlspace, moisture can condense, leading to mold and wood rot. A conditioned crawlspace closes up the vents and insulates the crawlspace making it part of the conditioned envelope.
Advantage: Insulating the walls of the crawlspace, sealing up penetrations and creating a moisture barrier will give homeowners a safer, more durable home with lower utility bills.

Insulate Heated Garage Slabs & Perimeter (Min of R10)

Definition: If the garage is not a part of the thermal envelope of the home, it is still good practice to insulate around the perimeter of the foundation and garage walls and ceilings.
Advantage: Significantly reduces cold air penetration and utilizes the warmth of a vehicles engine.

Non-asphalt-based Water Proofing

Definition: Damp proofing protects the porous concrete foundation wall from absorbing ground moisture by capillary action or wicking. Damp proof all basement walls, as well as those garage and crawl space walls common to basement walls. Asphalt damp proofing can leach into the soil and the water table.
Advantage: Solvent-based damp proofing products tend to have a high VOC content and may be a source of groundwater contamination. Non-asphalt damp proofing reduces the potential for groundwater contamination.

Structural Frame and Building Envelope

Design Energy Heels on Trusses

Definition: Trusses save time in the field and require less dimensional lumber to make than a conventionally framed roof. Standard trusses, however, don't leave room at the eaves for insulation. Switching to a raised-heel truss solves the problem by allowing full-depth insulation to extend all the way to the outside of the wall. Be sure to accommodate trim details to raised dimension.
Advantage: Designing energy heels on trusses will allow for insulation in common problem areas. Provides insurance against ice dams and will cut heating and cooling costs.

Low-VOC Caulk and Construction Adhesives (<70 gpl VOCs)

Definition: Select Low-VOC caulks and adhesives.
Advantage: These alternatives are healthier for both the installer and the homeowner.

Simple Footprint

Definition: A simple footprint is defined in terms of the number of corners formed into the foundation of the project.
Reduce the number of corners that are unnecessary.

a. **10 Corners or less**
b. **8 Corners or less**
c. **6 Corners or less**
d. **4 Corners or less**

Advantage: Not only does reducing corners improve energy efficiency but it saves money. Fewer corners mean less heat loss, less finishing, less material, less waste, less time, and less cost.

Building Envelope Dimensions in 2 Foot Increments

Definition: Modular construction refers to designing a building on 2-foot increments to make the most efficient use of building materials (e.g., framing lumber, wood sheathing, drywall, and trim) that typically are stocked in multiples of 2-foot dimensions.
Advantage: This technique reduces waste associated with making cuts in lumber.

Design Roof Trusses to Accommodate Ductwork under Insulation

Definition: One way to include HVAC ducts in conditioned space is to design trusses with sections that accommodate the ducts. This may add only slightly to the cost of the trusses.
Advantage: Designing trusses to accommodate ducts can reduce the cost of the duct installation. It also reduces duct heat loss/gain and air leakage to the attic.

Materials Manufactured Regionally/Locally

Definition: Transportation of building materials can consume tremendous amounts of energy in addition to the energy it takes to produce the materials used in the construction of the home. Locally produced framing products reduce the shipping impacts.
Advantage: By using materials that were manufactured in Colorado you are cutting down on the resources used to transport materials to the home. This is not only good for the environment, but it supports local business and the local economy.

Salvaged or Reclaimed Structural Materials

Definition: Salvaged material is that which has been saved from being sent to a land fill. Reclaimed material is that which has been claimed from an existing building being deconstructed.
Advantage: Using salvaged and reclaimed materials in the structure not only saves material from landfills and repurposes it, but it cuts down on the amount of trees clear cut for use in framing. It also can add character and an eclectic aesthetic to the home.

Beetle Kill Pine Salvaged Wood for Studs

Definition: Bark beetles have been killing off lodgepole pines in Colorado at an increasing rate, 1.5 million acres to date.
Advantage: Uses the abundant local source of dead lodgepole pines and decreases the need for lumber trucked in from distant sources.

FSC-Certified Wood

Definition: Forest Stewardship Council (FSC) certification assures that the forest from which the wood was harvested is managed in an environmentally, economically and socially responsible manner. FSC is the only lumber verification rating that maintains chain-of-custody certification throughout the cutting, milling and final delivery of products, thus ensuring that the end product originated from a certified, sustainably managed forest.
Advantage: FSC certification assures that forests are managed in a way that protects the long-term availability of wood resources, the health of forest ecosystems, and the sustainability of local economies.

Solid Wall Systems (Includes SIPs, ICFs)

Definition: Solid wall systems include structural insulated panels (SIPs), insulated pre-cast concrete, insulated concrete forms (ICFs), and similar systems that are not constructed of wood studs and include insulation in the system.
Advantage: These walls replace wood-frame construction by including structure, sheathing and insulation in a single durable, energy-efficient system. Most solid wall systems improve home comfort and save significant amounts of wood and energy.

Roof Design includes Overhang

Definition: An overhang extends or projects the roof beyond the exterior walls of the building to protect the envelope. This excludes roof elements above dormers or other architectural details.

Advantage: Overhangs increase a home's durability by protecting siding, windows and doors from water intrusion, thereby reducing the likelihood of moisture penetration. They provide protection from the sun's harsh UV rays, which can degrade building materials and furnishings.

Recycled-Content Steel Studs used for 90% of Interior Walls

Definition: Steel studs can be either stand-alone or contain wood pieces within the "C" channel. Steel studs may or may not be load-bearing, depending on their rating.

Advantage: In addition to its recycled content, steel provides strength, light weight, exacting specifications, fire- and pest-resistance, and fewer of the twisting, warping and other defects that can plague wood framing which impacts trim.

Exterior Finish

Select Durable and Non-Combustible ≥ 40 Year Roofing

Definition: A typical 15-year asphalt shingle roof won't last as long as the mortgage of a home. Forty- to fifty-year asphalt shingles, tile, slate, fiber-cement, recycled plastic and metal are examples of durable roofing materials. A Class A fire rating offers a home the highest in fire protection.
Advantage: Short-lived roofing materials result in more waste going to landfills and more money spent on roof replacement.

Recycled-Content (No Virgin Plastic) Decking for all non-structural Decking

Definition: There are two types of recycled content lumber: recycled plastic lumber, which contains only recycled plastic and composite lumber, which combines recycled wood fiber and recycled plastic.
Advantage: Recycled-content plastic and composite decking is more durable than most wood. It doesn't rot, crack, splinter, or require staining, and isn't treated with potentially toxic chemicals. Using recycled-content decking also reduces pressure to harvest forests.

FSC-Certified Wood Decking

Definition: FSC-certified lumber comes from forests managed in an environmentally and socially responsible manner.
Advantage: FSC certification guarantees that forests are managed in a way that will assure the long-term availability of wood resources such as redwood and cedar and protects the health of forests.

Durable and Non-Combustible Siding Materials used on over 50% of Wall Surfaces

Definition: When choosing a siding material, the two most important qualities are durability and the source of the material. Sidings made of metal, stone, and brick offer a durable and non-combustible home exterior. Fiber cement and stucco are both very durable materials that withstand age, rot, and fire.
Advantage: Using these siding materials can reduce repainting and maintenance, protects from fire, and may lower the homeowner's insurance, especially in fire-prone areas.

FSC-Certified Cedar Shakes

Definition: Cedar shakes can make a durable and attractive siding, but the best ones are manufactured from the sound heartwood of old-growth cedar trees. FSC-certified cedar ensures that the wood used was sustainably harvested allowing the old-growth trees to remain.
Advantage: Protects a valuable resource that is being rapidly diminished.
Documentation: Make a note on plans and provide the source of materials.

Beetle Kill Pine Salvaged Wood for Siding

Definition: Bark beetles have been killing off lodgepole pines in Colorado at an increasing rate, 1.5 million acres to date.
Advantage: Uses the abundant local source of dead lodgepole pines and decreases the need for lumber trucked in from distant sources.

Stone Exterior Finish Quarried within 500 Mile Radius

Definition: Routt County is situated central to many quarries of stone products. There is little need to import stone from distant places or other countries.
Advantage: By purchasing regional building materials, the local economy is supported, transportation costs and environmental impacts are reduced, and dollars are retained in the region, supporting the regional economy.

Reclaimed Exterior Trim/Siding

Definition: Reclaimed wood offers an environmental benefit because it reuses existing materials and therefore reduces the impact that the materials would have had on our local landfills had it not been reclaimed. The use of reclaimed lumber also reduces the impact of timber harvesting.
Advantage: Reuse of building materials reduces our impact on timber harvesting.
Documentation: Make a note on plans and provide the source of materials.

Recycled Content Roofing for 50-100% of Roof

Definition: A typical 15-year asphalt shingle roof won't last as long as the mortgage of a home. They are made up of virgin materials and caustic asphalt chemicals and are not recycled. Approved roofing materials include non-combustible tiles made of concrete, recycled plastic panels, faux shake/slate and recycled aluminum. Steel roofing with at least 75% recycled steel content is also permitted. All roofing materials must be hail-rated for Colorado. Provide snow slide resistance devices for steep roofs.
Advantage: Investing in a recycled-content roof, such as steel give you a longer lasting roof, that needs less maintenance, and when the roof does need repairs or replacement, can be recycled back into a new roof or other steel materials.

Vegetated Roof for 20% or More of Roof Area

Definition: Also known as living roofs, they typically consist of a flat or low-pitch roof with various roofing layers topped with a growing medium and plants chosen for their ability to withstand a roof's extreme conditions. These roofs replace heat-absorbing materials with plants that cool air through evapotranspiration (or evaporation of water from leaves).
without additional watering. Additional roof structure is typically required and consultation with a professional is recommended.
Advantage: Vegetated roofs act as an additional insulation layer to reduce summer heat gain and winter heat loss. The soil captures, filters, and slows roof runoff, and it extends the life of the roof itself by protecting the waterproof membrane from sunlight and punctures.

Recycled and/or Recovered-content Fascia, Soffit and Trim

Definition: Fascia, soffit and trim must contain a minimum of 50% pre- or post-consumer waste.
Advantage: Keeps waste out of landfills and saves energy on the process of producing virgin products.

Fiber Cement Fascia and Soffit

Definition: Fiber cement is a durable material that withstands age, rot and fire.
Advantage: Uses a material that reduces the need for maintenance.

Recycled and/or Recovered Content Interior Doors (100%)

Definition: Luan, the tropical wood used as a skin on hollow-core doors, has been harvested by clear-cutting thousands of square miles in South East Asia, mountain sides denuded and ravaged by erosion. Another undesirable feature of hollow-core doors is that they are glued together with urea formaldehyde adhesives, contributing to indoor air quality problems.
Advantage: Reduces deforestation and improves indoor air quality.

Insulating Window Shades Installed (> 75% of all exterior windows R-3 or higher)

Definition: Windows, even high performance models, are still typically the largest point of heat loss in walls. By utilizing insulating window coverings, a window's thermal performance can be doubled or tripled. The idea is to let in light and open up views during the day while you're using the room, then close off the window with an insulating layer when the room is unoccupied or at night. There are products available that incorporate an insulating airspace between two layers of fabric. Other approaches include movable panels of fabric, covered rigid foam, and exterior motorized shutters that automatically open and close depending on sunlight and temperature with a manual override.
Advantage: Blanketing the windows with insulating window shades increases the R-value of the window keeping conditioned air in the house and not conducting out through the windows. Insulating the windows will save money and energy.

Plumbing

Install R-15 Insulated Tank Water Heaters

Definition: Water heaters loose 15% of their energy consumption through the tank while the water sits waiting to be used.
Advantage: Installing a tank that is insulated to R-15 or better helps to keep the heat in the tank where it is needed saving energy and money.

Drain Waste Heat Recovery System

Definition: An inline heat exchanger that uses hot water typically lost down the drain to preheat the incoming supply water.
Advantage: The system can save up to 50% of the heat normally lost which translates into energy savings.

Install Only High Efficiency Toilets (Dual-Flush or ≤1.3 GPM)

Definition: Standard new toilets use 1.6 gallons per flush (gpf). Toilets that use less than 1.3 gpf are called High Efficiency Toilets (HETs). HETs are available in dual-flush, pressure-assist and conventional gravity-flush models. Unlike some older models of ultra low-flow toilets, the majority of today's HET toilets perform well and doesn't require multiple flushes.
Advantage: HETs perform well, reduce homeowners' water and sewer costs, and reduce demand on water supplies and treatment facilities.

≤2.0 GPM Showerheads Installed

Definition: Installing flow reducers on shower heads are an easy way to conserve water. Low-volume showerheads can save an estimated 38 gallons of water per day in a typical household when compared to showers with older shower heads of 5 gpm or more.
Advantage: Reduces water and energy use per shower.

Faucets Fitted with Aerator Restricting Flow to 2.0 GPM

Definition: An aerator mixes air into the water flow from the faucet.
Advantage: Installing faucets with aerators cuts back on the amount of water used, without a noticeable change in the pressure of water coming out of the tap.

Install Real Time Water Use Read Out

Definition: Water meters are typically outside the house and out of view of the occupants. This allows leaks particularly to be undetected for months or years. A meter read out also heightens the awareness of water consumption by the occupants.
Advantage: When there is a display within sight of the occupants, water leaks are immediately apparent and water can be conserved.

Heating, Ventilation and Air Conditioning

Mechanical Equipment Centrally Located

Definition: Additional space is often required when mechanical rooms cannot be centrally located or when space requirements are fragmented throughout the building. Centrally located mechanical rooms in the house are placed within the middle third (1/3) of the distance of the longest horizontal diagonal.
Advantage: Centrally locating mechanical rooms will minimize construction, maintenance, and operating costs through the reduction of ductwork, piping, and conduit runs. In addition, centrally located mechanical rooms will simplify distribution systems.

Install Effective Exhaust Systems in Bathrooms and Kitchens

Definition: Bathrooms and kitchens produce odors and a lot of moisture that can cause mold and other problems if the rooms are not properly ventilated. Gas ovens and cook tops produce carbon monoxide, nitrogen dioxide and other pollutants. Additionally, cooking food produces odors and particulates.
Advantage: Effective bathroom and kitchen exhaust systems reduce energy use compared to standard models, provide better efficiency and comfort with less noise, and reduce moisture and indoor air quality problems.

Install Mechanical Fresh Air Ventilation System

Definition: As the envelope is tightened the availability of fresh exterior air is diminished causing low indoor air quality. Mechanical ventilation systems exhaust stale, contaminated air caused by fumes and gases of home appliances, radon build up and mold and mildew. Introducing fresh, clean air is required if the house has less than >35 Natural Air Changes per hour (NACH).
Advantage: Mechanical ventilation systems provide today's tighter homes with fresh outdoor air. Whole house ventilation systems improve indoor air quality by diluting pollutants. Air-to-air heat exchangers introduce fresh air into the home while reducing energy loss by capturing heat from the exhausted air stream and transferring it to the incoming air.

Electrical

Exterior Lighting Minimized (5500 lumens or less) to meet International Dark Sky Standard for Nighttime Light Pollution

Definition: Pollution doesn't just come in smog form. It also can affect us through too much light at night. Light pollution affects sleeping patterns, reduces night sky visibility and can be a nuisance to local animals. Exterior lighting that provides low contrast on critical areas, such as sidewalks and home entrances, is better for visual acuity than over lighting. Eliminate all unshielded fixtures that let light escape skyward or trespass on neighboring properties, such as floodlights.
Advantage: Helps keep sleeping patterns and helps nocturnal animals keep their natural rhythms. Saves energy.

Lighting Efficiency Packages

Definition: Standard incandescent light bulbs create more heat than they do light. Lighting efficiency packages specify the installation of qualified fixtures and bulbs that use less energy and create more light than heat.
Advantage: With a lighting efficiency package installed, homebuyers can expect to save energy and money through reduced lighting operating costs.

Natural Day Lighting

Definition: Designing the home to take advantage of natural daylight. By planning rooms according to use and time of day, occupants can function with the natural light from the windows and not have to use artificial light until the sun goes down.
Advantage: Cuts down on the use of artificial light, saving on energy bills by reducing the need for electricity during the day.

Efficient Light Controls

Definition: Efficient lighting controls include occupancy/motion sensors and automatic daylight dimming controls.
Advantage: Adjusting the level of light to match the need saves energy and makes a room more comfortable.

LED Lighting

Definition: A Light Emitting Diode (LED) is a semiconductor device which converts electricity into light. LED lighting has been around since the 1960s, but is just now beginning to appear in the residential market for space lighting. The efficacy of a typical residential application LED is approximately 60-100 lumens per watt (LPW), though efficacies of up to 100 LPW have been created in laboratory settings. Incandescent bulbs have an efficacy of about 15 LPW and ENERGY STAR® qualified compact fluorescents are about 25 LPW. LED strip lights can be installed under counters, in hallways, and in staircases; concentrated arrays can be used for room lighting. Waterproof, outdoor fixtures are also available.

Advantage: LEDs are better at placing light in a single direction than incandescent or fluorescent bulbs. Because of their directional output, they have unique design features that can be exploited by clever designs. LED lights are more rugged and damage-resistant than compact fluorescents and incandescent bulbs. LED lights don't flicker. They are very heat sensitive; excessive heat or inappropriate applications dramatically reduce both light output and lifetime.

Real-time Electrical Read Out

Definition: Electric meters are typically located outside of the building and out of sight. Real-time readouts give feedback to the occupant on their total electrical use.

Advantage: Department of Energy research has shown that when people see how much energy they are using at a time they tend to turn off unnecessary lights and appliances. Saves energy and money.

Insulation

Install Batt Insulation with No Added Formaldehyde (> 50% of all insulation)

Definition: European standards for permissible levels of formaldehyde are 10 times lower than those in the U.S. Here, rules are based on the OSHA standard setting exposure levels that a 35-year-old worker should be allowed to encounter over an 8-hour workday, or 100 parts per billion (ppb) per product. Today, batts meet that standard. But, in Denmark, the standard of 10 ppb is based on the permissible exposure of an 18-month-old child roughly 18 inches from the source of formaldehyde over a 24-hour span. In California, there is a proposed standard of 27 ppb for the entire home one week after construction is finished. On the basis of California's standards, fiberglass batts that contain formaldehyde don't meet those standards, yet it gets used more often than any other type of insulation in U.S. homes. There are batts on the market that don't use added formaldehyde

Advantage: Minimizing formaldehyde and VOCs in the home improves indoor air quality and the health of children.

Install Insulation with 75% Recycled Content

Definition: In terms of percentages, cellulose, cotton, and slag wool lead by using 75% or more recycled material in newly manufactured insulation. Recycled content can be either post-consumer or post-industrial. Post-consumer recycled content comes from products that have been used and discarded by a consumer and are then reprocessed as a raw material for a new product. Post-industrial content is waste material from a manufacturing process that is reused to create a new product.

Advantage: Recycled content insulation keeps hundreds of millions of pounds of waste out of landfills. High post-consumer recycled content closes the loop in the curbside recycling process and reduces landfill deposits.

Blown/Sprayed Insulation (> 50% of all insulation)

Definition: Blown/sprayed insulation uses fiberglass or cellulose and is, blown or sprayed into the wall cavities. The spray insulation is usually mixed with a latex liquid that dries into a semi-rigid mass that won't settle. It fills voids better that batt insulation, particularly around wiring, plumbing and hard to reach places. Dry blown insulation is best used in attic spaces.

Advantage: Spray insulation in particular greatly reduces air movement in wall cavities reducing the possibility of mold. It also reduces infiltration providing greater comfort. Dry insulation fills in all cavities and can be blown in with greater depth than batts, creating a higher R-value.

HCFC-free Rigid Foam Insulation

Definition: Foam insulation products are typically petroleum derived, but most have superior air-sealing, moisture resistance, and insulating properties when compared to fiberglass and other fiber-insulation materials. Many types of foam require a blowing agent to create the foaming action. CFC's were used for this in the past, but have been eliminated because of their high ozone-depleting potential. CFC's were replaced primarily by HCFC's (hydrochloroflorocarbons), which have 1/10 the ozone depleting potential. Expanded polystyrene and polyiso foams can be HCFC free.
Advantage: Rigid foam applied to the outside of the structure reduces thermal bridging through structural members creating a tighter thermal envelope in the home. The energy saved more than compensates for the embodied fossil fuels in the insulation.

Flooring

Flooring Adhesives Have <70 gpl VOCs – Mandatory

Definition: Many solvent based flooring adhesives can have as high as 700 grams per liter (gpl) of volatile organic compounds that escape into the house air. New generation adhesives are often lower than 50 gpl and have superior adhesive properties. Less can be used for the same holding strength since they are stronger.
Advantage: Improves indoor air quality and improves quality of installation.

Leave Concrete Exposed as Finished Floor

Definition: With slab-on-grade construction or gyp-crete floors, the concrete can be polished, scored with joints in various patterns, or stained with pigments to make an attractive finish floor. This approach is especially appropriate for use with in-floor radiant heating systems and passive solar design.
Advantage: Using the slab as a finish floor eliminates the need to use other flooring materials. It is also durable and easy to clean.

90% Recycled-Content Ceramic Tile

Definition: Recycled-content ceramic tiles can contain up to 70% recycled glass or other materials. Most recycled-content tile is made from either recycled glass or feldspar tailings, which is a post-industrial waste product. These products represent an excellent example of resource-efficient manufacturing.
Advantage: Recycled-content products keep valuable resources out of the waste stream. Some recycled-content ceramic tile is very dense, which significantly reduces the amount of moisture and stains that are absorbed into the tile, making it more durable and easier to maintain.

90% Natural Stone Tile From Within a 500 Mile Radius

Definition: Routt County is situated central to many quarries of stone products. There is little need to import stone from distant places or other countries.
Advantage: By purchasing regional building materials transportation costs and environmental impacts are reduced, and dollars are retained in the region, supporting the regional economy.

Stone or Ceramic Tile Installed with Plasticizer-free Grout

Definition: For hundreds of years, grout was basically cement used to connect stone or tile floors. Plasticizers have been added the contemporary products that can off gas synthetic chemicals for weeks. Grout should be resealed every year or more frequently as needed.
Advantage: Natural grout reduces chemicals introduced into the home's air improving air quality.

Natural Linoleum

Definition: Linoleum is a hard surface flooring made of rapidly renewable resources, using a production process that has a very low environmental impact. Linoleum is made with natural raw materials: linseed oil, wood and cork flour, pine resins, and ground pigments. It is burn and scratch resistant, and easy to maintain. Linoleum has a proven record of durability; is easy to cut/customize with borders etc. It is typically used in kitchens and bathrooms. It is more brittle than vinyl sheet goods at temperatures below 55°.
Advantage: Improved air quality by eliminating vinyl chloride off gassing.

FSC–Certified Wood Flooring

Definition: FSC-certified wood flooring comes from forests managed in accordance with stringent sustainable forestry practices. FSC-certified products are available in a wide variety of domestic and exotic species.
Advantage: FSC certification assures that forests are managed in a way that protects the long-term availability of wood resources, the health of forest ecosystems, and the sustainability of local economies.

Wood Flooring

Definition: High quality salvaged wood flooring or other salvaged flooring products can often be reclaimed from demolished or remodeled buildings.
Advantage: Reclaimed building materials reduce resource consumption and landfill deposits. Many salvaged products are of higher quality and often cost less than new materials.

Beetle Kill Pine Salvaged Wood Floor (25% minimum)

Definition: Bark beetles have been killing off lodgepole pines in Colorado at an increasing rate, 1.5 million acres to date. Pine beetle affected lumber harvested in Colorado can be utilized as flooring and trim.
Advantage: Uses the abundant local source of dead lodgepole pines and decreases the need for lumber trucked in from distant sources.

Rapidly Renewable Flooring

Definition: Rapidly renewable flooring is flooring made of cork or bamboo. Cork is harvested from the outer bark of the cork oak tree; the tree regenerates its bark within about 10 years. Cork flooring is a byproduct of the bottle stopper industry. Scraps are ground and pressed into flat floor tiles which are typically pre-finished. Bamboo is an alternative to conventional hardwood flooring, carpet or vinyl flooring. Bamboo, which is as durable as most hardwood used for floors, is a fast-growing grass that can be harvested in three to five years.
Advantage: Rapidly renewable flooring materials are attractive, durable, low-toxic, perform well and reduce pressure to harvest forests. Cork is a rapidly renewable material that is also biodegradable, low in VOC emissions, and much less energy intensive to produce. Cork is hypoallergenic, can withstand years of

commercial traffic, does not offgass, is flexible, absorbs shock, and reduces noise. Bamboo is as durable as most hardwoods.

Natural or Recycled-content Carpet Pad Made from Textile, Carpet, or Carpet Cushion

Definition: Carpet pad is responsible for much of the off gassing attributed to carpet. The “standard” pad is an amalgamation of brightly colored recycled synthetic foam rubber. (A petroleum based product). Similarly priced, low VOC alternatives include (but are not limited to) “felt” pads made from (pre-consumer) denim cotton scraps and from (pre-consumer) garment scraps pad. No VOC, felted wool, and jute pads are also available. Underlayment can perform several functions; to create a level surface, as a sound barrier or to insulate from heat loss.
Advantage: Natural or recycled content padding reduces indoor air quality components found in conventional padding.

Recycled-Content Carpet

Definition: Recycled-content Carpet is made from recycled bottles or old carpets.
Advantage: Keeps material out of landfills and can improve indoor air quality.

Carpeting Meets CRI Green Label Plus Requirements (50% Minimum)

Definition: Flooring products may emit formaldehyde and other volatile organic compounds. To protect indoor air quality, look for carpets that have been tested and approved for low-emissions by a reputable third party or government organization.
Advantage: Minimizing formaldehyde and volatile organic compounds in the home improves indoor air quality.

Finishes

Use Low-VOC Caulk and Construction Adhesives (<70 gpl VOCs) for All Adhesives

Definition: Low-VOC caulks and adhesives are typically water-based rather than incorporating solvents such as toluene and xylene that are known to be carcinogens by the State of California.
Advantage: Low-VOC caulks and adhesives work as well as or better than conventional products, emit fewer pollutants, and reduce the risk of potentially harmful health impacts.

Design Entryways to Reduce Tracked in Contaminants

Definition: Up to two-thirds of dust and particulates in houses is tracked in on shoes. These tracked-in contaminants contain everything from soil and pesticides to abrasive sand, mold, road grime and bacteria. Once these particulates are inside the home, they can be difficult to get rid of.
Advantage: The home will be cleaner, with less dirt and other pollution tracked in.

Elimination of All Particleboard and MDF Inside Building Envelope

Definition: Formaldehyde is often used as a binder in home-building products such as plywood, particleboard, medium density fiberboard (MDF) and other composite wood products. These binders come in two basic forms: urea and phenol. Urea-formaldehyde binders are common in interior-grade products. Phenol-formaldehyde binders are used in exterior applications because they are more water resistant. This water resistance quality makes phenolic resins offgas more slowly and in lower quantities than urea glues, reducing some of the harmful effects on indoor air quality by as much as 90%.
Advantage: Reducing formaldehyde exposure helps protect the health of residents, particularly children, who are most susceptible. Advise homeowner that furniture is often made from particleboard which may undo what has been accomplished by eliminating particleboard from building materials.

Environmentally Preferable Materials used for Interior Finish: A) FSC-Certified Wood, B) Reclaimed (within a 500 mile radius), C) Rapidly Renewable, D) Recycled-Content, E) Finger-Jointed, or F) Beetle Kill Pine

Definition: Forest Stewardship Council (FSC)–certified wood comes from forests managed in accordance with stringent sustainable forestry practices. Reclaimed Materials must come from within a 500 mile radius of Steamboat/Routt County. Rapidly renewable materials are made from agricultural products that grow quickly and can be harvested on a relatively short cycle compared to slower-growing wood. Examples include bamboo and sheet goods made from straw, the stalk of wheat, rice, barley and other grains. Some recycled-content interior

finishes, such as molding, are made from recycled polystyrene or other plastics. Recycled-content countertops include recycled glass tiles, terrazzo-like materials that blend recycled glass and concrete, and natural fiber composites derived from rapidly renewable or recycled resources. Finger-jointed trim is manufactured from short pieces of wood glued together to create a finished material. Beetle kill pine is wood milled from the lodgepole pine.
Advantage: Reclaimed materials reduce resource consumption and landfill deposits. Reclaimed lumber and many other salvaged materials are often of higher quality than new products. Rapidly renewable materials are attractive, durable and reduce pressure to harvest forests. Recycled-content products keep valuable resources out of the waste stream. Recycled-content trim materials are often straighter and more stable than conventional clear wood. Recycled plastic materials are good for water-prone areas in kitchens and baths. Finger-jointed elements are straighter and more stable than conventional clear wood, and use wood more efficiently.

All Particleboard Sealed with 2 Coats of Sealer

Definition: Particleboard is the prime source of formaldehyde inside the envelope of the house. Sealant must be low/no VOC.
Advantage: Sealing the particleboard slows the rate of formaldehyde off gassing allowing it to be diluted by fresh air in the house resulting in better indoor air quality.

100% Agricultural Waste Board

Definition: Waste products such as rice husks and wheat straw which are manufactured with a formaldehyde-free binder and used as sheet goods that replace particleboard
Advantage: Agricultural waste boards are bonded with non-formaldehyde binders making the house healthier.

Low VOC, Water-Based Wood Finishes (<250 gpl VOCs) used on All Wood Finished Surfaces

Definition: Conventional petroleum-based wood finishes can off gas for months and can be harmful to children and chemically sensitive individuals. Off gassing means the solvents in the product are released into the air, contaminating indoor air quality. Low-VOC finishes, such as waterborne urethane and acrylic or plant-based oils, are lower in toxic compounds compared to conventional solvent-based finishes while providing similar durability.
Advantage: Using low-VOC wood finishes reduces off gassing, improving indoor air quality for both workers and occupants, and reducing the formation of smog.

Low-VOC or Zero-VOC Paint used on All Painted Surfaces

Definition: Most interior paints contain volatile organic compounds (VOCs), a major class of indoor and outdoor air pollutants. Besides affecting indoor air quality, certain VOCs react with other chemicals in the atmosphere, producing ozone that can affect human health. Low- and zero-VOC paints reduce these sources of pollution.

Advantage: Low- or zero-VOC paint reduces the emissions of VOCs, improving indoor air quality.

After Installation of Finishes, Test of Indoor Air Shows Formaldehyde Level <27 ppb

Definition: The California Air Resources Board (ARB) has classified formaldehyde as a Toxic Air Contaminant. ARB, the first American agency to develop a health standard, recommends that formaldehyde levels inside buildings be as low as possible (no greater than 27 parts per billion) because of formaldehyde's cancer-causing potential. Formaldehyde, a colorless gas, is usually present at higher levels in indoor air than outdoor air, in part because it is used as a binder and preservative in many common building products and furnishings. Formaldehyde evaporates from products into the home's interior, often for many years after the product is installed.

Advantage: Reducing formaldehyde can decrease the risks associated with exposure.