

Sustainable Development Guidelines
Adopted by Clarkdale Town Council October 9, 2018

This document is a supplement to the 2012 General Plan and the 2013 Sustainability Values adopted by Town Council. It provides guiding principles for sustainable development in the Town. Great value is placed on creative and innovative methods for meeting the intent of these guidelines.

The goal is to encourage sustainable development as it pertains to multi-family & mixed use projects. The anticipated benefits are reduced total cost of ownership through diminished maintenance and energy costs, conservation of local ecology and water resources as well as increased comfort and occupant satisfaction. Click [this link](#) for more details.

The bold text immediately following each numbered topic refers to the Town of Clarkdale's General Plan, while the citations in parentheses refer to the Town of Clarkdale's Sustainability Values.

1. Water Use - General Plan Chapter 6, Water Resources: Objective 6.1.b. Policy #2
“Look for alternatives to conventional water sources.”

Strategies:

- A. Incorporate passive water harvesting in landscaping through the use of berms, swales, drywells and rain gardens. (page 1-Water Management, page 3- Landscaping Standards)
 - *This solution depends more on good design and placement of materials than equipment or containers.*
- B. Consider selection of porous paving as an alternative to concrete and asphalt in parking areas and sidewalks.
 - *One manufacturer estimates initial cost at 10-15% higher than asphalt and boasts at least a 25 year life span, and existing installations featuring 15 years of minimal maintenance¹. Porous and permeable paving also reduces surface runoff and associated erosion while allowing groundwater recharge. Unlike the impermeable surfaces, they are not prone to cracking or water damage, and this predictably results in reduced maintenance costs.*
- C. Consider implementing active water harvesting and storage as an offset to groundwater pumping. (page 1-Water Management, page 3-Landscaping Standards) Note: Using harvested water on plantings requiring a high amount of water or non-native species is discouraged.
 - *Preserving groundwater is important to our local ecology, and using harvested rainwater for landscaping supplants the demand for ground water.*
- D. Preserve existing plants where possible and plant symbiotic groupings of native species. (page 1-Siting, page 2-Design Principles, page 3-Landscaping Standards)

¹ Invisible Structures GravelPave2, installed at Milagro Cohousing, Tucson, AZ in 2003 and has required little if any maintenance.
Source member of Milagro Cohousing

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- *Native plants thrive on just the water that falls from the sky. Supplementing landscaping with native plants ensures less water use to establish new plantings, and also a higher rate of survival. Planting symbiotic groupings of native species also creates visual interest while enabling each plant in the group to thrive due to proximity to others in the group.*
- E. Incorporate EPA WaterSense best practices into domestic and landscaping usages if any.

2. Ecological Design - General Plan Chapter 7, Environmental Planning: “...consider energy efficient designs incorporating solar and natural climatic principles, such as site orientation and use of local materials.”

Strategies:

- A. Minimize impact to land, open space, plants and wildlife by retaining existing vegetation and preserving wildlife corridors. (page 1-Siting, page 2-Design Principles, page 3-Landscaping Standards)
- *This can be accomplished with a little additional care taken on-site during the construction process.*
- B. Design to take advantage of natural lighting during daylight hours. (page 1-Siting, page 2-Green Building & Design Principles, page 3-Construction – 1. Energy Efficiency, 2. Indoor Environmental Quality, 6. Passive solar includes lighting). Leadership in Energy and Environmental Design (LEED) has standards for daylighting, and numerous studies extoll the benefits to human health and productivity associated with natural lighting².
- *Simple design considerations such as placement of windows and reflective surfaces which, when placed correctly, can shade interior surfaces from direct sunlight while reflecting useful light deeper into a building.*

3. Sustainable Construction - General Plan Chapter 10, Housing Objective: 10.2.c. “Encourage sustainability and green building in the Town’s development ordinances.”

Strategies:

- A. Design in cooperation with natural features that are unique to each site. (page 1-Siting, page 2-Green building)
- *Build to take advantage of topography, slope aspect (direction the slope is facing) and seasonal weather patterns to allow for increased comfort as well as the use of lower capacity mechanical systems.*
- B. Consider passive solar design with thermal mass and insulation. (page 1-Siting, page 2-Green building) —This strategy is enhanced by use of properly oriented glass for heating, and shade for cooling.

² National Renewable Energy Laboratory study (<https://www.nrel.gov/docs/fy02osti/30769.pdf>) provides more detailed information on many of these concepts.

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- *Although the initial cost of high-mass construction (concrete, adobe, earthen soil cement etc.) may be higher than ordinary construction, the total cost of ownership is lower due to reduced energy use. When correctly designed and oriented, this strategy provides extremely high energy efficiency – even an opportunity for **energy independence**. Combined with other long-term benefits like durability, improved sound insulation, low maintenance, fire resistance and comfort, this is a strong recommendation.*
 - C. Design for appropriate shading. (page 2-Green Building & Design Principles, page 3-Construction)
 - *This entails simple design considerations like strategic placement and selection of shade-trees and other structures.*
 - D. Design for natural ventilation in cooperation with building science phenomena (stack effect). – (page 1-Siting, page 2-Green Building & Design Principles, page 3-Construction)
 - *This recommendation entails simple design considerations like opposing high and low windows and use of other passive methods for cooling.*
 - E. Consider building smaller dwelling units.
 - *Smaller spaces with open floor plans require fewer materials and are hence less expensive to build and easier to heat, cool, ventilate and illuminate than larger spaces.*
 - F. Design and build with low toxicity materials and finishes by minimizing the use of Volatile Organic Compounds. (VOCs), formaldehydes. (page 2-Green Building & Design Principles, page 3-Construction)
 - *Alternative materials and finishes are readily available and similarly priced.*
- 4. Mixed Use Development – General Plan Chapter 2, Land Use: Table: Land Use Implementation Strategies: Objective: Encourage orderly patterns of growth and development. Policy: “Support well-designed, mixed use, master planned community developments and planned subdivisions.”**

Strategies:

- A. Locate Neighborhood Commercial development in close proximity to existing neighborhoods providing access to local restaurants, shopping and activities.
 - *Planned Area Development zoning allows for a variety of mixed uses*
- B. Incorporate walkable/bike-able circulation routes connecting with existing access patterns in Town. (page 1-Infrastructure, page 2-Green Building, Design Principles)
- C. Separate traffic from pedestrians with curb-cut fed greenways. (page 3-Landscape Standards) or other best practices.