

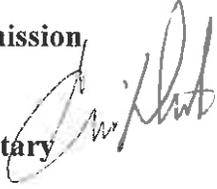


# PLANNING COMMISSION

Planning & Development Services Department • 201 N. Stone Ave. • Tucson, AZ 85701

**DATE:** May 4, 2011

**TO:** Planning Commission

**FROM:** Ernie Duarte  
Executive Secretary 

**SUBJECT:** Sustainable Land Use Code Update

**Issue** – This item is for discussion by the Planning Commission in a Study Session. The Sustainable Land Use Code's draft diagnostic report will be presented to Mayor and Council on May 10, 2011.

This project is time sensitive since it is being funded by a federal energy block grant. The grant money must be spent by October, 2012, otherwise, the remaining funds are withdrawn from the project.

**Recommendation** – No action required.

**Background** – Staff has reviewed the priority recommendations of the draft diagnostic report for several months with the Planning Commission, the Land Use Code Committee and recently with the Climate Change Committee, a committee formed by Mayor and Council as part of the City's participation in a national effort known as the Mayors' Climate Protection Agreement(MPCA) approved in 2006.

Staff will present a PowerPoint presentation and highlight the project's status and give information about the project's future direction.



*City of Tucson*

# Sustainable Land Use Code Integration Project



**PHASE 1: DIAGNOSTIC REPORT**

**Revised Draft: April 2011**



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# Executive Summary



## PROJECT OVERVIEW

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The Sustainable Land Use Code Integration Project is one of a series of projects commissioned by the city's Office of Conservation and Sustainable Development (OCSD) and financed by a Department of Energy (DOE) Energy Efficiency Conservation Block Grant (EECBG). The purpose of this project, which is being undertaken in collaboration with the city's Planning and Development Services Department (PDSD), is to prepare a sustainability analysis of the Land Use Code (LUC), identify a series of recommended amendments to the LUC, and ultimately to draft amendments that implement the City of Tucson's sustainable goals and policies. The project includes two phases: 1) preparation of a diagnostic report on the status of the current LUC and recommended revisions to better meet the city's sustainability goals; and 2) preparation of text amendments to the city's LUC and other development regulations to better reflect the city's sustainability goals.

This Diagnosis constitutes the third of three milestones established for the first phase of the Sustainable Land Use Code Integration Project. The city is currently in the planning stages for work on Phase II of the Sustainable Land Use Code Integration Project (preparation of sustainable code amendments) which is anticipated to begin in 2011.

## MAJOR THEMES

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Four major themes emerged from stakeholder interviews and discussions with city staff conducted as part of the project initiation phase: 1) Build on the work that the community has already done related to sustainability; 2) Streamline the development review process for projects that align with the city's sustainability goals; 3) Incorporate new requirements to address sustainability goals where needed, but offset with incentives and flexibility where possible; and 4) Address adaptive reuse as well as new development.

In addition to the overarching themes outlined above, detailed recommendations related to each topic also emerged. These more topic-specific recommendations have been incorporated, as appropriate, throughout this diagnosis.

## RELATED EFFORTS UNDERWAY

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### Citywide Sustainability Initiatives

In addition to this Sustainable Land Use Code Integration Project, the city has many other current sustainable policies and programs in place or underway and has supported sustainable initiatives for years. The following is a list of some of the more notable non-LUC, sustainable programs the city has initiated or joined in:

- Solar Integration Plan (2009) and Greater Tucson Solar Development Plan (2009)
- Framework for Advancing Sustainability (2008)
- Urban Landscape Framework (2008)
- Mayors' Climate Protection Agreement (MPCA) (2006)
- Creation of the Office of Conservation and Sustainable Development (OCSD) (2006)
- Leadership in Energy and Environmental Design (LEED) (2006)
- Beat the Peak (1976)

## Land Use Code Reorganization Project

Concurrent with the Sustainable Land Use Code Integration Project, the city also has underway the broader Land Use Code (LUC) Reorganization Project. The general purpose of the LUC Reorganization Project is to consolidate the requirements of the LUC, Chapter 23A Development Compliance Code, and the Development Standards into one new Unified Development Code (UDC) that minimizes redundancy and organizes the code into a more logical, simple, and user-friendly format.

A final draft of the reorganized UDC is scheduled to be completed by June 2011, after which the City Council will review and consider adoption. The city's intent is to use the adoption of the reorganized UDC as a springboard to consider broader substantive changes to the code. These subsequent substantive changes would be adopted independent from but coordinated with any substantive code changes resulting from the Sustainable Land Use Code Integration Project.

This Diagnosis distinguishes between comments that pertain to the current LUC or to the proposed changes to the DDS or some other major pending code amendment (e.g., parking standards).

## SUMMARY OF RECOMMENDED CHANGES

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### Overview

Based on a review of city policies and goals, staff identified eleven key sustainability topics as a foundation for the Inventory and Summary of City Sustainability/Energy Efficiency, and Conservation Goals and Policies prepared during Milestone 2 of Phase 1. These topics include: Water Quality and Conservation; Alternative Energy Production and Energy Conservation; Mobility and Transportation and Alternative Fuels; Urban Forestry and Urban Heat Island; Housing Accessibility, Diversity, and Affordability; Community Health and Safety; Food Production and Nutrition; Recycling and Waste Reduction; Open Space, Parks, and Trails; Green Building; and Climate Change and Air Quality. For each topic, the Diagnosis addresses the following:

- *Current regulations* relevant to each topic;
- Potential *barriers* in the LUC, Development Standards, and Design Guideline Manual as well as other sections of the municipal code related to each topic and possible revisions to remove those barriers;
- Potential *incentives* for consideration to encourage alternative energy production and energy conservation; and
- Specific *recommendations to fill regulatory "gaps."*

Although the focus of this diagnosis is on the LUC specifically, a number of Tucson's current regulations related to the eleven key sustainability topics are not located in the LUC, but in the Development Standards, Design Guidelines, or other ordinances. Therefore, these other sources are cited, as appropriate, in addition to the LUC in the inventory of current regulations provided for each topic. Recommendations for revisions focus on the LUC.

Due to the interrelated nature of a number of these topics, some overlap between the analysis of current regulations and recommendations may occur between topics. Redundancy has been retained to ensure that each topic may be reviewed independently, if desired. A brief summary of recommendations by topic is provided below.

### Water Quality and Conservation

Most of the city's water conservation measures and programs have not been enacted through the LUC. For example, the recent adoption of the rainwater harvesting and greywater stub-out ordinances amended Chapter 6 of the Civil Code. This is partially a result of water policy traditionally being separated from land use planning but it is also because most "technical" fixes for water conservation are more closely related to building code or plumbing code issues than the use of land.

However, the city recognizes that a change in thinking needs to take place so that the LUC becomes part of the city's water policy. While the LUC addresses water usage in a variety of ways, Tucson's location in the desert and uncertain water supply means that more can be done. For example, the city should consider standards to encourage or require more retention / detention of water on site from streets, sidewalks, and all hardscape so that water can infiltrate into the soil rather than run off the site. In a broader context, the city could try to direct growth away from areas with vulnerable local water supplies and areas that would be served by unrestricted private wells in parts of the city and Pima County.

Some of the potential changes identified include:

- Increasing density where water is available, especially the four areas identified in the Water Study (i.e., infill in the existing built environment, the Houghton corridor, the Southlands area, and the Southwest area);
- Providing a density bonus for development that utilizes the reclaimed water system;
- Requiring that riparian vegetation be protected from groundwater pumping;
- Addressing setback issues to encourage rain barrels or other water conservation infrastructure;
- Providing green infrastructure bonuses; and

## Alternative Energy Production and Energy Conservation

Tucson is ahead of many communities nationally with regard to renewable energy and energy conservation, and the city has been nationally recognized for its many programs and standards intended to promote energy efficiency. The city has also made numerous targeted amendments to its regulations in recent years to encourage and accommodate renewable energy generation. However, continuing efforts will be needed on a variety of fronts to help the city achieve its renewable energy goals and greenhouse gas reduction targets.

In terms of the LUC, the city still lacks some fundamental tools to address different types (e.g., size, public vs. private) of renewable energy facilities. In particular, the LUC needs to more explicitly address the full range of renewable energy facilities that the city wishes to encourage—ensuring that these facilities are permitted where appropriate and include appropriate standards to address the potential impacts of these facilities on adjacent uses.

Some of the potential changes identified include:

- Expanding existing renewable energy generation provisions to more explicitly address appropriate locations and standards for the full range of renewable energy facilities (large and small solar, wind, etc.);
- Revamping existing strict non-conforming use/structure regulations to encourage redevelopment and alternative energy retrofits of existing buildings; and
- Clarifying historic district regulations to ensure solar systems and other renewable energy facilities are not precluded.

## Mobility and Transportation and Alternative Fuels

Tucson and its regional partners are taking positive steps to better coordinate transportation goals with land use considerations. Major initiatives include the recent adoption of the forward-thinking 2040 Regional Transportation Plan, the Regional Transportation Plan (RTA) that dedicates \$533 million for transit in the next 20 years, and a 2006 voter-approved half cent sales tax to raise \$2.1 billion for transportation projects. In addition, the city's plan to construct a modern streetcar line that connects areas west of I-10 with downtown and the University of Arizona will not only help reduce air pollution but will help revitalize the downtown area — provided that appropriate land use policies are implemented to allow increased density to support streetcar ridership.

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Tucson's system of bike and pedestrian paths and bike lanes also deserves special recognition. Since 2000, the number of bikeway route miles has increased from 488 to 817, and the city has dedicated itself to expanding this number significantly while creating more connections between bicycle routes to increase safety. The Tucson Arizona /Pima Eastern Region received a Gold Level designation from the League of American Bicyclists in 2006 and 2008 for its bicycle friendly environment.

While Tucson has made some significant progress in making its transportation system more sustainable, the general changes to the LUC suggested below will further increase the sustainability of Tucson's transportation system:

- Increasing density around transit stops and in select zones. Identify and zone key transit-oriented development areas for higher density, heights, and mixed use. Clarify rules, especially dimensional standards, for mixed-use projects;
- Improving mobility by increasing connectivity between developments for vehicles and other modes of travel. In particular, new subdivisions should meet minimum connectivity standards that require high levels of connectivity within the subdivision and to surrounding properties; and
- Promoting Transportation Demand Management strategies (flexible work hours, vanpools, eco passes, etc.) through incentives and regulation.

## Urban Forestry and Urban Heat Island

Tucson has an impressive number of policies and programs that encourage the planting and maintenance of native and landscape trees. The city established a Landscape Task Force in 1988 to provide a strategy for improving the city's landscaped environment. Among other things, the LTF recommended that one person (the Urban Landscape Manager) be appointed to oversee and coordinate all landscaping-related efforts in the city and that a permanent Landscape Advisory Committee be created to advise the Mayor and Council on the design, management, and policies for improving the city's urban and natural landscapes. These efforts led to the city's endorsement in 2008 of the Urban Landscape Framework (ULF), which is the city's blueprint to turn existing policies, programs, and ideas into action for landscaping on public property. The ULF also incorporated the recommendations from the Livable Tucson program that promote the preservation of green space and make the community more livable. In addition, the non-profit *Trees for Tucson* was started in 1989 in cooperation with Tucson Electric Power Company to promote desert-adapted tree planting in the Tucson area by providing low-cost trees to customers to shade homes and save energy.

On the regulatory side, the city has a fairly aggressive native plant ordinance that requires preservation of native vegetation from development, or, where preservation is not feasible, the replacement or transplantation of native plants. Existing landscaping standards require that new and expanding development provide a minimum amount of new landscaping, including trees and groundcover. All new landscaping must be selected from an approved list of native or drought-tolerant plants. The city has also recently adopted new ordinances to require one tree for every four parking spaces to better shade parking lots, a rainwater harvesting ordinance for commercial development to irrigate landscaping, and an ordinance to require greywater stubouts on new residences to allow greywater for irrigation needs instead of limited potable water. On a more general level, the city is pushing harder for drought-tolerant species to be integrated into the design of new developments, especially in downtown infill areas.

While the city has many programs and standards related to trees, it still lacks some fundamental tools to increase the amount of shade provided by new development and to reduce the urban heat island effect.

Some of the potential changes identified include:

- Requiring more shade structures and features for pedestrians on streets and in parking lots and on buildings;

- Requiring building materials (paving and roofs) that have a higher solar reflectivity level for all types of development; and
- Providing protections for desirable species of mature existing trees on private property throughout the city.

## Housing Accessibility, Diversity, and Affordability

Tucson has taken several significant steps to promote housing accessibility, diversity, and affordability, supporting infill development in targeted areas of the city through its Downtown Infill Incentive District, Flexible Lot Development Standard, and other tailored tools. While these efforts greatly expand opportunities for increased housing diversity, they are relatively focused geographically. As part of the Sustainable Land Use Code Integration project, the city has an opportunity to expand its current efforts and to address these issues more broadly in the LUC. In particular, the LUC might more explicitly address the types of housing the city wishes to see in different locations, increasing predictability for the development community and neighborhood residents about what will be built in the future.

Some of the potential changes identified include:

- Clarifying language in the LUC related to housing types to more clearly define where in the city a diverse mix of housing types is desirable and ensuring standards are in place to accommodate this mix while protecting established neighborhoods;
- Reducing restrictions on accessory dwelling units that greatly limit usage; and
- Providing increased flexibility in minimum lot size and setback requirements in the Development Designator System to allow for creative approaches to housing, especially small-lot development.

## Community Health and Safety

As is true with other sustainability topics under consideration in this diagnosis, the city has already made some changes to its development codes to address public health and safety. For example, to promote compact mixed-use and infill development that will encourage walking, Tucson has recently adopted new zone districts such as the Downtown Infill Incentive District. The Planned Community Development Ordinance (2007) promotes more walkable, mixed-use master planned communities at the city's edges. Similarly, according to staff, the city applies an uncodified "safe by design" policy to rezoning requests that encourages all new development to incorporate landscape and lighting designs that assure a safe pedestrian environment and assist police patrols. All of these measures have helped to lay the foundation for the major amendments to the LUC and Development Standards necessary to address community health and safety in Tucson.

Some of the potential changes identified include:

- Adopting clear, simple design guidelines and development standards to promote infill and mixed-use developments throughout the city, not just in a limited number of districts;
- Removing barriers to farmers markets and community gardens that can help provide access to more nutritional food;
- Enacting standards to promote safe, efficient, and attractive routes to school and work;
- Expanding and codifying the safety by design principles and standards; and
- Considering wildfire protection regulations to protect new developments on the city's edges.

## Food Production and Nutrition

Tucson's land development regulations do not explicitly encourage sustainable food production. This lack of attention to urban food issues results in the code having some inadvertent — and perhaps some intentional — barriers to growing local food. In particular, there are no clear exceptions to allow structures that facilitate backyard food production, such as rain barrels and greywater systems, to be located in side and rear setbacks. Communities that have made urban agriculture a priority have also allowed a broader range of animals but with more detailed compatibility standards to ensure that neighboring properties are protected from potential conflicts.

Some of the potential changes identified include:

- Clearly allowing rain-collection structures, (e.g., rain barrels) greywater systems, and noncommercial greenhouses in side and rear setbacks to provide irrigation for gardens;
- Allowing farmers' markets in more districts as primary and accessory uses;
- Allowing gardening in landscape strip of street ROW;
- Defining community gardens and allowing them as a primary use in residential districts and accessory use in all or most districts;
- Designating the maximum number of fast-food restaurants and drive-thru restaurants per certain area of the city; and

## Recycling and Waste Reduction

Many communities are taking steps through their development review and land use regulatory processes to better manage solid wastes and support reduction, reuse, and recycling. Some of the potential changes identified to better support solid waste management include:

- Construction waste management, diversion, recycling;
- Requiring provision of sites for neighborhood-wide recycling and composting within a development or nearby sites for collecting compost wastes;
- Permitting establishment of reuse/resale centers for equipment and supplies;
- Requiring recycling receptacles in multi-family residential and commercial buildings and providing centralized drop-off recycling stations that are easily accessed for collection; and
- Encouraging food waste recycling.

## Open Space, Parks, and Trails

Tucson has a long history and continued commitment to providing and maintaining a system of parks for its residents. It has also worked closely with Pima County to create an interconnected system of open space and trails. However, as pointed out in the 2006 City of Tucson Parks and Recreation Ten-Year Strategic Service Plan, the city's projected population growth and its more diverse and aging population make clear there is a "critical need to add the existing parks and open space inventory to address current deficiencies and projected growth." The city followed up on this recommendation by imposing a regional park impact fee in 2007 rather than a public lands dedication ordinance for new residential development. It also has undertaken many other non-regulatory steps to improve and expand its system of parks, open space and trails.

The city currently has underway a major Parks Master Plan study and the Pima Regional Trail System Master Plan is nearing adoption. Both will provide valuable updated information on parks, open space, and trails needs in the city and guidance for implementation measures as part of this sustainable code revision effort. The city has ample support for additional action through its policy and planning documents such as the 2006 Parks and

Recreation Ten-Year Strategic Service Plan, the parks, recreation, and open space and environmental elements of its 2001 General Plan, and Livable Tucson Vision Plan (1999). Moreover, as noted, new parks and trail plans are nearing adoption or underway that which will provide additional policy guidance and recommended implementation measures.

Some of the potential changes identified include:

- Revising LUC and subdivision regulations to add clear, numeric standards regarding minimum private common open space set aside requirements for all developments (residential and non-residential). Consider public lands dedication requirement for neighborhood and community parks to complement regional parks impact fee;
- Clarifying throughout the LUC and Development Standards that alternative “sustainable” forms of open space such as community gardens are allowed to be counted towards any required open space;
- Making clear that limited size community gardens may sell produce to encourage active open space usage;
- Adopting tailored common open space set aside and dedication requirements for infill and redevelopment areas that are flexible and allow alternative forms and configuration for open space credit; and
- Considering stronger, clearer city-wide protection regulations for mature trees on private property with mitigation/replanting options.

## Green Building

Tucson has taken significant steps to promote green building design in both public and private development through its commitment to applying a LEED Silver or higher rating for all new city buildings and major renovations and its work developing a voluntary Residential Green Building Rating System that is tailored to the unique circumstances of the city’s desert environment. With these important foundations in place, the city has an opportunity to expand its current efforts and to address these issues more directly in the LUC. In particular, the LUC needs to more explicitly address the types of green building techniques that the city wishes to encourage—ensuring that innovative and more sustainable approaches to site planning and design are not precluded by current regulations.

Some of the potential changes identified include:

- Expanding the existing Residential Green Building Rating System to include all types of development and redevelopment and possibly making some or all aspects of the system mandatory;
- Expanding existing renewable energy generation provisions to more explicitly address appropriate locations and standards for the full range of renewable energy facilities;
- Revamping existing strict non-conforming use/structure regulations to encourage redevelopment and alternative energy retrofits of existing buildings; and
- Clarifying historic district regulations to ensure solar systems and other renewable energy facilities are not precluded.

## Climate Change and Air Quality

Tucson has already begun to revamp its development codes to address climate change and other sustainability topics. Many minor revisions have been made throughout the LUC to remove barriers to installation of solar panels. For example, Section 3.2.12 makes clear that solar energy collectors are permitted in all zone districts. Similarly, solar panels are protected from shadowing by multi-story structures on adjacent lots. Additionally, the city has adopted related measures such as the ground-breaking solar-ready housing ordinance that requires

## EXECUTIVE SUMMARY

builders of single-family and duplex residential dwelling units to “stub in” the electrical and plumbing systems to accommodate future solar systems. Moreover, to promote compact mixed-use and infill development, Tucson has recently adopted new zone districts such as the Downtown Infill Incentive District. All of these measures have helped to lay the foundation for the major amendments to the LUC and Development Standards necessary to address climate change and air quality in Tucson.

Some of the potential changes identified include:

- Expanding allowable use of accessory/secondary dwelling units to promote more compact, infill development without large-scale, multi-story buildings;
- Removing barriers for other alternative energy systems like wind and ground-source heating/cooling;
- Revamping existing strict non-conforming use/structure regulations to encourage redevelopment and alternative energy retrofits of existing buildings; and
- Adopting clear, simple design guidelines and development standards for infill throughout the city, not just a limited number of districts.

## PRIORITY RECOMMENDATIONS SUMMARY

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### Background

Building on its recent and current sustainability initiatives, the City of Tucson can make even greater progress towards its sustainability objectives through changes in its land use regulatory framework. This section contains a summary of priority recommendations for changes to the city's LUC.

Recommendations in each of the eleven topic areas outlined in this Diagnosis were reviewed by city staff and evaluated in terms of their feasibility, potential effectiveness in addressing the issues identified, and resources required to implement. Preliminary priority recommendations were sorted into three categories:

- **Proceed**—means the recommendation is ready to be drafted into either an LUC text amendment or a General Plan policy with minor adjustments.
- **Consider After More Research** – means the recommendation may be a viable idea, but more information about the details of implementing the recommendation is needed before time is invested in creating a text amendment.
- **Postpone** – means the recommendation may be too complicated or a low priority for this project right now.

Staff's preliminary priority recommendations were organized according to seven topic areas and presented to stakeholders during a second series of stakeholder workshops on January 31 and February 1. The narrower range of topic areas defined by staff allows recommendations to be streamlined in terms of their repetition within the Diagnosis and links them to priorities identified by Mayor and Council. Topic areas are listed below, along with an explanation of their relationship to the original eleven topic areas discussed in the body of the Diagnosis, if recommendations relate to more than one topic area:

- **Water/Land Use Planning**—includes recommendations from the Water Quality and Conservation section;
- **Infill Barriers**—includes recommendations from the Housing Accessibility, Diversity, and Affordability; Mobility and Transportation and Alternative Fuels, and Green Building; and Community Health and Safety sections;
- **Alternative Energy**—includes recommendations from the Alternative Energy Production and Energy Conservation; Climate Change and Air Quality; and Urban Heat Island sections;

- **Urban Food**—includes recommendations from the Food Production and Nutrition and Community Health and Safety;
- **Green Buildings**—includes recommendations from the Green Building and Urban Heat Island sections;
- **Recycling and Waste Reduction**; and
- **Open Space, Parks, and Trails**.

Based on input received during these workshops, a revised set of priority recommendations was prepared, as outlined in this chapter. These recommendations will serve as the basis for Phase II of the Sustainable Land Use Code Integration Project, which is anticipated to begin in May-June 2011.

## Priority Recommendations

The priority recommendations that follow are considered to be specific areas of focus that will be used to guide LUC amendments during Phase II of the Sustainable Land Use Code Integration Project. They are not intended to represent actual code language. The drafting of LUC language in the next phase of the project will clarify and codify specific provisions to implement the concepts embodied in these priority recommendations. For brevity, recommendations identified as 'Postpone or Do Not Do' are not included in this Executive Summary. Please see Section 3: Priority Recommendations to view these recommendations.

### WATER/LAND USE PLANNING

Priority recommendations related Water/Land Use Planning include:

#### Proceed

- Establish water budgets for landscaping irrigation to promote water conservation and encourage use of non-potable water sources (e.g., reclaimed water, rainwater). (Land Use Code)
- Create incentives for projects that utilize the reclaimed water system. (Land Use Code)
- Clarify definition of pervious materials appropriate for use in Tucson. (Land Use Code)

**Allow and clarify that rainwater cisterns can encroach into side and rear yard setbacks. (Land Use Code)**  
**Consider After More Research**

- Allow and encourage broader use of pervious materials for streets, sidewalks, and parking lots in low-traffic areas. Consider requiring a minimum percentage of pervious materials in parking lots. (Land Use Code)
- Encourage or consider requiring passive water-harvesting earthworks in residential developments. (Land Use Code)
- Encourage that a portion of street rights-of-way be reserved for trees and green infrastructure (also reduces Heat Island Effect). (Land Use Code or new Technical Manual)

### INFILL BARRIERS

Priority recommendations related to Infill Barriers include:

#### Proceed

- Create design standards for mixed-use/transit-oriented development that address distinctions between corridors, intersections, and districts and can be adapted for use by projects throughout the city, especially as part of future Urban Overlay Districts (UODs), Planned Area Development (PAD) rezonings, and within the Downtown Area Infill Incentive District (IID). Standards should address transitions to adjacent single-family neighborhoods and historic buildings or districts. Create incentives for desired development patterns (e.g., transit-oriented development, affordable housing, and adaptive reuse) through increased flexibility in landscaping, parking, open space, height, density, and other requirements. (Land Use Code or new Technical Manual)

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- Allow “green” renovations/expansions to existing non-conforming buildings (e.g., adding solar panels, insulation, etc.) to take place without bringing entire site or building into compliance with the LUC or allow expansions that reduce the degree of nonconformity or do not increase it to proceed without full compliance. Clarify current twenty-five percent expansion rules. (Land Use Code)
- Update purpose statements in zone districts to clarify where infill and redevelopment are desirable and to address neighborhood compatibility issues as applicable. (Land Use Code)

### **Create safe work/school route requirements. (General Plan and Land Use Code) Consider After More Research**

- Clearly delineate areas targeted for infill development in the city on the city’s General Plan maps and Zoning Map. Maps would visually depict where the city’s General Plan policies, transportation goals, and zoning regulations intend to promote redevelopment and identify the adjacent neighborhoods that would require protection from potentially incompatible development. (General Plan)
- Increase allowed density and consider establishing minimum densities near transit stations for future modern street car and other major transit nodes. (Land Use Code)
- Review and clarify existing regulations to promote greater pedestrian access (easements if necessary) from subdivisions and commercial buildings to public streets. Allow breaks in screening devices and perimeter walls for pedestrian access as necessary. (Land Use Code)
- Provide more specific and aggressive standards to promote road connectivity (e.g., “connectivity index” for new subdivisions). (Land Use Code or new Technical Manual)
- Offer streamlined/expedited processing or reduced fees for affordable housing projects. (Land Use Code or new Administrative Manual)
- Review existing Pima Association of Governments (PAG) ordinance and determine whether a travel demand management plan for larger commercial and multi-family developments would be beneficial at the local level. (Land Use Code)
- Adopt standards allowing for narrow streets where appropriate based on traffic volumes and where they do not impede the delivery of city services. (Land Use Code or new Technical Manual)
- Remove restrictions on accessory dwelling units with compatibility standards, if the standards can address concerns about the loss of neighborhood character. (Land Use Code)

## ALTERNATIVE ENERGY

Priority recommendations related to Alternative Energy include:

### **Proceed**

- Consolidate solar access provisions and clarify to address solar access protection, design of roof angle, orientation, and minimum percentage of solar oriented lots or buildings required in new developments. (Land Use Code)
- Review existing renewable energy generation provisions and expand to more explicitly address appropriate locations for different types and scales of renewable energy facilities (e.g., solar, wind, geothermal). Create separate definitions and standards as necessary to address issues of compatibility (e.g., historic districts). (Land Use Code)
- Allow electric vehicle charging stations as an accessory use in all zones in conjunction with all gas fueling stations; consider pre-wired parking spaces for the future. (Land Use Code)
- Allow fee incentives for renewable energy facilities. See AZ state statutes on Renewable Energy Incentive Districts. (Land Use Code)

**Consider After More Research**

- Expand solar ready requirements to include commercial buildings (most existing buildings are not designed to support the addition of solar at a later date). (Tucson Code or Land Use Code)
- Review and consider amending outdoor lighting code to require LED or other energy-saving technology to reduce over-lighting and conserve energy. (Land Use Code)
- Explore the possibility of requiring or providing incentives to encourage commercial property owners to measure and rate, or “benchmark” the energy performance of their buildings and make energy ratings available to the public. Consider both point of sale and new construction thresholds. (Land Use Code)
- Require minimum alternative energy percentage generation or purchase for new developments. (General Plan)
- Create a Solar Rights Act for the City of Tucson (similar to State of New Mexico Solar Rights Act) that enables users that record with the Recorders’ Office to retain that access. (Tucson Code)

**REMOVE OUTSIDE STORAGE LANDSCAPE EXEMPTIONS FOR CAR DEALERSHIP PARKING AREAS. (LAND USE CODE) URBAN FOOD**

Priority recommendations related to Urban Food include:

**Proceed**

- Better define agricultural uses in LUC (e.g., “general farming”). (Land Use Code and Tucson Code)
- Add a definition for community gardens and allow as a primary use in residential districts and as an accessory use in other districts. (Land Use Code)
- Allow accessory buildings such as greenhouses and small animal enclosures (e.g., rabbits, chickens) within side and rear setbacks, subject to compatibility standards. (Land Use Code) Consider After More Research
- Clarify the types, size, and number of animals (goats, pigs, chickens, rabbits, etc.) permitted in appropriate zones and expand to allow small-scale animal raising in zones where it will not create a nuisance. (Land Use Code)
- Clarify allowances for the sale of produce produced on site (e.g., vegetables, fruit, and eggs) to include community gardens and backyard gardens, with some limitations (Land Use Code)
- Allow farmer’s markets in a broader set of zone districts as a primary use. (Land Use Code)

**GREEN BUILDINGS**

Priority recommendations related to Green Buildings include:

**Proceed**

- Allow “green” renovations/expansions to existing non-conforming buildings (e.g., adding solar panels, insulation, etc.) to take place without bringing entire site or building into compliance with the LUC or allow expansions that reduce the degree of nonconformity or do not increase it to proceed without full compliance. Clarify current twenty-five percent expansion rules. (Land Use Code)
- Allow exterior window shades, awnings, and roof overhangs, and other appropriate shade structures to encroach into setbacks. (Land Use Code)
- Consider requiring cool roofs (e.g., a minimum level of solar reflectance for all roofs) or providing incentives to encourage them. (Land Use Code)
- Prohibit limitations on clotheslines in subdivision CC&Rs and specifically allow as an accessory use in all residential zone districts. (Land Use Code)

## EXECUTIVE SUMMARY

- Allow a green, vegetated roof to count as a percentage of open space requirements. (Land Use Code)
- Consider requiring pervious pavement materials for portion of parking areas. (Land Use Code and new Technical Manual)Consider After More Research
- Consider providing incentives for or requiring shade structures on building facades and roofs, and in parking lots. (Land Use Code)
- Require paving materials to have a solar reflectance index of at least 29 to reduce solar gain and the urban heat island effect or offer incentives to encourage the same. (Land Use Code)
- Create a permitting process allowing the building of projects meeting the Living Building Challenge. (Land Use Code)
- Impose a maximum limit on provided parking (e.g. 125% of the minimum standard) to reduce impervious surface/pavement and mitigate the urban heat island effect. (Land Use Code)
- Consider changing current parking standards to require both the tree requirement (1 tree per 4 parking spaces) and the shade requirement (50% shading from trees and buildings) instead of allowing an option to provide one or the other. (Land Use Code)

## RECYCLING AND WASTE REDUCTION

Priority recommendations related to Recycling and Waste Reduction include:

### Proceed

- Promote/require use of organic mulches as part of landscaping plans as a more sustainable, local, and low-energy groundcover than gravel and rock. (Land Use Code)
- Require or create incentives for the on-site reuse of a percentage of "green waste" or materials that may be converted to mulch. (Land Use Code)
- Require that construction management plans be required for projects of a certain size and that the handling of construction be detailed in the plan or require a certain percentage of construction waste be recycled. (Land Use Code)Consider After More Research
- Allow and possibly require recycling and/or compost stations in appropriate zones as a permitted or special exception use with locational and operational standards; consider allowances that on-site composting facilities may accept off-site compostable materials. (Land Use Code)

## ADD DEFINITIONS FOR GAS TO ENERGY USE AND THEN ALLOW IN CONJUNCTION WITH OTHER LARGE WASTE DISPOSAL AND RECYCLING SITES. (LAND USE CODE)OPEN SPACE, PARKS, AND TRAILS

Priority recommendations related to Open Space, Parks, and Trails include:

### Proceed

- Clarify that alternative forms of open space (e.g., roof top gardens and/or community gardens) may be counted towards required open space. (Land Use Code)

### Consider After More Research

- Require the planting of vegetation native to the Tucson Basin along all waterways. (Land Use Code)
- Adopt a standard for public land access maintenance as part of open space planning for larger developments. (Land Use Code)

# Section 1: Introduction

## PROJECT OVERVIEW

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The Sustainable Land Use Code Integration Project is one of a series of projects commissioned by the city's Office of Conservation and Sustainable Development (OCS D) and financed by a Department of Energy (DOE) Energy Efficiency Conservation Block Grant (EECBG). The purpose of this project, which is being undertaken in collaboration with the city's Planning and Development Services Department (PDSD), is to prepare a sustainability analysis of the Land Use Code (LUC), identify a series of recommended amendments to the LUC, and ultimately to implement amendments that are in compliance with the City of Tucson's sustainable goals and policies. The project includes two phases: 1) preparation of a diagnostic report on the status of the current LUC and recommended revisions to better meet the city's sustainability goals; and 2) preparation of text amendments to the city's LUC and other development regulations to better reflect the city's sustainability goals.

This Diagnosis constitutes the third of three milestones established for the first phase of the Sustainable Land Use Code Integration Project, which includes the following:

- **Milestone 1: Project Initiation**—During this initial task, city staff from OCS D and PDSD prepared an inventory of the city's sustainability policies in eleven key areas to serve as foundation for the process. Using the policy inventory as a guide, the project team met with city staff and conducted a series of stakeholder interviews with elected and appointed officials, local builders, renewable energy experts, developers, attorneys, neighborhood residents, and design professionals. Stakeholders were asked to provide input on potential barriers to sustainable development and regulatory gaps in the LUC and other development regulations in each of the inventory topic areas.
- **Milestone 2: Inventory and Summary of City Sustainability/Energy Efficiency, and Conservation Goals and Policies**—As part of this task, city staff researched and prepared a summary of existing city sustainability and energy efficiency/conservation goals, policies, plans, and recent or proposed ordinances. This summary and input received during the stakeholder interviews during Milestone 1 served as a foundation for the preparation of this diagnosis.
- **Milestone 3: Code Diagnosis**—As part of this current task, the project team conducted a thorough review of the LUC, Development Standards, Design Guidelines, draft ordinances under consideration by the City, and other relevant documents provided by the city and various stakeholder groups. This task and Phase I efforts are scheduled for completion in May 2011.

The city is currently in the planning stages for work on Phase II of the Sustainable Land Use Code Integration Project (preparation of sustainable code amendments) which is anticipated to begin in mid-2011.

## MAJOR THEMES

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Several major themes emerged from stakeholder interviews and discussions with city staff conducted as part of the project initiation phase.

- **Build on what's already been done**—many stakeholders noted that the city has many other efforts and initiatives underway (or that were recently completed) in support of its sustainability policies; while this effort is focused solely on sustainability as it relates to the LUC specifically, a clear understanding of recent and parallel efforts was necessary to help shape the recommendations contained in this diagnosis and are noted where applicable

## INTRODUCTION

- **Streamline the process**—stakeholders expressed concern about the lack of predictability in the development review process and the length of time needed to process “unique” projects that may not be consistent with the requirements of the LUC but are consistent with the city’s sustainability goals. While it was acknowledged that the city has a variety of tools intended to help provide opportunities for alternative approaches (e.g., Planned Community Development District, Downtown Infill Incentive District, Flexible Lot Development Option, and others,) there was consensus that more could be done generally in the LUC to help encourage more creative and sustainable development practices. In a number of instances, participants indicated that there was a lack of clarity in the LUC about what was desired in different areas of the city and that clearer guidance would increase predictability for the development community, property owners, and neighborhood residents.
- **Incorporate new requirements, but offset with incentives and flexibility**—stakeholders acknowledged that in many instances, new requirements would be needed in the LUC to address sustainable development practices; however, it was noted that flexible requirements and/or incentives were preferable to allow applicants to address a particular requirement in the most cost efficient and practical manner for each project. In addition, it was noted that many sustainable technologies (e.g., solar, wind) are advancing and changing very rapidly and that some flexibility should be built into the LUC to allow for administrative approval of new materials and technologies that are equal to or better than what’s actually required as these opportunities arise.
- **Address adaptive reuse as well as new development**—a particular challenge noted by stakeholders was that the LUC generally applies the same requirements to the adaptive reuse of an existing building or site and infill development as it would to an undeveloped site. It was noted that this one-size-fits-all approach may reduce the viability of reuse and revitalization on many of the city’s more challenging sites.

In addition the overarching themes outlined above, detailed recommendations related to each topic also emerged. These more topic-specific recommendations have been incorporated, as appropriate, throughout this diagnosis.

## RELATED EFFORTS UNDERWAY

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### Citywide Sustainability Initiatives

In addition to this Sustainable Land Use Code Integration Project, the city has many other current sustainable policies and programs in place and has supported sustainable initiatives for years. The following is a list of some of the more notable non-LUC, sustainable programs the city has initiated or joined in:

- **Framework for Advancing Sustainability (2008)** — provides a vision for sustainability for the city’s internal operations to reduce fossil-fuel-dependency and to become a more stable, secure, and healthy community that is in balance with the desert environment. It identifies goals, targets, and indicators for each sustainable initiative. A Climate Change Committee, composed of cross-section of public and private members, was formed as part of the Framework to help advise and lead the city in its efforts to implement the Framework.
- **Mayors’ Climate Protection Agreement (MCPA) (2006)**— the city adopted a resolution to support the MCPA, which encourages cities to reduce cumulative greenhouse gas emissions to seven percent below 1990 levels, including changes to land use and transportation systems, energy and water conservation, use of alternative fuels and renewable energy, and waste reduction and recycling.
- **Creation of the Office of Conservation and Sustainable Development (OCSA) (2006)**— the OCSA was created in 2006 and was only the fifth dedicated sustainability office in the country. The office helps to coordinate the sustainability efforts of city departments and communicates and educates the public on sustainable issues and involvement. It also publishes a comprehensive annual Sustainability Report that

summarizes the major sustainable accomplishments, programs, and awards the city has achieved over the past year.

- ***Leadership in Energy and Environmental Design (LEED) (2006)*** — The city has adopted the LEED Silver (or better) standard for all new city buildings, including Fire Central, the Reid Park Zoo Conservation Learning Center, and the Sun Tran Bus Storage and Maintenance Facility.
- ***Solar Integration Plan (2009) and Greater Tucson Solar Development Plan (2009)***— these two separate but related plans were developed through the Tucson Solar Initiative that was sponsored through the U.S. Department of Energy. Both plans are intended to facilitate the development of solar energy facilities in Tucson and the surrounding region and build on previous solar-related efforts, such as the Tucson-Pima County Metropolitan Energy Commission and the Sustainable Energy Standard (1998).
- ***Beat the Peak (1976)*** — this is Tucson Water’s flagship water conservation program that has educated the community’s youth and others how to conserve water, especially during summertime peak demand.
- ***Urban Landscape Framework (2008)*** — this plan proposes sustainable design principles for the city’s trees and urban landscape based on guidance from the General Plan and the Livable Tucson Visioning Program (1997).

## Land Use Code Reorganization Project

Concurrent with the Sustainable Land Use Code Integration Project, the city is also in the broader process of the Land Use Code (LUC) Reorganization Project. The general purpose of the LUC Reorganization Project is to consolidate the requirements of the LUC, Chapter 23A Development Compliance Code, and the Development Standards into one new Unified Development Code (UDC) that minimizes redundancy and organizes the code into a more logical, simple, and user-friendly format. For example, the new UDC will replace the more than 80 pages of repetitive text that lists the permitted and special exception uses for each zoning district with a single use table that will allow readers to quickly determine where each use is allowed and compare uses between districts.

The LUC Reorganization Project also includes one significant substantive code change, which is the replacement of the current Development Designator System (DDS) for dimensional standards with a simpler and more uniform set of dimensional standards for each zone district. Because the DDS system provides a highly nuanced and contextual set of dimensional standards (e.g., side and rear setback are determined by adjacent zoning), it can be difficult to apply and often makes fine regulatory distinctions with little practical benefit. The intent is to replace the DDS with single set of one (or two) dimensional standards (minimum lot size, lot coverage, density, height, setbacks) for each district and then relocate any special dimensional standards to the proposed new use table mentioned above.

A final draft of the reorganized UDC is scheduled to be completed by June 2011, after which the City Council will review and consider adoption. The city’s intent is to use the adoption of the reorganized UDC as a springboard to consider broader substantive changes to the code. These subsequent substantive changes would be adopted independent from but coordinated with any substantive code changes resulting from the Sustainable Land Use Code Integration Project.

In the Diagnosis below, the text distinguishes between comments that pertain to the current LUC or to the proposed changes to the DDS or some other major pending code amendment (e.g., parking standards).

## ORGANIZATION OF THIS DOCUMENT

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In addition to this introductory section, this document contains two primary sections:

### Diagnosis

This section contains a diagnosis of relevant LUC provisions as they pertain to each of the eleven topics identified by staff as part of the Inventory and Summary of City Sustainability/Energy Efficiency, and Conservation Goals and Policies. The diagnosis identifies:

- *Current regulations* relevant to each topic are summarized.
- Potential *barriers* in the LUC, Development Standards, and Design Guideline Manual as well as other sections of the municipal code related to alternative energy production and energy conservation, possible revisions to remove those barriers, and examples of other communities who have adopted or are considering similar regulatory changes;
- Potential *incentives* for consideration to encourage alternative energy production and energy conservation; and
- Specific *recommendations to fill regulatory "gaps."*

In addition, examples from other cities across the country are provided to demonstrate the range of potential regulatory solutions that exist.

### Priority Recommendations

This section highlights priority recommendations for each of the eleven key sustainability topics. Priority recommendations generally include recommendations identified as part of the diagnosis that could be readily implemented through targeted amendments to the LUC or that would remove significant barriers to the city's sustainability goals. These priority recommendations will serve as the foundation for Phase II of the Sustainable Land Use Code Integration Project, which will include preparation of text amendments to the city's LUC to better reflect the city's sustainability goals.

# Section 2: Diagnosis

## OVERVIEW

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Based on a review of city policies and goals, staff identified eleven key sustainability topics as a foundation for the Inventory and Summary of City Sustainability/Energy Efficiency, and Conservation Goals and Policies prepared during Milestone 2. The topics include:

- Water Quality and Conservation;
- Alternative Energy Production and Energy Conservation;
- Mobility and Transportation and Alternative Fuels;
- Urban Forestry and Urban Heat Island;
- Housing Accessibility, Diversity, and Affordability;
- Community Health and Safety;
- Food Production and Nutrition;
- Recycling and Waste Reduction;
- Open Space, Parks, and Trails;
- Green Building; and
- Climate Change and Air Quality;

This section inventories current regulations in the LUC, Development Standards, and Design Guidelines that either support or hinder the city's goals related to each topic and provides specific recommendations intended to remove barriers, create incentives, or establish new standards to encourage a more sustainable pattern and practice of development over time. Although the focus of this effort is on the LUC specifically, a number of Tucson's current regulations related to the eleven key sustainability topics are not located in the LUC, but in the Development Standards, Design Guidelines, or other ordinances. Therefore, these other sources are cited, as appropriate, in addition to the LUC in the inventory of current regulations provided for each topic. Recommendations for each topic, however, are limited to the LUC.

Due to the interrelated nature of a number of these topics, some overlap between current regulations and recommendations may occur between topics. Redundancy has been retained to ensure that each topic may be reviewed and applied independently, if desired.

## WATER QUALITY AND CONSERVATION

### Introduction

Perhaps no issue is more important to Tucson's future than ensuring a safe and adequate supply of water. Finding creative ways to secure, distribute, and conserve water has been a central focus of the desert community from its foundation and continues to today. The city estimates that its future demand for water will more than double from 129,000 acre feet per year to 253,000 acre feet of water by 2050 in order to serve its projected growth. And given that the city is becoming increasingly dependent on its fixed but unreliable allocation of imported Colorado River water, much of the new "supply" will have to come in the form of conservation, such as rainwater harvesting, stormwater detention to recharge aquifers, greywater systems, and maximizing the use of effluent and reclaimed water. The city's challenge is to meet its future demand in a sustainable way that not only conserves the quality and quantity of surface and groundwater (and associated riparian habitats) but does so at a reasonable and fair cost to the consumers.



*Active rainwater harvesting.*

Supplying water for a city is not simply a technological issue but an ecological issue as well. For example, the city's early over-reliance on the surface flows of the Santa Cruz River has caused the river to run dry through most of the year and destroyed much of its associated riparian habitat. More recently, the overuse of local groundwater to supply domestic water needs has resulted in significant land subsidence, increased pumping costs to compensate for dropping groundwater levels, and the gradual loss of riparian habitat along hydrologically-connected washes. These negative impacts are difficult and sometimes impossible to reverse. In addition, development dispersed in locations where the local water supply is not sustainable creates the need to overdraft groundwater, import water from adjacent or distant areas, extend costly infrastructure, and to supply the additional energy to pump water over greater distances. Better planning is needed.

This better planning requires that land use planning and water planning be carefully coordinated rather than operate in separate orbits. The traditional problem is that city officials and planners have rarely, if ever, based the approval of the amount or location of new development on the availability of water. Instead, decision-makers have simply assumed that the local water utility would supply whatever amount of water was necessary to service the approved growth. Most communities have not moved beyond these assumptions and continue to approve growth with little coordination between those who are responsible for the land, water, and finances of the city. To the city's credit, it is trying to shift away from the flawed "demand-driven" model of water provision and to better coordinate water supply limits with development. Tucson Water's recent interim decision to limit water service to its currently delineated obligated service area, instead of pre-committing to servicing large swaths of undeveloped areas, is a step in the right direction.

### Current Policies and Programs

Tucson Water is the largest water provider to the city and surrounding areas. It supplies approximately 72% of the municipal water demand in the region and serves about 800,000 customers, approximately 60 percent of whom are located in the city. About 56% of Tucson Water's total municipal service is for single family households, 19% for multi-family, and 35% for commercial users. Tucson Water also operates a reclaimed water system that provided 15,000 acre-feet of water in 2007 to 18 golf courses, 704 single-family residences, 47 parks, and 61 schools, as well as 1,600 acre-feet to the Town of Oro Valley. The reclaimed water is itself provided by the Pima County Regional Wastewater Reclamation Department, which operates and maintains the second largest

wastewater reclamation system in Arizona, serving almost 260,000 customers over a 700-square mile service area.

Tucson is a recognized leader in water conservation. The fact that the average household in Tucson uses 99 gallons of water per day (GPCD), which compares very favorably to other desert cities, such as 169 GPCD for Phoenix and 220 GPDCD for Las Vegas, is testament to the effectiveness of the city's current water conservation efforts. Over the years, efforts to educate the community through the successful "Beat the Peak" program, provide free residential water audits through the Zanjero program, offer rebates and incentive for ultra-low-flush toilets and other water-saving measures has led to tangible success. Recent changes to the plumbing code to require rainwater harvesting for commercial development and greywater stubouts in new residences will further help to conserve water. The city also tracks the amount of renewable water Tucson Water has available for use by proposed new developments through its "water checkbook" program and has an audit program that inventories the city's water use and recommends ways to increase the efficiency of the city's facilities and reduce water for landscaping.

Perhaps most impressive is the city's current multi-jurisdictional and comprehensive "City/County Water and Wastewater Infrastructure, Supply, and Planning Study," ("Water Study") conducted in conjunction with Pima County. The Water Study demonstrates serious leadership on the part of the city and region in managing its water resources. With two phases of the five phase process complete, the study provides recommendations to address how the region should balance water supply and demand in the long term, financially plan for infrastructure upgrades, promote intergovernmental cooperation, and integrate a more holistic planning perspective that coordinates water issues with land use controls and incentives. It recently released a draft "Action Plan for Water Sustainability" to implement the recommendations in the Phase 2 report. In November 2010, both the Tucson City Council and Pima County Board of Supervisors adopted an historic agreement which establishes 87 goals to ensure enough water to survive a drought, population growth and keeping costs within the family budget.

The LUC addresses water usage in a number of ways, including strict limits on turf grass, requirements to use drought-tolerant landscaping and efficient irrigations systems, and a requirement that reclaimed water be used for some projects. Even though these efforts exceed those found in many communities, there is no comprehensive program in the LUC to link land development and water conservation.

State law also plays a major role in managing water because water in Arizona is owned by the state. In addition to requiring local jurisdictions to prepare drought response plans to prioritize actions to reduce water usage during a drought, the state passed the Groundwater Management Act of 1980 that prohibits the depletion of groundwater throughout the state. This act delineates a number of Active Management Areas (AMA) in which groundwater must be conserved – the Tucson area being one of the larger AMAs. New development within the AMA is required to demonstrate that their existing, committed, and reasonably foreseeable future water demands can be met using renewable water supplies over a 100-year period. However, some small private water companies, agricultural interests, and industrial water users are exempted under the act and so are not required to shift to renewable supplies and can continue to overdraft ground water. Thus, it appears that residential and commercial development would be the primary opportunities for the LUC to address water conservation, although the exempt users should certainly be encouraged to reduce water usage through the code and other means.

## Summary

Most of the city's water conservation measures and programs have not been enacted through the LUC. For example, the recent adoption of the rainwater harvesting and greywater stub-out ordinances amended Chapter 6 of the Civil Code. This is partially a result of water policy traditionally being separated from land use planning but it is also because most "technical" fixes for water conservation are more closely related to building code or plumbing code issues than the use of land.

However, as stated above, a change in thinking needs to take place so that the LUC becomes part of the city's water policy. While the LUC addresses water usage in a variety of ways, Tucson's location in the desert and uncertain water supply means that more should be done. In particular, the city needs standards to encourage or

## DIAGNOSIS | WATER QUALITY AND CONSERVATION

require more retention / detention of water on site from streets, sidewalks, and all hardscape so that water can infiltrate into the soil rather than run off the site. Recommendations to help the city manage its water supplies more sustainably include:

- Increase density where water is available, especially the four areas identified in the Water Study (i.e., infill in the existing built environment, the Houghton corridor, the Southlands area, and the Southwest area).
- Provide density bonus for development that connects to reclaimed water system.
- Require that riparian vegetation be protected from groundwater pumping.
- Address setback issues for rain barrels or other water conservation infrastructure.
- Provide bonuses for green infrastructure.



*Passive rainwater harvesting by incorporating green infrastructure in the place of traditional street cross-sections.*

### Current Regulations

The following table cites the primary current regulations in the LUC, Development Standards, Design Guideline Manual, and other sections of the municipal code related to water quality and conservation. It is not meant to be all-inclusive, but to highlight some of the key provisions currently on the books that are directly related to water quality. Additionally, related measures are set forth more generally in the Climate Change and Air Quality, Food Production and Nutrition, and Alternative Energy Production and Energy Conservation sections of this diagnosis.

Regulations Addressing Water Quality and Conservation	
REF.	REGULATION
<b>Land Use Code</b>	
2.8.1	<b>Hillside Development Zone</b> —Standards for developing on steep slopes to reduce soil erosion, reduce water run-off, and minimize grading.
2.8.6	<b>Environmental Resource Zone (ERZ)</b> — Protects designated washes from incompatible development and to help control erosion, improve groundwater recharge, and protect 100% of qualifying riparian vegetation or mitigate as necessary.
3.2.5.2.F	<b>Accessory Structures</b> — Excepts buildings less than five feet in height and ten square feet or less in area from accessory structure standards, such as setbacks. This exception would apply to cisterns (rainbarrels) according to a recent interpretation by the Zoning Administrator.
3.6.1	<b>Flexible Lot Development</b> — provides flexibility in subdivision lot layout and design to avoid and buffer sensitive habitat areas, such as riparian area and drainages, to help protect water quality.
3.7.0	<b>General Landscaping Standards</b> —Requires use of drought-tolerant landscaping to reduce irrigation demand, water consumption, soil erosion, and to assist in water recharge.
3.7.2.2	<b>"Oasis" Exception</b> —Nondrought-tolerant landscaping allowed for small "oasis" areas (2.5 to 5% of site). Public parks, golf courses, and some similar uses are not subject to oasis limits.
3.7.2.5	<b>Turf</b> —Turf is only allowed in an oasis area. Turf areas of 10 acres or more are regulated by the state.
3.7.4	<b>Use of Water</b> —Water-conserving landscape design required, use of reclaimed water required consistent with Mayor and Council Water Policies, all landscape plans reviewed by Tucson Water

Regulations Addressing Water Quality and Conservation	
REF.	REGULATION
	for compliance with water policies, stormwater run-off must be addressed, requirements for efficiency and size of water features. Water-conserving irrigation system is required—stormwater and run-off harvesting required to supplement drip irrigation.
3.8.1	<b>Native Plant Preservation</b> —Requires preservation and/or mitigation of native plants that reduce demand for new landscaping and irrigation.
4.1.8.1	<b>Street Standards</b> — Provides for street design, including drainage.
4.1.8.7	<b>Hydrology</b> — Requires all subdivisions to comply with city’s floodplain regulations; Development Standard 10-01.0 Stormwater Retention/ Detention Manual, Development Standard 10-02.0, Manual for Drainage Design and Floodplain Management.
<b>Development Standards</b>	
2-06.3.0	<b>General Landscaping Standards</b> — Provides additional details on compliance with oasis requirements.
2.06.5.0	<b>Water Conservation and Irrigation Standards</b> — Provides additional details on compliance with irrigation requirements of LUC, such as technical specifications of the irrigation system and plant maintenance standards.
2.16.0	<b>Landscape Plant Materials</b> — Provides additional details on drought-tolerant vegetation that can be used for landscaping and provides a native seed list.
9.06.0	<b>Floodplain, Wash, and Environmental Resource Zone</b> — Provides additional details on LUC and city code (Chapters 26 and 29) requirements related to floodplains and washes.
<b>Design Guidelines</b>	
None	None
<b>Other</b>	
Ch. 6 6-181	<b>Commercial Rainwater Harvesting Ordinance</b> —Requires commercial developments to submit a rainwater harvesting plan and to supply 50% of the site’s irrigation for landscaping with harvested rainwater. It also prohibits private covenants from restricting the use of rainwater systems.
Ch.6 6.38	<b>Grey Water “Stub-outs”</b> —Requires all new single family and duplex residential units to have a grey water “stub out” so that a greywater system can be connected in the future and used for irrigation of landscaping.
Ch. 26	<b>Floodplain, Stormwater, Erosion Hazard Management</b> —Provides basic standards for development in and near floodplains to meet FEMA requirements and stormwater controls to help meet federal and state clean water requirements regarding stormwater discharges into surface waters.
Ch. 27 27.110 Art. VI Art. VIII	<b>Emergency Water Conservation Response and Drought Preparedness and Response Plan</b> — Provides an ordered plan for responding to droughts by prioritizing water-reduction measures at the various stages of a drought.
Ch. 29 Art. VIII	<b>Watercourse Amenities, Safety, and Habitat (WASH)</b> — Standards to promote groundwater recharge and riparian vegetation in washes and areas surrounding washes. Requires mitigation in “resource area” (area within wash and up to 50 feet from bank if good vegetation exists).
Ord. 10210	<b>Water Harvesting Guidance Manual</b> —Provides examples of different water harvesting techniques, describes benefits, and summarizes LUC requirements.

## Diagnosis

The following table contains a diagnosis of regulations addressing water quality and conservation.

<b>Diagnosis: Water Quality and Conservation</b>		
<b>Existing Provisions</b>	<b>Possible Revisions</b>	<b>Examples</b>
<b>REMOVE BARRIERS</b>		
<b>WQ-B.1:</b> Setbacks to perimeter yards do not provide exceptions for rainwater collection or grey water systems.	Allow structure associated with a rainwater collection (e.g., rain barrel) or grey water system to project into side and rear setbacks by five feet or more.	<ul style="list-style-type: none"> <li>Portland, OR, allows water collection cisterns under 6' in height in side and rear setbacks.</li> </ul>
<b>WQ-B.2:</b> Current regulations do not specifically allow pervious types of street or sidewalk paving materials or provide clear process to propose them.	Allow broader variety of pervious paving materials streets and sidewalks, especially "cool paving" surfaces, to reduce stormwater run-off and urban heat island effect. Provide clear criteria for approval of pervious surfaces.	<ul style="list-style-type: none"> <li>Golden, CO, offers 1 sustainability point, out of a required 25, for each 500 sq. ft. of pervious pavement.</li> <li>Scottsdale, AZ, grants points for its Green Building Program to construct 80% of exposed paving with light colored and permeable materials.</li> </ul>
<b>CREATE INCENTIVES</b>		
<b>WQ-I.1:</b> No apparent zoning-related program to encourage use of reclaimed water	Provide a density bonus, additional height, or some other kind of development bonus for development that utilizes the current reclaimed water system.	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>WQ-I.2:</b> The city has tools that encourage redevelopment through, in particular, its Infill Development District and draft Urban Downtown Core District.	Allow flexibility in compliance with certain development standards to facilitate redevelopment located within growth areas identified by city and where water supply is already adequate without major infrastructure improvements.	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>WQ-I.3:</b> Current regulations do not provide significant incentives to reduce impervious surfaces.	<ul style="list-style-type: none"> <li>Do not count pervious surfaces towards lot coverage limits, or discount pervious surfaces some percentage (e.g., 50%). Calculations for stormwater detention requirements should also be reduced if safe to do so.</li> <li>Clarify what types of pervious materials are suitable for Tucson's soils and climate.</li> </ul>	<ul style="list-style-type: none"> <li>Olympia, WA, Portland, OR, and Chicago, IL, encourage use of pervious pavement for residential streets and alleys.</li> </ul>
<b>WQ-I.4:</b> There are no development requirements or incentives for LEED-ND projects.	Offer density bonus, additional height, or other desirable development benefit for project that achieve LEED-ND water requirements.	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>WQ-I.5:</b> Green roof (which can improve stormwater quality and reduce runoff	Offer density bonus, additional height, or other desirable development benefit for installation of highly reflective roof	<ul style="list-style-type: none"> <li>Henderson, NV, allows green roofs as an alternative to other permitted roof forms and grants points in its</li> </ul>

Diagnosis: Water Quality and Conservation		
Existing Provisions	Possible Revisions	Examples
volumes) are encouraged but not provided with incentives in current regulations	materials or vegetated roof.	sustainability point review system for installation of cool or vegetated roofs.
FILLING REGULATORY GAPS		
<b>WQ-R.1:</b> There are no regulations that tie development potential to water availability or that channel growth to where water is most readily and cheaply available.	Identify the areas in the city most suitable for development based on water availability and current infrastructure (perhaps the four areas identified in the Water Study) and prioritize development in those areas.	<ul style="list-style-type: none"> <li>▪ N/A</li> </ul>
<b>WQ-R.2:</b> Recent rainwater harvesting ordinance applies to commercial projects only.	Consider expanding the requirement for rainwater harvesting to multi-family residential projects, and possibly to single family residences.	<ul style="list-style-type: none"> <li>▪ Santa Fe, NM, encourages rainwater collection as part of its green building code checklist.</li> </ul>
<b>WQ-R.3</b> Current regulations and policies provide requirements for stormwater retention/detention and design of such facilities.	<ul style="list-style-type: none"> <li>▪ Require more aggressive goals and requirements to increase on-site retention/detention of stormwater to allow greater infiltration into soil and irrigation use.</li> <li>▪ Consider requiring passive water-harvesting earthworks in front yard and private right-of-way landscapes in residential developments governed by an HOA.</li> </ul>	<ul style="list-style-type: none"> <li>▪ North Las Vegas, NV, is considering tailored stormwater retention standards for infill development instead of on-site retention which discourages redevelopment in many instances.</li> <li>▪ See U.S. EPA Water Quality Scorecard that encourages non-structural approaches to stormwater management. States of TN and WV proposing these approaches for state stormwater permits.</li> </ul>
<b>WQ-R.4:</b> Current regulations and policies provide requirements for stormwater management and some retention/detention and design for road and sidewalk facilities.	Require that city streets and sidewalks integrate green infrastructure so that ROW landscaping is watered through curb cuts, bioswales and other stormwater detention facilities to allow more landscaping and better water infiltration, instead of conveying water through ditches and culverts.	<ul style="list-style-type: none"> <li>▪ Oro Valley, AZ, requires developments to submit a rainwater harvesting plan as part of the development review process.</li> <li>▪ Covington, KY, has converted streets around its convention center to integrate green infrastructure (see photos above)</li> <li>▪ Numerous communities, including Portland, OR; NYC; Redmond, WA; Los Angeles, CA; and Chicago, IL; require green infrastructure.</li> </ul>
<b>WQ-R.5:</b> Current state regulations allow the groundwater used from one aquifer to be replenished or recharged by groundwater transferred from another aquifer.	If not prohibited by state law, specify in LUC that development (perhaps just new residential and commercial development) be required to supply all water from a local aquifer, as opposed to from a hydrologically disconnected aquifer, or some other renewable	<ul style="list-style-type: none"> <li>▪ N/A</li> </ul>

Diagnosis: Water Quality and Conservation		
Existing Provisions	Possible Revisions	Examples
	source, such as reclaimed water.	
<p><b>WQ-R.6:</b> While there are regulations to protect riparian vegetation associated with washes, there do not appear to be clear standards to prevent damage to riparian vegetation from usage that lowers the groundwater table.</p>	<p>While the approval of individual wells is regulated by the state, the city can control the land use effects of groundwater overuse by prohibiting the damage or destruction of riparian vegetation through groundwater use. This would apply to all types of development, including single family homes.</p>	<ul style="list-style-type: none"> <li>San Diego, CA, requires reclaimed water distribution systems where reclaimed water is available and suitable for irrigation.</li> </ul>
<p><b>WQ-R.7:</b> Recent rainwater harvesting has provision prohibiting private covenants from banning any rainwater harvesting systems.</p>	<ul style="list-style-type: none"> <li>Expand prohibition on covenants that ban rainwater systems to apply to greywater systems and other systems that collect, filter, or recycle water.</li> <li>Create a policy prioritizing the on-site harvest and beneficial on-site use of rainwater and stormwater from all new road and sidewalk projects.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<p><b>WQ-R.8:</b> Current regulations specify the use of specific types of conservation measures rather than focusing on the overall goal of water conservation.</p>	<p>Establish water budgets for landscaping irrigation to promote water conservation and encourage use of non-potable water sources (e.g., reclaimed water, rainwater).</p>	<ul style="list-style-type: none"> <li>State of California has adopted legislation requiring all local governments to adopt new water-efficient landscape regulations with water budgets and other next-generation requirements.</li> </ul>

## ALTERNATIVE ENERGY PRODUCTION AND ENERGY CONSERVATION

### Introduction

Alternative Energy production and energy conservation have been at the forefront of conversations in many communities in recent years as concern about the dependence of the country and many local economies on fossil fuels—coal, oil, and natural gas, has grown. The U.S. Department of Energy reports that more than 85 percent of the energy consumed in the United States comes from fossil fuels. This includes nearly two-thirds of our electricity, and virtually all of our transportation fuels. Over 63% of all oil that the nation uses is imported, a trend that has fueled growing national security concerns.

Energy generation from fossil fuels is the single largest contributor to greenhouse gas emissions, which have been linked to global warming and health impacts from air pollution. Awareness and interest in these issues have also increased as funding and incentives for renewable energy and energy efficiency projects have become more readily available to local governments and residents.



*Tucson's solar potential and leadership in using solar energy helped it gain its status as one of 13 Solar America Cities recognized by the U.S. Department of Energy (DOE) in 2007.*

In Arizona, most electricity comes from coal-fired power plants—major emitters of greenhouse gases. Throughout the desert Southwest, rising temperatures attributed to climate change are expected to increase demand for air conditioning, which will be further increased by projected growth, and which will in turn require more coal-fired electricity and result in more greenhouse gas emissions. While discussions about the importance of increasing our use of renewable energy sources (solar, wind, biomass, geothermal, and water) to help address these and other concerns have only recently begun in many parts of the country, Tucson and its partners have been taking action for years. Arizona is one of 29 states that have established a renewable portfolio standard. The Renewable Energy Standard and Tariff ("REST") became effective in August 2007 following approval from the Arizona Corporation Commission. Among other things, REST requires that 15 percent of the state's energy comes from renewable sources—either purchased or generated—by 2025. At the local level, the City of Tucson has committed to an ambitious goal of reducing community greenhouse gas emissions to seven percent below 1990 levels, by signing on to the Mayor's Climate Protection Agreement. One of several actions that the agreement calls for is the adoption and enforcement of land use policies that promote clean alternative energy.

Tucson Electric Power (TEP) provides energy to the City of Tucson. In accordance with REST targets, TEP has aggressively pursued efforts to expand the use of renewable energy at the utility-scale and residential or non-residential scale through a variety of programs. With more than 300 days of sunshine per year, it is no surprise that many of these programs center on solar technologies. TEP has offered or currently offers numerous rebates and incentives designed to encourage area residents and businesses to install solar water heaters and electric systems, among others. TEP is also offering incentive payments for residential and nonresidential small wind systems to encourage the installation of wind power; however, the feasibility of these systems is limited in most areas of the city due to low wind speeds. While these programs and incentives function independent of the City of Tucson, they represent an opportunity to bridge the city's efforts to increase efficiency in its facilities and operations with efforts to increase efficiency in private residential and non-residential development. To maximize the impact and effectiveness of TEP's programs and incentives, the city must ensure that its LUC explicitly addresses all types of renewable energy facilities and that it does not contain inadvertent barriers to these uses.

## DIAGNOSIS | ALTERNATIVE ENERGY PRODUCTION AND ENERGY CONSERVATION

The City of Tucson has worked closely with the Pima Association of Governments, TEP, Pima County, and other regional partners over the past ten years in its efforts promote energy conservation and efficiency. The city has been recognized nationally for the aggressive steps it has taken:

- In 2007, Tucson's solar potential and leadership in using solar energy helped it gain its status as one of 13 Solar America Cities recognized by the U.S. Department of Energy (DOE).
- The city requires that all new city-funded buildings and remodels over 5,000 sf use at least 5% solar energy and be LEED Silver certified.
- Energy efficiency retrofits at Tucson Water reduced electricity usage by 20%.
- Working with the Pima Association of Governments and other institutions, the city released a Greater Tucson Solar Development Plan in 2009.
- In 2009, the city placed \$7.6 million of Clean Renewable Energy Bonds to finance seven new city solar photovoltaic projects that were completed in 2009.
- The city's Environmental Services Department has initiated several major projects to convert methane gas from landfills to electric energy.

While these operational, technological investments and educational initiatives are critical, fossil fuels continue to be the predominant energy source for Tucson residents and much more much more will need to be done to meet the city's GHG reduction goals. The city's land development regulations that govern new growth, development, and redevelopment can play a key role.

### Current Policies and Programs

The City of Tucson has adopted numerous policies and programs to support alternative energy production and energy conservation, including those contained in the General Plan and the Framework for Advancing Sustainability. The General Plan includes many policies related to the support of programs intended to reduce energy consumption in government facilities and operations as well as increased energy, partnerships with public and private agencies to increase energy efficiency and sustainability in non residential uses, and programs to reduce energy consumption in housing. The Framework for Advancing Sustainability identifies practices, policies, and partnerships to help advance the city's many sustainability initiatives. With regard to alternative energy production and energy conservation, the framework identifies a series of initiatives, resolutions, and success indicators related to increased energy efficiency, use renewable energy, and use of alternative fuels in city facilities and operations. Many of these initiatives are reflected in the city's recent efforts, as listed above. As part of its ongoing efforts to further these initiatives, the city will continue to locate financing for solar electric and solar water heating projects at additional city sites including buildings, landfills, and other locations.

In support of these policies and programs, the city has already begun to revamp its development codes to address alternative energy production, energy conservation, and other sustainability topics. Many minor revisions have been made throughout the LUC to remove barriers to installation of solar panels. For example, Section 3.2.12 makes clear that solar energy collectors are permitted in all zone districts. Similarly, solar panels are protected from shadowing by multi-story structures on adjacent lots. Additionally, the city has adopted related measures such as the ground-breaking solar-ready housing ordinance that requires builders of single-family and duplex residential dwelling units to "stub in" the electrical and plumbing systems to accommodate future solar systems.

### Summary

Tucson is ahead of many communities nationally with regard to renewable energy and energy conservation and the city has been nationally recognized for its many programs and standards intended to promote efficiency. The city has also made numerous targeted amendments to its regulations in recent years to encourage and accommodate renewable energy generation. However, continuing efforts will be needed on a variety of fronts to help the city achieve its renewable energy goals and greenhouse gas reduction targets.

In terms of its LUC, the city still lacks some fundamental tools to address different types (e.g., size, public vs. private) of renewable energy facilities. In particular, the LUC needs to more explicitly address the full range of renewable energy facilities that the city wishes to encourage—ensuring that these facilities are permitted where appropriate and include appropriate standards to address the potential impacts of these facilities on adjacent uses.

Some of the potential changes identified below include:

- Expanding existing renewable energy generation provisions to more explicitly address appropriate locations and standards for the full range of renewable energy facilities;
- Revamping existing strict non-conforming use/structure regulations to encourage redevelopment and alternative energy retrofits of existing buildings; and
- Clarifying historic district regulations to ensure solar systems and other renewable energy facilities are not precluded.

### Current Regulations

The following table cites some of the main current regulations in the LUC, Development Standards, and Design Guideline Manual as well as other sections of the municipal code related to alternative energy production and energy conservation. It is not meant to be all-inclusive, but to highlight some of the key provisions currently on the books that are directly related to climate change. Additionally, related measures are set forth more generally in the Climate Change and Air Quality section that is closely associated with the topic of alternative energy production and energy conservation.

Regulations Addressing Alternative Energy Production and Energy Conservation	
REF.	REGULATION
<b>Land Use Code</b>	
2.7	<b>Renewable Energy Generation</b> —land use class included in the Utilities Use Group which allows Renewable Energy Generation in the Industrial Zones as a permitted use subject to compliance with performance criteria; in Commercial and Office Zones with a Limited Notice Procedure; and in the Residential Zones with a Full Notice Special Exception Land Use subject to compliance with certain performance criteria. The Rural Village Zone (RVC), Neighborhood Commercial Zone (NC), Recreational Vehicle Zone (RV), Planned Area Development Zone (PAD), Planned Community Development Zone (PCD), and Open Space Zone (OS) are excepted.
6.3.12.3	<b>Definition for Renewable Energy Generation</b> — renewable energy generation is a principal use for production of commercial power from natural resources such as sunlight, wind, rain, tides, and geothermal heat, which are renewable (naturally replenished). Typical uses are solar, geothermal, natural gases, and wind power.
3.2.12.1	<b>Solar Considerations</b> —permits the use of solar energy collectors for the purpose of providing energy for heating or cooling in all zones, whether as part of a principal structure or as an accessory structure. Requires consideration of and mitigation of the impact of shadows cast from a proposed multistory structure on solar energy systems located on an adjacent property.
3.2.5.2	<b>Accessory uses</b> —allows solar collectors as accessory uses in all zones and does not include them in calculating lot coverage.
3.7.2.6	<b>Solar access</b> —restricts the planting of trees that would interfere with solar access.
5.3.5	<b>Solar access protection</b> —relating to the Design Development Option provides solar access protection.

Regulations Addressing Alternative Energy Production and Energy Conservation	
REF.	REGULATION
<b>Development Standards</b>	
3.5.11.2	<b>Performance Criteria for Renewable Energy Generation</b> — requires walls and equipment to be setback twenty feet from any adjacent residential zone, also includes standards to address: noise, smoke, glare or heat, odors, vibration, air pollutants, liquids and solid waste, illumination, outdoor storage, and interference with television or radio equipment. Also requires a six foot decorative masonry wall between the project site and any residential zone.
9.08.0	<b>Historic Preservation Zone Development Standards</b> —relating to roof types sets forth guidelines for installation of solar panels and equipment. (subsection 3.5)
9.10.0	<b>Rio Nuevo and Downtown Zone Standards</b> —has resource conservation criteria related to energy conservation, solar energy, and natural wind ventilation.
2-06.0 and 2-07.0	<b>Landscaping and Screening Standards and Landscape Plan Content</b> —contain multiple provisions to protect solar access from screening by required landscape/tree planting.
2.10.0	<b>Flexible Lot Development Standard</b> —contains green building requirements (2-10.5.0) incorporated into a point system that includes solar and other energy-related provisions.
<b>Design Guidelines</b>	
Section I	<b>All Development</b> — Contains multiple provisions relating to <i>solar collection systems</i> (I.A.1.b--solar access, I.B.2.b and d-screening of solar equipment)
<b>Other</b>	
	<b>Residential Green Building Rating System</b> is a voluntary certification system used to guide builders, developers, and property owners in the design and construction of energy efficient, water-conserving, healthful homes. Includes criteria under seven broad headings: 1) Location, lot design, preparation, and development; 2) Resource efficiency; 3) Energy efficiency; 4) Water efficiency; 5) Indoor environmental quality; 6) Operation, maintenance, and owner education; and 7) Innovation points
Ord. 10549	<b>Residential Solar Readiness Ordinance</b> —requires solar “stub ins” on all new single family and duplex residential dwelling units to increase the ease with which solar energy systems may be added at a later date for the purposes of heating water and providing electrical power.

## Diagnosis

The following table contains a diagnosis of regulations addressing alternative energy production and energy conservation.

Diagnosis: Alternative Energy Production and Energy Conservation		
Existing Provisions	Possible Revisions	Examples
<b>REMOVE BARRIERS</b>		
<b>AE-B.1:</b> Renewable Energy Generation definition is limited to commercial energy facilities.	Incorporate separate definitions and performance criteria for different types and scales of renewable energy facilities (e.g., non-commercial) to explicitly address where these various types may or may not be appropriate.	<ul style="list-style-type: none"> <li>▪ Boulder, CO, has specific standards to ensure solar access for solar energy.</li> <li>▪ Denver, CO, permits solar and photovoltaic energy systems as an accessory structure subject to the building form standards for accessory structures.</li> <li>▪ Fort Collins, CO, promotes energy conservation by not allowing prohibitions or limits to be set on Xeriscape landscaping, solar collectors, clothes lines, and compost bins.</li> </ul>
<b>AE-B.2:</b> Strict nonconforming use/structure requirements discourage “green” building renovation/expansion.	Allow renovations/expansions related to “green building” (e.g., adding solar panels, insulation, etc.) to take place without bringing entire site into compliance or allow expansions that reduce the degree of nonconformity or do not increase it to proceed without full compliance.	<ul style="list-style-type: none"> <li>▪ Salt Lake City is adopting provision allowing “green building” improvements to nonconforming uses/structures without full site compliance.</li> <li>▪ Many mature communities allow expansion of nonconforming uses/structures if the expansion does not increase the degree of nonconforming.</li> </ul>
<b>AE-B.3:</b> Historic preservation design guidelines relating to solar systems on roofs may inhibit installation.	<ul style="list-style-type: none"> <li>▪ Adopt clearer hierarchy of preferred locations for solar on historic sites.</li> <li>▪ Allow solar on front roof under some specified circumstances with provisions to ensure compatibility.</li> </ul>	<ul style="list-style-type: none"> <li>▪ State of California forbids absolute prohibitions of solar on roofs of historic structures.</li> <li>▪ Salt Lake City is adopting a hierarchy of preferred locations for solar on historic sites, but may be allowed on front yard roofs as last resort.</li> </ul>
<b>AE-B.4:</b> LUC and Development Standards do not address wind energy conversion systems (WECS) <sup>1</sup> and other alternative energy systems except as principal use.	<ul style="list-style-type: none"> <li>▪ Add provisions allowing small WECS in specific districts subject to clear standards re height, noise, and other potential off-site impacts.</li> <li>▪ Review potential standards to permit ground-source heating and cooling systems.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Anchorage, AK, allows small WECS with limits on setbacks, height, noise, etc.</li> <li>▪ North Dakota requires a permit for all nonresidential geothermal projects (permitting them without a permit for private residential uses) to ensure proper design and to minimize risk of environmental problems.</li> </ul>

<sup>1</sup> Note: Large WECS have not been proposed to be addressed since their viability in the region appears to be extremely limited; however, Tucson Electric is offering incentives for small scale wind generation.

Diagnosis: Alternative Energy Production and Energy Conservation		
Existing Provisions	Possible Revisions	Examples
<b>CREATE INCENTIVES</b>		
<p><b>AE-I.1: Tiered Solar Fee Incentive Waiver</b> offsets building fees for new construction and renovation projects that include: Solar Electric (Photovoltaic); Solar Domestic Hot Water; Solar Space Heating; and Solar Air Conditioning Systems that displace a Minimum of 1,500 kilowatt hours per year.</p>	<ul style="list-style-type: none"> <li>Expand fee incentive to other renewable energy facilities such as small wind.</li> <li>Allow applicants to “earn” additional density or height by incorporating solar concepts into a project’s overall design.</li> </ul>	<ul style="list-style-type: none"> <li>States of California and Colorado place limits on the amount of local fees that can be imposed on permits for domestic solar energy systems.</li> <li>Henderson, NV, and Eagle County, CO, grant points in their sustainability point review systems for incorporating renewable energy sources.</li> </ul>
<p><b>AE-I.2:</b> LUC does not address electric vehicle charging stations.</p>	<p>Specifically allow electric vehicle charging stations as accessory use in all zone districts.</p>	<ul style="list-style-type: none"> <li>The State of Oregon outright permits installation of electronic vehicle charging stations on already developed properties.</li> <li>Salt Lake City allows charging stations as an accessory use.</li> </ul>
<p><b>AE-I.3:</b> LUC does not address low-energy maintenance landscaping.</p>	<p>Encourage low-energy maintenance landscaping by giving additional landscaping credit.</p>	<ul style="list-style-type: none"> <li>Eagle County, Colorado’s ECObuild program provides a range of credits towards required points for low-water or no water landscaping.</li> <li>State of California has adopted legislation requiring all local governments to adopt new water-efficient landscape regulations with water budgets and other next-generation requirements.</li> </ul>
<b>FILLING REGULATORY GAPS</b>		
<p><b>AE-R.1:</b> Renewable Energy Generation requirements permit renewable energy facilities intended for commercial purposes (e.g., solar farms) in a number of zones and establishes performance criteria; however, it does not address the size of these facilities, although height is specified.</p>	<ul style="list-style-type: none"> <li>Incorporate separate definitions and performance criteria for different types and scales of renewable energy facilities (e.g., non-commercial) to explicitly address where these various types may or may not be appropriate.</li> <li>Establish size thresholds and height requirements, with flexibility for height limits to accommodate technological needs and advances.</li> </ul>	<ul style="list-style-type: none"> <li>San Jose, CA, requires plan review for photovoltaic systems if the project does not meet specific requirements. All photovoltaic systems require a permit.</li> <li>Maricopa Association of Governments in Arizona created procedures for securing necessary electrical/building permits for residential (single-family) and commercial PV systems although local zoning regulations may apply.</li> </ul>
<p><b>AE-R.2:</b> The LUC, Development Standards, and Design Guidelines contain scattered solar access “considerations”</p>	<ul style="list-style-type: none"> <li>Existing standards regarding solar access should be consolidated in one section and clarified.</li> <li>Overlapping provisions should be reconciled.</li> </ul>	<ul style="list-style-type: none"> <li>Henderson, NV, grants points in its sustainability point review system for proper solar orientation.</li> <li>Boulder, CO, has detailed solar access review for every development</li> </ul>

Diagnosis: Alternative Energy Production and Energy Conservation		
Existing Provisions	Possible Revisions	Examples
throughout.	<ul style="list-style-type: none"> <li>Consider adding more formal process for protecting solar access or establishing a Solar Rights Act for the city.</li> <li>Expand natural wind ventilation requirements found in Rio Nuevo and Downtown Standards.</li> <li>Consider expanding solar-ready requirements to commercial buildings.</li> </ul>	<p>to protect adjacent solar “envelope”</p> <ul style="list-style-type: none"> <li>Laramie, WY, allows registration of solar panels that triggers protection.</li> <li>See Kettles, A Comprehensive Review of Solar Access Laws In Use And Suggested Standards For A Model Ordinance.</li> <li>State of New Mexico has a Solar Rights Act that enables all who use and record their active or passive solar use to retain their access.</li> </ul>
AE-R.3: No requirement for provision of priority spaces for alternative fuel vehicles, carpool vehicles, and shuttles.	Require provision of priority parking spaces for alternative fuel vehicles, carpool vehicles, and shuttles. Special EV parking spaces with chargers should be provided as well.	<ul style="list-style-type: none"> <li>Buckeye, AZ, requires all developments with more than 20 off-street parking spaces must to reserve a minimum of 5% of those spaces for alternative energy vehicles and/or carpools.</li> <li>Los Angeles, CA, provides preferential parking for hybrid vehicles.</li> <li>LEED awards 3 points out of 40 for basic certification for provision of preferential alternative fuel vehicle parking.</li> </ul>
AE-R.4: Outdoor lighting code has some progressive provisions, but does not require modern energy-saving technologies like solid-state and LED lighting, or address PV-powered outdoor lighting.	Consider targeted amendments to lighting code to require PV- powered outdoor lighting, LED and other modern, energy-saving lighting, and reduce overlighting of sites and waste of energy.	<ul style="list-style-type: none"> <li>Consider adoption of model regulatory provisions recommended by the Illuminating Engineers Society of America (IES) and International Dark-Sky Assn (IDA).</li> </ul>
AE-R.5: No mandatory minimum percentage of energy generation from alternative sources for buildings/developments.	Require minimum alternative energy % generation, or purchase or GHG reduction, especially of commercial projects.	<ul style="list-style-type: none"> <li>Henderson, NV, awards 5 points in sustainability point system if 20% of energy is generated on-site from renewable sources. 3 points if off-site.</li> <li>LEED-ND awards 1 point if 5% of energy is generated from renewable sources.</li> </ul>
AE-R.6: LUC and Development Standards contain no provisions re cool roofs, green roofs. <sup>2</sup>	Consider requiring cool roofs and offering incentives for green roofs.	<ul style="list-style-type: none"> <li>Chicago requires green roofs on all new downtown buildings.</li> <li>LEED-ND awards 1 point for cool or shaded roof.</li> <li>Henderson, NV, grants points in its</li> </ul>

<sup>2</sup> Despite common misconceptions, a recent EPA study entitled, *Green Infrastructure in Arid and Semi-Arid Climates*, confirms that green roofs can offer a water-efficient approach to urban stormwater management in arid climates such as Tucson’s.

Diagnosis: Alternative Energy Production and Energy Conservation		
Existing Provisions	Possible Revisions	Examples
		sustainability point review system for cool or vegetated roofs.
<p><b>AE-R.7:</b> LUC and Development Standards do not address shade structures.</p>	<p>Consider making shade structures mandatory on building facades, roofs, and in parking lots. Could add requirement that roofs of shade structures be covered by certain percentage of PV panels or be solar-ready.</p>	<ul style="list-style-type: none"> <li>▪ SmartCode provides alternative street standards oriented to pedestrians.</li> <li>▪ Marana, AZ, requires shaded walkways between entrances of large retail buildings and street.</li> <li>▪ Austin, TX, requires sidewalks along 50% of building façades adjacent to or facing the principal street or adjacent parking to be shaded in its mixed-use corridors</li> </ul>
<p><b>AE-R.8:</b> No requirements in LUC or Development Standards regarding solar-oriented lots and subdivisions.</p>	<p>Require minimum percentage of lots in larger subdivisions to be solar oriented (i.e., longer east-west axis to provide more exposure to sun), perhaps with flexibility to account for existing site constraints and topography.</p>	<ul style="list-style-type: none"> <li>▪ Fort Collins, CO, requires 65% of 15,000 sq. ft or greater residential lots to be “solar-oriented”.</li> <li>▪ Multnomah County and Ft. Collins require 20-30% of lots in new subdivisions to be solar-oriented.</li> <li>▪ LEED-ND awards point for solar oriented building or block design.</li> <li>▪ Glenwood Springs, CO, requires a minimum of 50% of lots in non-infill single-family subdivisions to have a north-south dimension of 90 feet or more; and to have a front lot line that is oriented within thirty (30) degrees of a true east-west axis.</li> </ul>
<p><b>AE-R.9:</b> LUC and Development Standards do not address electric vehicle (EV) charging stations.</p>	<p>Consider requiring certain percentage/number of parking spaces to have EV charging stations or be prewired to provide in future. Require certain types of buildings (e.g., larger commercial) to be prewired with EV chargers.</p>	<ul style="list-style-type: none"> <li>▪ San Francisco, CA, building code requires new construction to be prewired for electric car chargers.</li> </ul>
<p><b>AE-R.10:</b> LUC contains a number of landscaping standards to promote use of water-efficient landscaping which requires less water and therefore less energy for water treatment and irrigation systems.</p>	<p>Consider going to next generation of water-efficient landscaping standards that impose water budgets on sites and require grouping of plants with similar water demand to reduce overwatering.</p>	<ul style="list-style-type: none"> <li>▪ State of California has adopted legislation requiring all local governments to adopt new water-efficient landscape regulations with water budgets and other next-generation requirements.</li> <li>▪ Salt Lake City’s new water-efficient landscaping ordinance includes site water budgets and mandatory plant grouping.</li> </ul>

## MOBILITY AND TRANSPORTATION AND ALTERNATIVE FUELS

### Introduction

Communities around the country are increasingly realizing that policies for land use and transportation need to be more closely coordinated. Many western communities, have followed the traditional growth model in which local governments approve new development projects under the assumption that all necessary new or expanded transportation facilities — mostly roads — would be provided automatically to service that growth (similar to the flawed “demand-driven” philosophy of water and sewer service discussed above). This approach has led to an over-reliance on expensive road networks that facilitate leap-frog development, hurt downtown areas, neglect healthier modes of travel, such as walking, biking, and transit, increase congestion, decrease safety, and increase air and water pollution. The key is to simultaneously set clear transportation goals (e.g., increase transit ridership or bicycle commuting) and land use goals (reduce sprawl and increase mixed-use development) so that each set of goals reinforce each other. However, few development codes have been updated to put this new understanding into practice.



*Tucson's local street bike routes and shared use paths make it easy to choose this sustainable form of transportation.*

In particular, given that transportation accounts for a full third of CO<sub>2</sub> emissions in the United States that contribute to global warming (ULI, *Growing Cooler*, 2008), the need to carefully alter land use controls to better incorporate transportation impacts into the planning and development review process is more critical than ever. Tucson is one of five test cities where Nissan will launch about 1,000 of its new all-electric vehicles, called the Leaf, along with a couple thousand car chargers located around the city. Despite technological advances and growing awareness, vehicle miles traveled (VMT) are expected to increase in the country, leading to a related increase in the consumption of fossil fuels, the production of CO<sub>2</sub> emissions, and the continued decline in public health.

In terms of VMT, Tucson is no exception. According to the Pima Association of Governments (PAG), VMT grew 1.5 times faster than population from 2000 to 2005 and is projected to continue to increase as people travel greater distances to work, shop, and recreate due to dispersed development patterns. A low VMT is a strong indicator of a sustainable transportation system. A study conducted of 83 metropolitan areas revealed that residents in compact regions drove 25% less than in areas with more sprawling land use patterns. (ULI, *Growing Cooler*, 2008). Higher densities in targeted locations, especially near transit stations and surrounding major destinations, are required to achieve a compact community and sustainable transportation system. This is the reason many of the recommendations in this section revolve around the idea of supporting transit-oriented development (TOD).

An issue that often gets neglected in discussions about transportation is the high personal cost to residents of driving, which includes insurance, repairs, gas, and parking. This cost is most burdensome for low- and fixed-income individuals and families. Thus, land use decisions that encourage non-vehicular modes of travel will increase the financial and physical freedom of the city's residents, allowing them to better choose where they live, work, and obtain critical services.

Building a more sustainable transportation system in Tucson also means anticipating special local needs, such as serving an older and less mobile population that will need transportation options beyond individual cars. The fact that the city's population is expected to increase by 80% by 2040 should provide ample motivation for the city to make bold plans today.

## Current Policies and Programs

Tucson and its regional partners are taking positive steps to better coordinate transportation goals with land use considerations. Major initiatives include the recent adoption of the forward-thinking 2040 Regional Transportation Plan, the Regional Transportation Plan (RTA) that dedicates \$533 million for transit in the next 20 years, and a 2006 voter-approved half cent sales tax to raise \$2.1 billion for transportation projects. In addition, the city’s plan to construct a modern streetcar line that connects areas west of I-10 with downtown and the University of Arizona will not only help reduce air pollution but will help revitalize the downtown area — provided that appropriate land use policies are implemented to allow increased density to support streetcar ridership.

Tucson’s system of bike and pedestrian paths and bike lanes also deserves special recognition. Since 2000, the number of bikeway route miles has increased from 488 to 817, and the city has dedicated itself to expanding this number significantly while creating more connections between bicycle routes to increase safety. The Tucson Arizona /Pima Eastern Region received a Gold Level designation from the League of American Bicyclists in 2006 and 2008 for its bicycle friendly environment.

In addition, Tucson has taken numerous steps to support a more compact and transit supportive pattern of development in targeted areas of the city through its Downtown Infill Incentive District, Flexible Lot Development Standard, Urban Overlay District, and other tailored tools.

## Summary

While Tucson has made some significant progress in making its transportation system more sustainable, the general changes to the LUC suggested below will further enhance opportunities for transit supportive development and the use of alternative modes:

- Increase density around transit stops and in select zones. Identify and zone key transit-oriented development areas for higher density, heights, and mixed use. Clarify rules, especially dimensional standards, for mixed-use projects.
- Improve mobility by increasing connectivity between developments for vehicles and other modes of travel. In particular, new subdivisions should meet minimum connectivity standards that require high levels of connectivity within the subdivision and to surrounding properties.
- Promote Transportation Demand Management strategies through incentives and regulation.

## Current Regulations

The following table cites some of the main current regulations in the LUC, Development Standards, and Design Guideline Manual as well as other sections of the municipal code related mobility, transportation and alternative fuels. It is not meant to be all-inclusive, but to highlight some of the key provisions currently on the books that are directly related to transportation. Additionally, related measures are set forth more generally in the Climate Change and Air Quality, Community Health and Safety, and the Alternative Energy Production and Energy Conservation sections of this diagnosis.

Regulations Addressing Mobility and Transportation and Alternative Fuels	
REF.	REGULATION
<b>Land Use Code</b>	
2.8.2	<b>Scenic Corridor Zone (Overlay)</b> — Protects views of mountains and geologic formations for motorists on any Scenic Route designated on the MS&R Plan. Special restrictions apply to properties within 400’ of the MS&R future ROW line, including a 30’ vegetation buffer, height limitations, structural spacing requirements, and other design standards.
2.8.3	<b>Major Streets &amp; Routes (MS&amp;R) Setback Zone (Overlay)</b> — Delineates the future ROW needed to expand arterials and collectors in the city and prevents or limits development that would otherwise interfere with such expansions. Intended to implement the City’s General Plan, Regional

Regulations Addressing Mobility and Transportation and Alternative Fuels	
REF.	REGULATION
	Transportation Plan, Air Quality Plan, and the MS&R Plan.
2.8.4	<b>Gateway Corridor Zone (Overlay)</b> — Provides special standards for certain uses on any Gateway Route designated on the MS&R Plan. The purpose is to protect and enhance the visual appeal of character-defining roadways in the city. Special restrictions focus on landscaping, screening, signs and undergrounding utilities.
2.8.6.6	<b>Roadway Crossing in Environmental Resource Zone (ERZ)</b> — Requires roads and driveways to cross critical riparian habitat at narrowest point. Also, roadways, walkways, and bike paths must minimize interference with wildlife movement.
2.8.10	<b>Rio Nuevo Downtown (RND) Zone (Overlay)</b> — Encourages redevelopment in historic downtown area that is context-sensitive and pedestrian friendly. Allows flexibility from many development standards.
2.8.13	<b>Urban Overlay District Zone (UOD)</b> — Allows UOD to be initiated by the Mayor and Council that does not restrict underlying uses or regulations but provides a development option that encourages well-designed infill projects subject to the regulations and guidelines provided in the UOD’s development document. Supports pedestrian and transit-oriented, urban infill and mixed-use areas.
3.2.8	<b>Access Provisions</b> — Establishes standards for legal vehicular access to parcels, dimensions for pedestrians facilities, and to reduce conflicts between vehicular and pedestrian facilities.
3.2.13	<b>Streets</b> — Mostly a cross reference to street design standards in MS&R and DS 3-01.0.
3.3	<b>Motor Vehicle and Bicycle Parking Requirements</b> — Provides required parking standards for vehicles and bicycles based on proposed use or change of use. Bicycle parking helps to promote non-vehicular modes of travel. Also provides design criteria and dimensional standards that determine amount of impervious surface dedicated to parking lots. (The city is currently considering a major overhaul of its existing vehicle and bicycle parking regulations to reduce excessive parking requirements, provide more flexibility for redevelopment sites, and offer alternative methods of compliance, such as individual parking plans. Comments below that pertain to proposed parking amendment are identified as such.)
3.5	<b>Off-Street Loading</b> — Provides required loading standards based on proposed use or change of use. Also provides design criteria to reduce impacts to surrounding properties and dimensional standards that determine amount of impervious surface dedicated to loading areas.
3.5	<b>Performance Criteria</b> — Wide range of use-specific standards that address various transportation issues, such as auto-related use impacts, protections for adjacent residential properties, special access provisions, drive-thrus, etc.
3.7	<b>Landscaping and Screening Regulations</b> — Provides landscaping standards for parking lots and street frontages to provide shade and screening for pedestrians.
4.1.8	<b>Subdivision Design Standards</b> — Cross references street standards in DS 3-01.0 and provides basic standards to encourage new subdivision roads to connect to existing road network and leave stub-out for future connections. Also, provides standards for subdivision access and use and design of alleys.
<b>Development Standards</b>	
2-06.3.3 and 3.4	<b>Vehicular Use Areas and Landscape Borders</b> — Provides standards in addition to those in LUC regarding the shading of parking lots and street frontages to, among other things, encourage pedestrian use.
2-08.0	<b>Pedestrian Access</b> — Requires all development to provide a continuous pedestrian circulation path that connects to all public access areas of the development. Also, provides detailed locational and construction standards for sidewalks.

Regulations Addressing Mobility and Transportation and Alternative Fuels	
REF.	REGULATION
2-09.0	<b>Bicycle Parking Facility Design Requirements</b> — Provides supplemental standards to LUC Sec. 3.3.0 with more detailed requirements for bicycle parking location, security measures, and design.
3-01.0	<b>Street Development Standard</b> — Provides detailed standards and graphics for street ROWs, pavement and travel lane widths, parking lane dimensions, pedestrian facilities, construction standards (paving, curbing, sidewalks), street drainage, and sight visibility.
3-03.0	<b>Pavement Cut Criteria</b> — Provides criteria for the cutting of pavement, trenching, trench backfilling, repairing of pavement cuts, and the limiting of pavement cuts after installation of new pavement or overlay.
3-05.0	<b>Vehicular Use Area Design Criteria</b> — Provides supplemental standards to LUC Sec. 3.3.0 with more detailed requirements for off-street vehicle parking and traffic aisles, striping, signage, visitor parking, security measures, and design.
Design Guidelines	
I.A.3; II.A.3; II.A.3; IV.A.3	<b>Pedestrian and Alternative Transportation Modes</b> — Provides design strategies to encourage alternative modes of travel in future road improvement projects, with special focus on connections for pedestrian, bicycle, and equestrian use.
I.A.4; II.A.4; III.A.4; IV.A.4	<b>Vehicle Circulation and Parking</b> — Provides design strategies to minimize impact of traffic on neighborhoods, maximize efficiency of arterial streets, ensure safe parking areas, reduce excessive parking, and increase pedestrian amenities in redevelopment projects. Also encourages connectivity in new subdivisions and the maintenance of the rural character of rural roads.
I.B.1.b	<b>Parking Structures</b> — Provides design strategies to integrate parking structures into projects and make them more safe for all users.
V.D	<b>Transportation Corridor/Node</b> — Provides design strategies to stimulate commercial and mixed-use development along major routes throughout the community in order to improve streetscapes, reduce some of the negative impacts of strip commercial, and improve traffic flow.
Other	
Ch. 5	<b>Bicycles</b> — Provides general requirements for operating bicycles in the city.
Ch. 20	<b>Motor Vehicles and Traffic</b> — Provides general requirements for operating vehicles in the city, including rules for truck routes, pedestrians, traffic control devices, one-way streets, and parking.
Ch. 25	<b>Streets and Sidewalks</b> — Provides general requirements for making repairs and improvements in the ROW, avoiding obstructions to sidewalks and drainage ways, street addressing, and work zone traffic management.
Ch. 30	<b>Department of Transportation</b> — Establishes Department of Transportation and its duties and powers.

## Diagnosis

The following table contains a diagnosis of regulations addressing mobility and transportation and alternative fuels.

Diagnosis: Mobility and Transportation and Alternative Fuels		
Existing Provisions	Possible Revisions	Examples
<b>REMOVE BARRIERS</b>		
<b>MT-B.1:</b> Current code allows mixed use development in many districts but does not provide clear standards for doing so.	Make explicit how setbacks, height, density, etc, are to be calculated for mixed use development so that developers can better plan sites and financing.	<ul style="list-style-type: none"> <li>Colorado Springs, CO, has mixed-use zone districts and design standards that promote mixed-use projects while protecting surrounding lower-scale residential neighborhoods.</li> <li>Henderson, NV, has tiered mixed use zone districts with specific standards set for each zone.</li> </ul>
<b>MT-B.2:</b> Current code does not allow accessory dwelling units to be rented to non-residents of the primary structure.	Permit accessory dwelling units in all or most residential districts with additional size restrictions and parking standards to ensure compatibility	<ul style="list-style-type: none"> <li>Denver, CO, permits accessory dwelling unit buildings as an accessory structure subject to the building form standards for accessory structures.</li> </ul>
<b>MT-B.3:</b> Current code requires walls, fences, and other physical screening around subdivisions and other developments that act as barriers to pedestrians.	Require greater pedestrian access (easements if necessary) from subdivisions and commercial buildings to public street and allow breaks in screening devices for pedestrian access as necessary.	<ul style="list-style-type: none"> <li>SmartCode provides alternative street standards oriented to pedestrians.</li> <li>Marana, AZ, requires shaded walkways between entrances of large retail buildings and street.</li> <li>Henderson, NV, requires a pedestrian path to the nearest street and sidewalk system whenever a cul-de-sac is created.</li> </ul>
<b>MT-B.4:</b> Street standards require minimum street widths but rules to modify standards to allow narrower street widths are not clear.	Provide clear rules to approve narrower street widths to promote innovative design where traffic volume is conducive or where traffic control devices have been implemented.	<ul style="list-style-type: none"> <li>Eugene, OR, allows for narrower street design standards in TOD and mixed use areas.</li> <li>Smart Code and most form-based codes (e.g., Duluth, MN, Ocean Springs, MS, Mobile, AL) require narrower streets.</li> </ul>
<b>CREATE INCENTIVES</b>		
<b>MT-I.1:</b> Draft amendment for parking standards allows parking reduction for uses near major current or planned transit stops with Individual Parking Plan.	Allow automatic reduction (e.g., 25%) in required parking spaces for new uses that are located close to major transit stops.	<ul style="list-style-type: none"> <li>Eugene, OR, reduces or eliminates on-site parking requirements in mixed use and TOD areas.</li> <li>Buckeye, AZ, allows a 15% parking off-street parking reduction for all uses within a mixed use district as well as for multifamily dwellings within 300 feet of a transit stop. In addition, a 20% parking reduction is offered for nonresidential development that incorporates a transit station meeting specific design guidelines.</li> </ul>

<b>Diagnosis: Mobility and Transportation and Alternative Fuels</b>		
<b>Existing Provisions</b>	<b>Possible Revisions</b>	<b>Examples</b>
MT-I.2: No parking reduction in current or proposed regulations for provision of additional bicycle parking or planned transit stops.	Allow reduction in parking standard where applicant provides bicycle parking or facilities in excess of requirements, or makes offsite improvements to extend existing bicycle paths to site or to other approved location.	<ul style="list-style-type: none"> <li>Henderson, NV, may authorize a 5% reduction of off-street parking for providing enclosed and secure bicycle parking and shower/dressing rooms for employees.</li> </ul>
MT-I.3: Areas near existing or future transit are not targeted for higher density.	Increase allowed density near stations for future modern street car and other major transit nodes.	<ul style="list-style-type: none"> <li>Portland, OR, has certain districts that allow FAR and height bonuses for residential development around light rail stations. For each square foot of floor area developed and committed as housing, a bonus of 1 square foot of additional floor area is earned.</li> <li>Salt Lake City's new TOD ordinance grants automatic density bonuses and parking reductions for mixed-use developments along designated corridors.</li> </ul>
MT-I.4: No incentive to provide on-site amenities that discourage single-occupant vehicular travel.	Provide density bonus or parking reduction for voluntary provision of on-site locker rooms and showers, bike or car sharing programs, dedicated carpool parking, flexible work schedules, or similar amenities.	<ul style="list-style-type: none"> <li>Portland, OR, allows density bonuses in some districts for provision of long-term bicycle parking and locker room facilities that contain specific amenities.</li> </ul>
MT-I.5: Shading of pedestrian walkways is required only in a few instances.	Provide density bonus for voluntary provision of shaded walkways	<ul style="list-style-type: none"> <li>N/A</li> </ul>
MT-I.6: Mixed use projects are given no preference to single-use projects.	Adopt streamlined review process and/or reduction in application fees for mixed use and infill project.	<ul style="list-style-type: none"> <li>Miami-Dade County expedites processing of designated sustainable projects.</li> </ul>
<b>FILLING REGULATORY GAPS</b>		
MT-R.1: Subdivision regulations generally require that new subdivision roads connect to existing road network and provide future connections.	Provide more specific and aggressive standards for road connectivity. For example, add a "connectivity index" that requires new subdivisions to achieve a minimum connectivity score based on the number of intersections and road links provided within the subdivision and to surrounding properties.	<ul style="list-style-type: none"> <li>Franklin, TN, requires new subdivisions to attain a minimum connectivity score for pedestrian links within each project.</li> <li>Henderson, NV, requires all new development, except for new attached and detached single family residential uses with less than 5 dwellings and properties ½ acre or less zoned nonresidential or mixed use, to develop a circulation plan meeting a specific "connectivity index".</li> </ul>
MT-R.2: Individual Parking Plans in proposed parking amendment are voluntary except in the case of	<ul style="list-style-type: none"> <li>Require developers of a certain size to create and implement a Transportation Demand Management Plan (TDM) in order</li> </ul>	<ul style="list-style-type: none"> <li>Oregon's mandatory Employee Commuting Option (ECO) Program requires employers to provide commuting alternatives to employees to</li> </ul>

<b>Diagnosis: Mobility and Transportation and Alternative Fuels</b>		
<b>Existing Provisions</b>	<b>Possible Revisions</b>	<b>Examples</b>
nearby residential development	<p>to achieve a specified reduction in car trips.</p> <ul style="list-style-type: none"> <li>Require developers of a certain size to provide on-site car sharing or bike sharing programs, bus stops/shelters, and locker and shower facilities.</li> </ul>	<p>reduce VMT</p> <ul style="list-style-type: none"> <li>Arlington, VA, has a mandatory TDM requirement for all new major commercial development with a menu of techniques that can be adopted to qualify for approval.</li> </ul>
<b>MT-R.3:</b> No provisions to require certain densities near transit.	Require minimum densities around transit stations to ensure densities to support transit.	<ul style="list-style-type: none"> <li>Orange County (Orlando), FL, is considering a TOD ordinance with minimum densities depending on distance from transit stop.</li> <li>Fort Collins, CO, has minimum density requirements in mixed-use districts.</li> </ul>
<b>MT-R.4:</b> While current regulations offer a minor incentive for alternative fuel sites by not counting spaces reserved for electric vehicles or charging stations against required parking, the code is mostly silent on standards for electric vehicle charging stations.	Specifically allow electric vehicle charging stations as accessory use in all zone districts and in conjunction with all gas-fueling stations.	<ul style="list-style-type: none"> <li>The State of Oregon outright permits instillation of electronic vehicle charging stations on already developed properties.</li> <li>Communities in Washington—Thurston Pierce, King, and Snohomish Counties, permit electronic vehicle charging stations in all zoning districts except those designated for residential and resource protection. The EVI Model Ordinance guided these counties.</li> </ul>

## URBAN FORESTRY AND URBAN HEAT ISLAND

### Introduction

This section addresses the related topics of urban forestry and the urban heat island effect. Tools and techniques to promote urban forestry can also address the urban heat island effect, a critical issue in most major desert cities like Tucson.

Trees not only help define the visual character of a community but provide important biological and hydrological functions. In an effort to create more sustainable and healthy communities, cities throughout the country are moving beyond thinking of trees in merely traditional terms, such as for aesthetics and shade, and making them part of the city's "green" infrastructure. In this role, trees can be used to control and filter stormwater, reduce sediment into surface waters, limit flooding, reduce greenhouse gases, clean pollution from the air, save energy on cooling, and reduce the urban heat island effect — a particularly important concern for desert communities such as Tucson. Cities are also making green infrastructure a priority because it saves money in the long-term by reducing the need for and burden on conventional, highly-engineered ("grey") infrastructure, such as water treatment plants and detention ponds that are expensive to build and maintain.

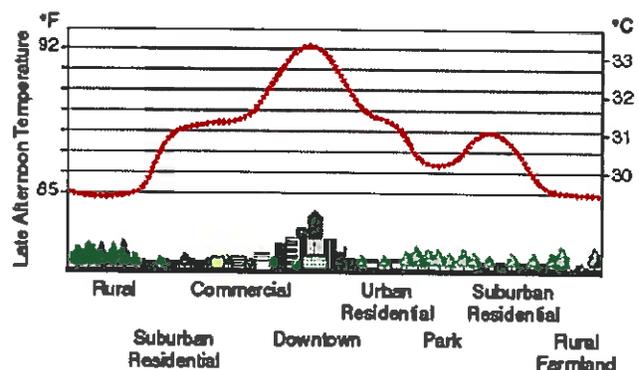


*Native trees and landscaping provide shade for pedestrians while reducing the urban heat island effect and controlling stormwater.*

Tucson's location in the Sonoran Desert means that any plan for trees must reflect the native climate and habitat. Given that native trees in the Tucson area are limited mostly to riparian areas associated with washes, any decision to plant trees outside of the washes, such as in the downtown or residential neighborhoods, should be done carefully and according to a plan that maximizes the benefits from the trees while minimizing water consumption. Based on the interviews with staff and stakeholder, the primary goals for trees beyond aesthetics are to provide shade for pedestrians, reduce the urban heat island effect, and control stormwater.

Reducing the urban heat island, in particular, has become a major issue for many cities. It is well documented that urban and suburban areas are often considerably hotter than surrounding rural areas. This is due primarily to the fact that hard, dry surfaces, such as streets and roofs, absorb more heat and reflect less energy than vegetated and less developed areas. In addition, tall buildings can contribute to the heat island effect when they inhibit air flow within urban areas. The heat effect is usually less dramatic during the day than during the night due to the slow release of heat from urban infrastructure and buildings. According to the EPA, the annual mean air temperature of a city with 1 million people or more can be 1.8–5.4°F warmer than its surroundings. At night, however, the temperature range increases to between 12 and as 22°F. These higher urban temperatures not only trap air pollution and threaten vulnerable people during heat waves, but significantly increase cooling costs for urban residents. For example, the peak urban electric demand increases approximately 1.5 to 2.0% for each 1°F increase in temperature. This means that approximately 5 to 10% of the total energy demand for some cities in the warmer months is consumed by the urban heat island effect.

The four main code approaches adopted by local governments to combat the urban heat island effect are: 1) preserving and planting trees to provide shade; 2) requiring "cool" (high reflectivity) roofs; 3) encouraging green (vegetated) roofs; and 4) requiring "cool" (highly reflective or porous) pavement.



## Current Policies and Programs

Tucson has an impressive number of policies and programs that encourage the planting and maintenance of native and landscape trees. The city established a Landscape Task Force in 1988 to provide a strategy for improving the city's landscaped environment. Among other things, the LTF recommended that one person (the Urban Landscape Manger) be appointed to oversee and coordinate all landscaping-related efforts in the city and that a permanent Landscape Advisory Committee be created to advise the Mayor and Council on the design, management, and policies for improving the city's urban and natural landscapes. These efforts led to the city's endorsement in 2008 of the Urban Landscape Framework (ULF), which is the city's blueprint to turn existing policies, programs, and ideas into action for landscaping on public property. The following are some of the major recommendations from the ULF:

- Develop an irrigation ordinance;
- Set goals for city-wide tree canopy coverage;
- Revise landscape guidelines, ordinances, and specifications;
- Increase canopy in parking lots to 50%;
- Address underground and overhead utility conflicts;
- Develop tree protection ordinance and tree replacement program; and
- Establish landscape design guidelines.

The ULF also incorporated the recommendations from the Livable Tucson program that promote the preservation of green space and make the community more livable. In addition, the non-profit *Trees for Tucson* was started in 1989 in cooperation with Tucson Electric Power Company to promote desert-adapted tree planting in the Tucson area by providing low-cost trees to customers to shade homes and save energy.

On the regulatory side, the city has a fairly aggressive native plant ordinance that requires preservation of native vegetation from development, or, where preservation is not feasible, the replacement or transplantation of native plants. Existing landscaping standards require that new and expanding development provide a minimum amount of new landscaping, including trees and groundcover. All new landscaping must be selected from an approved list of native or drought-tolerant plants. The city has also recently adopted new ordinances to require one tree for every four parking spaces to better shade parking lots, a rainwater harvesting ordinance for commercial development to irrigate landscaping, and an ordinance to require grey water stubouts on new residences to allow greywater for irrigation needs instead of limited potable water. On a more general level, the city is pushing harder for drought-tolerant species to be integrated into the design of new developments, especially in downtown infill areas.

## Summary

While the city has many programs and standards related to trees, it still lacks some fundamental tools to increase the amount of shade provided by new development and to reduce the urban heat island effect. In particular, the code should consider requiring more shade structures and features for pedestrians on streets and in parking lots and on buildings. It should also explore requiring building materials (paving and roofs) should have a higher solar reflectivity level. Additionally, protections might be provided for mature trees on private property throughout the city.

## Current Regulations

The following table cites some of the main current regulations in the LUC, Development Standards, and Design Guideline Manual as well as other sections of the municipal code related to urban forestry and urban heat island. It is not meant to be all-inclusive, but to highlight some of the key provisions currently on the books that are

DIAGNOSIS | URBAN FORESTRY AND URBAN HEAT ISLAND

directly related to urban forestry and heat islands. Additionally, related measures are set forth more generally in the Climate Change and Air Quality section.

Regulations Addressing Urban Forestry and Urban Heat Island	
REF.	REGULATION
<b>Land Use Code</b>	
2.8.6	<b>Environmental Resource Zone</b> — Protects 100% of mapped riparian corridors (i.e., 100 yr floodplains) from development, except allows roadways/sidewalks/bike paths/utilities if no alternative exists. Revegetation required with native plants only.
3.2.9	<b>Lot Coverage</b> — Limits the amount that residential and non-residential lots that can be covered by impervious surfaces (with certain exceptions to promote desired development). Ranges from 10% for rural areas to 90% for small lots.
3.7.0	<b>General Landscaping Standards</b> — Requirements for private property (single-family and duplexes excepted); drought-tolerant plants from approved list required (except "oasis" area and scenic corridor); parking (1 tree:4 spaces or 50% shade coverage (trees and buildings); ground coverage limits; turf only allowed in oasis areas and golf courses, water-conserving landscape plan required; policy to promote use of reclaimed water; long-term maintenance of landscaping required.
3.8.0	<b>Native Plant Preservation</b> — Requires preservation and/or mitigation of native plants and applies to all new development and expansions (with some exceptions); mitigation required for removed or damaged plants.
4.1.8.1	<b>Street Standards</b> — Provide more detailed street design standards, including drainage.
<b>Development Standards</b>	
2-06.0	<b>Landscaping and Screening Standards</b> — Provides more detailed landscaping design, plant material, irrigation, and plant maintenance standards than those in LUC 3.7.0.
2.15.0	<b>Native Plant Preservation Standard</b> — Provides procedures and additional information regarding implementation of LUC 3.8.0.
2.16.0	<b>Landscape Plant Materials</b> — Establishes plant and seed lists for drought-tolerant and native landscaping and ground cover.
3-01.0	<b>Street Development Standards</b> — Provides dimensional (widths, grades, etc.) and design standards of streets and sidewalks (5' wide, both sides of street, with numerous exceptions), and specifies paving materials and standards;
9-06.0	<b>Environmental Resource Zone Standards</b> — Helps implement Article 1, Division 1, Floodplain and Erosion Hazard Area Regulations, Chapter 26, Tucson Code; Article VIII, Watercourse Amenities, Safety and Habitat (WASH), Chapter 29, Tucson Code; and Section 2.8.6, Environmental Resource Zone (ERZ), LUC, and Chapter 23; applies to floodplain, flood fringe, and associated riparian areas and to Protected Riparian Areas (PRA) within all these resources zones. Requires mitigation plan for native species only if disturbance proposed. Contains plant replacement ratios: 2:1 if trunk 2 to 4 inches; 3:1 if trunk greater than 4 inches, special protections for significant trees.
<b>Design Guidelines</b>	
None	None
<b>Other</b>	
Ch. 29 Art. VIII (WASH)	<b>Commercial Rainwater Harvesting Ordinance</b> —Requires commercial developments to submit a rainwater harvesting plan and to supply 50% of the site's irrigation for landscaping with harvested rainwater. It also prohibits private covenants from restricting the use of rainwater systems.

## Diagnosis

The following table contains a diagnosis of regulations addressing urban forestry and urban heat island.

Diagnosis: Urban Forestry and Urban Heat Island		
Existing Provisions	Possible Revisions	Examples
<b>REMOVE BARRIERS</b>		
<b>UF-B.1:</b> Current regulations do not specifically allow pervious types of street or sidewalk paving materials or provide clear process to propose them.	Allow broader variety of pervious paving materials streets and sidewalks, especially “cool paving” surfaces, to reduce stormwater run-off and urban heat island effect. Provide clear criteria for approval of pervious surfaces.	<ul style="list-style-type: none"> <li>Golden, CO, offers 1 sustainability point, out of a required 25, for each 500 sq. ft. of pervious pavement.</li> <li>Scottsdale, AZ, grants points for its Green Building Program to construct 80% of exposed paving with light colored and permeable materials.</li> </ul>
<b>UF-B.2:</b> Current minimum street widths (e.g., 24’ for 2 lane) are wide with no clear process to modify standard.	Design and construct secondary streets with narrow rights-of-way to encourage shading by adjacent buildings.	<ul style="list-style-type: none"> <li>Santa Fe, NM, and many desert climate communities designed under the Spanish Law of the Indies incorporated narrow streets to so that adjacent buildings would provide shade on buildings across the street and for pedestrians.</li> </ul>
<b>UF-B.3:</b> Current lot coverage standards for residential development may be too generous and there are many exceptions.	Reduce lot coverages for residential and non-residential uses to reduce impervious coverage and urban heat island effect, with exceptions or flexibility for infill development.	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>UF-B.4:</b> Current code does not clearly indicate that shade structures located on the roof of buildings or to cover vehicular areas of parking lots are allowed as permitted or accessory uses.	Allow shade structures to be located on the roof of buildings or to cover vehicular areas of parking lots as permitted or accessory uses.	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>UF-B.5:</b> Current regulations consider outdoor auto sales lots as “show room” and not subject to parking area shading requirements.	Require that 50% of “show room” areas associated with car sales lots be covered by shade structures or shaded by vegetation, or 100% paved with a light colored, pervious material.	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>CREATE INCENTIVES</b>		
<b>UF-I.1:</b> Current regulations do not specifically allow pervious types of street or sidewalk paving materials or provide clear process to propose them.	Do not count pervious surfaces in calculating lot coverage limits or discount pervious surfaces by some percentage (e.g., 50%). Calculations for stormwater detention requirements should also be reduced if safe to do so..	<ul style="list-style-type: none"> <li>N/A</li> </ul>

Diagnosis: Urban Forestry and Urban Heat Island		
Existing Provisions	Possible Revisions	Examples
<p><b>UF-I.2:</b> Current regulations do not specifically require green/cool roofs, or green or “living” (vegetated) walls.</p>	<p>Offer density bonus, additional height, or other desirable development benefit for installation of highly reflective roof materials, a vegetated roof, or a vegetated or “living” wall.</p>	<ul style="list-style-type: none"> <li>▪ Knoxville, TN, requires an Energy Star Compliant (highly reflective) and high emissivity roof with a minimum emissivity and coverage area for each of its property development areas.</li> <li>▪ Portland, OR, offers FAR bonus for green roofs in its downtown districts.</li> <li>▪ Henderson, NV, grants points in its sustainability point review system for installing a cool or vegetated roof.</li> </ul>
<p><b>UF-I.3:</b> Current regulations do not specifically require cool pavement.</p>	<p>Offer density bonus, additional height, or other desirable development benefit for installation of highly reflective pavement materials.</p>	<ul style="list-style-type: none"> <li>▪ Henderson, NV, grants points in its sustainability point review system for using paving materials with a SRI of at least 29.</li> </ul>
FILLING REGULATORY GAPS		
<p><b>UF-R.1:</b> There is no tree protection ordinance for existing landscape trees (i.e., not covered by ERZ, WASH, or native plant ordinance).</p>	<p>Create regulations to preserve certain types and sizes of existing landscape tree (“specimen” trees), including food-bearing trees.</p>	<ul style="list-style-type: none"> <li>▪ Denver, CO, requires preservation of established trees in all residential zone districts unless permitted by the city forester.</li> <li>▪ Miami, FL, requires a tree removal permit to destroy or remove any tree on private property.</li> <li>▪ Salt Lake City requires permit for any tree removal along riparian corridors and 1:1 replacement.</li> <li>▪ Washington, D.C., requires protection and/or replacement of large trees in specified residential areas.</li> <li>▪ American Planning Association PAS Report 446, Tree Conservation Ordinance.</li> </ul>
<p><b>UF-R.2:</b> Current regulations do not require any minimum level of solar reflectance for paving materials.</p>	<p>Require paving materials to have a Solar Reflectance Index of at least 29 to reduce solar gain and the urban heat island effect. Encourage/require porous pavement for low-traffic areas.</p>	<ul style="list-style-type: none"> <li>▪ Houston, TX: The Cool Houston! Plan</li> <li>▪ Miami, FL, requires a minimum solar reflectance for all paving materials based on type of material.</li> </ul>
<p><b>UF-R.3:</b> Current regulations do not require any minimum level of solar reflectance for roof materials.</p>	<p>Require all buildings to install a “cool roof” with a Solar Reflectance Index of 78 for flat roofs or 29 for roofs with a slope greater than 2:12. In the alternative, install solar panels, or a green or vegetated roof, on at least 50% of the roof area of all buildings in the project.</p>	<ul style="list-style-type: none"> <li>▪ Pleasanton, CA, adopted Residential Cool Roofing Requirements that require the altered exterior surface area of existing roofs to be replaced with a product certified by the Cool Roof Rating Council (CRRC).</li> <li>▪ Miami, FL, requires a minimum solar reflectance for all roofing materials specific to the slope of the roof.</li> <li>▪ Chicago, IL, requires green roofs on all downtown buildings.</li> </ul>

Diagnosis: Urban Forestry and Urban Heat Island		
Existing Provisions	Possible Revisions	Examples
<p><b>UF-R.4:</b> Current parking standards require 1 tree per 4 parking spaces or 50% shading from trees and buildings.</p>	<p>Instead of having current option (tree requirement or shade coverage), require both the tree requirement and the 50% shade requirement. Any roof materials shall have a Solar Reflectance Index of 29 or be covered to a minimum degree by solar panels .</p>	<ul style="list-style-type: none"> <li>▪ Miami, FL, requires 50% of parking spaces to be under cover and the roof must have a solar reflectance of at least 0.30.</li> <li>▪ Golden, CO, offers 4 sustainability points, out of a required 25, for placing 50% or more of required parking under cover with a roof that has a minimum SRI of 29.</li> </ul>
<p><b>UF-R.5:</b> Current parking regulations do not contain a maximum limit on parking.</p>	<p>Impose a maximum limit on provided parking, such as 125% of the required minimum parking standard, to prevent excessive parking and asphalt.</p>	<ul style="list-style-type: none"> <li>▪ Irving, TX, limits commercial and industrial uses to have no more than 125% of the minimum required parking.</li> <li>▪ Denver, CO, limits parking for transit-oriented development to no more than 110% of the minimum parking spaces required.</li> </ul>
<p><b>UF-R.6:</b> Current regulations do not require that sidewalks or pedestrian access lane in parking lots be covered, or that shade structures be required be incorporated into the design of private courtyards or public gathering places.</p>	<p>Require that all non-residential buildings provide shaded pedestrian sidewalks if adjacent to building and that pedestrian access from parking lots be covered. Any roof or shade shall have a Solar Reflectance Index of 29.</p>	<ul style="list-style-type: none"> <li>▪ Marana, AZ, requires pedestrian shade structures from entrances of large retail buildings to public street.</li> <li>▪ Buckeye, AZ, requires shaded walkways along 50% of all commercial building facades adjacent to or facing sidewalks, parking areas, and outdoor gathering spaces. In addition, shaded sidewalks must constitute at least 30% of the total sidewalks in the development.</li> </ul>
<p><b>UF-R.7:</b> Current regulations do not require any specific orientation of streets to promote shading (or solar access).</p>	<p>For major retail streets, align north-south and install roof structures to provide shade.</p>	<ul style="list-style-type: none"> <li>▪ Henderson, NV, and Buckeye, AZ, require new commercial, mixed-use, and industrial buildings to be oriented as to minimize direct solar exposure on the primary façade and areas of high pedestrian activity.</li> </ul>
<p><b>UF-R.8:</b> Current regulations do not reserve any of the ROW for "green" infrastructure.</p>	<p>Require that certain portion of ROW be reserved for trees and other "green" infrastructure to avoid conflicts with utilities and other grey infrastructure.</p>	<ul style="list-style-type: none"> <li>▪ Carson City, NV, requires public streets in downtown mixed-use districts to have a minimum of six feet for street tree/furniture area with minimum landscaping requirements.</li> <li>▪ Miami, FL, requires public frontages in certain zones to be lined with predominantly native and tolerant trees.</li> </ul>

<b>Diagnosis: Urban Forestry and Urban Heat Island</b>		
<b>Existing Provisions</b>	<b>Possible Revisions</b>	<b>Examples</b>
<b>UF-R.9:</b> Current regulations do not address the reflectivity levels of non-roof building materials (siding) to reduce heat island effect.	Require that building materials for larger buildings (greater than 6 stories+) have a Solar Reflectance Index of 29 or certain percentage of building sides be covered by green façade or “living” walls	<ul style="list-style-type: none"> <li>▪ Knoxville, TN, requires using light-colored/high albedo materials with a reflectance of at least 0.3 or providing shade.</li> </ul>
<b>UF-R.10:</b> Current regulations do not address the potential for taller buildings to interfere with cooling wind currents and thereby increasing the heat island effect.	Require a “heat island effect analysis” for taller buildings (6 stories+) that addresses impact of proposed building(s) on wind currents and other possible contributors to heat island effect. <sup>3</sup>	<ul style="list-style-type: none"> <li>▪ Many large cities like Chicago and Denver require large high-rise structures to analyze the impact of wind currents on pedestrians and surrounding plazas/open space.</li> </ul>

<sup>3</sup> Note: Could be difficult for landowner to comply with and for staff to administer because science is complex and evolving.

## HOUSING ACCESSIBILITY, DIVERSITY, AND AFFORDABILITY

### Introduction

A truly sustainable community must provide a variety of housing options to meet the needs of a diverse population. The community's housing stock must be affordable in that it offers a variety of rental and for sale units within reach of a mix of incomes. Housing must also be provided that is accessible to disabled residents and allows older residents to "age in place."

Like many cities across the country, Tucson's population is changing. First, it is getting larger. Although the city's growth has slowed dramatically in recent years as a result of the current recession, projections indicate that Tucson's population will reach 800,900 by 2030, up from 543,566 today<sup>4</sup>. Therefore, overall demand for housing will continue increase over time.

Second, Tucson's population is getting older. By 2030, the percentage of Americans over the age of 65 is expected to rise as high as 20-25 percent of the population. In Arizona, this percentage is expected to be 22 percent<sup>5</sup>. This trend translates to a need for more housing stock that can allow residents to stay in their current homes as they get older—or "age in place." In order to accommodate these needs, homes must incorporate a single level design, wheel chair accessibility, and visitability principles. In response to these trends, Tucson adopted a very progressive Inclusive Home Design Ordinance in 2007 which requires that all new single-family homes meet basic visitability criteria in support of an aging population.

Third, the city's household sizes are shrinking. According to the American Community Survey, between 1970 and 2005, Tucson's household size dropped from just over 3.0 persons to just over 2.4 persons per occupied house. In the U.S. as a whole, household size is also dropping, but has hovered around 2.6 persons per occupied house between 2000 and 2005. As household size decreases, demand for alternatives to the single-family detached home may also increase. This demand may be difficult to response to, as housing diversity in Tucson is somewhat limited. Driven by the availability of land and market demand, the majority of homes built in Tucson during the high growth era of the 1990's and 2000's were single-family detached units. While permits vary from year to year, as an example, in 2007 the city issued 737 single-family detached units versus 101 multifamily units—which includes duplex, tri & quad-plex, and apartments.

A final challenge is that the city's housing stock is also aging. As of 2001, the Tucson General Plan (General Plan) estimated that the number of housing units in the city 50 years old or older would top 87,000 by 2010. Older homes are often much smaller than modern homes which can make them more affordable; however, lower rental and purchase prices are may be offset by higher maintenance costs and utility bills associated with the age and condition of the home.

Many communities across the country are experiencing similar demographic shifts as Tucson and are adapting their land use policies and regulations to address changing housing needs. Furthermore, federal funding for a land use and transportation projects has recently been driven by the application of sustainable development



*A mix of housing types is necessary to address accessibility and affordability needs and to provide a wide range of housing options for Tucson's diverse population.*

<sup>4</sup> Pima Association of Governments, Regional Data.

<sup>5</sup> US Census Bureau.

practices and Smart Growth Principles, which clearly support the creation of a range of quality housing opportunities and choices for people of all income levels and compact building design.

### Current Policies and Programs

The Housing and Community Development Department is responsible for housing policy for the city. It attempts to assure housing opportunities for citizens of many needs. It runs the planning and administration of federal programs for low and middle income neighborhoods and families and also assists in home repair, home ownership and homeless programs in providing for the communities housing needs. Funding sources include: Community Development Block Grant (CDBG) Program; HOME Program; and Homeless Programs.

The HOME program is a tool to expand the stock of affordable housing. The city receives about \$2.5 million annually in this block grant. HOME has supported housing development, repair, and homebuyer assistance, leverages public and private funds, and supports the efforts of non-profit and for profit affordable housing developers.

The General Plan addresses housing more broadly and makes the observation that traditionally housing has been shaped by market factors including consumer preferences, land availability, and household size. The issues of habitat conservation, energy efficiency and natural resource shortages will be key factors affecting housing preferences in the future—as will changes in the age and size of the city’s population over time.

The General Plan clearly points to the need to focus our housing policies less on urban sprawl and more on infill development and reinvestment in our current housing stock. Three key General Plan goals stand out:

- Invest in mature neighborhoods and design new neighborhoods with a mix of commercial and residential uses focusing on pedestrian connectivity and landscaping amenities;
- Reduce poverty and create greater opportunities for housing that includes reducing social and economic inequality; and
- Create safe neighborhoods that give people the perception of feeling safe from crime and risk in their neighborhoods.

Despite the General Plan’s support for housing diversity and infill development, these objectives have been challenging to implement on a broad level. Higher densities associated with infill development are often pointed to by some community stakeholders as a problem that causes safety issues, privacy intrusions, loss of community and other problems. At the same time, it can help increase housing diversity in areas where commercial services, employment, and transit service are more readily available and help promote a more compact pattern of development within the city. Neighborhood compatibility has also been an issue in some established areas due to differences between existing development and underlying zoning regulations and a lack of clarity among residents about where infill development will be supported.

Despite these challenges, there have been numerous successful residential infill projects built in the city in recent years—such as Armory Park del Sol, and others in the downtown area. Although these projects have been recognized for their innovative designs, integration of sustainable materials and construction techniques, and mix of housing types, most were not easy to implement within the context of current LUC provisions. In addition, the cost of these homes is out of reach for many Tucson residents. One of the primary challenges in providing more affordable homes through infill and redevelopment is that this form of construction tends to cost more than greenfield development. Infrastructure in infill areas often must be upgraded or replaced, land costs tend to be higher due to the proximity of infill sites to jobs, services, and in some cases transit service, and unique site conditions preclude one-size-fits-all design and site planning solutions that might otherwise work in greenfield locations.

As energy and other natural resources become more expensive there may be an inevitable need for a more sustainable approach to housing that will tilt toward creating well-designed denser development.

## Summary

Tucson has taken several significant steps to promote housing accessibility, diversity, and affordability, supporting infill development in targeted areas of the city through its Downtown Infill Incentive District, Flexible Lot Development Standard, Urban Overlay District, and other tailored tools. While these efforts greatly expand opportunities for increased housing diversity, they are relatively focused geographically. As part of the Sustainable Land Use Code Integration project, the city has an opportunity to expand its current efforts and to address these issues more broadly in the LUC. In particular, the LUC needs to more explicitly address the types of housing the city wishes to see in different locations, increasing predictability for the development community and neighborhood residents about what will be built in the future.

Some of the potential changes identified below include:

- Clarifying language in the LUC related to housing types to more clearly define where in the city a diverse mix of housing types is desirable and ensuring standards are in place to accommodate this mix while protecting established neighborhoods;
- Reducing restrictions on accessory dwelling units that greatly limit usage; and
- Providing increased flexibility in minimum lot size and setback requirements in the Development Designator System to allow for creative approaches to housing, especially small-lot development.

## Current Regulations

The following table cites current regulations related to housing accessibility, diversity, and affordability. It is not meant to be all-inclusive; rather it highlights some of the key provisions currently on the books that are directly related to this issue.

Regulations Addressing Housing Accessibility, Diversity, and Affordability	
REF.	REGULATION
<b>Land Use Code</b>	
2.6.3	<b>Planned Area Development Zone (PAD)</b> , provides for the establishment of zoning districts with distinct regulations as adopted by Mayor and Council. Offers flexibility for unique developments that meet size or location criteria.
2.65	<b>Planned Community Development (PDC) District</b> , provides flexibility for large-scaled, unified planned developments which conform to the policies of the General Plan, applicable specific plans and other sustainability and conservation programs. Supports a variety of housing, including affordable housing.
2.8.11	<b>Neighborhood Preservation Zone</b> -establishes requirements intended to preserve the unique characteristics of the city's historic neighborhoods as a foundation for the creation of a neighborhood-specific design manual.
Division 6	Five <b>mixed-use zone districts</b> (Office/Commercial/Residential-1/2; Planned Area Development, Multiple Use, and Planned Commercial Development Districts) allow/encourage mixed-use developments. PAD purpose statement specifically refers to the provision of a variety of housing and affordable housing.
2.8.12	<b>Downtown Infill Incentive District</b> promotes infill development through a variety of incentives, ranging from reduced fees to expedited permitting in downtown to exemption from a number of suburban development requirements.
2.8.13	<b>Urban Overlay District Zone (UOD)</b> - allows UOD to be initiated by the Mayor and Council that does not restrict underlying uses or regulations but provides a development option that encourages well-designed infill projects subject to the regulations and guidelines provided in the UOD's development document. Supports pedestrian and transit-oriented, urban infill and mixed-use areas

Regulations Addressing Housing Accessibility, Diversity, and Affordability	
REF.	REGULATION
	and safe urban neighborhoods.
2.8.10	<i>Rio Nuevo and Downtown Zone Districts</i> encourage mixed-use development and infill by allow modification of many development standards (parking, landscaping, etc.).
3.2.5	<i>Accessory Uses and Structures</i> , limits residents of secondary dwellings to occupants of the principal dwelling, customers, employees, or guests of principal use.
Division 3	<i>Design Development Option (DDO)</i> , provides the ability to modify, under certain criteria, the Development Designator provisions applicable to a land use within each zone. Criteria include consideration for the implementation of alternative design solutions, including the efficient use of land through design innovation.
4.1.9	<i>Condominium conversions</i> are required to address a requirements related to the relocation of tenants who will be displaced and provide compensation to offset relocation costs.
Development Standards	
2-10.0	<i>Flexible Lot Development Standard</i> , allows for higher density development and lots less than 4,000 sq. ft. in exchange for green building, siting, and other infill requirements.
Design Guidelines	
Section II	<i>Community Character and Design</i> , encourages variation in lot size, building orientation, and setbacks to add character and interest, indirectly promoting a mix of housing types.
Other	
Ord.1046 3	<i>Inclusive Home Design Ordinance</i> requires that all new single-family homes meet basic visitability criteria in support of an aging population.

## Diagnosis

The following table contains a diagnosis of regulations addressing housing accessibility, diversity, and affordability.

Diagnosis: Housing Accessibility, Diversity, and Affordability		
Existing Provisions	Possible Revisions	Examples
<b>REMOVE BARRIERS</b>		
HA-B.1: LUC prohibits most secondary dwelling units.	Remove existing restrictions on accessory dwelling unit standards to allow non-resident/non-employee tenants. Include protective standards related to unit size, ownership, occupancy of principal dwelling, etc.	<ul style="list-style-type: none"> <li>City of Santa Cruz, CA, has progressive accessory dwelling unit program implemented through zoning code.</li> <li>Salt Lake City is considering amendments to zoning code to permit accessory dwelling units in specified areas (e.g., near transit) and neighborhoods where plans approve of ADUs.</li> </ul>
HA-B.2: Current minimum lot size for single-family detached homes is 5,000 s.f.	Reduce minimum lot size to allow for small lot residential development and incorporate new standards to address potential compatibility issues.	<ul style="list-style-type: none"> <li>North Las Vegas, NV, allows very small lot developments (&lt;4,000 square feet) with special design standards.</li> </ul>

Diagnosis: Housing Accessibility, Diversity, and Affordability		
Existing Provisions	Possible Revisions	Examples
<p><b>HA-B.3:</b> The Development Designator system provides limited flexibility on setbacks and lot sizes for housing modification. The Design Development Option (DDO), provides the ability to modify setbacks required by the Development Designator, but does not allow for modifications that would result in the increase of the number of residential dwelling units provided.</p>	<p>Allow for increased flexibility in lot sizes and setbacks specifically to accommodate higher residential densities in targeted locations provided the additional density would not conflict with other criteria stated.</p>	<ul style="list-style-type: none"> <li>Glenwood Springs, CO, provides a menu of setback options to address typical infill scenarios in its residential neighborhoods.</li> </ul>
<p><b>HA-B.4:</b> Many existing residential zone districts allow for a variety of housing types; however, purpose statements for many districts do not clearly define the types of housing that is desired in different districts. (e.g., the term 'Family Dwelling' is used to describe both attached and detached housing types)</p>	<ul style="list-style-type: none"> <li>Increase predictability for the development community and neighborhood residents by updating purpose statements to clearly define where infill and redevelopment and a broader mix of housing types is desirable to support the city's sustainability goals.</li> <li>Address unique aspects of each zone district that should be considered as part of the development process (e.g., transitions to adjacent neighborhoods, compatibility with surrounding uses).</li> <li>Incorporate definitions for the distinct housing types that are desired (e.g., townhomes, mansion apartments, duplex)</li> </ul>	<ul style="list-style-type: none"> <li>Most modern development codes include definitions for a range of distinct housing types. In communities experiencing infill pressures, new definitions to address non-traditional housing types (e.g., mansion apartments, courtyard apartments) are commonly being incorporated along with residential design standards or other compatibility requirements.</li> </ul>
CREATE INCENTIVES		
<p><b>HA-I.1:</b> Flexible Lot Development Standard Mix of housing types is allowed in mixed-use districts and several residential districts; but there is no incentive for developers to include more than one type.</p>	<p>Provide density bonuses for projects that incorporate affordable or workforce housing units; increase the bonus and allow for reductions in required off-street parking for projects located in areas where high-frequency transit service currently exists or is planned in the future. Concentrate these types of adjustments along major travel corridors where higher-intensity development is less likely to have a negative impact on established neighborhoods and may be served by</p>	<ul style="list-style-type: none"> <li>Sparks, NV, offers reduced parking requirements for projects that incorporate affordable housing in the city's TOD corridor.</li> <li>Boulder, CO, grants automatic parking reductions to affordable housing projects whose residents typically have fewer cars and rely more on public transit.</li> <li>Henderson, NV, offers density bonuses and reduced parking for projects that incorporate housing as part of a broader mix of uses along</li> </ul>

Diagnosis: Housing Accessibility, Diversity, and Affordability		
Existing Provisions	Possible Revisions	Examples
	high frequency transit.	<p>the city's Boulder Highway BRT Corridor.</p> <ul style="list-style-type: none"> <li>Glenwood Springs, CO, provides a lot coverage bonus for infill developments that incorporate accessory dwelling units.</li> </ul>
<p>HA-I.2: HUD site mentions that Tucson offers streamlined processing for affordable housing, however, need to confirm with staff whether this is still current practice<sup>6</sup>.</p>	<p>If not currently provided, offer streamlined processing and/or reduced processing fees for affordable housing projects.</p>	<ul style="list-style-type: none"> <li>Fort Collins, CO, and Teton County, WY, offer reduced fees for affordable housing projects</li> </ul>
FILLING REGULATORY GAPS		
<p>HA-R.1: Existing regulations allow for a mix of housing types in many zone districts.</p>	<p>Require a mix of housing types in new developments in proportion to the size of the development—e.g., the larger the development, the greater the housing mix</p>	<ul style="list-style-type: none"> <li>Glenwood Springs, CO, requires residential developments larger than three acres to incorporate a minimum of two housing types and developments larger than six acres to incorporate a minimum of three housing types.</li> <li>Erie, CO, requires developments larger than 20 acres to incorporate a minimum of two housing types and developments larger than 40 acres to incorporate a minimum of three housing types.</li> </ul>
<p>HA-R.2:</p>	<p>Require a mix of unit sizes in multi-family developments to help ensure units at a range of price points are available.</p>	<p>Erie, CO— Requires all multi-family developments to meet one of the following:</p> <ul style="list-style-type: none"> <li>A minimum of 50% of the total planned units shall vary in size from other units by at least 250 square feet.</li> <li>A maximum of 50% of the total planned units may have the same number of bedrooms.</li> <li>A minimum of ten percent of the total planned units shall have at least three bedrooms.</li> </ul>
<p>HA-R.3: No requirement for units to meet local housing affordability thresholds</p>	<p>Establish an inclusionary housing ordinance that requires a certain percentage of units meet local housing affordability thresholds or require a fee-in-lieu payment when such units can't be provided on site.</p>	<ul style="list-style-type: none"> <li>Denver, CO, requires that all projects with 30 or more dwelling units for sale shall either be affordable at 80% of the AMI or 2) if the development has a building(s) with more than 3 stories, elevators, and more than</li> </ul>

<sup>6</sup> <http://www.huduser.org/rbc/search/rbcdetails.asp?DocId=82>

<b>Diagnosis: Housing Accessibility, Diversity, and Affordability</b>		
<b>Existing Provisions</b>	<b>Possible Revisions</b>	<b>Examples</b>
		<p>60% structures parking, create 10% dwelling units at 95% of AMI.</p> <ul style="list-style-type: none"> <li>San Diego, CA, requires 10% of units in most large residential developments to be affordable to targeted households. Can provide units off-site.</li> </ul>

## COMMUNITY HEALTH AND SAFETY

### Introduction

There is mounting evidence nationally of a direct link between community health and safety and land use and development patterns. Despite best efforts, public health officials have had limited success in persuading Americans to adopt better eating and exercise habits. Based on national public health studies, they are increasingly focusing on how communities are laid out and how development is regulated through zoning standards as an important strategy in addressing major national health problems such as obesity and heart disease.<sup>7</sup>



*Providing ample opportunities for physical activity is a key characteristic of a healthy community.*

Nationally, public health officials and community planners are focusing on several key areas of opportunity in the context of development patterns and zoning.

- Obesity and obesity-related illnesses
- Physical activity and pedestrian safety
- Diet and nutrition
- Violent crime and public safety
- Natural disasters (floods, landslides, etc.)
- Chronic heart and lung conditions

Obesity rates are soaring throughout the nation, including Arizona. Just a decade ago, the adult obesity rate in Arizona was less than 15%; it now exceeds 20%, including Tucson where the rate in 2008 was 21%. If current trends continue, experts estimate that more than 86% of U.S. adults will be overweight or obese by 2030. The statistics for children are particularly disturbing--nearly 18 percent of Arizona children are obese, and the rate of childhood obesity here rose by nearly 46 percent between 2003 and 2007, largest increase in the nation. But Arizona posted the biggest increase in childhood obesity prevalence of all states between 2003 and 2007. In 2003, 12.1 percent of the state's children were obese. In 2007 that percent was up to 17.8. The national rate is 16.4 percent.<sup>8</sup> Statistics show that Native American and Hispanic children are most at risk.

According to a 2008 study by the Robert Wood Johnson Foundation, Pima County also had a high rate of respiratory disease deaths compared to other Arizona cities and nationally.

The link between physical activity, pedestrian safety, and crime is another key health/zoning issue. One reason obesity rates are so high in most places is because of low rates of physical activity. But residents are often reluctant to walk to run errands or to get to school or work because of traffic safety or crime concerns. In Los Angeles, for example, one of the leading causes of death of Hispanics is traffic accidents—pedestrians being hit while walking to work or school because of lack of sidewalks or safe routes to destinations. Arizona consistently ranks among the worst states for pedestrian fatalities, and Tucson until recently was one of its worst offenders

<sup>7</sup> A good example is an excellent recent study by the Johns Hopkins Schools of Medicine and Public Health, "Zoning For A Healthy Baltimore," (2010). This study summarizes the significant empirical evidence of the health effects of the built environment features governed or affected by zoning.

<sup>8</sup> [Archives of Pediatrics & Adolescent Medicine](#) (May 2010)

with a rate of 3.26 deaths per 100,000 people. Use of new pedestrian signal devices has reduced that rate to 2.54/100,000—but it is still over double the national average of 1.26. Violent crime also deters walking for work, school, and recreation. Tucson’s violent crime rate (murder, rape, robbery, and aggravated assault), while showing a downward trend, was one of the highest in Arizona in 2008 and almost twice the national average (803.9/100,000 vs. 454 nationally and 660 in Phoenix).

Other national studies cite the poor diets of many citizens as a major national health issue, linking it in part to neighborhoods that are food “deserts”—that is, residents lack of access to healthy foods either through supermarkets, farmers markets, or community gardens.

Finally, national disasters related to incidents like floods and wildfires continue to take a toll both in property damage and deaths nationally and in Arizona. Environmental contamination of groundwater and building sites is another related public health issue. Again, the relationship to zoning is clear.

Tucson has taken some important steps to address community health and safety issues, such as:

- Adopting an aggressive environmental remediation program related to groundwater and chemically contaminated soil.
- Promoting infill development by assessing and cleaning up brownfield sites
- Adopting new mixed-use development districts and regulations to promote compact, mixed-use projects.
- Protecting native plants and vegetation in the development review process.
- Installing new pedestrian-friendly traffic signals.
- Promoting new community policing and crime-prevention techniques.

While these initiatives are critical and have begun to show results such as reduced crime rates, there are significant opportunities to improve community health and safety through amendments to the city’s development codes. The development code strategies for addressing community health and safety fall into four main categories:

- (1) Promoting development patterns such as mixed-use, compact projects that encourage walking for work, school, errands, and recreation.
- (2) Providing safe routes to work and school for pedestrians.
- (3) Improving access to healthy food sources like farmers markets, community gardens, and supermarkets in all neighborhoods.
- (4) Protecting citizens through crime prevention site and building design techniques and natural hazard protection regulations.

There is increasing scientific evidence in each one of these categories that development codes can have a significant positive impact and improve public health and safety. For example, several studies have shown that mixed-use development is associated with increased physical activity and decreased obesity. Other studies have shown a decrease in police calls when Crime Prevention Through Environmental Design Principles relating to landscaping and lighting were adopted in local zoning codes.

As is true with other sustainability topics under consideration in this diagnosis, the city has already made some changes to its development codes to address public health and safety. For example, to promote compact mixed-use and infill development, Tucson has recently adopted new zone districts such as the Downtown Infill Incentive District. The Planned Community Development Ordinance (2007) promotes more walkable, mixed-use master planned communities at the city’s edges. Similarly, according to staff, the city applies an uncodified “safe by design” policy to rezoning requests that encourages all new development to incorporate landscape and lighting

designs that assure a safe pedestrian environment and assist police patrols. All of these measures have helped to lay the foundation for the major amendments to the LUC and Development Standards necessary to address community health and safety in Tucson. Some of the potential changes identified below include:

- Adopting clear, simple design guidelines and development standards to promote infill and mixed-use developments throughout the city, not just a limited number of districts.
- Removing barriers to farmers markets and community gardens that can help provide access to more nutritional food.
- Enacting standards to promote safe, efficient, and attractive routes to school and work
- Expanding the safety by design principles and standards.
- Considering wildfire protection regulations to protect new developments on the city's edges.

### Current Regulations

The following table cites some of the main current regulations in the LUC, Development Standards, and Design Guideline Manual as well as other sections of the municipal code related to community health and safety. It is not meant to be all-inclusive, but to highlight some of the key provisions currently on the books that are directly related to climate change. Additionally, related measures are set forth in the sections on Climate Change, Urban Forestry, Food Production/Nutrition, and Open Space that are closely associated with the topic of community health and safety.

Regulations Addressing Community Health and Safety	
REF.	REGULATION
<b>DEVELOPMENT PATTERNS— MIXED-USE, INFILL, AND COMPACT GROWTH</b>	
<b>Land Use Code</b>	
Division 6	Lists 5 mixed-use zone districts (Office/Commercial/Residential-1/2; Planned Area Development, Multiple Use, and Planned Commercial Development Districts) that allow/encourage mixed-use developments.
2.8.12	Establishes the <b>Downtown Infill Incentive District</b> that promotes mixed-use development, reduces fees, and expedites permitting in downtown.
2.8.10	Establishes the <b>Rio Nuevo and Downtown Zone District</b> that encourages mixed-use development and infill by allowing modification of many development standards (parking, landscaping, etc.).
2.8.13	Establishes <b>Urban Overlay District Zone (UOD)</b> to be initiated by the Mayor and Council that does not restrict underlying uses or regulations but provides a development option that encourages well-designed infill projects subject to the regulations and guidelines provided in the UOD's development document. Supports pedestrian and transit-oriented, urban infill and mixed-use areas.
3.2.2.2	Relating to <b>Principal Uses</b> applies most restrictive development residential designator/dimensional standards to mixed-use projects with residential.
3.2.5	<b>Accessory Uses and Structures</b> — limits residents of secondary dwellings to occupants of the principal dwelling, customers, employees, or guests of principal use.
Division 3	<b>Parking</b> , sets forth off-street parking requirements for motor vehicles and bicycles. Many requirements relating to motor vehicles are very high (e.g., retail, office). Reductions allowed for mixed-use projects (3.3.5), downtown development (3.3.6.1), and existing development sites (3.3.8.6). On-street parking allowed to count towards off-street requirements in some instances (e.g., visitor parking for some residential uses).
3.3.3.11, 3.3.8.6, 3.3.8.7	In May 2009, the city council adopted a series of amendments to parking regulations to reduce the number of motor vehicle parking spaces for non-conforming and existing uses (Sections 3.3.3.11 and 3.3.8.6) and establishing a process for tailored reduced parking plans (Section 3.3.8.7).

Regulations Addressing Community Health and Safety	
REF.	REGULATION
5.3.6	<b>Nonconforming Use or Structure</b> — and other provisions (e.g., 3.3.3.12 regarding parking) scattered throughout LUC address expansions of nonconforming uses and structures. Expansions of more than 25-50% require full compliance with some LUC standards.
3.6.1	<b>Flexible Lot Development</b> — allows flexibility in development standards to create high-quality sustainable development featuring enhanced connectivity, open space, water harvesting, etc.
2.6.5	<b>Planned Community Development District</b> — promotes sustainable land development patterns, connectivity, and mobility options in large master planned communities.
<b>Development Standards</b>	
9-10.0	<b>Rio Nuevo and Downtown Zone</b> — incorporates many sustainability related provisions including provisions encouraging high-density, mixed-use development within a walkable environment.
<b>Design Guidelines</b>	
I.A.5.a	Encourages compatible mixed-use development by specifying transitions and buffers between uses in and adjacent to mixed-use areas.
III.A.5.a	Recommends design solutions to encourage compatible development in “park industrial” mixed-use areas.
Section V	<b>Special Design Options</b> describes and illustrates selection and design criteria for infill areas, transportation nodes/corridors, and redevelopment districts.
<b>FOOD PRODUCTION AND ACCESS TO HEALTHY FOOD</b>	
<b>Land Use Code</b>	
6.3.10.6	Farmer’s markets mentioned only as a subset of “Swap Meets and Auctions” in definitions.
2.5 and 2.7	Swap meets allowed only in C-2, C-3, P-1 (by special exception), and industrial zone districts.
3.5.9.4	Sets forth performance criteria for swap meets. Limits on hours of operation and noise if near a residential use or zone.
6.3.3	<ul style="list-style-type: none"> <li>▪ The terms “community garden” or “backyard garden” are not used in the LUC. Not clear if allowed. “Accessory use” definition allows land uses that are “incidental” to principal use, but neither specifically includes or excludes community or backyard gardens.</li> <li>▪ “Greenhouses” are defined under “crop production”. “Crop production” not allowed in most small-lot, urban residential zone districts.</li> </ul>
3.2.5.1.D	<b>Accessory Uses</b> — allows animals to be kept for personal use in all zone districts subject to Tucson Code, Chapter 4, <i>Animals and Fowl</i> (See below.) All accessory structures for animals must be set back at least 50 feet from all property lines. The area occupied by an accessory use or structure is included in lot coverage calculation.
6.3.3.2 3.5.2.1-2 2.2 6.3.3	<ul style="list-style-type: none"> <li>▪ Includes poultry and rabbits in the definition of “agricultural production” in the Agriculture use group. “Agricultural production” defined as for “commercial gain.”</li> <li>▪ Contains performance standards for the agricultural use group. All structures for animals must be set back at least 50 feet from property lines. Animal sheds or shelters must be set back 100 feet.</li> <li>▪ Agricultural production is allowed only in large-lot residential zones (e.g., Rural Homestead, Suburban Ranch), not in smaller lot districts (e.g., R-1, R-2, R-3) or mixed use.</li> <li>▪ <b>Agricultural Use Group</b>— includes “general farming” which is defined as any combination of animal or crop production for personal use. However, general farming is only in large-lot residential zones (e.g., Rural Homestead, Suburban Ranch), not in smaller lot districts (e.g., R-1, R-2, R-3) or mixed use.</li> </ul>

Regulations Addressing Community Health and Safety	
REF.	REGULATION
<b>Development Standards</b>	
	The terms "agricultural, community garden, backyard garden, and farmers market" are not mentioned in the Development Standards. The term "animal" is mentioned only in relation to endangered species.
<b>Design Guidelines</b>	
None	None
<b>Other</b>	
Tucson Code, Chap.4	<b>Animals and Fowls</b> — contains detailed regulations for the keeping and care of animals and fowls in Tucson. Article IV permits up to 24 fowl to be kept. Coops must be kept at least 50 feet away from any dwelling. Hogs and pigs (except 3 miniature pigs) are prohibited.
<b>PEDESTRIAN CONNECTIVITY</b>	
<b>Land Use Code</b>	
2.6.5 2.8.10 2.8.12	A number of zone districts specifically encourage or require connectivity and walkable developments <ul style="list-style-type: none"> <li>▪ Section 2.6.5, Planned Community Development District</li> <li>▪ Section 2.8.10, Rio Nuevo and Downtown Zone District</li> <li>▪ Section 2.8.12, Downtown Area Infill Incentive District</li> </ul>
3.3-5.7	Related to parking at regional malls requires shaded sidewalk connections to public transit facilities, mall entrances, free-standing commercial pads, and streets
3.5-9.7	<b>Large Retail Establishment Design Criteria</b> — requires safe, attractive pedestrian accessibility and "attractive, inviting pedestrian-scale" amenities.
3.6.1	<b>Flexible Lot Development</b> — contains multiple references to pedestrian circulation and connectivity and requires a pedestrian circulation system (Section 3.6.1.5.G)
<b>Development Standards</b>	
Submittal Req.	The Development Standards contain many provisions related to sidewalks, walkways, and pedestrian connections in submittal requirements (e.g., DS 1-07.0, <i>Design Compatibility Report</i> in rezoning procedures).
2-06.3.8	<b>Landscaping and Screening Standards</b> — sets forth safety standards related to landscaping and trees along walkways and bike paths/lanes
3-01.2.6-2.7 and 3.3	Establish standards for bikeways and sidewalks along streets (e.g., all streets require sidewalks on each side of street) and in new developments.
9-10.0	<b>Rio Nuevo and Downtown Zone</b> — contains a variety of requirements to improve the pedestrian experience (e.g, Subsection 4.2 addresses improving the pedestrian experience through building design and orientation; Section 4.3 gives pedestrian "top priority" in the Downtown regarding circulation and parking and requires shading of 50% of sidewalks; Section 4.4 encourages pedestrian plazas and open space and pedestrian-oriented streetscape features (such as seating and lighting).
<b>Design Guidelines</b>	
Section I	<b>All Development</b> — contains numerous provisions to promote pedestrian and alternative transportation modes (e.g., traffic calming measures, pedestrian access through development perimeter walls, parking reductions trade-off for site amenities such as shaded pedestrian areas, lighting standards)

Regulations Addressing Community Health and Safety	
REF.	REGULATION
Section II	<b>Residential Development</b> — incorporates many guidelines to enhance pedestrian opportunities (e.g., development of circulation plans keeping in mind pedestrian walking times to destinations, "safe by design" concepts," pedestrian networks with direct connections to commercial, schools, transit, and pedestrian-oriented streetscapes). Section III, <i>Office/Commercial/Park Industrial Development</i> , contains similar provisions for non-residential developments.
Section V	<b>Special Design Options</b> — has three design options with significant pedestrian-oriented features (Urban Villages/Master Planned Communities, Pedestrian District [within a mixed-use area], and Transportation Corridor/Node).
<b>PUBLIC SAFETY—CRIME PREVENTION AND NATURAL HAZARD PROTECTION</b>	
<b>Land Use Code</b>	
2.8.1	<b>Hillside Development Zone</b> — provides for the "reasonable use" of hillside areas while protecting public health and safety. Regulations reduce allowable density as degree of slope increases.
2.8.5	<b>Airport Environs Zone</b> — establishes restrictions on certain high-density and noise-sensitive uses around Tucson International Airport and Davis-Monthan Air Force Base.
2.8.6	<b>Environmental Resource Zone</b> — is intended to preserve open space and critical habitats within the floodplain (See Floodplain Management ordinance below.).
5.2.2.1.l	<b>Special Planning Document</b> — requires a safety element in the comprehensive plan for the protection of the city from natural and manmade hazards including planning for evacuation routes, peak load water supply requirements, and geologic hazard mapping.
	The city has reportedly been applying a "safe by design" policy in rezonings and other development approvals that encourages design to discourage hidden areas that would prevent police patrols from being able to observe all areas of a property to assure a safe environment. There are on-line references to this policy in city development decisions over the past decade, but apparently the policy is not written down or officially adopted according to staff. Development plans are sent to the Police Department for their review of local safe by design techniques. (See Crime Prevention Landscaping Guidelines under Development Standards below.)
<b>Development Standards</b>	
2-06.3.6	<b>Crime Prevention Landscaping Guidelines</b> — addresses the positioning, location, and type of planting, screening, and other landscape elements to allow for natural surveillance of outdoor spaces from within buildings, outdoor locations on-site, and from adjacent properties. Height limits are prescribed for plantings near walkways and windows.
<b>Design Guidelines</b>	
	None
<b>Other</b>	
Tucson Code, Chapter 26	<b>Floodplain and Erosion Hazard Management</b> — provides for the management of uses and development in floodplains to protect the public from flooding and to protect riparian habitats. All proposed developments within the 100-year floodplain require a permit from the City Engineer. Necessary riparian habitat disturbance must be mitigated.

## Diagnosis

The following table contains a diagnosis of regulations addressing community health and safety.

Diagnosis: Community Health and Safety		
Existing Provisions	Possible Revisions	Examples
<b>REMOVE BARRIERS</b>		
<b>DEVELOPMENT PATTERNS—MIXED-USE, INFILL, AND COMPACT GROWTH</b>		
<p><b>CH-B.1:</b> While several districts tailor development standards for infill and promote connectivity/ pedestrian activity, other infill areas are subject to suburban-oriented development standards.</p>	<p>Consider adopting tailored development standards (landscaping, parking, open space) for designated infill and redevelopment areas throughout city to promote connectivity.</p>	<ul style="list-style-type: none"> <li>▪ Laramie, WY, has customized landscaping, parking, and open space stds. for mature areas of the city.</li> <li>▪ Franklin, TN, has adopted traditional neighborhood standards addressing connectivity for older areas of city.</li> <li>▪ Seattle, WA, Green Factor landscaping requirements in commercial and commercial neighborhood districts (and possible MF development in future).</li> </ul>
<p><b>CH-B.2:</b> Development designator system applies most restrictive standards (usually residential) to mixed-use projects.</p>	<p>Revise development designator system to apply less restrictive standards to mixed-use projects or replace development designator with more traditional zone district dimensional system.</p>	<ul style="list-style-type: none"> <li>▪ City currently considering major revisions to development designator system as part of code reformatting project.</li> </ul>
<p><b>CH-B.3:</b> LUC prohibits most secondary dwelling units.</p>	<p>Remove existing restrictions on accessory dwelling unit standards to allow non-resident/non-employee tenants. Include protective standards related to unit size, ownership, occupancy of principal dwelling, etc.</p>	<ul style="list-style-type: none"> <li>▪ City of Santa Cruz, CA, has progressive accessory dwelling unit program implemented through zoning code.</li> <li>▪ Salt Lake City is considering amendments to zoning code to permit accessory dwelling units in specified areas (e.g., near transit) and neighborhoods where plans approve of ADUs.</li> </ul>
<p><b>CH-B.4:</b> Off-street parking requirements excessive for many uses—this pushes development apart and makes pedestrian activity more difficult.</p>	<p>Reduce base off-street parking requirements. Increase automatic reduction for mixed-use projects near existing/planned transit stops (now 10%). Allow on-street parking adjacent to property to count towards minimum on-street requirements. Adopt maximum parking limits.</p>	<ul style="list-style-type: none"> <li>▪ Austin, TX, grants vertical mixed-use buildings automatic 60% parking reduction.</li> <li>▪ Anchorage, AK, grants automatic 25% reduction in parking for mixed-use projects.</li> <li>▪ Many cities have adopted maximum parking limits (e.g., 125% of minimum).</li> </ul>
<b>FOOD PRODUCTION AND ACCESS TO HEALTHY FOOD</b>		
<p><b>CH-B.5:</b> Tucson Code, Chapter 4, <i>Animals and Fowls</i>, contains regulations allowing certain animals and fowls in city. However,</p>	<ul style="list-style-type: none"> <li>▪ Carefully review all food production/agricultural provisions in LUC and reconcile with Chapter 4.</li> <li>▪ Consider allowing raising of fowl in smaller lot residential zone districts</li> </ul>	<ul style="list-style-type: none"> <li>▪ Burlington, VT, addresses the definitions of gardening, produce sales and other urban food production topics and allows community gardens in residential</li> </ul>

<b>Diagnosis: Community Health and Safety</b>		
<b>Existing Provisions</b>	<b>Possible Revisions</b>	<b>Examples</b>
LUC contains some conflicting provisions (e.g., setback of animal sheds) and prohibitions in some residential districts	(e.g., R-3) where now prohibited, but reduce number of allowable fowl to less than 24 as now permitted in Chapter 4. Add additional protective provisions for small zone districts. <ul style="list-style-type: none"> <li>▪ Consider reducing setbacks for small animal enclosures such as chicken and rabbit coops.</li> </ul>	zones, public parks, and open space.
<b>CH-B.6:</b> LUC lumps farmer’s markets in with “Swap Meets and Auctions” and limits permissible locations.	Consider establishing separate definition and standards for farmers markets. Allow use in greater range of districts, including residential, with protective standards in LUC and Development Standards.	<ul style="list-style-type: none"> <li>▪ Dallas, TX, has tailored provisions for farmers markets and home produce sales under certain conditions.</li> <li>▪ Havelock, North Carolina permits seasonal outdoor fruit and vegetable markets in accordance with the specific development standards as a temporary use.</li> </ul>
<b>CH-B.7:</b> LUC does not mention “community garden” or “backyard garden.” “Agricultural production” for commercial gain not allowed in many residential districts—this may effectively prohibit community gardens or private, backyard gardens from selling produce.	<ul style="list-style-type: none"> <li>▪ Add definitions for backyard and community gardens to LUC.</li> <li>▪ Clarify definitions for agricultural uses (e.g., “general farming”)</li> <li>▪ Make clear that limited size community gardens and backyard gardens may sell produce. Allow in smaller lot residential zone district and public lands/parks (with city permission) along with necessary accessory structures such as tool sheds. Address composting as permitted accessory use.</li> <li>▪ Clarify that non-commercial greenhouses and similar structures are permitted accessory uses in residential zone districts; review and consider reductions in setback requirements with compatibility standards.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Cleveland, OH, has adopted a comprehensive regulatory approach to urban food production that addresses urban gardens by providing definitions, creating a tailored zone district, and provisions for accessory structures and produce sales.</li> </ul>
<b>PEDESTRIAN CONNECTIVITY (SAFE SCHOOL/WORK ROUTES, SIDEWALKS)</b>		
<b>CH-B.8:</b>	<ul style="list-style-type: none"> <li>▪ Adopt street/pedestrian connectivity standards for development , including trails or lanes, where appropriate</li> <li>▪ Adopt a wider range of and more flexible street standards to accommodate alternative modes.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Eugene, OR, in mixed use and TOD aras, the city allows for narrower streets design standards.</li> <li>▪ Chicago, IL, FAR bonuses for streetscape improvements in downtown districts, including raised planters, pavers, pedestrian lighting, seating, etc.</li> </ul>

<b>Diagnosis: Community Health and Safety</b>		
<b>Existing Provisions</b>	<b>Possible Revisions</b>	<b>Examples</b>
<b>CREATE INCENTIVES</b>		
<b>DEVELOPMENT PATTERNS—MIXED-USE, INFILL, AND COMPACT GROWTH</b>		
CH-I.1: Existing mixed-use zone districts create some incentives for mixed-use projects.	Offer development bonuses (height, density, etc.) for implementing sustainability goals. Tailor standards to encourage infill development and address compatibility issues with adjacent neighborhoods.	<ul style="list-style-type: none"> <li>Austin, TX, grants vertical mixed-use buildings with minimum use mix a wide variety of major incentives (no front setbacks, no FAR, no building coverage limits, and additional uses.</li> </ul>
<b>FOOD PRODUCTION AND ACCESS TO HEALTHY FOOD</b>		
CH-I.2: LUC does not address allowing community gardens as an alternative open space amenity.	Allow community gardens and roof top gardens to qualify as required open space. Consider extra credit for providing irrigation, tool sheds, and other supportive elements.	<ul style="list-style-type: none"> <li>Portland, OR, provides FAR bonuses for roof top gardens.</li> </ul>
<b>PEDESTRIAN CONNECTIVITY</b>		
CH-I.3: Various LUC and Development Standard provisions protect native vegetation that can provide shade for pedestrians.	Provide bonus credit towards landscaping requirements for preservation of large existing trees, including non-native species.	<ul style="list-style-type: none"> <li>Franklin, TN, and Colleyville, TX, grant landscaping credit for protecting existing mature trees.</li> </ul>
<b>PUBLIC SAFETY—CRIME PREVENTION AND NATURAL HAZARD PROTECTION</b>		
CH-I.4: Required safety element in comprehensive plan does not address crime prevention	Add requirement that safety element address broader range of issues such as crime prevention and safety by design. This will lend support to adopting regulations discussed below.	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>FILLING REGULATORY GAPS</b>		
<b>DEVELOPMENT PATTERNS—MIXED-USE, INFILL, AND COMPACT GROWTH</b>		
CH-R.1: LUC specifies maximum densities, but not minimum density or minimum mix of uses to produce pedestrian activity.	Consider requiring minimum densities, especially in potential transit-oriented development and mixed-use areas	<ul style="list-style-type: none"> <li>Fort Collins, CO, requires a minimum residential density of 4 units/ac.</li> <li>Orange County, FL proposed MXDAC mixed-use district specifies minimum use mix in designated areas.</li> </ul>
CH-R.2: Several zone districts and Flexible Lot Development Standards address sidewalk, connectivity requirements	Create mandatory internal and external connectivity standards for all major developments, not just in limited number of special areas.	<ul style="list-style-type: none"> <li>The Florida DOT adopted connectivity standards in its "Model Regulations for Multimodal Transportation Districts."</li> <li>Franklin, TN, adopted a connectivity index with numerical standards to assess new subdivisions.</li> </ul>

Diagnosis: Community Health and Safety		
Existing Provisions	Possible Revisions	Examples
<b>FOOD PRODUCTION AND ACCESS TO HEALTHY FOOD</b>		
CH-R.3: LUC and Development Standards contain no provisions regarding vegetated, green roofs. <sup>9</sup>	Add provisions specifically allowing or requiring vegetated/green roofs	<ul style="list-style-type: none"> <li>Chicago requires green roofs on all new downtown buildings.</li> <li>LEED-ND awards 1 point for shaded roofs.</li> <li>Henderson, NV, grants points in its sustainability point review system for vegetated roofs.</li> </ul>
CH-R.4: LUC does not address allowing community gardens to qualify for open space credit.	Require new subdivisions and planned developments to provide space for community gardens and supporting structures/facilities.	<ul style="list-style-type: none"> <li>Salt Lake City has adopted new regulations to promote provision of community gardens in new developments.</li> </ul>
CH-R.5: Codes do not address small-scale fowl/animal raising with compatibility standards.	Adopt comprehensive standards addressing fowl raising on a smaller scale in residential areas	<ul style="list-style-type: none"> <li>Madison, WI, allows food production of produce, fowl raising, and animal husbandry by right and conditionally with compatibility standards.</li> </ul>
<b>PEDESTRIAN CONNECTIVITY</b>		
CH-R.6: LUC requires connectivity and walkable developments for several special zone districts. Design Guidelines encourage direct pedestrian connections to work, schools, transit, etc.	<ul style="list-style-type: none"> <li>Expand connectivity and pedestrian circulation plan requirements to cover all larger commercial and residential developments.</li> <li>Codify safe work/school route requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Salt Lake City has codified complete street standards to include pedestrian walkways and amenities.</li> <li>See National Safe School Routes Program Resource Center. <a href="http://www.saferoutesinfo.org">http://www.saferoutesinfo.org</a></li> </ul>
CH-R.7: LUC and Development Standards have scattered provisions requiring or encouraging shade structures (e.g., in Rio Nuevo district and for regional malls)	Consider expanding requirements for shade structures on building facades, roofs, and in parking lots.	<ul style="list-style-type: none"> <li>Henderson, NV, requires sidewalks along 50% of building façade to be shaded.</li> </ul>
CH-R.8: Current regulations provide strong protections for native plants and vegetation protection in washes, hillsides. Vague protections in general development standards.	To promote shading of pedestrian walkways and activity areas, consider stronger, clearer city-wide protection regulations for mature trees with mitigation/replanting options.	<ul style="list-style-type: none"> <li>Clayton, MO, requires preservation of large trees or 1:1 replacement in caliper inches.</li> <li>Salt Lake City riparian ordinance requires protection of all large trees or replanting at 2X ratio.</li> </ul>
CH-R.9: Limited provisions of LUC or Development Standards address maintaining public access	Adopt stronger standards requiring maintenance of existing public lands access as part of open space planning for larger developments.	<ul style="list-style-type: none"> <li>Salt Lake City is considering adoption of public lands access requirements in new subdivision regulations.</li> </ul>

<sup>9</sup> Despite common misconceptions, a recent EPA study entitled, *Green Infrastructure in Arid and Semi-Arid Climates*, confirms that green roofs can offer a water-efficient approach to urban stormwater management in arid climates such as Tucson's.

Diagnosis: Community Health and Safety		
Existing Provisions	Possible Revisions	Examples
to public lands.		
PUBLIC SAFETY—CRIME PREVENTION AND NATURAL HAZARD PROTECTION		
<p><b>CH-R.10:</b> Development Standards has “crime prevention” landscaping guidelines. LUC does not address safety by design.</p>	<p>Codify safety by design/Crime Prevention Through Environmental Design Standards. Address four principles of CPTED (natural surveillance, natural access control, territorial reinforcement, maintenance).</p>	<ul style="list-style-type: none"> <li>Refer to national websites for details on CPTED.  <a href="http://www.cptedsecurity.com/cpted_design_guidelines.htm">http://www.cptedsecurity.com/cpted_design_guidelines.htm</a>;  <a href="http://www.cops.usdoj.gov/files/ric/publications/eo807391.pdf">http://www.cops.usdoj.gov/files/ric/publications/eo807391.pdf</a></li> </ul>
<p><b>CH-R.11:</b> Wildfire hazards apparently not addressed in LUC or Tucson Code</p>	<p>Adopt wildland/urban interface regulations to minimize threat of wildfire to developed property and deter development in high wildfire potential areas. Reconcile with native vegetation protection regulations.</p>	<ul style="list-style-type: none"> <li>Many communities have adopted wildfire protection regulation (Pitkin County, CO, Alpine City, UT, Prescott, AZ)</li> <li>Arizona Rev. Stat. Section 9-806 enables cities to adopt wildland-urban interface codes based on national model codes (See International Urban-Wildland Interface Code, 2009, International Codes Council.)</li> </ul>

## FOOD PRODUCTION AND NUTRITION

### Introduction

Communities throughout the world are pioneering technologies and techniques for urban gardening. The use of small spaces, such as yards, roofs, street areas, vacant lots, porches, and planters to grow food not only provides healthy foods to urban dwellers but reduces greenhouse gases. Even in heavily urbanized cities such as London, 14 percent of the population produces 18 percent of city's nutritional needs. In 2007, the Seattle Market Gardens provided produce for approximately 60 households over a 22-week period. The United Nations Food and Agriculture Organization estimates that 200 million urban residents produce food for the local urban market, providing 15 to 20 percent of the world's food. In addition, considering the continuing loss of agricultural land to urbanization and the fact that over 50% of the world's population now lives in urban areas for the first time in history, it is even more critical that urban dwellers be able to produce cheap, healthy, secure, and sustainable sources of food.



*The use of small spaces, such as yards, roofs, street areas, vacant lots, porches, and planters to grow food not only provides healthy foods to urban dwellers but reduces greenhouse gases.*

In the United States, our highly mechanized and centralized food system makes sustainable food production a challenge. With the average food item in the U.S. traveling 1,400 miles to get to the dinner table, the sustainability of food production in this country is diminishing as productive land is consumed by suburban sprawl, forcing dependence on distant domestic farms and foreign producers. While rural farmland is being lost, the number of small farms and gardening operations in urban areas is increasing at an unprecedented rate. In the U.S. alone, there are an estimated 10,000 community gardens operating today. Given that approximately 40 million Americans are considered "food insecure," promoting alternative, local sources of food is critical.

Urban agriculture is not only an important source of food but social interaction and community pride. Community gardens and urban farms, such as a pumpkin patch, are where neighbors can get to know each other, add green space, and put abandoned and underutilized urban land to productive use. In Seattle, the comprehensive plan requires at least one community garden for every 2,500 households in an urban village or neighborhood. San Francisco, CA has a goal of creating one urban farm on every block in the city by 2015. Chicago's Neighborspace program allows residents to use city parks for gardening.

A necessary task for cities to support agriculture is to carefully compare their zoning code provisions to existing land uses and identify lots, areas, and neighborhoods that are suitable for urban agriculture uses, such as community gardens, farmer's markets, and food stands, but are not being used for such purposes, due to code barriers, lack of encouragement, or some other reason. Portland, OR, for example, has compiled a detailed map that shows exactly where in the city urban agriculture is prohibited, allowed as a conditional use, or allowed outright. This map led to comprehensive but targeted changes to Portland's zoning code, including the creation of an "agricultural use" category that excludes most kinds of commercial-scale agriculture but provides reasonable limits on the size and location of accessory buildings, to promote urban agriculture. Integrating urban agriculture into existing and future open space areas should also be a priority.

Addressing nuisance issues related to urban agriculture — especially regarding the keeping of livestock (chickens, ducks, goats, small pigs, etc) — is often a major concern for communities. However, by carefully placing limits on the number and species of animals allowed and by limiting the intensity of animal use to appropriate zones, many cities have successfully protected adjacent neighbors from potential odor, noise, or hygiene concerns. Portland

allows up to three chickens, ducks, doves, pygmy goats, or rabbits without a permit, but residents can get a special use permit for a small-scale livestock facility with the permission of property owners within 150 feet of the site. Denver, CO recently revised its zoning code to allow beekeeping on residential lots.

Another aspect of food and health involves community fast-food restaurants. Increasingly, fast food chain restaurants are changing their ways and providing healthier options for “fast food”. As awareness about nutrition has risen and obesity has increased as a major health problem, the public pressure on fast food restaurants has risen as well. In order to encourage a healthier society, some communities are regulating the location and number of fast food sites as well as drive-through food services. Also, an increase in local food production has been a central force in creating and supporting the “locavore” movement, which is a recent culinary trend that emphasizes eating locally-grown, seasonal foods in the home and in restaurants. Allowing food carts, which can be rather sophisticated and made to look semi-permanent, in commercial and mixed use zone throughout a city is a great way to support local agriculture and bring unique and healthy foods to neighborhoods, especially in vacant or underutilized parking lots.

### Current Policies and Programs

The city has not articulated an urban agriculture policy. Neither the Tucson General Plan (General Plan) nor the Landscape Framework mention urban food production, and the LUC provides no incentives to help landowners grow food on their own property or use public property for community gardening. Also, the rules for selling home-grown foods or home-raised (non-slaughtered) animal products (eggs) are not clear. However, the LUC, in conjunction with other sections of the Civil Code, do provide limits on the number of animals that can be kept by residents and impose some basic locational requirements for animal-related accessory buildings. Urban agriculture in Tucson is primarily as an informal practice done by landowners in their private yards with more collective efforts, such as community gardens, being less prevalent.

Nevertheless, Tucson does have a number of active non-governmental groups involved in promoting sustainable food production. Community Gardens of Tucson (CGT) is an all-volunteer non-profit that promotes health and a sense of community by helping Tucson residents establish and maintain neighborhood vegetable and flower gardens. CGT manages approximately 13 community gardens in the city. Iskashitaa is a group of refugees from Africa, Asia, and the Middle East that partners with local Tucson volunteers to harvest approximately 75,000 pounds of fruits and vegetables each year from backyards and local farms. These foods are distributed to local refugee families and other Tucson organizations that assist families in need. Similarly, the Community Food Bank also runs gleaning operations to pick fruit from local fruit trees that would otherwise rot. Desert Harvesters is a non-profit, volunteer-run organization that encourages the planting of indigenous, food-bearing shade trees (such as the Velvet Mesquite) in water-harvesting earthworks, and educates the public on how to harvest and process the food.

### Summary

Tucson’s land development regulations do not explicitly encourage sustainable food production. This lack of attention to urban food issues results in the code having some inadvertent — and perhaps intentional — barriers to growing local food. In particular, there are no clear exceptions to allow structures that facilitate backyard food production, such as rain barrels and gray water systems, to be located in side and rear setbacks. Communities that have made urban agriculture a priority have also allowed a broader range of animals but with more detailed compatibility standards to ensure that neighboring properties are protected from potential conflicts.

Below are some regulatory options that address sustainable food production and nutrition:

- Specifically allow rain-collection structures, (e.g., rain barrels) greywater systems, and noncommercial greenhouses in side and rear setbacks to provide irrigation for gardens;
- Allow farmers’ markets in more districts as primary and accessory uses;

- Define community gardens and allow them as a primary use in residential districts and accessory use in all or most districts;
- Designate the maximum number of fast food restaurants and drive-thru restaurants per certain area of the city.
- Update fowl ordinance to reduce allowed number of birds.

## Current Regulations

The following table cites some of the main current regulations in the LUC, Development Standards, and Design Guideline Manual as well as other sections of the municipal code related to food production and nutrition. It is not meant to be all-inclusive, but to highlight some of the key provisions currently on the books that are directly related to this topic. Additionally, related measures are set forth more generally in the Community Health and Safety section.

Regulations Addressing Food Production and Nutrition	
REF.	REGULATION
<b>Land Use Code</b>	
3.2.5.1.D	<b>Animals for Personal Use</b> — Animals may be kept as an accessory and personal use in all zones subject to Tucson Code, Ch. 4 and any other health regulations.
3.2.5.2.B	<b>Accessory Buildings</b> — Standard requires that accessory buildings comply with the same dimensional standards as principle structure for that district.
3.2.5.2.F	<b>Exceptions to Accessory Standards</b> — Standard states that accessory buildings, such as dog houses and refuse containers, 5 feet or less in height and 10 sf in area are not subject to side and rear setback standards for principle building. This exemption would appear to apply to rainwater collection containers, such as rain barrels, or gray water tanks if they do not exceed the size limits. (No accessory buildings are allowed in front yard.)
3.2.5.G	<b>Structures for Animals</b> — All structures for animals must be at least 50 feet from all property lines, except corrals which must be set back at least 10 feet from all property lines.
3.5.2.2 / 6.3.3.3	<b>Crop Production</b> — The “crop production” land use class, which appears to include noncommercial gardening and incidental selling of garden products, is allowed in all residential districts, but not in any non-residential districts. In addition, A greenhouse heating plant or cooling fan must be at least 200 feet from any property line.
6.3.3.4	<b>General Farming</b> — This use, permitted only in the RH, SR, SH, and RX-1 zones, allows any use included in “animal production” or “crop production” if it is limited to personal use. This appears to allow the keeping of a wide variety of domestic animals, subject to restrictions in the LUC performance criteria and other ordinances, such as Chapters 4 and 6 in the city code.
6.3.10.6	<b>Farmers’ Market</b> — A farmers’ market is categorized under land use class “swap meets and auctions,” and allowed by special exception in the OCR-1, OCR-2, P-1 and I-1 districts, and outright in the C-2, C-3, and I-2 districts.
<b>Development Standards</b>	
None	The terms “agricultural, community garden, backyard garden, and farmers market” are not mentioned in the Development Standards. The term “animal” is mentioned only in relation to endangered species.
<b>Design Guidelines</b>	
None	None
<b>Other</b>	
Ch. 4, 4-56	<b>Fowl in City</b> — Limits number to no more than 24 fowl within city limits, except as permitted by Ch. 23.

Regulations Addressing Food Production and Nutrition	
REF.	REGULATION
Ch.6, 4-57 (Also 3.2.5.2.G)	<b>Location of Coop</b> — Coops or enclosure for pigeons or fowl must be at least 50 feet from any property boundary.
Ch.6, 4-57	<b>Male Fowl</b> — No male fowl allowed within city limits.
Ch. 11.3(1)	<b>Bees</b> — Allows one apiary/hive for each 2,500 sf of lot area (except in SR or R zones) and an apiary located closer than 30 feet from a property line must be screened with a barrier at least 5 five tall and extending 30 feet in both directions from the hive to block bees from neighbors. Each beekeeper must be licensed by the state.

## Diagnosis

The following table contains a diagnosis of regulations addressing food production and nutrition.

Diagnosis: Food Production and Nutrition		
Existing Provisions	Possible Revisions	Examples
<b>REMOVE BARRIERS</b>		
<b>FP-B.1:</b> Current code does not address specifically whether and to what degree rainwater collection receptacles (rain barrels) and greywater systems are allowed in rear and side setbacks.	Make clear that accessory structures, such as rain barrels, greywater systems, and composting bins that can aid in gardening on residential or commercial property are allowed within side and rear setbacks, but perhaps no closer than 5 feet from any property line.	<ul style="list-style-type: none"> <li>Portland, OR allows water collection cisterns under 6' in height in side and rear setbacks.</li> </ul>
<b>FP-B.2:</b> Current code does not address specifically whether and to what degree greenhouses are allowed in rear and side setbacks.	Make clear that accessory buildings, such as noncommercial greenhouses and small animal enclosures (e.g, rabbits, chickens), are allowed within side and rear setbacks, but perhaps no closer than 5-10 feet from any property line.	<ul style="list-style-type: none"> <li>Portland, OR allows greenhouses under 6' in height in side and rear setbacks.</li> </ul>
<b>FP-B.3:</b> Farmers' markets allowed in restricted number of zones or through special exception process (primary use: C-2,C-3,I-2; special exception: OCR-1, OCR-2, P-1, L-1; not allowed in MU).	Allow farmers' markets in broader set of districts as primary uses, such as C-1, MU, OCR-1, OCR-2, and P-1.	<ul style="list-style-type: none"> <li>Dallas, TX, has provisions for farmers markets and home produce sales under certain conditions.</li> </ul>
<b>FP-B.4:</b> Appears that food grown on site (garden) is not permitted to be sold on site, especially in residential districts.	Allow food grown on-site (either in a community garden or backyard garden) to be sold on site, with standards to ensure compatibility in residential districts in particular.	<ul style="list-style-type: none"> <li>Salt Lake City has recently amended its zoning ordinance to allow sales from community gardens.</li> </ul>

Diagnosis: Food Production and Nutrition		
Existing Provisions	Possible Revisions	Examples
<p><b>FP-B.5:</b> Street ROW standards appear to prohibit or do not address gardening in street landscape islands or strips.</p>	<p>Allow gardening in street ROW landscape strip between sidewalk and street by adjacent landowner or with permission of adjacent landowner.</p>	<ul style="list-style-type: none"> <li>Seattle, WA, allows gardening of street planting strips without a street use permit, unless trees or hardscape is proposed, in which case a free street use permit is needed from the city's transportation department.</li> </ul>
<b>CREATE INCENTIVES</b>		
<p><b>FP-I.1:</b> LUC does not address allowing community gardens as an alternative open space amenity.</p>	<p>Allow community gardens and roof top gardens to qualify as a percentage of required open space. Consider extra credit for providing irrigation, tool sheds, and other supportive elements.</p>	<ul style="list-style-type: none"> <li>Portland, OR, provides FAR bonuses for roof top gardens.</li> </ul>
<b>FILLING REGULATORY GAPS</b>		
<p><b>FP-R.1:</b> Community gardens are not defined or mentioned as primary or accessory use in the code; agricultural uses are not clearly defined.</p>	<ul style="list-style-type: none"> <li>Add definition for community gardens and then allow community gardens as a primary use in residential districts and as an accessory use in all or most districts. Allow them on open space lots in subdivisions as primary use.</li> <li>Clarify definition of agricultural uses (e.g., "general farming")</li> </ul>	<ul style="list-style-type: none"> <li>Burlington, VT, addresses the definitions of gardening, appurtenant structures, produce sales, and allows community gardens in residential zones, public parks, and open space.</li> <li>Cleveland, OH, Urban Garden District includes definitions, accessory structures for garden operations, addresses sales, and can be used as an overlay.</li> <li>Madison, WI, allows food production of produce, fowl raising, and animal husbandry by right and conditionally with compatibility standards.</li> </ul>
<p><b>FP-R.2:</b> Subdivision regulations do not address community gardens and food trees as desirable or possible use.</p>	<p>Require new subdivisions or planned developments to provide public or neighborhood open space set-aside and allow community gardening use. Consider green infrastructure in design of subdivision to supply rainwater to community garden area.</p>	<ul style="list-style-type: none"> <li>Austin, TX, awards a point in its commercial green building program for providing garden space dedicated to communal food growing.</li> <li>Henderson, NV, grants points in its sustainability point review system for providing viable community gardens and associated facilities.</li> </ul>
<p><b>FP-R.3:</b> Current regulations do not allow a wide range of domestic animal raising (fowl only).</p>	<p>Expand the types of animals allowed to be raised (small pigs, goats) in appropriate zones and provide more detailed compatibility standards to ensure conflicts are avoided. Clarify numbers and size of animals allowed.</p>	<ul style="list-style-type: none"> <li>Madison, WI, has a "MAD" chicken code that allows four hens (no roosters) per household in a coop that must be 25' from the nearest neighbor's living quarters.</li> <li>Minnesota Model Sustainable Development Ordinance provisionally permits animal husbandry as a use in the local food production district.</li> </ul>

Diagnosis: Food Production and Nutrition		
Existing Provisions	Possible Revisions	Examples
<p><b>FP-R.4:</b> Landscaping standards do not encourage or require food-bearing trees.</p>	<p>Require or encourage food-bearing trees to be included as part of landscape plans (with irrigation provided by non-potable, on-site water resources (active and/or passively harvested rainwater and stormwater, greywater, condensate, etc.).</p>	<ul style="list-style-type: none"> <li>▪ Many communities require planting of trees on residential lots, but usually ornamental. The original Mormon city planning rules required planting of two fruit trees on every lot for fruit production.</li> </ul>
<p><b>FP-R.5:</b> Current regulations do not address the concentration of fast food restaurants.</p>	<p>Limit the number of fast food restaurants or drive-thru restaurants that can be located in the city.</p>	<ul style="list-style-type: none"> <li>▪ Sanibel Island, FL, does not allow drive-thru or drive-in lanes for any food service establishment and does not allow formula restaurants (fast food chains essentially) in any district in the city.</li> <li>▪ Solvang, CA, bans new or expanded formula restaurants in its Tourist Commercial District.</li> <li>▪ Berkeley, CA, has set a quota of three carry-out restaurants and seven fast food restaurants of no more than 1,000 sf in its Elmwood Commercial District.</li> </ul>

## RECYCLING AND WASTE REDUCTION

### Introduction

The high volume and often unnecessary disposal of waste is a significant contributor to greenhouse gases. Waste buried in landfills produces high levels of methane gas that often escapes into the atmosphere and waste incinerators release carbon dioxide. Furthermore, waste that is not reused or recycled must be replaced with virgin materials that require the consumption of additional energy, primarily from fossil fuels, and creates greenhouse gas emissions. In a sustainable community, used materials should not become waste until the community has decided there is no other possible use for the materials. A comprehensive solid waste management program should incorporate:

- Reduction of the amount of waste produced,
- Reuse of waste materials where possible, and
- Recycling of wastes.



*Between 2003 and 2008, the City of Tucson's recycling program diverted 250,000 tons of recycled materials from the landfill.*

The most efficient and cost-effective strategy to avoid creating waste is to not produce it in the first place or to create by-products that can be reused or recycled. Holding manufacturers accountable for their products (future waste) is one proven strategy. For example, the European Union has adopted an End-of-Life Vehicle Directive and a Directive on Reusability, Recyclability and Recoverability that require stringent requirements for vehicle recycling. Today, new vehicles in the EU must demonstrate reusability and/or recyclability of at least 85%, and reusability and/or recoverability of at least 95% by weight. This strategy not only creates a financial incentive to design cars out of easily recycled materials but also creates a market for such goods. This type of "cradle to grave" strategy may not work in all instances, but it demonstrates the point that implementing systemic accountability, instead of putting the entire onus for recycling on the end-user, breeds solutions that can comprehensively reduce waste, improve cost efficiencies, and reduce greenhouse gas emissions.

One particularly important area of waste reduction is the recycling of food and other organic wastes. It is the decomposition of organic materials that produce the high levels of methane in landfills. In addition, the composting of organic wastes is a simple process that can often be done with little technology and at low cost by individuals at their homes or businesses. The rich soil that is produced can be used in the garden or for landscaping. Increasing the percentage of food and organic waste recycling should thus be a major priority in any sustainable community. The United States, however, recycles only about 5% of its food waste compared to about 95% in South Korea, where strict laws require separation of food waste from all other waste. Despite the low national average, some American communities are making a difference. For example, Alameda County, CA, in which food waste (food scrapes and food-soiled paper) is the single largest item in its waste stream, collects organic waste in separate large containers that are picked up weekly with the trash. Many other California communities, such as Oakland, have similar programs. For Tucson, reducing waste will result in more efficient trash collection services, long term cost savings, and extended landfill life.

### Current Policies and Programs

There is little in the current Tucson LUC or General Plan that promotes recycling. The city's solid waste and recycling service is run by the Department of Environmental Services (DES) and its sub-agency Tucson Recycles. In 2003, the city implemented a voluntary city-wide recycling program that distributed 90-gallon recycle

## DIAGNOSIS | RECYCLING AND WASTE REDUCTION

containers ("blue barrels") to city residents who requested them. Between 2003 and 2008, the program diverted 250,000 tons of recycled materials from the landfill and currently has a residential participation rate of approximately 85 percent. Recycling rates for commercial and multi-family housing, however, has lagged far behind at only about 5%, partly because businesses have to pay an additional cost for recycling pick-up. The city's overall recycling rate is about 21%, which is substantially below the national average of about 28 percent.

One major zoning issue currently facing the city regarding recycling has been a controversial permitting process for the city's sole composting facility, which is a private business. The centrally-located facility has needed numerous zoning approvals to bring it into full compliance with the code and to resolve neighborhood concerns (e.g., noise, odor). This facility plays a significant role in converting organic waste, especially construction and yard waste, into a profitable soil that can be sold to commercial landscapers and others. It is encouraging to see the city making a significant effort to accommodate this critical facility, while also considering allowing it to potentially expand its on-site recycling services. This issue, however, reinforces the fact that the LUC needs to be modernized to adequately address major sustainable land uses.

The zoning code also prohibits gas-to-energy (e.g., methane gas from landfills) projects that can be another important sustainable land use in many communities. It appears, however, that the city is in the process of proposing changes to the LUC to allow this use in certain cases with strict controls and is working with companies to bring this sustainable energy source to the city. Although not in the LUC, the Mayor and Council also recently adopted an ordinance in Chapter 15 of the Civil Code to require certain businesses using plastic bags to accept them back for recycling and offer reusable bags as an alternative.

### Summary

Many communities are taking steps through their development review and land use regulatory processes to better manage solid wastes and support reduction, reuse and recycling. The following are examples of how development standards can be used to better support solid waste management.

- Requiring provision of sites for neighborhood-wide recycling and composting within a development or nearby sites for collecting compost wastes.
- Permitting establishment of reuse/resale centers for equipment and supplies.
- Requiring recycling receptacles in multi-family residential and commercial buildings and providing centralized drop-off recycling stations that are easily accessed for collection.
- Food waste recycling
- Construction waste management, diversion, recycling

### Current Regulations

The following table cites some of the main current regulations in the LUC, Development Standards, and Design Guideline Manual as well as other sections of the municipal code related to recycling and waste reduction. It is not meant to be all-inclusive, but to highlight some of the key provisions currently on the books that are directly related to recycling and waste reduction.

Regulations Addressing Recycling and Waste Reduction	
REF.	REGULATION
<b>Land Use Code</b>	
2.8.8.7	<b>Demolition of Historic Structures</b> — Allows demolition of historic, contributing, and noncontributing structures only in limited situations, which encourages reuse of existing buildings rather than consuming additional energy for new buildings materials.
3.2.5	<b>Accessory Uses</b> — Exempts refuse containers that are 5 feet or less in height and 10 square feet in area from accessory use standards.
3.2.6	<b>Exceptions to Perimeter Yards</b> — Recycling collection containers are not exempted or partially exempted from side and rear setback requirements.
3.5.5.6	<b>Salvage and Recycling Requirements</b> — Variety of requirements for the collection of donated recycling items and facilities, including screening walls and security measures.
4.1.8.3	<b>Alleys (Subdivision)</b> — Requires alleys in certain instances to facilitate refuse collection.
<b>Development Standards</b>	
6-01.0	<b>Solid Waste Disposal (Refuse)</b> — Provides standards to ensure a safe and efficient refuse collection system, especially standards for location and access to containers for different types of development.
<b>Design Guidelines</b>	
None	None
<b>Other</b>	
Ch. 15	<b>Environmental Services Department</b> — Provides the general operational requirements for the city's solid waste disposal and recycling program. Chapter 15 also contains the recent ordinance that requires retail establishments that offer plastic carry-out bags to provide bins for their recycling or reusable bags as an alternative.

## Diagnosis

The following table contains a diagnosis of regulations addressing recycling and waste reduction.

Diagnosis: Recycling and Waste Reduction		
Existing Provisions	Possible Revisions	Examples
<b>REMOVE BARRIERS</b>		
<b>RW-B.1:</b> Current code does not address community-serving recycling or composting stations for neighborhoods or in residential subdivisions or large commercial projects.	<ul style="list-style-type: none"> <li>Allow recycling and composting stations as a permitted or special exception use in most zone districts, subject to locational standards.</li> <li>Consider specifying that on-site composting facilities may accept off-site compostable materials</li> </ul>	<ul style="list-style-type: none"> <li>Henderson, NV grants 2 points in its sustainability point review system for providing an on-site composting station for all occupants.</li> <li>LEED-ND GIB Credit 16: Solid Waste Management Infrastructure.</li> <li>See <i>Turning a Liability Into An Asset: A Landfill Gas-to-Energy Project Development Handbook (US EPA)</i>.</li> </ul>
<b>RW-B.2:</b> Current code does not allow "gas to energy" as a permitted use.	Add definition for "gas to energy" use and then allow in conjunction with other large waste disposal and recycling sites as appropriate.	<ul style="list-style-type: none"> <li>N/A</li> </ul>

Diagnosis: Recycling and Waste Reduction		
Existing Provisions	Possible Revisions	Examples
RW-B.3: Current code encourages use of rock mulch in landscape areas.	Promote/prioritize use of organic mulches as a more sustainable, local, and low-energy groundcover than gravel and rock.	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>CREATE INCENTIVES</b>		
RW-I.1: Current code does not provide incentives for recycling.	<ul style="list-style-type: none"> <li>Offer incentives for rehabilitation of existing buildings.</li> <li>Allow additional seating, less parking, or other bonus to restaurants, grocery stores or institutional users if a composting facility is provided on-site or used off-site.</li> </ul>	<ul style="list-style-type: none"> <li>Henderson, NV grants 2 points in its sustainability point review system for providing an on-site composting station for all occupants.</li> <li>LEED-ND GIB Credit 15: Recycled Content in Infrastructure and Credit 16: Solid Waste Management Infrastructure.</li> </ul>
<b>FILLING REGULATORY GAPS</b>		
RW-R.1: Current code does not include provisions for comprehensive recycling	Require recycling station/facilities in multi-family, commercial, and new residential subdivisions that are convenient to both users and pick-up vendors.	<ul style="list-style-type: none"> <li>Austin, TX requires an easily-accessible and clearly-marked area for recycling serving the entire facility in its green building commercial program.</li> <li>Salt Lake City is considering regulations requiring recycling sites in commercial and multi-family buildings and recycling bins in all residential structures.</li> </ul>
RW-R.3: Current code does not encourage or require recycling of construction waste.	Require that construction management plans be required for projects of certain size and that the handling of construction waste be detailed in the plan. Or, if a reasonable facility exists to recycle or compost construction waste, the city could require a certain percentage of construction waste be recycled.	<ul style="list-style-type: none"> <li>LEED ND (Green Construction and Technology #18) addresses construction waste management; #19 addresses co posting stations.</li> <li>San Mateo, CA has a comprehensive ordinance requiring the diversion or recycling of construction and demolition debris. CA state law requires all jurisdictions to have major waste reduction programs or pay penalties.</li> <li>Pitkin County, CO requires construction management plans that must address construction site waste reduction and recycling. They also require deconstruction instead of demolition and separation of materials for recycling or resale.</li> </ul>

## OPEN SPACE, PARKS, AND TRAILS

### Introduction

This section addresses the topic of open space, parks, and trails, its relationship to the city's sustainability goals, and identifies regulatory options for addressing this issue. The term "open space" broadly means natural areas both in and surrounding localities that provide important community space, habitat for plants and animals, recreational opportunities, farm and ranch land (working lands), places of natural beauty, and critical environmental functions and areas (e.g. wetlands and floodplain). Open space may include areas for public parks, golf courses, gardens, and trails that provide both active and passive usage.



*Open space, parks, and trails play a critical role in the livability and quality of life in Tucson.*

As discussed in greater detail in the Community Health and Safety section of this diagnosis, national public health experts are increasingly focusing attention on land use development patterns and availability of parks and trails in their efforts to combat major national health challenges such as obesity and heart disease. Moreover, cities like Tucson have long realized the benefits of open space, parks, and trails to their communities' livability for residents and attractiveness to new businesses and their employees.

The availability of open space also provides other significant environmental quality and natural resource protection safety benefits. Open space protects wildlife and plant habitat, places of natural beauty, and working lands by removing development pressures and redirecting new growth to designated areas. Additionally, preservation of open space benefits the environment by combating air pollution, absorbing greenhouse gases (through open space vegetation), attenuating noise, controlling wind, providing erosion control, and moderating the urban heat island effect. Open space also protects surface and ground water resources by filtering trash, debris, and chemical pollutants before they enter a watershed.

Open space, parks, and trails play a critical role in the livability and quality of life in Tucson. Surrounded by Saguaro National Park, the environmentally rich Sonoran desert, Coronado National Forest, and imposing peaks such as those of the Catalina Mountains, its setting in the Tucson Basin is one of the most attractive and striking of any American city. These features provide the framework for an interconnected network of open space including parks, washes, riparian habitats, and public preserves throughout the region.

Tucson has a long history and continued commitment to providing and maintaining a system of parks for its residents. It has also worked closely with Pima County to create an interconnected system of open space and trails. However, as pointed out in the 2006 City of Tucson Parks and Recreation Ten-Year Strategic Service Plan, the city's projected population growth and its more diverse and aging population make clear there is a "critical need to add the existing parks and open space inventory to address current deficiencies and projected growth."<sup>10</sup> That plan compared the city's park and recreation facilities with those of five other communities including Phoenix, Tempe, Mesa, Colorado Springs, and Long Beach, California. The survey found that Tucson ranked last in neighborhood park and regional park acreage per person, fourth in community parks, and last in trail miles.<sup>11</sup> Among other things, the plan recommended that the city develop "a park ordinance for developer impact fees

<sup>10</sup> At p. i.

<sup>11</sup> At pp. 25-26.

and other available methods of cost recovery that support the guidelines for park acreage per 1,000 residents” suggested in the plan.

The city followed up on this recommendation by imposing a regional park impact fee in 2007 rather than a public lands dedication ordinance for new residential development.<sup>12</sup> It also has undertaken many other non-regulatory steps to improve and expand its system of parks, open space and trails, including:<sup>13</sup>

- Creating the El Paso and Southwestern Greenway that will establish recreational linkages from South Tucson through downtown,
- Undertaking the \$68 million Arroyo Chico Basin Drainage improvement project that will include a 42-acre urban open space greenbelt park with habitat restoration,
- Planning, designing, or constructing paths such as the Julian Wash and Atterbury Wash Linear Parks,
- Participating with Pima County on the design and implementation of an Urban Loop, which once completed will account for over 139 miles of off-street shared-use trails;
- Participating with the federal government in two federally sponsored river restoration projects along the Santa Cruz River.

The city currently has underway a major Parks Master Plan study and the Pima Regional Trail System Master Plan is nearing adoption. Both will provide valuable updated information on parks, open space, and trails needs in the city and guidance for implementation measures as part of this sustainable code revision effort.

In addition to the impacts that changing demographics and growth in the city will have on parks and open space, as the 2006 Strategic Plan points out, they will also potentially increase pressures on the city’s unique natural setting and environmental resources. Development scenarios for the eastern and southern reaches of the city have led the city council to work towards improved wash protection through consolidation of its three existing riparian habitat ordinances into a comprehensive Environmentally Sensitive Lands Ordinance. As discussed below, others may be in order to advance the city’s sustainability goals.

Development guidelines and regulations have historically played an important role in ensuring that communities had adequate open space. Early English and Spanish land planning laws required the set aside of community open space in the form of commons, plazas, and town squares for the use and enjoyment of citizens. Many communities now require new projects to provide open space, parks space/playgrounds and bike trails/pedestrian connections to meet the needs of new residents and implement community plans. The city has ample support for additional action through its policy and planning documents such as the 2006 Parks and Recreation Ten-Year Strategic Service Plan, the parks, recreation, and open space and environmental elements of its 2001 General Plan, and Livable Tucson Vision Plan (1999). Moreover, as noted, new parks and trail plans are nearing adoption or underway that which will provide additional policy guidance and recommended implementation measures.

In addition to new regulations to promote open space, parks, and trails, comparable jurisdictions are removing barriers to alternative forms of open space such as community gardens and green “vegetated” roofs and options for infill open space such as plazas and courtyards. They are also creating incentives for provision of additional open space in new developments.

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<sup>12</sup> Regional parks are defined in the impact fee ordinance as parks with at least 15 acres and that provide for recreational facilities such as sports fields, concert stages, and recreation centers. The rate per residential unit is currently \$0.86 per square foot. Recent project expenditures from the parks impact fee fund include expansion of Lincoln Park, the South Central Community Park, and land acquisition for the Valencia Corridor.

<sup>13</sup> A more detailed list can be found in the city’s 2009 Sustainability Report at pp. 18-20.

## Current Regulations Addressing Open Space, Parks, and Trails

The following table cites some of the main current regulations in the LUC, Development Standards, and Design Guideline Manual as well as other sections of the municipal code related to open space, parks, and trails. It is not meant to be inclusive, but to highlight some of the key provisions currently on the books that are directly related to climate change. Additionally, related measures are set forth in the sections on urban forestry, community health, and water quality and conservation that are closely associated with the topic of open space, parks, and trails.

Regulations Addressing Open Space, Parks, and Trails	
REF.	REGULATION
<b>Land Use Code</b>	
2.6.5.5	<b>Planned Community Development District</b> —requires Resource Plans that delineate areas to be preserved as natural open space, establishment of development regulations to address pedestrian connections, natural resource areas, private recreation areas, and trails. Annual report require regarding open space dedication and installation of parks and trails.
2.8.1	<b>Hillside Development Zone</b> —applies the Flexible Lot Development option to preserve sloped areas. Trails are the only form of development allowed in designated natural areas.
2.8.6	<b>Environmental Resource Zone</b> —established to conserve designated washes and buffer Saguaro National Park and Tucson Mountain Park from new development
2.9.1	<b>Open Space Zone</b> —has as its purpose the designation of private and public open space to preserve natural resources and open space.
3.2.14	<b>Lots</b> —exempts land dedicated for public parks and open space from minimum lot size requirements.
3.6.1	<b>Flexible Lot Development</b> —creates incentives for creatively designed residential development. The Maximum Density Option can be achieved through provision of 15-20% additional functional open space beyond that required by other sections of the Tucson Code or trail dedication. The base functional open space requirement in Section 3.6.1.4 ranges from 109 square feet/unit to 269 square feet/unit depending on the size of the development. Criteria are set forth to guide the configuration and location of open space. Streamlined procedure for tentative plat approval—director’s decision.
3.6.1.5	<b>Flexible Lot Development</b> —requires the provision of trails as determined by the city Parks and Recreation Department.
3.8.6.3	<b>Native Plant Preservation</b> —requires the preservation of areas containing native plants.
4.1.8.3	<b>Subdivisions</b> —states that where “in accordance with an adopted plan, it is determined there are inadequate parks and recreational facilities....the Mayor and City Council may require that land area be reserved for ....those uses” in keeping with state subdivision law.
5.2.2.1	<b>Special Planning Documents</b> —requires a parks, recreation, open space, and trails element in the city’s General Plan.
5.3.4.3	<b>Special Development Applications</b> —prohibits modification of standards that will cause obstruction of significant views of parks or is a requirement of the Environmental Resource Zone.
<b>Development Standards</b>	
1-07.0	<b>Rezoning Procedures</b> —requires an Environmental Resource Report for rezoning requests that identifies environmental issues in specified planning areas and near designated public preserves. Information must also be submitted mapping sensitive natural areas in the area proposed for rezoning. If the Residential Cluster Project option is being used, a cluster option report must be submitted depicting open space to be preserved. Criteria are set forth to guide staff review of the cluster option and open space provision.

Regulations Addressing Open Space, Parks, and Trails	
9-06.0	<b>ERZ Standard</b> —sets forth standards to preserve natural and existing drainages and 100% of habitat areas within protected riparian areas.
9-10.0	<b>Rio Nuevo and Downtown Zone</b> —incorporates many provisions related to pedestrian paths, plazas, and open space.
Design Guidelines	
I.A.1.	<b>All Development</b> —calls for environmentally sensitive site design and preservation of natural areas.
I.A.2	Encourages provision of open space and common areas, utilization of detention basins for open space, and open space transitions between developments.
1.A.3	Encourages provision of pedestrian paths and bridle trails.
II.2	<b>Residential Development</b> —encourages location of open space to be easily accessible from homes and other open space.
Section V	<b>Special Design Options</b> —promotes urban master planned communities with “significant public open space” and a sensitive lands cluster option.
Other	
Development Compliance Code, 23A-71	<b>Impact Fee Regulations</b> —establishes a regional park impact fee for new residential development. The fee is currently \$0.86 per square foot of the gross floor area of the structure. Credit is give for the dedication of land for regional parks or capacity improvements.

## Diagnosis

The following table contains a diagnosis of regulations addressing open space, parks, and trails.

Diagnosis: Open Space, Parks, and Trails		
Existing Provisions	Possible Revisions	Examples
<b>REMOVE BARRIERS</b>		
<b>OS-B.1:</b> Current regulations do not clearly allow credit towards common open space requirements for community gardens, green roofs <sup>14</sup> , and other “sustainable” open space forms	Clarify throughout the LUC and Development Standards that alternative “sustainable” forms of open space (e.g., community gardens, rooftop gardens, green roofs) are allowed to be counted towards any required open space.	<ul style="list-style-type: none"> <li>Portland, OR, allows green, vegetated roofs to count toward open space requirement.</li> <li>Proposed code amendments in Salt Lake City allow community gardens and green roofs to count towards open space requirements.</li> </ul>
<b>OS-B.2:</b> Current regulation do not allow sale of produce from community gardens in residential areas.	Make clear that limited size community gardens may sell produce to encourage active open space usage.	<ul style="list-style-type: none"> <li>Cleveland, OH, has adopted a comprehensive regulatory approach to urban community gardens.</li> </ul>

<sup>14</sup> Despite common misconceptions, a recent EPA study entitled, *Green Infrastructure in Arid and Semi-Arid Climates*, confirms that green roofs can offer a water-efficient approach to urban stormwater management in arid climates such as Tucson’s.

<b>Diagnosis: Open Space, Parks, and Trails</b>		
<b>Existing Provisions</b>	<b>Possible Revisions</b>	<b>Examples</b>
<b>OS-B.3:</b> Several special districts such as Rio Nuevo contain tailored open space standards that allow plazas, courtyards, and other urban amenities to count towards open space requirements, but limited in geographic scope.	Consider adopting tailored common open space set aside and dedication requirements for infill and redevelopment areas that are flexible and allow alternative forms and configuration for open space credit.	<ul style="list-style-type: none"> <li>▪ Laramie, WY, has customized open space standards for mature areas of the city that differ significantly from more suburban, edge development areas.</li> </ul>
<b>CREATE INCENTIVES</b>		
<b>OS-I.1:</b> The Flexible Lot Development Option provides a density bonus for setting aside open space beyond that required elsewhere in Tucson Code.	Consider expanding open space density bonus provision to all developments.	<ul style="list-style-type: none"> <li>▪ Sheridan County, WY, in its conservation subdivision design ordinance grants a significant density bonus for provision of additional open space and trails beyond minimum requirements</li> </ul>
<b>OS-I.2:</b> Cluster development option available through Flexible Lot Development Provisions.	Allow creation of a “free” stewardship lot with sales proceeds to be used for open space improvements and long-term maintenance/care. Extra lot would not count against base density limits.	<ul style="list-style-type: none"> <li>▪ N/A</li> </ul>
<b>OS-I.3:</b> Detention/retention basins required for larger developments	Grant open space credit for detention/retention basins that are improved for recreational or open space purposes.	<ul style="list-style-type: none"> <li>▪ Erie, CO, counts storm water detention areas as open space if they are less than 5 feet deep and have slopes less than 5:1.</li> </ul>
<b>OS-I.4:</b> Various LUC and Development Standard provisions protect native vegetation.	Provide bonus credit towards landscaping requirements for preservation of large existing trees, including non-native species.	<ul style="list-style-type: none"> <li>▪ Franklin, TN, and Colleyville, TX, give landscaping credit for protecting existing mature trees.</li> </ul>
<b>FILLING REGULATORY GAPS</b>		
<b>OS-R.1:</b> While the Flexible Lot Development standards and a few other sections of the LUC are clear about minimum common open space set aside requirements, most applicable sections of the current LUC and subdivision regulations are not specific about how much land should be provided for common private open space or public land dedication.	Revise LUC and subdivision regulations to add clear, numeric standards regarding minimum private common open space set aside requirements for all developments (residential and non-residential). Consider public lands dedication requirement for neighborhood and community parks to complement regional parks impact fee.	<ul style="list-style-type: none"> <li>▪ Numerous western jurisdictions require dedication of land for parks as part of subdivision regulations (e.g., Arvada, CO, Jackson, WY, Routt County, CO)</li> <li>▪ Franklin, TN, has specific land set-aside requirements for all new development, including types of open space.</li> <li>▪ National Parks and Recreation Association has established standards for the amount of park and open space lands as well as developed park facilities to meet needs of population/thousand.</li> </ul>

Diagnosis: Open Space, Parks, and Trails		
Existing Provisions	Possible Revisions	Examples
<p><b>OS-R.2:</b> Current regulations to protect washes, hillsides, and other sensitive natural areas are fragmented with gaps in coverage.</p>	<ul style="list-style-type: none"> <li>▪ Continue work on comprehensive Environmentally Sensitive Lands Ordinance</li> <li>▪ Require the planting of vegetation native to the Tucson Basin along all waterways.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Salt Lake County and Park City, UT, have adopted comprehensive sensitive lands regulations.</li> <li>▪ Summit County, CO, has adopted a wildlife habitat overlay district that provides comprehensive protection of key wildlife habitats.</li> <li>▪ Mark Bobrowski and Andrew Teitz, Model Land Use Ordinance to Protect Natural Resources (available on-line)</li> <li>▪ Duerksen and Snyder, Nature-Friendly Communities, Island Press (2005)</li> </ul>
<p><b>OS-R.2:</b> Current regulations provide strong protections for native plants and vegetation protection in washes, hillsides. However, only vague protections in general development standards for other lands.</p>	<p>Consider stronger, clearer city-wide protection regulations for mature trees with mitigation/replanting options.</p>	<ul style="list-style-type: none"> <li>▪ Clayton, MO, requires a one/one replacement of any large specimen trees removed from a development site.</li> <li>▪ Salt Lake City riparian ordinance requires protection of all large trees or replanting at 2X ratio.</li> </ul>

## GREEN BUILDING

### Introduction

A great deal of attention has been placed on the role of sustainable or “green” building design and construction techniques in recent years as an important component of a community’s strategy to reduce resource consumption and resulting greenhouse gas emissions. Green building design and construction techniques address a full range of considerations, including: the incorporation of low water fixtures, the types and sources of materials used, the location of the site, the use or generation of renewable energy on site, and many other elements. As such, many of the topics covered in this section are also addressed in other sections of this diagnostic report.



*Tucson’s new fire station #22 is the first LEED Gold certified fire station in Arizona.*

Many communities have adopted standards that encourage or require compliance with programs such as The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™, established by the U.S. Green Building Council. The LEED system has become the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. The program encourages the use of products and techniques to promote sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. Separate certification processes have been developed for residential, commercial, and most recently, for Neighborhood Development.

Although there are many benefits associated with the LEED system, members of the development community have noted that the expense and time associated with the certification process can make it cost prohibitive for some projects. In addition, the nationwide applicability of the system limits its ability to reflect regionally specific issues such as climate and access to specific tools and techniques.

In response to these concerns, some communities—including Tucson—have chosen to supplement the LEED system with a more flexible Green Building Rating System that either stands alone or is integrated within their land development regulations. While many of these systems are voluntary, some communities have begun to require compliance. This shift is likely to continue as communities strive to reduce their consumption and overall footprint on the environment.

### Current Policies and Programs

The City of Tucson has worked to become a leader in the area of green building design. In 1998, the city developed and adopted the Sustainable Energy Standard (SES) for all new city buildings. In 2006, The Mayor and Council adopted a Leadership in Energy and Environmental Design (LEED) Silver or higher rating for all new city buildings and any renovations greater than 5,000 sq. ft. By applying the LEED standard, the city has expanded green building requirements for city buildings to include water conservation, waste reduction, and consideration of sustainable site design, indoor air quality, and use of recycled and sustainable materials.

In addition, in 2009, the city adopted a voluntary Residential Green Building Rating System to help to guide builders, developers, and property owners in the design and construction of energy efficient, water-conserving, healthful homes. The point-based system builds on work done by Pima County and incorporates requirements tailored to Tucson’s unique climate.

The city has also adopted numerous ordinances related to renewable energy, water conservation, and other sustainable development practices in recent years.

### Summary

Tucson has taken significant steps to promote green building design in both public and private development through its commitment to applying a LEED Silver or higher rating for all new city buildings and major renovations and its work developing a voluntary Residential Green Building Rating System that is tailored to the unique circumstances of the city’s desert environment. With these important foundations in place, the city has an opportunity to expand its current efforts and to address these issues more directly in the LUC. In particular, the LUC needs to more explicitly address the types of green building techniques that the city wishes to encourage—ensuring that innovative and more sustainable approaches to site planning and design are not precluded by current regulations.

Some of the potential changes identified below include:

- Expanding the existing Residential Green Building Rating System to include all types of development and redevelopment and possibly making some or all aspects of the system mandatory;
- Expanding existing renewable energy generation provisions to more explicitly address appropriate locations and standards for the full range of renewable energy facilities;
- Removing barriers for other alternative energy systems like wind and ground-source heating/cooling;
- Revamping existing strict non-conforming use/structure regulations to encourage redevelopment and alternative energy retrofits of existing buildings; and
- Clarifying historic district regulations to ensure solar systems and other renewable energy facilities are not precluded.

### Current Regulations

The following table cites some of the main current regulations in the LUC, Development Standards, and Design Guideline Manual as well as other sections of the municipal code related to green building. It is not meant to be all-inclusive, but to highlight some of the key provisions currently on the books that are directly related to green building. Additionally, related measures are set forth more generally in the Alternative Energy Production and Energy Conservation Section.

Regulations Addressing Green Building	
REF.	REGULATION
<b>Land Use Code</b>	
2.2 through 2.7	<b>Renewable Energy Generation</b> —land use class included in the Utilities Use Group which allows Renewable Energy Generation in the Industrial Zones as a permitted use subject to compliance with performance criteria; in Commercial and Office Zones with a Limited Notice Procedure; and in the Residential Zones with a Full Notice Special Exception Land Use subject to compliance with certain performance criteria. The Rural Village Zone (RVC), Neighborhood Commercial Zone (NC), Recreational Vehicle Zone (RV), Planned Area Development Zone (PAD), Planned Community Development Zone (PCD), and Open Space Zone (OS) are excepted.
6.3.12.3	<b>Definition for Renewable Energy Generation:</b> Renewable Energy Generation is a principal use producing commercial power from natural resources such as sunlight, wind, rain, tides, and geothermal heat, which are renewable (naturally replenished). Typical uses are solar, geothermal, natural gases, and wind power.
3.2.12.1	<b>Solar Considerations</b> —permits the use of solar energy collectors for the purpose of providing energy for heating or cooling in all zones, whether as part of a principal structure or as an accessory structure. Requires consideration of and mitigation of the impact of shadows cast from a proposed multistory structure on solar energy systems located on an adjacent property.

Regulations Addressing Green Building	
REF.	REGULATION
3.2.5.2	<b>Accessory uses</b> —allows solar collectors as accessory uses in all zones and does not include them in calculating lot coverage.
3.7.2.6	<b>Solar access</b> —restricts the planting of trees that would interfere with solar access.
5.3.5	<b>Solar access protection</b> —relating to the Design Development Option provides solar access protection.
Development Standards	
3.5.11.2	<b>Performance Criteria for Renewable Energy Generation:</b> requires walls and equipment to be setback twenty feet from any adjacent residential zone, also includes standards to address: noise, smoke, glare or heat, odors, vibration, air pollutants, liquids and solid waste, illumination, outdoor storage, and interference with television or radio equipment. Also requires a six foot decorative masonry wall between the project site and any residential zone.
2.10.0	<b>Flexible Lot Development Standard,</b> allows for higher density development and lots less than 4,000 sq. ft. in exchange for green building requirements.
3.5.11.2	<b>Performance Criteria for Renewable Energy Generation:</b> requires walls and equipment to be setback twenty feet from any adjacent residential zone, also includes standards to address: noise, smoke, glare or heat, odors, vibration, air pollutants, liquids and solid waste, illumination, outdoor storage, and interference with television or radio equipment. Also requires a six foot decorative masonry wall between the project site and any residential zone.
9-08.0	<b>Historic Preservation Zone Development Standards,</b> relating to roof types sets forth guidelines for installation of solar panels and equipment. (subsection 3.5)
9.10.0	<b>Rio Nuevo and Downtown Zone Standards,</b> has resource conservation criteria related to energy conservation, solar energy, and natural wind ventilation.
2-06.0 and 2-07.0	<b>Landscaping and Screening Standards and Landscape Plan Content,</b> contain multiple provisions to protect solar access from screening by required landscape/tree planting.
2.10.0	<b>Flexible Lot Development Standard,</b> contains green building requirements (2-10.5.0) incorporated into a point system that includes solar and other energy related provisions.
Design Guidelines	
Section I	Contains multiple provisions relating to <b>solar collection systems</b> (I.A.1.b-solar access, I.B.2.b and d-screening of solar equipment)
Other	
	<b>Residential Green Building Rating System</b> is a voluntary certification system used to guide builders, developers, and property owners in the design and construction of energy efficient, water-conserving, healthful homes. Includes criteria under seven broad headings: 1) Location, lot design, preparation, and development; 2) Resource efficiency; 3) Energy efficiency; 4) Water efficiency; 5) Indoor environmental quality; 6) Operation, maintenance, and owner education; and 7) Innovation points
Ch. 6 6-181	<b>Commercial Rainwater Harvesting Ordinance</b> —Requires commercial developments to submit a rainwater harvesting plan and to supply 50% of the site's irrigation for landscaping with harvested rainwater. It also prohibits private covenants from restricting such systems.
Ch.6 6.38	<b>Grey Water "Stub-outs"</b> —Requires all new single family and duplex residential units to have a greywater "stub out" so that a greywater system can be connected in the future and used for irrigation of landscaping.

## Diagnosis

The following table contains a diagnosis of regulations addressing green building.

Diagnosis: Green Building		
Existing Provisions	Possible Revisions	Examples
<b>REMOVE BARRIERS</b>		
<b>GB-B.1:</b> Renewable Energy Generation definition is limited to commercial energy facilities	Incorporate separate definitions and performance criteria for different types and scales of renewable energy facilities (e.g., non-commercial) to explicitly address where these various types may or may not be appropriate	<ul style="list-style-type: none"> <li>▪ Boulder, CO has specific standards to ensure solar access for solar energy.</li> <li>▪ Henderson, NV incorporates separate definitions for and performance criteria for different types of renewable energy facilities.</li> </ul>
<b>GB-B.2:</b> Strict nonconforming use/structure requirements discourage “green” building renovation/expansion	<ul style="list-style-type: none"> <li>▪ Allow renovations/expansions related to “green building” (e.g., adding solar panels, insulation, etc.) to take place without bringing entire site into compliance or allow expansions that reduce the degree of nonconformity or do not increase it to proceed without full compliance.</li> <li>▪ Allow flexibility in setbacks to accommodate the addition of insulation to exterior walls provided the added wall assembly achieves a minimum R-value as established by the code.</li> <li>▪ Allow exterior window shades or roof overhangs to project into require setbacks</li> </ul>	<ul style="list-style-type: none"> <li>▪ Salt Lake City is adopting provision allowing “green building” improvements to nonconforming uses/structures without full site compliance.</li> <li>▪ Many mature communities allow expansion of nonconforming uses/structures if the expansion does not increase the degree of nonconforming.</li> </ul>
<b>GB-B.3:</b> Historic preservation design guidelines relating to solar systems on roofs may inhibit installation	<ul style="list-style-type: none"> <li>▪ Adopt clearer hierarchy of preferred locations for solar on historic sites.</li> <li>▪ Allow on front roof under some specified circumstances with provisions to ensure compatibility.</li> </ul>	<ul style="list-style-type: none"> <li>▪ State of California forbids absolute prohibitions of solar on roofs of historic structures.</li> <li>▪ Salt Lake City is adopting a hierarchy of preferred locations for solar on historic sites, but may be allowed on front yard roofs as last resort.</li> </ul>
<b>GB-B.4:</b> LUC and Development Standards do not address wind energy conversion systems (WECS) <sup>35</sup> and other alternative energy systems except as principal use	<ul style="list-style-type: none"> <li>▪ Add provisions allowing small WECS in specific districts subject to clear standards regarding height, noise, and other potential off-site impacts.</li> <li>▪ Review potential standards to permit ground-source heating and cooling systems.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Yavapai County, AZ recently adopted regulations for solar and wind power installations.</li> <li>▪ Buckeye, AZ encourages new commercial buildings to incorporate opportunities for renewable power, use energy efficient-materials, incorporate a sustainable roof, and other generally accepted sustainable</li> </ul>

<sup>35</sup> Note: Large WECS have not been proposed to be addressed since their viability in the region appears to be extremely limited; however, Tucson Electric is offering incentives for small scale wind generation.

Diagnosis: Green Building		
Existing Provisions	Possible Revisions	Examples
		design features and practices.
<b>CREATE INCENTIVES</b>		
<b>GB-I.1:</b> Voluntary Residential Green Building Rating System	<ul style="list-style-type: none"> <li>Offer increased residential densities for residential developments that choose to seek certification through the Residential Green Building Rating System.</li> <li>Create a permitting process allowing the building of projects meeting the Living Building Challenge.</li> </ul>	<ul style="list-style-type: none"> <li>King County and Snohomish County, WA, reward funding through grants to new commercial and residential buildings seeking LEED certification.</li> <li>Clarke County, WA, allows exemptions for projects that meet the Living Building Challenge (e.g., goes well beyond LEED in terms of efficiency, but requires practices/strategies that do not meet current code.)</li> </ul>
<b>GB-I.2:</b> <i>Tiered Solar Fee Incentive Waiver</i> offsets building fees for new construction and renovation projects that include: Solar Electric (Photovoltaic); Solar Domestic Hot Water; Solar Space Heating; and Solar Air Conditioning Systems that displace a Minimum of 1,500 kilowatt hours per year.	<ul style="list-style-type: none"> <li>Expand fee incentive to other renewable energy facilities such as small wind.</li> <li>Allow applicants to “earn” additional density or height by incorporating solar concepts into a project’s overall design</li> </ul>	<ul style="list-style-type: none"> <li>Austin, TX, rewards points through its green building commercial and multifamily program when a portion of the building’s annual electricity use is created by on-site renewable energy systems.</li> </ul>
<b>GB-I.3:</b> LUC does not address electric vehicle charging stations	Specifically allow electric vehicle charging stations as accessory use in all zone districts	<ul style="list-style-type: none"> <li>The State of Oregon permits outright instillation of electronic vehicle charging stations on already developed properties.</li> </ul>
<b>GB-I.4:</b> LUC does not address low-energy maintenance landscaping	Encourage low-energy maintenance landscaping by giving additional landscaping credit.	<ul style="list-style-type: none"> <li>Eagle County, CO’s ECObuild program provides a range of credits towards required points for low-water landscaping.</li> </ul>
<b>GB-I.5:</b> Current regulations do not address incentives for solar energy in parking shade structures.	Provide a parking lot reduction solar panels are provided on shade structure that would be sufficient to provide the parking lot’s security lighting.	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>FILLING REGULATORY GAPS</b>		
<b>GB-R.1:</b> Voluntary Residential Green Building Rating System	<ul style="list-style-type: none"> <li>Consider establishing a tiered approach in which residential developments are <i>required</i> within the LUC to achieve a certain number of points from each of the Residential Green Building Rating System category. Assign a higher number of points to techniques or requirements that achieve the</li> </ul>	<ul style="list-style-type: none"> <li>Many communities in the Southwest have adopted mandatory or voluntary green building requirements for new residential construction, including Pima and Coconino Counties and Scottsdale, AZ.</li> <li>Eagle County’s ECObuild program requires all new residential</li> </ul>

Diagnosis: Green Building		
Existing Provisions	Possible Revisions	Examples
	<p>greatest return in terms of the efficiency gained over the project's life cycle and/or those that require the most significant cost commitment.</p> <ul style="list-style-type: none"> <li>Adapt and expand existing Residential Green Building Rating System to address larger multi-family, mixed-use, commercial, and industrial projects, as well as adaptive reuse of existing buildings.</li> </ul>	<p>construction, as well as additions/reconstructions over 50% of the existing floor area to achieve a minimum number of points for sustainable building methods.</p> <ul style="list-style-type: none"> <li>Austin, TX requires all projects in the Central Business District and Downtown Mixed Use zones, as well as other zones to achieve an Austin Energy Green Building rating.</li> </ul>
<p><b>GB-R.2:</b> LUC and Development Standards contain no provisions re cool roofs, green roofs<sup>16</sup></p>	<ul style="list-style-type: none"> <li>Consider requiring cool roofs and/or green roofs</li> </ul>	<ul style="list-style-type: none"> <li>Golden, CO offers 1 sustainability point, out of a required 25, for 10 sq. ft. of a vegetative roof.</li> <li>Chicago requires green roofs on all new downtown buildings.</li> <li>LEED-ND awards 1 point for cool or shaded roof.</li> <li>Henderson, NV, grants points in its sustainability point review system for cool or vegetated roofs.</li> </ul>

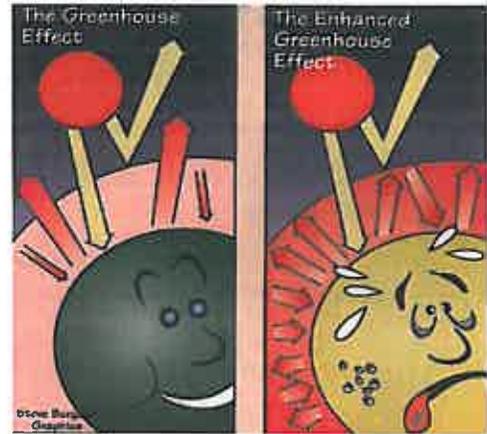
<sup>16</sup> Despite common misconceptions, a recent EPA study entitled, *Green Infrastructure in Arid and Semi-Arid Climates*, confirms that green roofs can offer a water-efficient approach to urban stormwater management in arid climates such as Tucson's.

## CLIMATE CHANGE AND AIR QUALITY

### Introduction

This section of the diagnosis addresses the topic of climate change, its related causes, and identifies regulatory options for addressing this issue. Air quality is related to climate change causes and is discussed as well. Climate change is being accepted as a scientific fact that will require us to create policies and solutions to address the problem. Tangible evidence seems to be accumulating on an almost daily basis—shorter winters, melting polar ice caps, rising sea levels, and deeper droughts. The earth's climate is predicted to change because of human activities altering the chemical composition of the atmosphere. There most likely will be increases in temperature and changes in precipitation, soil moisture, and sea level, which could have adverse effects on many ecological systems, as well as on human health and the economy.

Greenhouse gases, with their undisputed heat-trapping properties, are increasingly linked to and seen as the leading cause of global warming. Greenhouse gases (GHGs) are primarily made up of carbon dioxide, methane, nitrous oxides, and chlorofluorocarbons. They contribute to global warming by trapping infrared radiation and heat from the sun within the earth's atmosphere. The bulk of greenhouse gasses emitted in the U.S. are associated with transportation, energy generation, and energy usage. The burning of fossil fuels – coal, oil, and natural gas – for energy is the primary source of emissions. Energy burned to run vehicles, heat homes and businesses, and power factories is responsible for about 80% of global carbon dioxide emissions, about 25% of U.S. methane emissions, and about 20% of global nitrous oxide emissions. More than 60% of the total air pollution in Tucson is caused by motor vehicles<sup>37</sup>. Pima County Department of Environmental Quality (PDEQ) constantly monitors the air quality in Pima County, specifically in Tucson. PDEQ has documented a significant decrease in carbon monoxide concentrations over the past three decades due to better technology in newer cars; however, they predict concentrations will increase with a growing population and more cars on the roads despite this technology<sup>38</sup>.



*The greenhouse effect – greenhouse gases trap heat and are linked to the leading cause of global warming.*

Along with the issues of GHGs and its cause and effect relationship with climate change is the overarching issue of total air quality, where ozone and particulate matter add additional challenges to the goal of cleaner air and meeting U.S. Environmental Protection Agency (EPA) standards. Poor air quality has significant impacts on public health, the natural environment, and economic interests such as tourism and business attraction that are important to Tucson. The unique physical geography of the Tucson region characterized by its high mountains creating a “bowl effect” around the city that can trap pollution in the area, makes the challenge of good air quality even greater. The state has played a major role in addressing air quality through stricter motor vehicle and industry emission regulations, yet air quality is still a challenge. Four of the pollutants that PDEQ monitors daily in Tucson, including carbon monoxide, remained almost completely in the “good” category of the Air Quality Index (AQI) with a few dips into the “moderate” and “unhealthy” categories. AQI is a measurement set by the EPA to consistently measure air pollution levels.<sup>39</sup>

By signing on to the Mayor’s Climate Protection Agreement, the City of Tucson has committed to an ambitious goal of reducing community greenhouse gas emissions to seven percent below 1990 levels. Among the actions that the Agreement calls for are adopting and enforcing land use policies that reduce sprawl, preserve open space, create alternatives to private automobile transport, and promote clean alternative energy. The fact that the city

<sup>37</sup> Pima County Department of Environmental Quality: [www.airinfnow.org](http://www.airinfnow.org)

<sup>38</sup> 2009 Air Quality Summary Report for Pima County, Arizona. Pima County Department of Environmental Quality, July 2010.

<sup>39</sup> 2009 Air Quality Summary Report for Pima County, Arizona. Pima County Department of Environmental Quality, July 2010.

## DIAGNOSIS | CLIMATE CHANGE AND AIR QUALITY

has a specific goal and has put operational and administrative steps in place to attain its goal is a significant commitment.

Tucson has already been recognized nationally for the aggressive steps it has taken to address climate change and promote energy conservation and efficiency:

- In December 2008 the city manager's office established standards for City of Tucson building energy conservation measures that will save \$150,000 annually.
- Energy efficiency retrofits at Tucson Water reduced electricity usage by 20%.
- Working with Pima County and other institutions, the city released a Greater Tucson Solar Development Plan in 2009.
- The city has invested more than \$1.78 million in solar energy projects including eight solar voltaic systems with a combined 220 kW peak capacity rating.
- In 2009, the city placed \$7.6 million of clean Renewable Energy Bonds to finance seven new city solar photovoltaic projects in the near future.
- The city's Environmental Services Department has initiated several major projects to convert methane gas from landfills to electric energy.

While these operational, technological investment, and educational initiatives are critical, much more will need to be done to meet the city's GHG reduction goals—and its land development regulations that govern new growth, development, and redevelopment can play a key role. The development code strategies for addressing climate change fall into three main categories:

- (1) Promoting development patterns leading to less auto-dependent mobility, reduced vehicle miles traveled, and a corresponding reduction in GHGs,
- (2) Supporting alternative energy generation, therefore reducing reliance on fossil fuel and GHG generating sources such as oil, gas, and coal-fired power plants, and
- (3) Preserving existing trees and planting new trees and other vegetation that can sequester CO<sub>2</sub>, thereby cleaning the air of major GHGs.

Sustainable urban development patterns can be promoted by zoning strategies that encourage mixed-use development (residential and commercial use in same area), reduced parking requirements, transportation alternatives, walkable communities, compact/denser building design, and provision of trees/green space. Such approaches can enable a community to fight climate change (and improve quality of life) by reducing personal automobile dependence, increasing trees and green space, and encouraging renewable energy usage. Improved urban design through regulations and incentives, with attention to trees, landscaping, and shading, have the added benefit of mitigating what people experience – the urban heat island effect and poor air quality.

Several studies have linked denser, compact communities with reduced driving and in turn, reduced GHG emissions. For example, a study by Reid Ewing of 83 metro areas found that residents in compact regions such as Portland and Boston drive 25% less than sprawling regions such as Atlanta and Raleigh.<sup>20</sup> Higher-density urban areas, especially those incorporating mixed uses, make public transit and people-powered transportation more practical, while reducing emissions and encouraging exercise.

Trees also play an important role, not only for the aesthetic enhancements they provide, but for shading and cooling and absorbing carbon dioxide. According to the U.S. Department of Energy, a 30-year old hardwood tree can sequester the equivalent of 136 pounds of carbon dioxide annually. It takes about 70 such trees to offset the carbon dioxide emissions from one medium-sized car for the year. In addition to the preservation of existing

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<sup>20</sup> Ewing, [Growing Cooler: The Evidence on Urban Development and Climate Change \(2009\)](#).

trees, new trees in conjunction with development, in parks, and in available spaces along the city’s right-of-ways should also be areas of focus.

Fortunately, the city has already begun to revamp its development codes to address climate change and other sustainability topics. Many minor revisions have been made throughout the land development code (LUC) to remove barriers to installation of solar panels. For example, Section 3.2.12 makes clear that solar energy collectors are permitted in all zone districts. Similarly, solar panels are protected from shadowing by multi-story structures on adjacent lots. Additionally, the city has adopted related measures such as the ground-breaking solar-ready housing ordinance that requires builders of single-family and duplex residential dwelling units to “stub in” the electrical and plumbing systems to accommodate future solar systems. Moreover, to promote compact mixed-use and infill development, Tucson has recently adopted new zone districts such as the Downtown Infill Incentive District. All of these measures have helped to lay the foundation for the major amendments to the LUC and Development Standards necessary to address climate change and air quality in Tucson. Some of the potential changes identified below include:

- Expanded use of accessory/secondary dwelling units that can promote more compact, infill development without large-scale, multi-story buildings;
- Removing barriers for other alternative energy systems like wind and ground-source heating/cooling;
- Revamping existing strict non-conforming use/structure regulations to encourage redevelopment and alternative energy retrofits of existing buildings; and
- Adoption of clear, simple design guidelines and development standards for infill throughout the city, not just a limited number of districts.

### Current Regulations

The following table cites some of the main current regulations in the LUC, Development Standards, and Design Guideline Manual as well as other sections of the municipal code related to climate change and air quality. It is not meant to be all-inclusive, but to highlight some of the key provisions currently on the books that are directly related to climate change. Additionally, related measures are set forth in the sections on Alternative Energy, Water Conservation, and Transportation/Mobility that are closely associated with the topic of climate change.

Topics addressed under the heading of Climate Change and Air Quality include:

- Mixed-use, infill, and compact growth patterns;
- Alternative energy production and conservation; and
- Tree/vegetation protection and planting.

Regulations Addressing Climate Change and Air Quality	
REF.	REGULATION
<b>DEVELOPMENT PATTERNS—MIXED-USE, INFILL, AND COMPACT GROWTH</b>	
Land Use Code	
Division 6	Lists 5 mixed-use zone districts (Office/Commercial/Residential-1/2; Planned Area Development, Multiple Use, and Planned Commercial Development Districts) that allow/encourage mixed-use developments.
2.8.12	Establishes <b>Downtown Infill Incentive District</b> that promotes mixed-use development, reduces fees, and expedites permitting in downtown.
2.8.13	Establishes <b>Urban Overlay District Zone (UOD)</b> to be initiated by the Mayor and Council that does not restrict underlying uses or regulations but provides a development option that encourages well-designed infill projects subject to the regulations and guidelines provided in the UOD’s

Regulations Addressing Climate Change and Air Quality	
REF.	REGULATION
	development document.
2.8.10	Establishes the <b>Rio Nuevo and Downtown Zone District</b> that encourages mixed-use development and infill by allow modification of many development standards (parking, landscaping, etc.).
3.2.2.2	Relating to <b>Principal Uses</b> applies most restrictive development residential designator/dimensional standards to mixed-use projects with residential.
3.2.5	<b>Accessory Uses and Structures</b> — limits residents of secondary dwellings to occupants of the principal dwelling, customers, employees, or guests of principal use.
Division 3	<b>Parking</b> — sets forth off-street parking requirements for motor vehicles and bicycles. Many requirements relating to motor vehicles are very high (e.g., retail, office). Reductions allowed for mixed-use projects (3.3.5), downtown development (3.3.6.1), and existing development sites (3.3.8.6). On-street parking allowed to count towards off-street requirements in some instances (e.g., visitor parking for some residential uses).
3.3.311, 3.3.8.6, and 3.3.8.7	In May 2009, the city council adopted a series of amendments to <b>parking regulations</b> to reduce the number of motor vehicle parking spaces for non-conforming and existing uses (Sections 3.3.311 and 3.3.8.6) and establishing a process for tailored reduced parking plans (Section 3.3.8.7).
5.3.6	<b>Nonconforming Use or Structure</b> — and other provisions (e.g., 3.3.3.12 regarding parking) scattered throughout LUC address expansions of nonconforming uses and structures. Expansions of more than 25-50% require full compliance with some LUC standards.
3.6.1	<b>Flexible Lot Development</b> — allows flexibility in development standards to create high-quality sustainable development featuring enhanced connectivity, open space, water harvesting, etc.
<b>Development Standards</b>	
9-10.0	<b>Rio Nuevo and Downtown Zone</b> — incorporates many sustainability related provisions including provisions encouraging high-density, mixed-use development within a walkable environment.
<b>Design Guidelines</b>	
I.A.5.a	Encourages <b>compatible mixed-use</b> development by specifying transitions and buffers between uses in and adjacent to mixed-use areas.
III.A.5.a	Recommends <b>design solutions</b> to encourage compatible development in “park industrial” mixed-use areas.
Section V	<b>Special Design Options</b> — describes and illustrates selection and design criteria for infill areas, transportation nodes/corridors, and redevelopment districts.
<b>ALTERNATIVE ENERGY AND ENERGY CONSERVATION</b>	
<b>Land Use Code</b>	
<ul style="list-style-type: none"> <li>▪ 3.2.12</li> <li>▪ 5.3.5</li> <li>▪ 3.7.2.6</li> <li>▪ 3.2.5.2</li> </ul>	<p>Numerous targeted amendments have been made in recent years to encourage and accommodate solar energy collectors:</p> <ul style="list-style-type: none"> <li>▪ <b>Solar Considerations</b>— allows solar energy collectors in all zone districts and provides solar access protection.</li> <li>▪ Relating to the <b>Design Development Option</b> provides solar access protection.</li> <li>▪ Restricts the planting of trees that would interfere with <b>solar access</b>.</li> <li>▪ Allows <b>solar collectors</b> as accessory uses in all zones and does not include them in calculating lot coverage.</li> </ul>
<ul style="list-style-type: none"> <li>▪ 6.3.12</li> </ul>	<ul style="list-style-type: none"> <li>▪ Recent amendments allow larger <b>renewable energy</b> generation facilities as a principal use in all zone districts subject to special review procedures in commercial, office, and residential districts subject to performance criteria. New definition includes solar, geothermal, and wind.</li> <li>▪ Except for proposed amendments relating to <b>renewable energy</b> generation facilities as principal</li> </ul>

Regulations Addressing Climate Change and Air Quality	
REF.	REGULATION
	use, there are no specific provisions related to large or small wind energy conversion systems, ground-source heating/cooling systems, or geothermal as accessory uses in the LUC
2006 City of Tucson/ Pima County Outdoor Lighting Code: Section 2.8.6.7 and Division 5	<ul style="list-style-type: none"> <li>▪ City adopted a stand-alone outdoor lighting code in 2006 that is not part of the LUC. See description below.</li> <li>▪ Sets forth lighting restrictions (height, type, shielding) for sources in the Environmental Resource Zone.</li> <li>▪ <i>Performance Criteria</i>— contains several sections addressing outdoor lighting (3.5.13.3—elimination of glare; 3.5.9.7.A—lighting plan with mitigation requirements).</li> </ul>
<b>Development Standards</b>	
2.10.0	<i>Flexible Lot Development Standard</i> — contains green building requirements (2-10.5.0) incorporated into a point system that includes solar and other energy related provisions.
9.10.0	<i>Rio Nuevo and Downtown Zone Standards</i> — has resource conservation criteria related to energy conservation, solar energy, and natural wind ventilation.
2-06.0 and 2-07.0	<i>Landscaping and Screening Standards and Landscape Plan Content</i> — contain multiple provisions to protect solar access from screening by required landscape/tree planting.
9-08.0	<i>Historic Preservation Zone Development Standards</i> — relating to roof types sets forth guidelines for installation of solar panels and equipment. (subsection 3.5)
3.05	Contains design criteria for off-street parking. Tandem spaces do not count towards visitor parking requirements (3-05.2.4.5); visitor parking may be provided on public streets (3-05.2.4.6).
<b>Design Guidelines</b>	
I	<i>All Development</i> — contains multiple provisions relating to solar collection systems (I.A.1.b--solar access, I.B.2.b and d--screening of solar equipment)
I.d and I.e	<i>All Development</i> — allows for parking reductions in mixed-use projects and as trade-off for additional site amenities such as shaded pedestrian linkages.
<b>Other</b>	
	<i>Residential Green Building Rating System</i> is a voluntary certification system used to guide builders, developers, and property owners in the design and construction of energy efficient, water-conserving, healthful homes. Includes criteria under seven broad headings: 1) Location, lot design, preparation, and development; 2) Resource efficiency; 3) Energy efficiency; 4) Water efficiency; 5) Indoor environmental quality; 6) Operation, maintenance, and owner education; and 7) Innovation points
Ordinance 10549	<i>Residential Solar Readiness Ordinance</i> — requires solar "stub ins" (electrical, plumbing, etc.) on all new single family and duplex residential dwelling units. Stub ins allow greater ease and convenience in subsequent solar energy system installations (both thermal hot water and photovoltaic).
2006 City of Tucson/ Pima County Outdoor Lighting Code	Is a comprehensive code to control outdoor lighting. Sets overall lighting limits for developments, establishes curfews for lighting for specified uses, and controls maximum illumination.

Regulations Addressing Climate Change and Air Quality	
REF.	REGULATION
<b>TREE AND VEGETATION PRESERVATION AND PLANTING</b>	
<b>Land Use Code</b>	
<ul style="list-style-type: none"> <li>▪ 2.8.6</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Native Plant Preservation</b>—preparation of native plant preservation plan and preservation of specified percentage of certain plants and/or replacement</li> <li>▪ <b>Environmental Resource Zone</b>— requires protection/non-disturbance of mapped critical riparian habitat or mitigation/replacement and protection of habitat during construction.</li> </ul>
<ul style="list-style-type: none"> <li>▪ 3.7.2.2</li> <li>▪ 3.7.5</li> <li>▪ 3.6.1.5</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Landscaping and Screening</b>— requires planting of trees in parking lots (3.7.2.3) and landscape borders (3.7.2.4).</li> <li>▪ Specifies the use of drought-tolerant vegetation.</li> <li>▪ Designated gateway and scenic routes have special landscaping requirements.</li> <li>▪ Requires special landscaping and tree planting for flexible lot developments (FLD).</li> </ul>
<b>Development Standards</b>	
2-15.0	<b>Native Plant Preservation Standard</b> — sets forth comprehensive submittal requirements and a salvage/transplanting methodology aimed at preserving native vegetation. Fencing standards to protect vegetation during construction are included.
2-06.0, and 2-07.0	<ul style="list-style-type: none"> <li>▪ <b>Landscaping and Screening Standards and Landscape Plant Content</b>— sets forth standards for preservation of trees and vegetation and specifications for trees (e.g., drought-tolerant, size, etc.) required for landscaping plans and vehicular use areas. Section 2-06.3.1.G “encourages” preservation of healthy existing trees and shrub. Other sections address crime prevention through environmental design, irrigation systems, and reclaimed water use.</li> <li>▪ Contain multiple provisions to protect solar access from screening by required landscape/tree planting.</li> </ul>
9-01.5.2	Relating to the <b>Hillside Development Zone</b> requires preservation of existing trees greater than 4 inch trunk diameter and salvage where not feasible. Also slope revegetation required.
9-06.0	<b>Floodplain, Wash, and Environmental Resource Zone (ERZ) Standard</b> — requires revegetation/restoration of disturbed areas (9-06.2.5.A.4 and 5.2)
<b>Design Guidelines</b>	
I.B	<b>All Development</b> — contains guidelines throughout relating to placement of trees (e.g., for shading), plant materials, and landscaped buffers.

## Diagnosis

The following table contains a diagnosis of regulations addressing climate change and air quality.

Diagnosis: Climate Change and Air Quality		
Existing Provisions	Possible Revisions	Examples
<b>REMOVE BARRIERS</b>		
<b>DEVELOPMENT PATTERNS—MIXED-USE, INFILL, AND COMPACT GROWTH</b>		
CC-B.1: While several districts tailor development standards for infill, other infill areas subject to suburban development standards.	Consider adopting tailored development standards (landscaping, parking, open space) for designated infill and redevelopment areas throughout city.	<ul style="list-style-type: none"> <li>▪ Laramie, WY, Cedar Rapids, IA, and Winnipeg, Canada, have customized landscaping, parking, and open space stds. for mature areas of city.</li> <li>▪ Franklin, TN, has adopted traditional neighborhood standards for older areas of city.</li> </ul>

Diagnosis: Climate Change and Air Quality		
Existing Provisions	Possible Revisions	Examples
<p><b>CC-B.2:</b> Development designator system applies most restrictive standards (usually residential) to mixed-use projects.</p>	<p>Revise development designator system to apply less restrictive standards to mixed-use projects or replace development designator with more traditional zone district dimensional system.</p>	<ul style="list-style-type: none"> <li>City currently considering major revisions to development designator system as part of code reformatting project.</li> </ul>
<p><b>CC-B.3:</b> LUC prohibits most secondary dwelling units.</p>	<p>Remove existing restrictions on accessory dwelling unit standards to allow non-resident/non-employee tenants. Include protective standards related to unit size, ownership, occupancy of principal dwelling, etc.</p>	<ul style="list-style-type: none"> <li>City of Santa Cruz, CA, has progressive accessory dwelling unit program implemented through zoning code.</li> <li>Salt Lake City is considering amendments to zoning code to permit accessory dwelling units in specified areas (e.g., near transit) and neighborhoods where plans approve of ADUs.</li> </ul>
<p><b>CC-B.4:</b> Off-street parking requirements excessive for many uses.</p>	<p>Reduce base off-street parking requirements. Increase automatic reduction for mixed-use projects near existing/planned transit stops (now 10%). Allow on-street parking adjacent to property to count towards minimum on-street requirements. Adopt maximum parking limits.</p>	<ul style="list-style-type: none"> <li>Current parking amendment reduces off-street requirements, allows on-street parking reduction, and allows individual parking plans.</li> <li>Austin, TX, grants vertical mixed-use buildings automatic 60% parking reduction.</li> <li>Anchorage, AK, grants automatic 25% reduction in parking for mixed-use projects.</li> <li>Many cities have adopted maximum parking limits (e.g., 125% of minimum).</li> </ul>
<p><b>CC-B.5:</b> Strict nonconforming use/structure requirements discourage "green" building renovation/expansion.</p>	<p>Allow renovations/expansions related to "green building" (e.g., adding solar panels, insulation, etc.) to take place without bringing entire site into compliance or allow expansions that reduce the degree of nonconformity or do not increase it to proceed without full compliance.</p>	<ul style="list-style-type: none"> <li>Salt Lake City is adopting provision allowing "green building" improvements to nonconforming uses/structures without full site compliance.</li> <li>Many mature communities allow expansion of nonconforming uses/structures if the expansion does not increase the degree of nonconforming.</li> </ul>
<p><b>CC-B.6:</b> Historic preservation design guidelines relating to solar systems on roofs may inhibit installation.</p>	<p>Adopt clearer hierarchy of preferred locations for solar on historic sites. Allow on front roof under some specified circumstances with provisions to ensure compatibility.</p>	<ul style="list-style-type: none"> <li>State of California prohibits absolute prohibitions of solar on roofs of historic structures.</li> <li>Salt Lake City is adopting a hierarchy of preferred locations for solar on historic sites, but may be allowed on front yard roofs as last resort.</li> </ul>

Diagnosis: Climate Change and Air Quality		
Existing Provisions	Possible Revisions	Examples
<p>CC-B.7: LUC and Development Standards do not address wind energy conversion systems (WECS) and other alternative energy systems except as principal use.</p>	<ul style="list-style-type: none"> <li>Add provisions allowing small and large WECS in specific districts subject to clear standards re height, noise, and other potential off-site impacts.</li> <li>Review potential standards to permit ground-source heating and cooling systems.</li> </ul>	<ul style="list-style-type: none"> <li>Anchorage, AK, allows small WECS with limits on setbacks, height, noise, etc.</li> <li>Model ordinances from the Pennsylvania Department of Environmental Protection and the South Dakota Public Utilities Commission provide additional protective standards for jurisdictions allowing large-scale WECS.</li> <li>North Dakota requires a permit for all nonresidential geothermal projects (permitting them with out a permit for private residential uses) to ensure proper design and construction and to minimize risk of ground water contamination or other environmental problems.</li> </ul>
<b>CREATE INCENTIVES</b>		
<b>DEVELOPMENT PATTERNS--MIXED-USE, INFILL, AND COMPACT GROWTH</b>		
<p>CC-I.1: Existing mixed-use zone districts create some incentives for mixed-use projects.</p>	<p>Offer development bonuses (height, density, etc.) for implementing sustainability goals. Tailor standards to encourage infill development.</p>	<ul style="list-style-type: none"> <li>Austin, TX, grants vertical mixed-use buildings with minimum use mix a wide variety of major incentives (no front setbacks, no FAR, no building coverage limits, additional uses.</li> </ul>
<p>CC-I.2:</p>	<p>Allow vegetated/green roofs to count toward landscaping and open space requirements or provide bonus (height, density, etc.)<sup>21</sup></p>	<ul style="list-style-type: none"> <li>Portland, OR, grants FAR bonus for ecoroofs in selected zone districts</li> </ul>
<p>CC-I.3: Current regulations do not address incentives for solar energy in parking shade structures.</p>	<p>Provide a parking lot reduction if solar panels are provided on shade structure sufficient to provide the parking lot's security lighting.</p>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>ALTERNATIVE ENERGY AND ENERGY CONSERVATION</b>		
<p>CC-I.4:</p>	<p>Require provision of priority parking spaces for alternative fuel vehicles, carpool vehicles, and shuttles</p>	<ul style="list-style-type: none"> <li>Puget Sound Regional Council (PSRC) Model Development Regulations and Guidance reserves parking spaces for electric vehicle charging stations and counts the spaces toward the minimum parking requirement. This document also specifies location and design criteria.</li> </ul>

<sup>21</sup> Despite common misconceptions, a recent EPA study entitled, *Green Infrastructure in Arid and Semi-Arid Climates*, confirms that green roofs can offer a water-efficient approach to urban stormwater management in arid climates such as Tucson's.

<b>Diagnosis: Climate Change and Air Quality</b>		
<b>Existing Provisions</b>	<b>Possible Revisions</b>	<b>Examples</b>
		<ul style="list-style-type: none"> <li>Los Angeles, CA, provides preferential parking for hybrid vehicles.</li> <li>LEED awards 3 points out of 40 for basic certification for provision of preferential alternative fuel vehicle parking.</li> </ul>
CC-I.5: LUC does not address electric vehicle charging stations.	Specifically allow electric vehicle charging stations as accessory use in all zone districts. If charging station is solar-powered, provide an incentive, such as waiver of development fees or extra density.	<ul style="list-style-type: none"> <li>Communities in Washington, Thurston Pierce, King, and Snohomish Counties, permit electronic vehicle charging stations in all zoning districts except those designated for residential and resource protection. The EVI Model Ordinance guided these counties.</li> </ul>
CC-I.6: LUC does not address low-energy maintenance landscaping.	Encourage low-energy maintenance landscaping by giving additional landscaping credit.	<ul style="list-style-type: none"> <li>Eagle County, CO's ECObuild program provides a range of credits towards required points for low-water landscaping.</li> </ul>
<b>TREE AND VEGETATION PRESERVATION AND PLANTING</b>		
CC-I.7: Various LUC and Development Standard provisions protect native vegetation.	Provide bonus credit towards landscaping requirements for preservation of large existing trees, including non-native species.	<ul style="list-style-type: none"> <li>Franklin, TN, and Colleyville, TX, give landscaping credit for protecting existing mature trees.</li> </ul>
<b>FILLING REGULATORY GAPS</b>		
<b>DEVELOPMENT PATTERNS—MIXED-USE, INFILL, AND COMPACT GROWTH</b>		
CC-R.1: LUC specifies maximum densities, but not minimum density or minimum mix of uses.	Consider requiring minimum densities, especially in potential transit-oriented development and mixed-use areas.	<ul style="list-style-type: none"> <li>Many cities require minimum densities in areas designated for mixed-use and transit-oriented development, including Portland, OR; Sparks and Henderson, NV; and Denver, CO.</li> <li>Orange County, FL proposed MXDAC mixed-use district specifies minimum use mix in designated areas.</li> </ul>
CC-R.2: Several zone districts and Flexible Lot Development Standards address sidewalk, connectivity requirements.	Create mandatory internal and external connectivity standards for all major developments.	<ul style="list-style-type: none"> <li>The Florida DOT adopted connectivity standards in its "Model Regulations for Multimodal Transportation Districts."</li> <li>Franklin, TN, adopted a connectivity index with numerical standards to assess new subdivisions.</li> </ul>
<b>ALTERNATIVE ENERGY AND ENERGY CONSERVATION</b>		
CC-R.3: Outdoor lighting code has some progressive provisions, but does not reference/allow modern	Consider targeted amendments to lighting code to allow LED and other modern, energy-saving lighting, reduce overlighting of sites and waste	<ul style="list-style-type: none"> <li>Consider adoption of model regulatory provisions recommended by the Illuminating Engineers Society of America (IES)</li> </ul>

Diagnosis: Climate Change and Air Quality		
Existing Provisions	Possible Revisions	Examples
energy-saving technologies like solid-state and LED lighting	of energy.	and International Dark-Sky Assn (IDA).
CC-R.4: No mandatory minimum percentage of energy generation from alternative sources for buildings/developments.	Require minimum alternative energy % generation or purchase or GHG reduction.	<ul style="list-style-type: none"> <li>▪ Henderson, NV, awards 5 points in sustainability point system if 20% of energy is generated on-site from renewable sources. 3 points if off-site.</li> <li>▪ LEED-ND awards 1 point if 5% of energy is generated from renewable sources.</li> </ul>
CC-R.5: LUC and Development Standards contain no provisions re cool roofs, green roofs.	Consider requiring cool roofs and/or green roofs.	<ul style="list-style-type: none"> <li>▪ Golden, CO offers 1 sustainability point, out of a required 25, for 10 sq. ft. of a vegetative roof.</li> <li>▪ Chicago requires green roofs on all new downtown buildings.</li> <li>▪ LEED-ND awards 1 point for cool or shaded roof.</li> <li>▪ Henderson, NV, grants points in its sustainability point review system for cool or vegetated roofs.</li> </ul>
CC-R.6: LUC and Development Standards do not address shade structures.	Consider making shade structures mandatory on building facades, roofs, and in parking lots. Could add requirement that roofs of shade structures be covered by certain percentage of PV panels or be solar-ready.	<ul style="list-style-type: none"> <li>▪ Miami, FL, requires 50% of the site's hardscape to be shaded, have a solar reflectance of 0.3, or be a pervious surface.</li> <li>▪ Henderson, NV, requires sidewalks along 50% of building façade to be shaded.</li> </ul>
CC-R.7: No requirements in LUC or Development Standards regarding solar-oriented lots and subdivisions.	Require minimum percentage of lots in larger subdivisions to be solar oriented (i.e., longer east-west axis to provide more exposure to sun).	<ul style="list-style-type: none"> <li>▪ Fort Collins, CO requires 65% of 15,000 sq. ft or greater residential lots to be "solar-oriented".</li> <li>▪ Multnomah County, OR and Ft. Collins, CO require 20-30% of lots in new subdivisions to be solar-oriented.</li> <li>▪ LEED-ND awards point for solar oriented building or block design.</li> </ul>
CC-R.8: The city is currently considering a major overhaul of its existing vehicle and bicycle parking regulations to reduce excessive parking requirements, provide more flexibility for redevelopment sites, and offer alternative methods of compliance, such as	Require more parking plus other facilities (showers, locks, etc.)	<ul style="list-style-type: none"> <li>▪ Austin, TX, awards points in sustainability scoring system for showers, secure indoor bike lockers, etc.</li> </ul>

<b>Diagnosis: Climate Change and Air Quality</b>		
<b>Existing Provisions</b>	<b>Possible Revisions</b>	<b>Examples</b>
individual parking plans.		
CC-R.9: LUC and Development Standards do not address electric vehicle charging stations	Consider requiring certain percentage/number of parking spaces to have electric vehicle charging stations or be prewired to provide in future.	<ul style="list-style-type: none"> <li>▪ San Francisco, CA building code requires new construction to be prewired for electric car chargers.</li> <li>▪ Golden, CO offers 2 sustainability points, out of a required 25, for installing 3% of required parking as electric plug-in stations.</li> </ul>
CC-R.10: The LUC, Development Standards, and Design Guidelines contain scattered solar access "considerations" throughout.	<ul style="list-style-type: none"> <li>▪ Existing standards regarding solar access should be consolidated in one section and clarified.</li> <li>▪ Overlapping provisions should be reconciled.</li> <li>▪ Consider adding more formal process for protecting solar access.</li> <li>▪ Expand natural wind ventilation requirements found in Rio Nuevo and Downtown Standards.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Boulder, CO, has detailed solar access review for every development to protect adjacent solar "envelope"</li> <li>▪ Laramie, WY, allows registration of solar panels that triggers protection.</li> <li>▪ See Kettles, A Comprehensive Review of Solar Access Laws In Use And Suggested Standards For A Model Ordinance.</li> <li>▪ Abu Dhabi Estidama sustainability standards require consideration of natural ventilation and wind cooling in development and building design.</li> </ul>
<b>TREE AND VEGETATION PRESERVATION AND PLANTING</b>		
CC-R.11: Current regulations provide strong protections for native plants and vegetation protection in washes, hillsides. Vague protections in general development standards.	Consider stronger, clearer city-wide protection regulations for mature trees with mitigation/replanting options.	<ul style="list-style-type: none"> <li>▪ Yucca Valley, CA, severely limits the removal or transplanting of certain native plant and tree species.</li> <li>▪ Clayton, MO, requires preservation of large trees or 1:1 replacement in caliper inches.</li> <li>▪ Salt Lake City riparian ordinance requires protection of all large trees or replanting at 2X ratio.</li> </ul>

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# Section 3: Priority Recommendations

## BACKGROUND

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Building on its recent and current sustainability initiatives, the City of Tucson can make even greater progress towards its sustainability objectives through changes in its land use regulatory framework. This section contains a summary of priority recommendations for changes to the city's LUC.

Recommendations in each of the eleven topic areas outlined in this Diagnosis were reviewed by city staff and evaluated in terms of their feasibility, potential effectiveness in addressing the issues identified, and resources required to implement. Preliminary priority recommendations were sorted into three categories:

- **Proceed**—means the recommendation is ready to be drafted into either an LUC text amendment or a General Plan policy with minor adjustments.
- **Consider After More Research**—means the recommendation may be a viable idea, but more information about the details of implementing the recommendation is needed before time is invested in creating a text amendment.
- **Postpone**—means the recommendation may be too complicated or a low priority for this project right now.

Staff's preliminary priority recommendations were organized according to seven topic areas and presented to stakeholders during a second series of stakeholder workshops on January 31 and February 1, 2011. The narrower range of topic areas defined by staff allows recommendations to be streamlined in terms of their repetition within the Diagnosis and links them to priorities identified by Mayor and Council. Topic areas are listed below, along with an explanation of their relationship to the original eleven topic areas discussed in the body of the Diagnosis, if recommendations relate to more than one topic area:

- **Water Quality and Conservation;**
- **Infill Barriers**—includes recommendations from the Housing Accessibility, Diversity, and Affordability; Mobility and Transportation and Alternative Fuels, and Green Building; and Community Health and Safety sections;
- **Alternative Energy**—includes recommendations from the Alternative Energy Production and Energy Conservation; Climate Change and Air Quality; and Urban Heat Island sections;
- **Urban Food**—includes recommendations from the Food Production and Nutrition and Community Health and Safety;
- **Green Buildings**—includes recommendations from the Green Building and Urban Heat Island sections;
- **Recycling and Waste Reduction;** and
- **Open Space, Parks, and Trails.**

Based on input received during these workshops, a revised set of priority recommendations was prepared, as outlined in this chapter. These recommendations will serve as the basis for Phase II of the Sustainable Land Use Code Integration Project, which is anticipated to begin in mid-2011.

## PRIORITY RECOMMENDATIONS

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The priority recommendations that follow are considered to be specific areas of focus that will be used to guide LUC amendments during Phase II of the Sustainable Land Use Code Integration Project. They are not intended to

## PRIORITY RECOMMENDATIONS

represent actual code language. The drafting of LUC language in the next phase of the project will clarify and codify specific provisions to implement the concepts embodied in these priority recommendations. After each recommendation, we have noted in parentheses the type of change anticipated to implement the recommendation (e.g. Land Use Code text amendment, General Plan policy, new Technical Manual, or new Administrative Manual).

### Water Quality and Conservation

Priority recommendations related Water Quality and Conservation include:

#### PROCEED

- Establish water budgets for landscaping irrigation to promote water conservation and encourage use of non-potable water sources (e.g., reclaimed water, rainwater). *(Land Use Code)*
- Create incentives for projects that utilize the reclaimed water system. *(Land Use Code)*
- Clarify definition of pervious materials appropriate for use in Tucson. *(Land Use Code)*
- Allow and clarify that rainwater cisterns can encroach into side and rear yard setbacks. *(Land Use Code)*

#### CONSIDER AFTER MORE RESEARCH

- Allow and encourage broader use of pervious materials for streets, sidewalks, and parking lots in low-traffic areas. Consider requiring a minimum percentage of pervious materials in parking lots. *(Land Use Code)*
- Encourage or consider requiring passive water-harvesting earthworks in residential developments. *(Land Use Code)*
- Encourage that a portion of street rights-of-way be reserved for trees and green infrastructure (also reduces Heat Island Effect). *(Land Use Code or new Technical Manual)*

#### POSTPONE OR DO NOT DO

- Expand rainwater harvesting requirements to multi-family and single family residential areas. *(Land Use Code or Tucson Code)*
- Increase groundwater recharge through more on-site retention/detention/reuse of storm water. *(Land Use Code or new Technical Manual)*
- Create a policy for locating development near reclaimed water system and discouraging development outside of a designated water supply area. *(General Plan)*

### Infill Barriers

Priority recommendations related to Infill Barriers include:

#### PROCEED

- Create design standards for mixed-use/transit-oriented development that address distinctions between corridors, intersections, and districts and can be adapted for use by projects throughout the city, especially as part of future Urban Overlay Districts (UODs), Planned Area Development (PAD) rezonings, and within the Downtown Area Infill Incentive District (IID). Standards should address transitions to adjacent single-family neighborhoods and historic buildings or districts. Create incentives for desired development patterns (e.g., transit-oriented development, affordable housing, and adaptive reuse) through increased flexibility in landscaping, parking, open space, height, density, and other requirements. *(Land Use Code or new Technical Manual)*

- Allow “green” renovations/expansions to existing non-conforming buildings (e.g., adding solar panels, insulation, etc.) to take place without bringing entire site or building into compliance with the LUC or allow expansions that reduce the degree of nonconformity or do not increase it to proceed without full compliance. Clarify current twenty-five percent expansion rules. *(Land Use Code)*
- Update purpose statements in zone districts to clarify where infill and redevelopment are desirable and to address neighborhood compatibility issues as applicable. *(Land Use Code)*
- Create safe work/school route requirements. *(General Plan and Land Use Code)*

## CONSIDER AFTER MORE RESEARCH

- Clearly delineate areas targeted for infill development in the city on the city’s General Plan maps and Zoning Map. Maps would visually depict where the city’s General Plan policies, transportation goals, and zoning regulations intend to promote redevelopment and identify the adjacent neighborhoods that would require protection from potentially incompatible development. *(General Plan)*
- Increase allowed density and consider establishing minimum densities near transit stations for future modern street car and other major transit nodes. *(Land Use Code)*
- Review and clarify existing regulations to promote greater pedestrian access (easements if necessary) from subdivisions and commercial buildings to public streets. Allow breaks in screening devices and perimeter walls for pedestrian access as necessary. *(Land Use Code)*
- Provide more specific and aggressive standards to promote road connectivity (e.g., “connectivity index” for new subdivisions). *(Land Use Code or new Technical Manual)*
- Offer streamlined/expedited processing or reduced fees for affordable housing projects. *(Land Use Code or new Administrative Manual)*
- Review existing Pima Association of Governments (PAG) ordinance and determine whether a travel demand management plan for larger commercial and multi-family developments would be beneficial at the local level. *(Land Use Code)*
- Adopt standards allowing for narrow streets where appropriate based on traffic volumes and where they do not impede the delivery of city services. *(Land Use Code or new Technical Manual)*
- Remove restrictions on accessory dwelling units with compatibility standards, if the standards can address concerns about the loss of neighborhood character. *(Land Use Code)*

## POSTPONE OR DO NOT DO

- Consider stronger, clearer city-wide policy protecting mature trees with planting options or landscaping credits. *(Land Use Code)*
- Require mix of housing in new developments in proportion to its size. *(Land Use Code)*
- Require mix of unit size in MF development to ensure varied price points. *(Land Use Code)*
- Establish an inclusionary zoning ordinance. *(Land Use Code)*

## Alternative Energy

Priority recommendations related to Alternative Energy include:

### PROCEED

- Consolidate solar access provisions and clarify to address solar access protection, design of roof angle, orientation, and minimum percentage of solar oriented lots or buildings required in new developments. *(Land Use Code)*

## PRIORITY RECOMMENDATIONS

- Review existing renewable energy generation provisions and expand to more explicitly address appropriate locations for different types and scales of renewable energy facilities (e.g., solar, wind, geothermal). Create separate definitions and standards as necessary to address issues of compatibility (e.g., historic districts). *(Land Use Code)*
- Allow electric vehicle charging stations as an accessory use in all zones in conjunction with all gas fueling stations; consider pre-wired parking spaces for the future. *(Land Use Code)*
- Allow fee incentives for renewable energy facilities. See AZ state statutes on Renewable Energy Incentive Districts. *(Land Use Code)*

## CONSIDER AFTER MORE RESEARCH

- Expand solar ready requirements to include commercial buildings (most existing buildings are not designed to support the addition of solar at a later date). *(Tucson Code or Land Use Code)*
- Review and consider amending outdoor lighting code to require LED or other energy-saving technology to reduce over-lighting and conserve energy. *(Land Use Code)*
- Explore the possibility of requiring or providing incentives to encourage commercial property owners to measure and rate, or “benchmark” the energy performance of their buildings and make energy ratings available to the public. Consider both point of sale and new construction thresholds. *(Land Use Code)*
- Require minimum alternative energy percentage generation or purchase for new developments. *(General Plan)*
- Create a Solar Rights Act for the City of Tucson (similar to State of New Mexico Solar Rights Act) that enables users that record with the Records’ Office to retain that access. *(Tucson Code)*
- Remove outside storage landscape exemptions for car dealership parking areas. *(Land Use Code)*

## POSTPONE OR DO NOT DO

- Require priority parking for electric vehicle and a minimum number of parking spaces as charging stations. *(Land Use Code)*
- Expand Tiered Solar Fee Incentive Waiver to other renewable energy facilities, such as small wind. *(Land Use Code)*
- Encourage low-energy maintenance landscaping by giving additional landscaping credit. *(Land Use Code)*

## Urban Food

Priority recommendations related to Urban Food include:

### PROCEED

- Better define agricultural uses in LUC (e.g., “general farming”). *(Land Use Code and Tucson Code)*
- Add a definition for community gardens and allow as a primary use in residential districts and as an accessory use in other districts. *(Land Use Code)*
- Allow accessory buildings such as greenhouses and small animal enclosures (e.g., rabbits, chickens) within side and rear setbacks, subject to compatibility standards. *(Land Use Code)*

### CONSIDER AFTER MORE RESEARCH

- Clarify the types, size, and number of animals (goats, pigs, chickens, rabbits, etc.) permitted in appropriate zones and expand to allow small-scale animal raising in zones where it will not create a nuisance. *(Land Use Code)*

- Clarify allowances for the sale of produce produced on site (e.g., vegetables, fruit, and eggs) to include community gardens and backyard gardens, with some limitations *(Land Use Code)*
- Allow farmer's markets in a broader set of zone districts as a primary use. *(Land Use Code)*

### **POSTPONE OR DO NOT DO**

- Allow gardening in street right-of-way landscape strip between sidewalk. *(Land Use Code)*
- Encourage the planting of fruit trees and consider re-introduction of heritage fruit trees as part of a landscaping requirement with irrigation provided by non-potable, on-site water resources (active and/or passively harvested rainwater and stormwater, greywater, condensate, etc.). Consider establishing materials demonstrating how to grow fruit trees in Tucson with limited use of potable water. *(New Technical Manual)*
- Limit the number of fast food restaurants or drive-thrus that can be located in the city. *(Land Use Code)*

## **Green Buildings**

Priority recommendations related to Green Buildings include:

### **PROCEED**

- Allow "green" renovations/expansions to existing non-conforming buildings (e.g., adding solar panels, insulation, etc.) to take place without bringing entire site or building into compliance with the LUC or allow expansions that reduce the degree of nonconformity or do not increase it to proceed without full compliance. Clarify current twenty-five percent expansion rules. *(Land Use Code)*
- Allow exterior window shades, awnings, roof overhangs, and other appropriate shade structures to encroach into setbacks. *(Land Use Code)*
- Consider requiring cool roofs (e.g., a minimum level of solar reflectance for all roofs) or providing incentives to encourage them. *(Land Use Code)*
- Prohibit limitations on clotheslines in subdivision CC&Rs and specifically allow as an accessory use in all residential zone districts. *(Land Use Code)*
- Allow a green, vegetated roof to count as a percentage of open space requirements. *(Land Use Code)*
- Consider requiring pervious pavement materials for portion of parking areas. *(Land Use Code and new Technical Manual)*

### **CONSIDER AFTER MORE RESEARCH**

- Consider providing incentives for or requiring shade structures on building facades and roofs, and in parking lots. *(Land Use Code)*
- Require paving materials to have a solar reflectance index of at least 29 to reduce solar gain and the urban heat island effect or offer incentives to encourage the same. *(Land Use Code)*
- Create a permitting process allowing the building of projects meeting the Living Building Challenge. *(Land Use Code)*
- Impose a maximum limit on provided parking (e.g. 125% of the minimum standard) to reduce impervious surface/pavement and mitigate the urban heat island effect. *(Land Use Code)*
- Consider changing current parking standards to require both the tree requirement (1 tree per 4 parking spaces) and the shade requirement (50% shading from trees and buildings) instead of allowing an option to provide one or the other. *(Land Use Code)*

## PRIORITY RECOMMENDATIONS

### POSTPONE OR DO NOT DO

- Require heat island effect analysis on taller buildings (6 stories and higher) addressing wind currents and other heat island effects. *(Land Use Code)*
- Offer increased residential densities for residential development that seek a certain level of Residential Green Building technology. *(Land Use Code)*

## Recycling and Waste Reduction

Priority recommendations related to Recycling and Waste Reduction include:

### PROCEED

- Promote/require use of organic mulches as part of landscaping plans as a more sustainable, local, and low-energy groundcover than gravel and rock. *(Land Use Code)*
- Require or create incentives for the on-site reuse of a percentage of "green waste" or materials that may be converted to mulch. *(Land Use Code)*
- Require that construction management plans be required for projects of a certain size and that the handling of construction be detailed in the plan or require a certain percentage of construction waste be recycled. *(Land Use Code)*

### CONSIDER AFTER MORE RESEARCH

- Allow and possibly require recycling and/or compost stations in appropriate zones as a permitted or special exception use with locational and operational standards; consider allowances that on-site composting facilities may accept off-site compostable materials. *(Land Use Code)*
- Add definitions for gas to energy use and then allow in conjunction with other large waste disposal and recycling sites. *(Land Use Code)*

### POSTPONE OR DO NOT DO

- None.

## Open Space, Parks, and Trails

Priority recommendations related to Open Space, Parks, and Trails include:

### PROCEED

- Clarify that alternative forms of open space (e.g., roof top gardens and/or community gardens) may be counted towards required open space. *(Land Use Code)*

### CONSIDER AFTER MORE RESEARCH

- Require the planting of vegetation native to the Tucson Basin along all waterways. *(Land Use Code)*
- Adopt a standard for public land access maintenance as part of open space planning for larger developments. *(Land Use Code)*

### POSTPONE OR DO NOT DO

- Consider expanding open space density provision included as part of the Flexible Lot Development Option to all developments in designated infill areas. *(Land Use Code)*
- Allow creation of a "free" stewardship lot with sales proceeds to be used for open space. *(Land Use Code)*
- Grant open space credit for detention retention basins that are improved for recreational or open space purposes. *(Land Use Code)*

- Revise subdivision standards to have a clear numeric requirement for minimum open space set aside for all developments. Consider public lands dedication to compliment regional park impact fee. (*Land Use Code*)
- Consider a comprehensive environmentally sensitive lands ordinance. (*General Plan and Land Use Code*)
- Adopt a wildland/urban interface standard to minimize the threat of wildfire to developed property. (*Land Use Code*)



# **Sustainable Land Use Code Project**

Update May 4, 2011



Planning & Development Services Department

May 4, 2011

## **Sustainable Land Use Code Project**

- Energy Efficiency Conservation Block Grant
- Phase 1 - Inventory of the City's current sustainable policies.
- Phase 2 - Diagnostic report on the LUC's standards analyzing barriers and opportunities in aligning standards with sustainable principles.
- Phase 3 – Land Use Code revisions promoting sustainable principles.



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May 4, 2011



## **Stakeholder Comments Prior to Report**

- Build on the work the City has already started or done.
- Streamline the development review process.
- When incorporating new requirements also allow for flexible incentives.
- Address adaptive re-use as well as new development.



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## **Stakeholder Comments After the Report**

- Make the process easy to do.
- Try to offer cost effective solutions.
- Focus on policy where there is more than one sustainable pay off.
- Emphasize incentives and options over mandatory prescriptive standards.



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## Setting Priorities

- Proceed with a text amendment or General Plan Policy.
- Consider after more study.
- Postpone – Not best use of project resources; not supported right now.



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## Areas with M/C Direction

- Water Conservation - Water Study
- Infill Barriers - Water Study
- Alternative Energy - DOE Grant's major goal



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## Current Areas of Focus for Amendments

- Expand urban infill and transit-oriented standards
- Consolidate solar standards
- Expand heat island mitigation
- Address reuse and expansions
- Expand rainwater harvesting and water conservation
- Explore urban food options
- Update alternative energy standards
- Refine relationship between land use and water planning
- Improve pedestrian and street connectivity



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## Revision Phase of the Project

- Work with Clarion to bundle a series of proposed revisions.
- The LUC Committee and the Planning Commission will review.
- Expect two additional bundles of amendments to follow.
- Expect drafts to represent best practices also expect flexibility and process improvement.
- Will be opportunities for the public to review the drafts and make comments.
- Expect each draft to have a rationale regarding the barrier, policy gap or incentive that is being addressed.
- May return to Mayor and Council if a controversy regarding a revision item is raised and needs further direction.



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## **Timeline**

- January – April 2011 - Discuss with LUC Committee and Commission.
- February – April - Discussed edits with Clarion.
- May 2011 - Present recommendations to M/C and get direction.
- May 2011 to October 2012 - Proceed with revisions in stages.



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