



“IMPACT” SYSTEM MEMORANDUM OF UNDERSTANDING ON IMPLEMENTATION AND MONITORING PROCESS COMMUNITY OF CIVANO, LLC

CIVANO IMPACT SYSTEM MEMORANDUM OF UNDERSTANDING ON IMPLEMENTATION AND MONITORING PROCESS

Signed June 26, 1998

The parties to this Memorandum of Agreement are the City of Tucson (the “City”) and The Community of Civano, LLC and Case Enterprises Development Corporation (these latter two collectively referred to as the “Community of Civano”). The Community of Civano is the present master developer and the owner of all of the property in the Civano project located east of Houghton Road except for the parcel developed as the Global Solar property as set forth in the Amendment to the Development Agreement which was adopted by the City on June 23, 1997, and property dedicated to the City by the plat for Neighborhood One as approved by the City on October 20, 1997. This Memorandum of Understanding is binding upon and shall inure to the benefit of the Community of Civano and its successors, developers, contractors, builders and property owners who subsequently acquire rights to develop within the Civano property to the extent applicable to each.

1.0 GOAL

The goal of the Civano project is to create a new mixed-use community that attains the highest feasible standards of sustainability, resource conservation and development of Arizona’s most abundant energy resource -- solar -- so that it becomes an international model for sustainable growth. The State of Arizona through the Department of Commerce, Energy Office has provided significant financial support for the planning and design of Civano. This funding was explicitly in support of the demonstration of the use of solar energy as a guiding, organizing principle of community development.

Another major goal of Civano is to foster creativity and innovation in the construction of Civano. Establishing clear performance achievement levels and then allowing the Community of Civano and designers and builders flexibility in the method of achieving the standards best advances this goal.

The sustainable growth objectives of Civano have been amplified and expanded in the Specific Plan for Neighborhood 1 to include the goals of Building Community, Connection with the Land, Respect for Climate and Regeneration.

The goal of the Memorandum of Understanding is to confirm the strategies for sustainable development, energy conservation, and economic feasibility of the design and technologies used to implement the IMPACT System which are the basis for Civano and to implement and monitor the Civano IMPACT System ("IMPACT System").

2.0 BACKGROUND

The City of Tucson ("City"), in cooperation with the State Land Department and the Metropolitan Energy Commission, and with significant input from the public, established the general development guidelines for Civano. These were implemented through a planning process, the adoption of conditions upon the sale of the state trust land and conditions enacted in the rezoning of the property by the City. These conditions included resource and energy conservation targets as well as community planning targets such as preservation of open space and encouraging a greater mix of uses.

On October 2, 1995, the City formally adopted the IMPACT System to define and administer the resource conservation goals and to maintain Civano's position on the leading edge of sustainable development. The IMPACT System as adopted clarified the City's initial policies and requirements for the Civano development:

CITY OF TUCSON GUIDELINES FOR DEVELOPERS AND BUILDERS: THE IMPACT SYSTEM (Integrated Method of Performance and Cost Tracking)

The IMPACT System is a means of organizing resource efficiency goals and stakeholder cooperation for sustainable community development and for measuring progress toward those goals over time. It is intended to be a cyclical process that:

- Is grounded on metropolitan Tucson baseline conditions that are normally documented and periodically updated by community organizations.
- Is responsive to community policy priorities that will change over time.
- Uses performance targets and specific requirements that exceed baseline conditions without detrimental cost penalties.
- Uses collaboration among stakeholders to reach common goals.
- Measures development performance and costs to evaluate target achievement.
- Enables revisions as baseline conditions improve, and as new targets become technically and economically feasible.

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While the initial responsibility for meeting the IMPACT System Standards will lie with the Community of Civano, the responsibility for administering the IMPACT System over time will lie principally with the Civano Community Association (CCA). The CCA is the non-profit corporation to be created pursuant to the Civano Covenants, Conditions, and Restrictions (CC&Rs) for purposes of administering the CC&Rs, as described in the State Land Department Master Development Plan. The CCA membership will include all owners of Civano property.

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The IMPACT System clarifies the Rezoning Conditions established in City of Tucson Zoning Ordinance 7697, and will guide the City's review of subdivision and development plans and initial building permit applications.

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The City of Tucson is committed to achieving the original performance targets for Civano over time and does not intend to accept lower performance levels in the initial Memoranda of Understanding.

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The IMPACT System established baseline standards and "Performance Targets and Specific Requirements" to achieve the conservation and sustainability goals. These Performance Targets and Specific Requirements are collectively referred to as the "IMPACT System Standards."

The City subsequently entered into the Civano Development Agreement ("Development Agreement") with the Community of Civano, which reaffirmed the goals and principles of Civano and provided the framework for cooperation between the City and the Community of Civano in the development of Civano. The Development Agreement requires both parties to negotiate a Memorandum of Understanding that addresses the implementation and monitoring aspects of the IMPACT System Standards that underpin the Development Agreement. The implementation and monitoring responsibilities described in this Memorandum of Understanding update, clarify and supplement those in the original IMPACT System.

After purchasing the Civano property, the Community of Civano prepared a specific plan for the development of the first neighborhood of Civano (the "Specific Plan"). The Specific Plan was adopted by the Mayor and Council to further guide the initial development. The Specific Plan, along with the Development Agreement, the rezoning conditions and State Land Patent conditions, provide the framework for developing Civano as a leading sustainable development.

The parties recognize that implementation of the IMPACT System Standards and achievement of the Civano Performance Targets will require a multifaceted approach. While some of the Performance Targets are appropriately addressed by compliance with Specific Requirements for planning, development and construction phases. Other Performance Targets are necessarily dependant upon the actions and conduct of future residents of Civano and must be assessed over time. Initially implementation of the Specific Requirements will involve the review and certification of compliance by the City and by the Community of Civano.

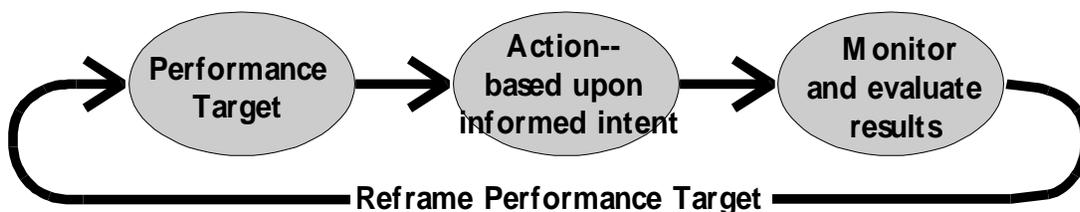
As Civano develops it is anticipated that the parties will have additional information from advances in technology and the monitoring of the implementation of the IMPACT System which may affect future implementation strategies, requirements and methodologies. It is also anticipated that as Civano develops, the residents will begin to actively participate in the shaping and implementation of the Performance Targets and IMPACT System through their actions and through the Civano Community Association ("CCA").

3.0 OUTLINE OF PROCESS

3.1 Sustainable Development as a Process

The term "sustainable development" has been defined as "a process of change in which the use of resources, the direction of investment, the orientation of technological development, and institutional change all enhance potential to meet human needs both today and tomorrow."¹

Conceptually, the IMPACT System Standards are the measuring sticks on which all actions are based and by which performance will be measured. In addition to meeting Specific Requirements and moving toward achievement of all the established Performance Targets, performance must include success in the marketplace. It is understood that the success of Civano will require the good faith commitment and diligent actions by all parties concerned. This approach requires an integrated, flexible response to meet the mandated targets and requirements. This process will be supported and documented by continued monitoring and evaluation of its effectiveness.



3.2 Relationship of Plan Review to Monitoring and Evaluation

The underlying principle, as outlined above, is that compliance with the performance targets as described herein will be demonstrated by the construction and subsequent use of site improvements and the development of related programs. Buildings, site improvements, and related programs will be designed to meet or exceed the IMPACT Systems Standards. The Community of Civano and individual builders cannot be sanctioned, however, if actual performance does not meet standards where the personal behavior of occupants affects how buildings function. Plan review will insure that, in accordance with Section 7, initial development and construction meets Specific Requirements applicable at that stage. Subsequent monitoring of performance in accordance with this Memorandum of Understanding will provide the basis for determining the success in meeting the IMPACT System Standards as well as the basis for improving future conservation and sustainability strategies and standards.

3.3 Impact System Evaluation Committee Established

An IMPACT System Evaluation Committee (the "Civano IMPACT Committee") is hereby established to include a minimum of one representative of the Civano principals selected by the Community of Civano; one representative designated by the City Manager and one CCA representative selected by the CCA. Commencing January 1, 1999, the Civano IMPACT Committee will meet at least every six months to review the IMPACT System Monitoring Reports to track progress and compliance with the IMPACT System Standards, identify issues of concern, and seek solutions to problems encountered, all in a manner consistent with the success of the Civano Development.

The parties shall further seek the cooperation of the University of Arizona, the State of Arizona Department of Commerce, Energy Office, Tucson Electric Power, other utility companies, energy providers, environmental experts, environmental engineers and similar independent agencies for the monitoring, evaluation and proposed revisions of the baselines and IMPACT System Standards, status of Civano compliance to date and strategies for improved implementation of the IMPACT System.

3.4 The IMPACT System Monitoring Report

The IMPACT System Monitoring Report ("Monitoring Report") shall be a public status report prepared by the CCA and the Community of Civano documenting the success of Civano in achieving the IMPACT System Standards, supplemented with related information from the City and publicly available information concerning the resource conservation baselines and Performance Targets. The Monitoring Reports will initially be submitted to the City at the end of each calendar quarter commencing December 31, 1998 and continuing through December 31, 2000, and shall be submitted thereafter on an annual basis or such periods as may be agreed upon by the parties.

Following is a format for the Monitoring Report which includes not only progress toward meeting the Performance Targets, but also is designed to provide information

for public policy changes which would support greater resource conservation and sustainable development. The Monitoring Report will also provide general public information relative to the Civano community development process and progress. It shall include the following information with supporting data submitted by the Community of Civano:

3.4.1 Overall goals, objectives and strategies, including builder and buyer education for resource conservation practices consistent with the IMPACT System Standards.

3.4.2 Site layout, showing the built development to date, in relation to the overall plans for development.

3.4.3 Description of anticipated near-term projects.

3.4.4 Projected timetables and milestones for completion of anticipated projects.

3.4.5 Status of building and occupancy relative to parking (Parking Inventory and Monitoring Program), pedestrian ways, and landscaping (conceptual planning framework).

3.4.6 Progress to date, and recommended strategies, toward meeting baseline IMPACT System Standards in the following areas:

- reducing fossil-fuel energy use from gas, electricity and gasoline;
- developing solar energy resources;
- reducing potable water usage;
- reducing building wastes;
- reducing solid wastes;
- reducing auto travel and resultant air pollution;
- creating a balance of jobs and housing;
- creating affordable housing, meeting needs of on-site working population; and
- demonstrating the economic feasibility of resource conservation and sustainable development as a model for growth in Civano.

3.4.7 Resulting linkages to central and inner city redevelopment.

The City will provide supplemental information to be attached to the Monitoring Report which includes a status report on progress toward meeting the City's strategies and responsibilities enumerated in this Memorandum of Understanding.

The form of the Monitoring Report will be written, with appropriate graphics, for wide distribution.

3.5 Periodic Review

Commencing two (2) months after the initial Monitoring Report and continuing every year thereafter during the life of the Development Agreement as it may be amended or extended, the City and the Civano IMPACT Committee shall consider whether any amendments to this Memorandum of Understanding are necessary to achieve the maximum practical compliance with the IMPACT System Standards. This shall include review of the baselines established in the IMPACT System, the methods of monitoring and establishing compliance, the strategies and Specific Requirements which are appropriate to achieve compliance, the integration of new technology and other matters which are appropriate to maintaining the role of Civano as a leading demonstration of resource conservation and sustainability. Where it is determined that an amendment to this Memorandum of Understanding is appropriate, the parties shall proceed in accordance with Section 8 herein.

4.0 JOINT CITY AND COMMUNITY OF CIVANO STRATEGIES AND RESPONSIBILITIES

4.1 Description of Joint Strategies and Responsibilities

In recognition of the need for cooperation in achieving the goals described in the IMPACT System, as may be revised from time to time, and this Memorandum of Understanding, the City and the Community of Civano understand that the following strategies and responsibilities are important to the success of Civano as a sustainable community:

4.1.1 Building plans, development plans, specific plans and similar requests will be prepared, submitted and reviewed in a timely and complete manner.

4.1.2 The Tucson-Pima County Sustainable Energy Standard will be reviewed and considered by the City for application to other development in the City.

4.1.3 The parties will explore with the Arizona Department of Commerce, Energy Office and other appropriate agencies, the initiation of programs to further encourage, develop, use, and monitor the beneficial applications of solar energy.

4.1.4 Grant funding should be pursued to undertake studies and analysis of the role of landscaping and coloration in building and paving cooling strategies.

4.1.5 Street standards will be reviewed to determine the appropriate methods to significantly reduce the "urban heat island" effect, including the effect of reducing paved surfaces, integrating landscaping for shading of pedestrian, bicycle and automobile parking areas, and allowing alternative, less heat-absorbing paved surfaces in a manner consistent with public safety and handicapped accessibility requirements.

4.1.6 The parties will cooperate on demonstration projects involving the private and public uses of developing technology; e.g., solar photovoltaic powering of residential homes and of on-site municipal streetlights or pumps, including pursuing grants and other funding for renewable technology demonstration projects.

4.1.7 The parties will explore the installation of filtration systems for reclaimed water to meet ADEQ standards for full body contact and to permit use of reclaimed water for vegetables to be consumed raw. The parties shall further explore obtaining the adoption of any necessary revisions to existing standards to permit these uses.

4.1.8 The parties will cooperate to designate and provide garbage and recycling pick-up to all uses, including multifamily and commercial, in conformance with City plans and designs incorporated in the Specific Plan and development plans.

4.1.9 The City will consider the designation of the proposed Civano recycling center as a "neighborhood recycling center" within the City's overall program.

4.1.10 The parties will explore the use of Civano as a pilot site for demonstrating new programs and advanced recycling and composting techniques.

4.1.11 The parties will cooperate to formulate an overall solid waste plan for Civano particularly as it relates to waste reduction and diversion goals.

4.1.12 The parties will cooperate to develop a transit plan for Civano and the surrounding area, including exploring with the State of Arizona Department of Transportation, the City's Department of Transportation and other affected property owners, a transportation corridor plan for Houghton Road.

4.1.13 The parties will cooperate with the Greater Tucson Economic Council and other agencies to actively recruit employers for location in Civano.

4.1.14 The City will consider land-use designations in the vicinity of Civano that incorporate mixed uses, complement Civano, and encourage sustainable development.

4.1.15 The parties will explore programs to provide assistance to developers/builders who participate in low and moderate-income housing programs.

4.1.16 The parties will explore the application of the landscape and xeriscape requirements set forth in the City's Land Use Code, Art. III, Div. 7 (originally adopted as Ordinance 7687) to all uses in Civano and to all lot areas consistent with the goals of the Civano Master Development Plan and will further explore the integration of personal and community gardens, orchards and food producing landscaping into these requirements.

4.1.17 The parties will cooperate to develop a plan for the Pantano Riverpark which integrates adjacent planned open space and recreation areas in Civano.

4.1.18 The parties will cooperate to develop standards which more effectively utilize natural drainage areas and private open space areas for water harvesting and retention, in order to encourage native plant growth, recharge aquifers and reduce the magnitude of flood flows and erosion hazards.

4.1.19 The parties will cooperate in a manner consistent with the IMPACT System and the Development Agreement to achieve the goals of this Memorandum of Understanding.

5.0 SPECIFIC PROCEDURES FOR IMPLEMENTATION

5.1 Developer Requirements Prior to Issuance of Residential Building Permits

Prior to the issuance of any residential building permits, except for proposed model homes for Neighborhood One, Phase One development and permits for the Neighborhood Center in Neighborhood One, the Community of Civano shall submit to the City evidence that the CCA has been established and that the following provisions have been adopted pursuant to the provisions of the Covenants, Conditions and Restrictions which have been recorded and which apply to the development.

5.1.1 The CCA shall adopt Development Design Guidelines enforceable by the CCA by July 31, 1998. The Design Guidelines shall assure that provisions are made to meet the IMPACT System Standards.

5.1.2 A Certification Committee shall be formed, and will be a formal part of the Design Review Committee, which is defined and designated in the Covenants, Conditions and Restrictions applicable to Civano and the Design Guidelines. The Certification Committee shall include a Design Review Committee representative, a licensed architect, or a licensed engineer, and a CCA representative.

5.1.3 Establish exterior water budgets, monitor water consumption, and develop a contingency program to achieve compliance with the budgets if water conservation targets are not met, which utilize City-provided reclaimed water in landscaping for individual residential properties not to exceed 28 gallons per capita per day.

5.1.4 Establish provisions for utilizing non-potable water for all outdoor irrigation systems and for utilizing efficient and effective, non-pooling drip irrigation systems for all landscaping. This provision shall not require the use of reclaimed water in gardens for the production of raw vegetables for human consumption unless such use is approved by the State of Arizona.

5.1.5 Establish interior water budgets, monitor water consumption and develop a contingency program to advance compliance with the budgets if water consumption targets are not met, for each building and design the plumbing systems accordingly that will reduce the interior use of water in residential structures to 53 gallons per person per day and to 15 gallons per person per day in non-residential structures. The guidelines shall specify the manner in which water use has been calculated and the principal measures to be taken to meet these budgets.

5.1.6 The CCA shall adopt and enforce procedures for the review and approval of building plans and energy analyses which demonstrate compliance with the Building Energy Demand reduction required by the IMPACT System. Compliance with the Sustainable Energy Standard, attached as Exhibit 1, as it may be amended with the consent of the parties, which shall not be unreasonably withheld, shall establish compliance with the IMPACT System without further documentation or analysis.

5.2 Area Planning, Subdivision and Specific Plan Review

Certain requirements apply to development in a broader context than the specifications for a single structure or lot or a specific point in time. These must be reviewed with consideration for the progress in existing development as well as the prospective development as set forth in the Civano Master Development Plan. City development decisions on the Civano project, which will be viewed in this broader context, are rezonings and specific plans, subdivision plats, development plans, and amendments thereto, not including plans applicable to a single family lot. Interpretation of compliance with these requirements shall be analyzed in the same manner in which the Tucson General Plan, existing area plans and neighborhood plans are applied to prospective development. Any dispute regarding these interpretations may be resolved pursuant to Section 5.4.

General planning areas, not including plans applicable to a single family residential lot, such as development plans, subdivision plats, rezonings and specific plans shall be designed to meet the following IMPACT System Standards, as applicable for the scale of the project, in addition to all other applicable code requirements. The City shall review all such plans in accordance with Section 7. Compliance shall be consistent with the Civano Master Development Plan and may take into account future development as provided for in the Civano Master Development Plan. Monitoring Reports that document compliance with the IMPACT System shall be prima facie evidence of prior compliance. Any dispute regarding these interpretations may be resolved pursuant to Section 5.4.

5.2.1 Streets and lots are to be designed so that all structures can be oriented to optimize solar exposure and permit the incorporation of some beneficial application of solar energy use in every lot.

5.2.2 Land may be designated and set aside by the Community of Civano for the design and construction of demonstration projects, as more fully described in Section 6.0, which are compatible with the technologies being offered by Civano.

5.2.3 Site design and grading plans shall limit site clearance on residential lots to preserve existing desert vegetation and maximize natural drainage in a manner consistent with the grading plans approved with the Civano Master Development Plan and any approved Specific Plan. The exact requirement for preservation of existing desert vegetation shall be determined after completion of drainage and engineering studies.

5.2.4 Location of a community pool to be constructed early in the development of each phase or neighborhood (as those terms are used in the Master Development Plan) by the Community of Civano and/or individual builders in an attempt to discourage construction of private pools.

5.2.5 Inclusion of commercial services and other mixed uses with residential developments, consistent with the adopted Master Development Plan and subsequently-adopted Specific Plans, to provide access from residences to commercial or employment areas by walking, bicycling or similar alternatives to automobile use.

5.2.6 Provision of a central location for access to city bus routes or alternative transit shuttle services, consistent with the adopted Master Development Plan and subsequently adopted specific plans. Consideration of the extension of bus routes to Civano during the development of each Phase or Neighborhood or, as one of several possible alternatives, a shuttle service to the nearest Sun Tran express route and/or park and ride lot sponsored by the Community of Civano.

5.2.7 Provision of a pedestrian and bicycle-built environment, which is consistent with the requirements to provide access to disabled persons. Each development phase will provide for a majority of through streets (versus cul-de-sacs), construction of a system of sidewalks or bike or multi-purpose paths and nonresidential uses which have orientation access and emphasis on pedestrian /bicycle linkages rather than auto linkages.

5.2.8 Provide for recyclable materials pick-up areas consistent with requirements of the City Solid Waste Department.

5.2.9 Provision of a minimum of 300 square feet of non-residential floor area for every two dwelling units constructed. This requirement may be determined by the total development of the Civano provided that the proposed plan does not

substantially reduce the total ratio below the minimum requirement. Credit shall be given to dedicated home office space in residential buildings.

5.2.10 Design of telecommunications capacity to enable the expansion of fiber optics or similar infrastructure to all commercial and home office locations. This may be met by providing conduit capability during construction.

5.2.11 Identification of the provision for 20% of the dwellings to meet the goal for affordable housing as defined in the IMPACT System Standards to the extent that assistance is available from public agencies, foundations, and other sources to finance and construct affordable housing. The construction of affordable housing shall be reasonably uniform throughout the development of Civano. The Civano development as a whole shall approximately conform with the 20% requirement at the time 625 residential dwelling units have been constructed, at the time 1,250 dwelling units have been constructed, at the time 1,875 dwelling units have been constructed, at the time 2,500 dwelling units have been constructed and at full buildout of Civano.

5.2.12 Extension by Community of Civano of reclaimed water lines to all lots. Exposed hose bibs for reclaimed water shall be discouraged and if used shall be clearly identified prior to sale of the property.

5.2.13 Functioning systems using reclaimed water, graywater or rainwater harvesting shall be provided for all landscape irrigation except that:

5.2.13.1 the limited use of potable water for personal and community gardens producing vegetables to be consumed raw will be allowed within the overall landscape design until it is determined that such use of non-potable water is safe.

5.2.13.2 potable water may be used for temporary and periodic flushing of the reclaimed system if necessary to assure efficient operation of irrigation systems, upon notification to and consent by the City, which consent shall not be unreasonably withheld.

5.2.14 All landscaping which is required by Specific Plan 6A for public streets adjacent to residential properties shall be limited to drought tolerant plants as established by City Development.

5.3 Building Plan Requirements and Review

All plan submittals for building permits shall be determined in accordance with Section 7 to meet the following requirements in addition to all other applicable codes.

5.3.1 All building permit applications shall be certified in accordance with Section 7.0 as complying with the following:

5.3.1.1 Residential building plans shall provide a certification that the plans as submitted provide for a total energy use through the building shell, heating and cooling systems ("building energy use") of at least a 65% reduction for each dwelling from the 1990 Metropolitan Energy Commission annual energy use baseline commencing at the time of initial residential occupancy. The certification shall be in the form attached hereto as Exhibit 2.

5.3.1.2 Non-residential building permits shall provide a certification that the plans as submitted provide for a total energy use through the building shell, heating and cooling systems ("building energy use") of at least a 55% reduction for each structure from the annual energy use by a comparable non-residential structure in 1990 as established by the Metropolitan Energy Commission. The certification shall identify the 1990 level used, the method of determining that level and the source material documenting that level. The energy conservation shall commence at the time of initial occupancy. The certification shall be in the form attached hereto as Exhibit 2.

5.3.1.3 Building plans shall identify the manner in which the proposed structures will be designed to optimize solar orientation for passive heating and cooling purposes, consistent with Civano's goals.

5.3.1.4 Plans shall incorporate some beneficial use of solar energy to reduce the energy demands from heating, cooling and interior water heating. Solar devices such as currently found in A.R.S. § 44-1761 shall qualify as beneficial uses of solar energy will satisfy this requirement.

5.3.1.5 Landscape and hardscape coloration and/or vegetation shall be used to reduce the microclimate temperature adjacent to the structures. The average reflectivity of all major landscape and hardscape surfaces must be 0.5 or greater on the albedo scale or result in equivalent energy savings.

5.3.1.6 Plans shall identify procedures for preserving construction materials for recycling during construction and for the use of recycled construction materials in construction.

5.3.2 Structural calculations demonstrating that the roof will support solar photovoltaic, solar thermal power generation and solar water heating systems of sufficient size for the potential uses of the building.

5.3.3 Location and installation of plumbing stubouts for solar hot water heaters shall be required and shown on all residential and commercial buildings.

5.3.4 Two water supply systems shall be shown: one for potable water and one for reclaimed water for landscaping or similar external uses. Provisions may be made for

rainwater harvesting and/or graywater use for landscaping in conformance with existing codes.

5.3.5 Non-residential space conditioning system cooling towers rated at one hundred tons or more of cooling capacity shall comply with ADWR water conservation requirements.

5.3.6 Solar thermal water heaters or other devices or technologies which achieve equivalent energy savings in the heating of hot water shall be included on all model homes for demonstration purposes and as options on all other homes.

5.3.7 Plans shall provide for built-in recyclable separation features and storage of hazardous materials.

5.3.8 Provision of electric cart charging facilities, which may include designated electrical outlets which are accessible for electric cart charging.

5.4 Expedited Review of Interpretations

The City will establish a review committee for the resolution of all interpretive or technical disputes in accordance with Section 6.2.1 of the Development Agreement (the "Interpretive Review Committee"). The Community of Civano or the City may submit any matter to this Interpretive Review Committee for a determination as to whether the matter is one of interpretation or whether there exists an established requirement which is subject to an established administrative appeal procedure. Where the matter is one of interpretation, the Interpretive Review Committee shall determine the interpretation to be applied. The Interpretive Review Committee shall consist of the Director of Special Projects for the City, a designee of the City Attorney's office and a designee of the director of the department or departments which is/are responsible for the review and/or enforcement of the matter being submitted. The Interpretive Review Committee shall reach a decision on the matter or shall state the reason why a decision cannot be made within five working days of the submission. The Community of Civano may appeal (a) any such decision or (b) the Interpretive Review Committee's failure to reach a decision within five working days to the City Manager pursuant to Section 6 of the Development Agreement. The Community of Civano agrees to comply with any decision that is not appealed to the City Manager within five working days of the decision.

6.0 DEMONSTRATION PROJECTS

The parties recognize that development of innovative designs and technologies for resource conservation and use of solar energy are important goals of Civano. In order to encourage such innovation, the Community of Civano may set aside a limited number of residential or commercial lots for construction of demonstration buildings. Such buildings shall not be subject to the requirements of Sections 5.2 and 5.3 at the time of initial planning or permit review but shall provide descriptions of the manner

in which these requirements will be met. Such designated structures shall be reviewed after one year for compliance with the resource conservation requirements of the IMPACT System. The buildings shall not be sold or otherwise conveyed to private parties other than the Community of Civano, unless such buildings are certified as set forth in section 7 to comply with the resource conservation requirements of the IMPACT System Standards and the requirements of Section 5.3. Such demonstration buildings may be leased or otherwise occupied without certification of compliance. If in compliance with the requirements of Section 5.3, the demonstration projects may be marketed to private parties. The Community of Civano shall provide a notice that a building was constructed pursuant to this section to any prospective user or purchaser prior to the use, lease or sale of the structure to the public.

7.0 CERTIFICATION OF COMPLIANCE

The parties recognize that the IMPACT System includes both Performance Targets to be reached over time, as provided in Sections 3 and 4, and specific resource conservation requirements, as provided in Section 5, which establish minimum thresholds for performance and which are to be met commencing with the initial development of Civano in order to establish progress toward achieving the Performance Targets. The Community of Civano agrees to establish this compliance through the Monitoring Report and compliance with Specific Requirements as set forth below.

7.1 During the initial development of Phase One of Civano, and thereafter during the development of Civano until changed by mutual agreement of the parties, the Community of Civano shall provide to the City a certification based upon information provided to it by a professional chosen by the Community of Civano that the plans subject to the certification are in compliance with the conservation requirements set forth in Section 5.3.1. The form of the certification is attached as Exhibit A and made part of this MOU.

7.1.1 The City may audit any such certification and may request in writing supporting documentation from the Community of Civano . The Community of Civano shall provide such documentation within fifteen (15) days of receipt of the notice. If it is determined by the City based upon such an audit that the conservation requirements of Section 5.3.1 have not been met for one or more buildings, the City shall notify the Community of Civano and the applicant submitting the building plan(s) in writing of the specific matters which are not in compliance, the "Noncompliance Notice".

7.1.2 The Community of Civano shall have thirty (30) days from the date of the notice, unless the time is extended in writing by the City, to either cure the noncompliance or to submit a plan to correct the noncompliance, the "Cure Statement", which is acceptable to the City. The City shall have fifteen (15) days from receipt of the Cure Statement to either accept or reject the Cure Statement as

submitted or to request further information or actions. The parties may thereafter continue to seek a mutual resolution of the problem.

7.1.3 If the City rejects the cure as proposed by the Community of Civano pursuant to section 7.1.2, the Community of Civano may submit to the City a supplemental plan for curing the non-compliance, the "Supplemental Compliance Plan". If a Supplemental Compliance Plan is submitted, no further action shall be taken regarding the non-compliance for at least forty-five (45) days. By submitting the Supplemental Compliance Plan, the Community of Civano agrees that all requests for permits which contain a substantially similar non-compliance problem will be put on hold pending final resolution of the issue.

7.1.4 If the City and the Community of Civano are unable to resolve differences regarding the Noncompliance Notice and the Cure Statement within sixty (60) days of the date of the Noncompliance Notice, or differences regarding the Supplemental Compliance Plan within forty-five (45) days of the submittal of the Plan, the matter may be submitted by the City or by the Community of Civano to the City Manager for final resolution.

7.1.5 A City audit of a plan shall not delay the processing or approval of the plan.

7.1.6 Upon issuance of the Noncompliance Notice, the City may delay issuance of permits for the plan subject to the notice and all other plans which contain the same potential noncompliance problem until the question of compliance with the requirements of Section 5.3.1 is resolved. The City shall include notice that issuance of permits will be delayed in the Noncompliance Notice.

7.1.7 If the parties agree that a plan is not in compliance pursuant to sections 7.1.1 and 7.1.2 or the City Manager determines that the plan is not in compliance pursuant to section 7.1.3, the City may deny the issuance of permits to the proposed structure and any other structures which would not be in compliance for the same reason. In determining whether to deny the issuance of permits the City shall consider the materiality of the noncompliance, the Community of Civano's ability to correct the problem with respect to future buildings, the number of building which would not be in compliance if permits were issued, the cost of curing the noncompliance in the proposed plan and the financial cost to the builder or developer which would result from any denial of permits.

7.1.8 If the City determines that the certification pursuant to section 7.1 has resulted in a material noncompliance with the requirements of section 5.3.1, the City may require that future review and approval of compliance with one or more of the requirements in Section 5.3.1 shall be determined by the City Development Services Department rather than by the Community of Civano.

7.2 During the initial development of a Phase or Neighborhood of Civano, and thereafter during the development of Civano until changed by mutual agreement of

the parties, the City Development Services Department shall, pursuant to its standard procedures including the availability of independent third party review as provided in the 1994 Uniform Administrative Code, Section 103, where appropriate, determine compliance with all Specific Requirements set forth in Sections 5.2 and 5.3 other than the requirements of Section 5.3.1, subject to review by the Interpretive Review Committee and appeal to the City Manager as provided in Section 5.4 of this Memorandum of Understanding and Section 6.2.1 of the Development Agreement.

7.3 The parties recognize that the goal of Civano is to integrate energy and resource conservation principles, standards and technologies into the standard practices and procedures of the City. Thus the parties anticipate that as experience is gained over time with the implementation of the IMPACT System, the parties will be able to develop less burdensome compliance review procedures without any reduction in the progress toward achieving the Performance Targets.

8.0 AMENDMENT

The parties may periodically review this Memorandum of Understanding to ensure that it continues to promote the energy and resource conservation and sustainable development goals of Civano and may amend this Memorandum of Understanding by mutual agreement or as set forth herein to achieve the Performance Targets and Specific Requirements of the IMPACT System Standards and to meet changing circumstances as Civano development proceeds.

If, on the basis of the Monitoring Reports, the analysis and recommendations of the Civano IMPACT Committee, or independent information which has been reviewed by the Civano IMPACT Committee, either party determines that development is not progressing toward full compliance with the IMPACT System Standards in a satisfactory manner, it may notify the other party in writing of its intent to amend this Memorandum of Understanding and/or the IMPACT System. The City of Tucson shall provide a copy of the notice to the Arizona State Department of Commerce, Energy Office. The parties shall then negotiate in good faith to establish appropriate amendments to ensure compliance with the goals and requirements of the IMPACT System. Any amendment shall consider the economic impact of the proposed requirement upon the development of Civano and the investment of public funds and grants in this development. If the parties are unable to mutually agree upon amendments within sixty (60) days, they shall discuss any issues with the City Manager, and the City Manager may, as provided in Section 6.2.2 of the Development Agreement, resolve such issues and impose amendments which he deems reasonably necessary to achieve the goals of the IMPACT System.

Any amendment to this Memorandum of Understanding shall not apply to any application for development approval, including specific plans and rezonings, subdivision plats, development plans and building permits, that has already been submitted for review to the City prior to the notice of the intent to amend this Memorandum of Understanding, unless such development approval expires pursuant to

existing code provisions. The parties shall provide notice of any amendment to the Arizona Department of Commerce, Energy Office. Any such amendment shall be in writing. Amendments to the IMPACT System Standards shall be approved by the Mayor and Council.

Any application by Civano for a change of the Civano Master Development Plan, the rezoning conditions or the conditions of any adopted specific plan which are adopted by the Mayor and Council subsequent to the signing of this Memorandum of Understanding shall supercede any requirement herein.

9.0 REMEDIES

The IMPACT System Monitoring Report, Periodic Evaluation and Specific Procedures for Implementation set forth in Sections 3.2, 3.3 and 5 above shall be the only portion of the Memorandum of Understanding which shall be subject to the remedies provided in Section 9.10 of the Civano Development Agreement as amended. In addition to these remedies, the City shall not be required to issue any building permit which does not conform to City codes, existing and future specific plans and zoning and the requirements which are included in Section 5, Specific Procedures for Implementation, as set forth herein or as amended or revised pursuant to Section 8.

10.0 NON-WAIVER OF COMPLIANCE

Except as may be expressly agreed in writing, any decision by the City approving further development without complete compliance with all requirements and targets shall not constitute a waiver of any future application of requirements or Performance Targets as set forth in this Memorandum of Understanding or in the IMPACT System Standards.

Signed this ____ day of _____, 1998.

Kevin M. Kelly
Authorized Representative
The Community of Civano, LLC

David Case
Case Development Enterprises Corporation
City of Tucson

Luis G. Gutierrez
City Manager

4/22/98

The following modifications to the CABO Model Energy Code, 1995 Edition are deemed to be a sustainable standard:

(Editorial Note: This Energy Standard was reviewed by the Tucson/Pima County Building Code Committee and is regionally specify to the Tucson Metro area.)

Material to be added is shown in *italics*. Material to be deleted is shown as ~~strikeout~~.

CHAPTER 1 ADMINISTRATION AND ENFORCEMENT

Section 101.4 Scope. Add a paragraph to read:

The calculated Target annual energy consumption of the building shell and mechanical system and domestic hot water heating shall be less than the energy required by the present Tucson/Pima County Model Energy Code by 50 percent.

Section 102.1.3 add to first paragraph: *, and there shall be a verification of proper installation before drywall installation and the completion of the "Insulation Installation Warranty" and signature` by a representative of the developer and builder.*

Section 102.2 Maintenance Information: Delete the first two sentences.

Section 102.3 Change the first sentence to read: *Whole-window assembly U-factor, solar heat gain coefficient, visible light transmittance and air leakage values of fenestration products ...*

Table 102.3a Add the following notes at the end of the table:

The minimum design characteristics to qualify as a Thermal Break are:

a. The material used as the thermal break must have a thermal conductivity of not more than 3.6 Btu/inch/hr/sq. ft./F, and;

b. The thermal break must produce a gap not less than 0.210 inches, and;

c. All metal members of the product exposed to interior and exterior air must incorporate a thermal break meeting the criteria in (a) and (b) above.

In addition, the product must be clearly labeled by the manufacturer that it qualifies as a thermally broken product. Non-metal products may include metal fasteners, hardware, and door thresholds.

For all dual glazed products, adjust the listed U-values as follows:

a. Subtract 0.05 for spacers 7/16" or wider.

b. Add 0.05 for products with dividers between panes if the spacer is less than 7/16" wide.

c. Add 0.05 to any product with true divided lites (dividers through the panes).

Section 102.4 Equipment. Add a new subsection to read:

102.4 Equipment. Residential buildings constructed under the provisions of this standard shall be permitted to use refrigerated air conditioning systems selected under the guidelines of the Air Conditioning Contractors of America (ACCA) Manual J Procedures, Specifically Sections 7-27, 7-28 and 7-29 at outside conditions of 105 degrees F. and inside conditions of 75 degrees F. Other provisions of this standard notwithstanding, air conditioning equipment shall have a minimum SEER of 12 or a minimum EER of 10.

Evaporative cooling is encouraged for cooling or to reduce air conditioning requirements but may not be used as the method of compliance to this standard except for commercial buildings that use evaporative cooling as an economizer cycle on a refrigeration or air conditioning application. Duct leakage through the evaporative device must be minimized during air conditioning and heating modes of operation. Separate duct systems or whole house ductless ventilation is recommended.

Examples of water heating systems demonstrating compliance are listed here:

- *Solar water heaters.*
- *Instant gas water heaters with electronic ignition.*
- *Heat pump electric water heaters.*
- *Heat recovery water heaters from air conditioning or other sources.*
- *Gas water heaters exceeding 90% efficiency (condensing types) .*

Commercial buildings or domestic water heating systems which serve only hand sinks, a single mop sink or other applications which have low hot water demands on an annual basis may use any of the following:

- *Instant electric water heaters.*
- *Point of use electric water heaters.*
- *Storage tank electric water heaters not exceeding 20 gallons in volume.*

Section 104.1 General: Delete parenthesis around last sentence, delete the Footnote. Add a sentence after the exception to read:

Plans and specifications shall show the method of utilizing "beneficial use of solar energy".

CHAPTER 2 DEFINITIONS

Section 201 Definitions: Revise as follows:

201.1 Application of Terms. Conditioned Floor Area:

Delete the words "The horizontal projection of", and capitalize the new first word "That".

201.1 Application of Terms. Positive Cooling Supply:

Insert *including evaporative cooling systems*, between "cooling" and "deliberately"

Add a new subsection:

201.1 Application of Terms. Civano: A Tucson Solar Village, a model sustainable community; a vision of the future where resource consumption is reduced through more efficient technologies, use of solar energy and lifestyles which promote greater harmony and balance with the natural environment; a community in the spirit of the "Civano" period, a golden era of the Hohokam culture which balanced natural resources and human needs; incorporates and demonstrates strategies for achieving more sustainable development.

201.1 Application of Terms. Sustainable Development: "Development that meets the needs of the present without compromising the ability of future generations to meet their needs." (UN World Commission on the Environment and Development)

201.1 Application of Terms. Beneficial Use of Solar Energy: The following devices/methods may be used to demonstrate compliance:

- *Solar thermal or solar electric space heating systems.*
- *Trombe wall or clear view collectors for space heating.*
- *Solar Photovoltaic systems.*
- *Solar thermal/electric power generating systems, including stand-alone and grid connected parabolic trough and dish Stirling.*
- *Solar daylighting systems specifically designed to capture and redirect visible solar energy while controlling infrared energy (conventional skylights are specifically excluded) for at least one half of the non-bedroom space.*
- *Passive building heating for the winter through the use of optimum window shade structures and orientation.*
- *Solar water systems for domestic water heating or space heating.*
- *Solar pool or spa water heating.*
- *Solar oven that is built into the structure.*
- *Solar food dehydrator that is built into the structure.*
- *Solar water distiller attached to building.*

201.1 Application of Terms. Power Density: The total connected power load of all components of a building system, including all auxiliary components and circuitry, without regard to the timing, scheduling, or control of their operation, in w/ft² or Btuh/ft².

201.1 Application of Terms. Site Energy: Energy, other than recovered energy, utilized for any purpose on the site.

Source energy consumption shall be determined by multiplying the site energy usage in kBtuh per square foot by the following factors:

<i>{PRIVATE }Site Energy</i>	<i>Factor</i>
<i>Electric</i>	<i>3.10</i>
<i>Gas</i>	<i>1.11</i>
<i>Wood</i>	<i>1.00</i>
<i>Solar (amount of displaced electric or gas)</i>	<i>0.00</i>

201.1 Application of Terms. SOLAR ENERGY SOURCE. Revise to read:
SOLAR ENERGY SOURCE. Natural daylighting or thermal, chemical or electrical energy derived directly from conversion of incident solar radiation.

201.1 Application of Terms. Water-chilling Package of Absorption Revise to read:
Water-chilling package, absorption.

CHAPTER 3 DESIGN CONDITIONS

Table 302.1 Exterior design conditions: Revise the table as follows:

Table 302.1
Exterior Design Conditions³

WINTER	DESIGN DRY BULB TEMP.	30 F
SUMMER	DESIGN DRY BULB TEMP.	104 F
	DESIGN WET BULB TEMP.	66 F
DEGREE DAYS HEATING		7000
DEGREES NORTH LATITUDE		32

³ *This table is not intended to be used for the purpose of system or equipment sizing.*

Add a new section to read:

SECTION 304

WOOD-BURNING STOVES AND FIREPLACES

304.1 General. A wood-burning stove or fireplace shall be considered as providing the required space heating energy only when installed as backup energy for a solar-thermal collection system.

304.2 Wood-burning stoves. Wood-burning stoves shall be labeled to show compliance with the following U. S. Environmental Protection Agency (EPA) standards for particulate emissions during operation:

Stoves with catalytic elements 4.1 grams per hour
Stoves without catalytic elements 7.5 grams per hour
Catalytic stoves shall have an accessible, modular, replaceable catalyst element.

304.3 Fireplaces. Wood-burning fireplaces shall produce useful heat and be provided with a means of supplying 100% of the combustion air for operation from the outside, and shall limit particulate emissions to less than 7.5 grams per hour. All fireplaces shall be provided with a tight fitting glass door and a positive means of circulating the heated air in the occupied space.

Direct vent gas fireplaces shall have a minimum of 70% overall efficiency.

CHAPTER 4
 RESIDENTIAL BUILDING DESIGN BY SYSTEMS ANALYSIS
 AND DESIGN OF BUILDINGS UTILIZING
 RENEWABLE ENERGY SOURCES

Section 402.1 Energy Analysis. Change the first paragraph to read:

402.1 Energy Analysis. Compliance with this chapter will require an analysis of the annual source energy usage as required in section 101.4, hereinafter called an annual energy analysis *or shall not exceed the source energy usage shown in Table 402.1.*

Table 402.1

<i>Building</i>	<i>kBtu/Sq.Ft./yr. (source consumption)</i>		
<i>Sq. Ft. Range</i>	<i>Heatin g</i>	<i>Cooling</i>	<i>Total</i>
<i><1000</i>	<i>5</i>	<i>22</i>	<i>27</i>
<i>1000 - 1399</i>	<i>4</i>	<i>18</i>	<i>22</i>
<i>1400 - 1799</i>	<i>4</i>	<i>16</i>	<i>20</i>
<i>1800 - 2199</i>	<i>4</i>	<i>15</i>	<i>19</i>
<i>>2200</i>	<i>4</i>	<i>14</i>	<i>18</i>

402.1.1 Input values for Group R buildings. Add a sentence at the end of the first paragraph to read:

Domestic hot water energy use must be calculated separately from glazing systems, heat storage, thermal envelope and space conditioning equipment and must meet the energy reduction percentages of section 101.4.

Distribution System Loss Factor on page 12; change the Outside factor for Cooling to read *0.75*.

Add the following:

402.1.1.1 Thermal Mass. Designs utilizing thermal mass may be used provided the materials' volumetric heat capacity is between 18 minimum to 30 Btu/cu.ft. F (except

water walls) and meet the values shown in Table 402.1., with walls without external insulation at least 12 inches minimum thickness or 8 hours time lag. External insulation can be used (R-9 to R-11) to reduce thickness of thermal mass to no less than 4". Surface area of uncovered thermal mass (in the direct sun zone) will be minimum 9 times the area of south glass, with 1ft² of additional south glass for every 40 ft² of mass located outside the direct sun zone (a simplified method of calculating thermal mass and south glass areas).

Table 402.1
Heat Storage Properties of Materials

Material	Specific Heat (Btu/lb F)	Density (lb/cu. ft.)	Volumetric Heat Capacity (Btu/cu. ft. -F)
Poured Concrete	0.16 - 0.20	120 - 150	19.0 - 30.0
Clay Masonry	0.19 - 0.21		
Molded Brick		120 - 130	19.0 - 27.3
Extruded Brick		125 - 135	23.8 - 28.4
Adobe	0.20 - 0.24	80 - 106	16.0 - 25.4
Concrete Masonry	0.19 - 0.22		
CMU		80 - 140	15.2 - 30.8
Brick		115 - 140	21.9 - 30.8
Pavers		130 - 150	24.7 - 33.0
Water	1.0	62.4	62.4

402.1.1.2 Summer ventilation. Thermal-mass buildings shall be provided with a means of venting to the outside at night during the months of May through October to avoid overheating. Operable windows totaling at least 20 percent of the total glazing area, located for effective cross-ventilation or ceiling fans or a whole-house fan sized to provide 10 air changes per hour may be used.

Section 402.4 Calculation Procedure. Operational Characteristics: Add a sentence to read:

The occupied mode shall be not less than 10 hours in a 24-hour period.

Section 402.5 Documentation. Delete the exception.

CHAPTER 5 RESIDENTIAL BUILDING DESIGN BY COMPONENT PERFORMANCE APPROACH

Section 502.1 General: Add:

Thermal design parameters to be used in this chapter are found in Chapter 3, Section 302.1.

Section 502.1.2: Revise the second paragraph by placing a comma after "Masonry", and adding "*earthen materials*," between "Masonry" and "or".

Table No. 502.1.2c: Delete the phrase "~~SUCH AS A LOGWALL~~" in the heading.

Section 502.2.1 Walls. Add a subsection to read:

502.2.1.2 Glazing. All glazing facing between 20 - 165 degrees or 195 - 340 degrees shall have a minimum summer shade or shading coefficient of 0.39. All glazing facing between 165-195 degrees shall have a minimum summer shade or shading coefficient of 0.5 or less. This may be accomplished by the use of overhangs, covered porches, tinted glazing, or other approved methods.

Table 502.2.1a Revise as follows:

Table 502.2.1a¹
HEATING AND COOLING CRITERIA

ELEMENT	MODE	TYPE A-1 BUILDINGS	TYPE A-2 BUILDINGS
		U _o	U _o
Walls	Heating or cooling	0.11	0.17
Roof/Ceiling	Heating or cooling	0.026	0.026
Floors over unheated spaces	Heating or cooling	0.05	0.05
Heated slab on grade	Heating	R-Value 8	R-Value 8
Unheated slab on grade	Heating	R-Value 0	R-Value 0
Basement wall ²	Heating or cooling	U-Value 0.095	U-Value 0.095
Crawl space wall ^{2,3}	Heating or cooling	U-Value 0.06	U-Value 0.06

¹ Values *are* determined by using the graphs (Figure Nos. 1, 2, 3, 4, 5 and 6) contained in Chapter 8 using heating degree days as specified in Section 302.

² Basement and crawl space wall U values shall be based on the wall components and surface air films. Adjacent soil shall not be considered in the determination of the U value.

³ Typical foundation wall insulation techniques can be found in Standard RS-20 listed in Chapter 8.

Add a new section 502.2.1.1 to read:

502.2.1.1 Software. Model Energy Code (MEC) software (DOS Version) called MEC check is available to verify compliance with this standard. It is available for download free from the Internet at:

<http://www.energycodes.org/meccheck/mecdownload.html>

To use the software:

*Use DOS to modify the LOCATION file line 188 to read: Civano
Tucson, 7000,34892*

Save the file and open the program.

Under state, select Arizona and under city, select Civano Tucson.

Select "Trade-offs" from the top bar and set HVAC Efficiencies for an air conditioner value of SEER 12.0 or better and Furnace AFUE to 80 or better.

Corresponding heat pump values may be used.

Enter the building components and verify the building meets the MECcheck criteria.

Print the report with the check list (see Table 502.2.1.1 below) and submit for a permit.

Table 502.2.1.1
Check List to Accompany MEC Check Report when using Chapter 5

Section	Description	Check
502.2.1.2	Glazing facing between 195-340 and 20-165 degrees has a summer shade or shading coefficient of 0.39 or less. Glazing facing between 165-195 degrees has a summer shade or shading coefficient of 0.5 or less.	
502.3	Air Leakage Warranty verifying maximum of 0.35 ACH.	
503.2.4	Recessed lighting fixtures when installed in building envelope is constructed to accept only lamps with efficacy greater than 40 lumens/watt.	
503.8.1	Duct Leakage Test passed before drywall and "Intermediate Verification and Warranty" form is signed.	
101.4, 102.4	Water heater system demonstrating compliance.	
504.2.1.1	Electric storage water heaters has a standby loss not to exceed 4 watts/ft ² of tank surface or 43 watts, whichever is greater.	
504.5.1	Pools and spas utilize solar energy as the only water heating source.	
504.5.4	Recirculating system (if used) is installed on hot water line with a timer and pipe insulation.	
504.8	Low water use plumbing fixtures.	

Section 502.2.4 Slab-on-grade floors: Delete in its entirety.

Section 502.3 add the following sentence at the end:

An Air Leakage Warranty verifying a maximum of 0.35 ACH shall be provided to the home owner. A representative of the developer and/or builder will perform a blower door test after completion but before occupation of the residence. The representative will certify a maximum of 0.35 ACH based upon the results of the blower door test. An Air Leakage Warranty verifying a maximum of 0.35 ACH shall be provided to the homeowner.

Section 502.3.4 Recessed lighting fixtures. Revise the first paragraph to read:

503.2.4 Recessed lighting fixtures. When installed in the building envelope, recessed lighting fixtures shall be constructed so as to *accept only lamps with efficacy greater than 40 lumens/watt, and* meet one of the following requirements:

Section 503.2.1 Calculation procedures. Add a sentence to read:
Equipment not covered by the tables in this section shall show the following maximum installed cooling power densities, including all auxiliaries:

<i>less than 65,000 BTU/hr:</i>	<i>2.7 kW primary energy per 1000 sf at site</i>
<i>65,000 - 135,000 BTU/hr:</i>	<i>3.6 kW per 1000 sf</i>
<i>135,000 - 250,000 BTU/hr:</i>	<i>3.7 kW per 1000 sf</i>
<i>greater than 250,000 BTU/hr:</i>	<i>2.0 kW per 1000 sf</i>

with energy intensity of mechanical cooling equipment calculated from EER ratings if entirely electric.

Table 503.35a Change the SEER values in the fourth column (Minimum Performance) from 10 and 9.7 to 12.0 and 10, respectively. *Add the following note at the bottom of the table:*

Note: Air-conditioning may be used selected under the guidelines of the Air Conditioning Contractors of America (ACCA) Manual J Procedures, Specifically Sections 7-27, 7-28 and 7-29 at outside conditions of 105 degrees F. and inside conditions of 75 degrees F.

Section 503.4 Add new sub-sections to read:

503.4.3 Speed Reduction. An automatic method of speed reduction for pump and fan motors, or air or water flow reduction, during less than full system load conditions, which assures energy savings through motor power input reduction, shall be employed for any air system that exceeds a total system static pressure of 2.0 inches water gauge, and any water system that exceeds a total water system pressure equivalent to a 50 foot head of water.

Section 503.5 Balancing. Add a new second sentence to read: *For structures with a floor area greater than 5000 square feet with forced-air climate control, balancing shall be performed, or included as part of a commissioning process from the design and construction phase. Certification and results of the balancing shall be submitted to the jurisdiction, the owner and the designer of the project.*

Section 503.8.1 strike entire section. Section should read as follows: *All ducts shall be leak tested in accordance with this standard. The tested rate of air leakage is not to exceed 3% of conditioned floor area in CFM at 25 pascals (0.1 inches WC). A representative of the developer and/or builder will perform a field inspection and leakage test of the ductwork before drywall installation. The field representative will certify successful completion of this test.*

Section 503.9 Piping Insulation. Delete exceptions 2 and 4, and renumber exception 3 to 2.

Section 504.2.1.1 Electric Water heaters. Revise to read:

All Automatic electric storage water heaters shall have a standby loss not exceeding 4.0 watts/ft² (43W/m²) of tank surface or 43 watts, whichever is greater, when tested in accordance with Standard RS-5 listed in Chapter 8 and calculated at a 30 Degrees F. temperature difference.

Section 504.5.1 Add the following at the beginning of the paragraph:

All recreational swimming pools and spas shall utilize solar energy as the only water heating source. Medical and rehabilitation pools smaller than 3,000 gallons water capacity shall use solar energy as the primary water heating source, with a new energy source permitted as backup.

Add a new Section 504.5.4:

Section 504.5.4 Recirculating Systems. Recirculating systems shall be provided with time clocks as required in Sec. 504.5.3, switches as required in Sec. 504.6, and pipe insulation as required in Sec. 504.7.

Section 504.8 Conservation of Hot Water. Delete in its entirety and add "*Plumbing fixtures shall meet the following maximum usage requirements unless special requirements dictate otherwise:*

- *Water closets: 1.6 gallons per flush.*
- *Kitchen showers and lavatory faucets: 3 gallons per minute.*
- *Urinals: 1 gallon per flush.*

Add a new section 506 to read:

Section 506. Energy Consumption - Other Than Electrical. In multifamily dwellings , provisions shall be made to determine the energy consumed by each tenant by separately metering individual dwelling units or tenant spaces.

CHAPTER 6 RESIDENTIAL BUILDING DESIGN BY ACCEPTABLE PRACTICE

Section 602.2.1 Walls. Add the following paragraph to read:

602.2.1.1 Wall assemblies. Exterior walls shall be constructed to meet a minimum composite R-Value of 19 including air films. The following assemblies are deemed to meet this requirement:

1. *Nominal 2 x 6 wood-frame construction insulated with R-19 batts or applied blown-in process custom cavity filling insulation.*

2. *Nominal 2 x 4 wood-frame construction insulated with R-13 batts or applied blown-in process custom cavity filling insulation and rigid insulation board on the exterior with an R-Value of not less than 3.2, with a nominal 4 inch brick veneer.*
3. *Nominal 2 x 4 wood-frame construction insulated with R-13 batts or applied blown-in process custom cavity filling insulation and rigid insulation board on the exterior with an R-Value of not less than 6.0.*
4. *Earthen material or solid masonry, at least 4 inches in thickness with insulation with an R-Value of not less than 9.0 applied to the exterior.*
5. *Earthen material or solid masonry, at least 12 inches in thickness or 8 hours time lag.*
6. *Straw bales at least 14 inches in thickness.*
7. *Log or solid wood construction with an average thickness of 12 inches.*
8. *Log or solid wood construction with an average thickness of 6 inches with nominal 2x4 frame construction insulated with R-13 batts or loose fill insulation on the inside.*
9. *Structural insulated panels with a minimum R value of 25.*

Add the following exceptions after the last paragraph:

Exceptions:

1. *Doors whose area and U-value are considered as glazing in section 602.2.1 shall be exempt.*
2. *One exterior swinging door with a maximum area of 32 square feet may be installed for ornamental, security or architectural purposes and be exempt from these requirements.*

Add new subsections to read:

602.2.1.1 Exterior door area. For doors containing at least 20 percent of the door area in glazing, the glazing area shall be subtracted from the door area for the purpose of determining the U-value of the door.

602.2.1.2 Exterior door U-value. All exterior doors shall have maximum area weighted U-value not exceeding that prescribed in Table 102.3b.

602.2.1.3 Glazing. All glazing facing 20 - 165 degrees or 195 - 340 degrees shall have a minimum summer shade or shading coefficient of 0.39. All glazing facing between 165 - 195 degrees shall have a minimum summer shade or shading coefficient of 0.5 or less. This may be accomplished by the use of overhangs, covered porches, tinted glazing or other approved methods. Whole-unit glazing maximum U-value shall be determined by the following equation or Table 602.2.1.3:

$$U = 5 / [(Glazing Percentage) - 5] \quad \text{or} \quad R = [(Glazing Percentage) - 5] / 5$$

where Glazing Percentage = 100 x (glazing area / floor area)

Table 602.2.1.3

<u>Percent of floor area</u>	<u>Window R value</u>
10	1.0
12	1.4
14	1.8
16	2.2
18	2.6
20	3.0
22	3.4
24	3.8
26	4.2
28	4.6
30	5.0

602.2.1.4 Summer ventilation. Buildings utilizing thermal-mass (items 4 and 5, in section 602.2.1.1) shall be provided with a means of venting to the outside at night during the months of May through October to avoid overheating. Operable windows totaling at least 20 percent of the total glazing area, located for effective cross-ventilation and ceiling fans or a whole-house fan sized to provide 10 air changes per hour may be used.

Section 602.2.2 Roof/ceiling. Add a new subsection to read:

602.2.2.1 Roof/ceiling assemblies. Ceilings below ventilated attic spaces and single rafter vaulted ceilings shall be constructed to meet a minimum composite R-value of 38 including air films. The following assemblies are deemed to meet this requirement:

- 1. Wood-frame assembly insulated with R-38 batts or loose-fill insulation.*
- 2. Earthen material or solid masonry at least 12 inches in thickness with glass fiber or foam insulation with an R-Value of not less than 22 applied to the interior.*
- 3. Earthen material or solid masonry at least 24 inches in thickness with glass fiber or foam insulation with an R-Value of not less than 11 applied to the interior.*
- 4. Earthen material or solid masonry at least 36 inches in thickness*
- 5. Straw bales at least 14 inches in thickness.*
- 6. Structural insulated panels with an R value of at least 38.*

Section 602.2.4 Slab-on-grade floors. Delete 2nd paragraph and insert the following sentence: *At least 25 percent of the floor area in the living space shall be without carpet or an equivalent area of internally exposed mass.*

Section 602.3 add the following sentence at the end:

An Air Leakage Warranty verifying a maximum of 0.35 ACH shall be provided to the home owner per Section 502.3.

Section 603.2 HVAC equipment requirements, change to read:

. . . *efficiency and power density requirements of section 503.2, 503.3 and 503.8.1.*

Table No. 603.5 Minimum Pipe Insulation. Revise by changing the numbers 1-1/2 to 1/2 in the third and fourth columns on the line "CHILLED WATER".

Section 603.6 Add a new section to read:

603.6 Space Cooling. Buildings constructed under the provisions of this standard shall be permitted to use refrigerated air conditioning systems selected under the guidelines of the Air Conditioning Contractors of America (ACCA) Manual J Procedures, Specifically Sections 7-27, 7-28 and 7-29 at outside conditions of 105 degrees F. and inside conditions of 78 degrees F. Other provisions of this standard notwithstanding, air conditioning equipment shall have a minimum SEER of 12 or a minimum EER of 10. System sizing shall be determined by an analysis consistent with industry standards.

Section 603.7 Add a new subsection to read:

603.7 Mechanical Equipment and Water Heater Efficiency. The efficiency of water heating and mechanical equipment shall be in accordance with sections 101.4, 102.4 and 503 of this standard.

Check List when using Chapter 6		
Section	Description	Check
102.1.3	"Insulation Installation Warranty" completed and signed.	
102.4	Minimum of 600 ft ² /ton.	
104.1	A method of utilizing solar energy (may overlap with 504.2).	
503.2.4	Recessed lighting fixtures when installed in building envelope are constructed to accept only lamps with efficacy greater than 40 lumens/watt.	
503.8.1	Duct Leakage Test passed before drywall and "Intermediate Verification and Warranty" form is signed.	
101.4, 102.4	Water heater system demonstrating compliance.	
504.2.1.1	Electric storage water heaters has a standby loss not to exceed 4 watts/ft ² of tank surface or 43 watts, whichever is greater.	
504.5.1	Pools and spas utilize solar energy as the only water heating source.	
504.5.4	Recirculating system (if used) is installed on hot water line with a timer and pipe insulation.	
504.8	Low water use plumbing fixtures conform with UPC.	
602.2.1.3	Glazing facing between 195-340 & 20-165 degrees has a summer shade or shading coefficient of 0.39 or less. Glazing facing between 195-165 degrees has a summer shade or	

	shading coefficient of 0.5 or less.	
602.2.1	Wall assembly from table 602.2.1.1	
602.2.1.2	All exterior doors but one (maximum of 32 ft ²) to be R-5.	
602.2.1.3	Minimum window U value as per Table 602.2.1.3	
602.2.1.4	Buildings utilizing thermal mass walls have minimum 20% operable windows or ceiling fans or a whole house fan (10 ACH).	
602.2.2.1	Minimum composite R value of 38 for roof/ceiling.	
602.2.4	Minimum of 25% of floor area without carpet or equivalent area of other internally exposed mass.	
602.3	"Air Leakage Warranty" verifying maximum of 0.35 ACH.	

SECTION 604
SERVICE WATER HEATING

Section 604.1.2.3 Swimming Pools *and Spas*. Add the following at the beginning of the first paragraph:
All recreational swimming pools and spas shall utilize solar energy as the only water heating source. Medical and rehabilitation pools smaller than 3,000 gallons water capacity shall use solar energy as the primary water heating source, with a new energy source permitted as backup. When permitted, spa and Ppool remainder unchanged.

Section 604.2 Water heaters, storage tanks and boilers. Add a sentence to read:
Shall comply with Section 101.4 and 102.4 of this standard.

Section 604.4 Conservation of hot water. Delete in its entirety and add: "*Plumbing fixtures shall meet the following maximum usage requirements unless special requirements dictate otherwise:*

- *Water closets: 1.6 gallons per flush.*
- *Kitchen showers and lavatory faucets: 3 gallons per minute.*
- *Urinals: 1 gallon per flush.*

CHAPTER 7
BUILDING DESIGN FOR ALL BUILDINGS OTHER THAN
RESIDENTIAL BUILDINGS

Section 702.1 Basic Requirements. Revise to read as follows:

702.1 Basic Requirements. Building designs shall meet the requirements of *Section 101.4 and 102.4 of this standard* as well as the requirements of Sections 5.4, 6.4, 7.4, 8.4, 9.4, 10.4, 11.4 and 12.4 in Standard RS-22 listed in Chapter 8.

Section 702.2 Additional requirements. Add the following before the first exception:

Buildings otherwise meeting the requirements of Chapter 4, 5 or 6 of this standard may employ the following performance requirement substitutions of Standard RS-22, listed in Chapter 8.

Remainder unchanged.

Add a new section to read:

SECTION 703

ELECTRICAL REQUIREMENTS

703.1 Lighting Power Budget. The maximum lighting power density (LPD) for any building may be calculated by either the Complete Building Method or the Area Category Method, according to the following table:

TABLE 703.1

Complete Building Method

<i>Building Type</i>	<i>Max. Lighting Power Density (W/sf)</i>
<i>General commercial or industrial work buildings</i>	<i>0.8</i>
<i>Grocery stores</i>	<i>1.2</i>
<i>Industrial or commercial storage buildings</i>	<i>0.5</i>
<i>Medical buildings and clinics</i>	<i>1.0</i>
<i>Office buildings</i>	<i>1.0</i>
<i>Religious worship, auditorium/convention centers</i>	<i>1.3</i>
<i>Restaurants</i>	<i>1.0</i>
<i>Retail and wholesale stores</i>	<i>1.3</i>
<i>Schools</i>	<i>1.2</i>
<i>Theaters</i>	<i>1.0</i>
<i>All others</i>	<i>0.5</i>

Area Category Method

<i>Area Type</i>	<i>Max. Lighting Power Density (W/sf)</i>
<i>Auditorium</i>	<i>1.3</i>
<i>Bank/financial institutions</i>	<i>1.2</i>
<i>Classrooms</i>	<i>1.3</i>
<i>Convention/conference/meeting centers</i>	<i>1.0</i>
<i>Corridors, restrooms, support areas</i>	<i>0.5</i>
<i>Dining</i>	<i>0.8</i>
<i>Exhibit</i>	<i>1.5</i>
<i>General commercial and industrial work</i>	<i>0.8</i>
<i>Grocery</i>	<i>1.3</i>
<i>Hotel function</i>	<i>1.5</i>

<i>Industrial and commercial storage</i>	<i>0.4</i>
<i>Kitchen</i>	<i>1.5</i>
<i>Lobbies: Hotel lobby</i>	<i>1.5</i>
<i>Main entry lobby</i>	<i>1.0</i>
<i>Malls, arcades, and atria</i>	<i>0.8</i>
<i>Medical and clinical care</i>	<i>1.2</i>
<i>Office</i>	<i>1.0</i>
<i>Precision commercial and/or industrial work</i>	<i>1.3</i>
<i>Religious worship</i>	<i>1.4</i>
<i>Retail sales, wholesale showrooms</i>	<i>1.4</i>
<i>Theaters: Motion picture</i>	<i>0.7</i>
<i>Performance</i>	<i>1.0</i>

For any building greater than 5,000 square feet in area, and for all non-residential buildings, the following shall apply:

Lighting design shall comply with current IESNA guidelines and application notes, with selection of the median illuminance as the target optimum, not the minimum. In all areas designated higher than IESNA category C, specified illuminance shall be on task, with ambient illuminance generally task/3. LPD shall in no case exceed the values in Table 703.1. In all areas, lighting targets shall be achieved by the most energy efficient technology which meets the following requirements:

- ° CRI greater than 80 for work areas, greater than 75 for all areas.*
- ° Color Temperature less than 3600 K, except in retail display, excluding tasklights*

Technologies include but are not limited to:

- ° Incorporation of natural daylight, and daylight-supplementing artificial light*
- ° Area lighting by high-CRI straight tube fluorescent with specular reflectorized interior luminaire. For applications which do not involve frequent switching, use fully electronic instant start 4-lamp parallel-circuit ballasts. Daylight-dimming via photocell sensor/controller.*
- ° Task lighting by 13 watt lamps (or smaller), with laterally offset placement so as not to cause direct or veiling glare*
- ° Conference rooms to have continuous architectural-dimming (to10%) fluorescent luminaires in place of incandescent can downlights, or else can lights controlled by center-off double throw switch which prevents simultaneous operation of area lights and downlights.*
- ° Reflectorized technologies for interior luminaries.*
- ° Areas with visible daylight may use continuous-dimming photocell-controlled variable light output devices except those controlled by non-defeatable occupancy sensors. Daylighting contribution to be considered in calculation of IESNA target illuminance.*

Prohibited technologies include:

- *Tungsten filament incandescent except quartz-halogen*
- *T12 fluorescent*
- *VHO and SHO lamps*
- *Mercury vapor lamps*
- *U-shaped lamps (except CFLs <20W)*
- *Small-cell paracube grates and Large cell paracube fixtures where the lamp is not centered into the cell*
- *Magnetic fluorescent ballasts*
- *Series-circuit ballasts*

Occupancy Sensors shall be specified and installed in accordance with EPA Green Lights guidelines, with control technology appropriate to the application. Areas with video display terminals shall be primarily illuminated by task lighting, use of overhead luminaries in each space to be evaluated for Visual Comfort Probability. Visual acuity factors are to be treated as minus weighting factors.

EXHIBIT 2

CERTIFICATION

The Community of Civano, LLC has reviewed the plan for _____(address), plan number _____ to determine compliance of that plan with the conservation requirements for Civano as set forth herein.

The Community of Civano, LLC certifies it is familiar with and the plans meet the requirements of Memorandum of Understanding between the City of Tucson and the Community of Civano, LLC dated June 9, 1998 as indicated below:

_____ Sec 5.3.1.1 of the Memorandum of Understanding for Residential Buildings or the code requirements of the Sustainable Energy Standard attached to the Memorandum of Understanding.

_____ Sec 5.3.1.2 of the Memorandum of Understanding for Commercial Buildings or the code requirements of the Sustainable Energy Standard attached to the Memorandum of Understanding.

Compliance with section 5.3.1.1 or 5.3.1.2 has been determined by:

___ Prescriptive Method

___ Component Method

___ Systems Method;

____ Section 5.3.1.3;

____ Section 5.3.1.4;

____ Section 5.3.1.5;

____ Section 5.3.1.6.

Date:

Signature:

On behalf of the
Community of Civano, LLC