Cochise County
Board of Supervisors

Public Programs…Personal Service
www.cochise.az.gov

AGENDA FOR FLOOD CONTROL DISTRICT MEETING
Tuesday, December 15, 2015 at 10:00 a.m.
BOARD OF SUPERVISORS HEARING ROOM
1415 MELODY LANE, BUILDING G, BISBEE, AZ 85603

ANY ITEM ON THIS AGENDA IS OPEN FOR DISCUSSION AND POSSIBLE ACTION

ROLL CALL
Members of the Cochise County Board of Supervisors will attend either in person or by telephone, video or internet conferencing.

CONSENT

Board of Supervisors

1. Approve the Minutes of the Flood Control District meeting for October 27, 2015.

PUBLIC HEARINGS

Community Development

2. Adopt Flood Control District Resolution 15-03 approving the revisions to the County Floodplain Regulations.

ACTION

Community Development

3. Approve grant award from The Nature Conservancy of $70,375 to Cochise County Flood Control District for streamflow monitoring for Palominas Recharge Project and two potential future recharge sites and for match for the next approved recharge project analysis and conceptual design.

CALL TO THE PUBLIC

This is the time for the public to comment. Members of the Board may not discuss items that are not specifically identified on the agenda.

Pursuant to the Americans with Disabilities Act (ADA), Cochise County does not, by reason of a disability, exclude from participation in or deny benefits or services, programs or activities or discriminate against any qualified person with a disability. Inquiries regarding compliance with ADA provisions, accessibility or accommodations can be directed to Chris Mullinax, Safety/Loss Control Analyst at (520) 432-9720, FAX (520) 432-9716, TDD (520) 432-8360, 1415 Melody Lane, Building F, Bisbee, Arizona 85603.

Cochise County Board of Supervisors
1415 Melody Lane, Building G Bisbee, Arizona 85603
520-432-9200 520-432-5016 fax board@cochise.az.gov

Consent 1.

Flood Control District Meeting **Board of Supervisors**

Meeting Date: 12/15/2015

Minutes

Submitted By: Arlethe Rios, Board of Supervisors

Department: Board of Supervisors

Presentation: No A/V Presentation **Recommendation:**

Document Signatures: **# of ORIGINALS Submitted for Signature:**

NAME of PRESENTER: n/a **TITLE of PRESENTER:** n/a

Mandated Function?: **Source of Mandate or Basis for Support?:**

Information

Agenda Item Text:

Approve the Minutes of the Flood Control District meeting for October 27, 2015.

Background:

n/a

Department's Next Steps (if approved):

n/a

Impact of NOT Approving/Alternatives:

n/a

To BOS Staff: Document Disposition/Follow-Up:

Route signed Minutes to Recorder for microfilming.

Budget Information

Information about available funds

Budgeted: ☐ **Funds Available:** ☐ **Amount Available:**

Unbudgeted: ☐ **Funds NOT Available:** ☐ **Amendment:** ☐

Account Code(s) for Available Funds

1:

Fund Transfers

Attachments

Minutes

PROCEEDINGS OF THE COCHISE COUNTY FLOOD CONTROL DISTRICT
MEETING HELD ON
Tuesday, October 27, 2015

A meeting of the Cochise County Flood Control District was held on Tuesday, October 27, 2015 10:00 a.m. in the Board of Supervisors' Hearing Room, 1415 Melody Lane, Building G, Bisbee, Arizona.

Present:	Patrick G. Call, Chairman; Ann English, Vice-Chairman; Richard R. Searle, Director
Staff Present:	James E. Vlahovich, County Administrator
	Edward T. Gilligan, Deputy County Administrator
	Elda Orduno, Civil Deputy County Attorney
	Arlethe G. Rios, Clerk of the Board

Chairman Call called the meeting to order at 10:00 a.m.

ANY ITEM ON THIS AGENDA IS OPEN FOR DISCUSSION AND POSSIBLE ACTION

PLEDGE OF ALLEGIANCE

THE ORDER OR DELETION OF ANY ITEM ON THIS AGENDA IS SUBJECT TO MODIFICATION AT THE MEETING

CONSENT

Board of Supervisors

1. Approve the Minutes of the Flood Control District meeting for August 3, 2015.

   Vice-Chairman English moved to approve item 1 on the consent agenda. Director Searle seconded the motion and it carried unanimously.

ACTION

Community Development

2. Acceptance of Grant of Drainage Easement traversing the North 50 feet of parcel number 410-12-026, which connects Washington Avenue to Highway 80.

   Mr. Joaquin Solis, Highway & Floodplain Deputy Director, Community Development, presented this item using a PowerPoint presentation. Mr. Solis said that flooding in this area had been a major problem for years for all the citizens of Bay Acres and showed maps and pictures of location.

   Vice-Chairman English said that this would be a solution to a problem that the residents of Bay Acres had for a long time. She noted that Ms. Paterno granted the County the

easement and in exchange the County would be providing a culvert so she could get onto her property.

Director Searle moved to approve the acceptance of Grant of Drainage Easement traversing the North 50 feet of parcel number 410-12-026, which connects Washington Avenue to Highway 80. Vice-Chairman English seconded the motion.

Chairman Call called for the vote and it was approved 3-0.

CALL TO THE PUBLIC

Chairman Call opened the call to the public.

No one chose to speak and Chairman Call closed the call to the public.

This is the time for the public to comment. Members of the Board may not discuss items that are not specifically identified on the agenda.

Chairman Call adjourned the meeting at 10:02 a.m.

APPROVED:

_____
Patrick G. Call, Chairman

ATTEST:

_____
Arlethe G. Rios, Clerk of the Board

Public Hearings 2.

Flood Control District Meeting **Community Development**

Meeting Date:	12/15/2015		
Revisions to Floodplain Regulations Ordinace			
Submitted By:	Teresa Vasquez, Community Development		
Department:	Community Development	**Division:**	Floodplain
Presentation:	PowerPoint	**Recommendation:**	Approve
Document Signatures:	BOS Signature Required	**# of ORIGINALS Submitted for Signature:**	2
NAME of PRESENTER:	Joaquin Solis, P.E.	**TITLE of PRESENTER:**	Assistant Director Highway & Floodplain
Mandated Function?:	Federal or State Mandate	**Source of Mandate or Basis for Support?:**	

Docket Number (If applicable):

Information

Agenda Item Text:

Adopt Flood Control District Resolution 15-03 approving the revisions to the County Floodplain Regulations.

Background:

~~The Floodplain Regulations were updated in January 2013. Since we are currently in the process of updating our FEMA floodplain maps, the Arizona Department of Water Resources has reviewed our regulations as part of the updating of our floodplain maps. The current rules and regulations are not in compliance with State and Federal Emergency Management Agency (FEMA) requirements and in some cases vague as to exact requirements for property owners and commercial development when building within a special flood hazard area. This current draft reflects needed changes and would put us in good standing with FEMA – National Flood Insurance Program (NFIP) and the Arizona Department of Water Resources (ADWR/State liaison for FEMA).

Department's Next Steps (if approved):

staff will administer development within affected areas with the new floodplain regulations.

Impact of NOT Approving/Alternatives:

~~County will be suspended from the NFIP, denial of update floodplain map revisions, and loss of our Community Rating System (CRS) rating, which provides all citizens of Cochise County a 5% discount on flood insurance.

To BOS Staff: Document Disposition/Follow-Up:

~~Please return a copy of the recorded documents to H&F, attn: Teresa Garcia

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Budget Information

Information about available funds

Budgeted: ☐ **Funds Available:** ☐ **Amount Available:**

Unbudgeted: ☐ **Funds NOT Available:** ☐ **Amendment:** ☐

Account Code(s) for Available Funds

1:

Fund Transfers

Attachments

Presentation
Executive Summary
Resolution
Floodplain Regulation Ordinance

COCHISE COUNTY

Floodplain Regulations Ordinance 2015 Changes

Presented by: Joaquin Solis, P.E
Assistant Director

Public Programs…Personal Service

COCHISE COUNTY

Brief Description

- The Floodplain Regulations Ordinance was updated in January 2013.
- We are in the process of updating our FEMA floodplain maps (Effective Date February 3, 2016) and the Arizona Department of Water Resources and County Attorney's Office have reviewed our regulations as part of that update.
- This current draft reflects needed changes/clarifications and would put us in good standing with FEMA – National Flood Insurance Program (NFIP) and the Arizona Department of Water Resources (ADWR/State liaison for FEMA).

COCHISE COUNTY

Changes made

- Grammatical/Formatting changes

- Key sections/definitions missing from ADWR Model Ordinance & consistency with A.R.S requirements
  - Unlawful Acts (Section 3.9)
  - Violation Section revised (Section 3.11) to follow A.R.S.
  - Substantial Improvement & Substantial Damage Assessments (Section 4.2B)
  - Adverse Impacts (Section 5.1D)

- Combined Standards for:
  - General Land Disturbance, Commercial, & Industrial Developments. (Section 5.6)

- Added Appendix A for Drainage Report Requirements

COCHISE COUNTY

Impact of <u>Not</u> Approving: Should the Floodplain Regulations Ordinance not be approved

- County could be suspended from the NFIP and
- Denial of floodplain map revisions updates (Hereford, Benson, & Richland Ranchettes Areas) and
- Loss of our Community Rating System (CRS) rating (which provides all citizens of Cochise County a 5% discount on flood insurance with the opportunity to receive greater discounts)

Cochise County
Community Development
Highway and Floodplain Division
Public Programs...Personal Service
www.cochise.az.gov

DATE: December 3, 2015

TO: Flood Control District Board

FROM: Joaquin Solis, P.E., Assistant Director Highway & Floodplain J.S.

SUBJECT: **Approve the Revisions to the Floodplain Regulations Ordinance**

Recommendation: This department recommends approval of the updated Floodplain Regulations Ordinance authorizing the adoption of needed changes to the floodplain regulations.

Background (Brief): The Floodplain Regulations Ordinance was updated in January 2013. Since we are currently in the process of updating our FEMA floodplain maps, the Arizona Department of Water Resources has reviewed our regulations as part of the updating of our floodplain maps. The current rules and regulations are not in compliance with State and Federal Emergency Management Agency (FEMA) requirements and in some cases vague as to exact requirements for property owners and commercial development when building within a special flood hazard area. This current draft reflects needed changes and would put us in good standing with FEMA – National Flood Insurance Program (NFIP) and the Arizona Department of Water Resources (ADWR/State liaison for FEMA).

Fiscal Impact & Funding Sources: If approved, there will be no fiscal impact.

Next Steps/Action Items/Follow-up: If approved, staff will administer development within affected areas with the new floodplain regulations.

Impact of <u>Not</u> Approving: Should the item not be approved, the County will be suspended from the NFIP, denial of update floodplain map revisions, and loss of our Community Rating System (CRS) rating, which provides all citizens of Cochise County a 5% discount on flood insurance.

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floodplain@cochise.az.gov

Planning, Zoning and Building Safety
1415 Melody Lane, Building E
Bisbee, Arizona 85603
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RESOLUTION FCD 15-___

REVISIONS TO THE FLOODPLAIN REGULATIONS

WHEREAS, the State of Arizona delegated responsibility to local governments to adopt floodplain regulations pursuant to A.R.S. §§ 48-3601 through 48-3628; and

WHEREAS, the Cochise County Flood Control District Board adopted the Floodplain Regulations on July 30, 1984; and

WHEREAS, the Floodplain Regulations were amended May 26, 1987, November 6, 2000, April 12, 2002, and January 29, 2013; and

WHEREAS, the Floodplain Department has proposed to revise the Floodplain regulations to bring them up to date with requirements of the Arizona Department of Water Resources, as set forth in Attachment A; and

WHEREAS, a public hearing has been properly noticed and held to consider the contents and merits of the proposed revisions.

NOW THEREFORE, IT IS HEREBY RESOLVED, that the Cochise County Flood Control Regulations, as shown in Attachment A, are hereby adopted and shall become effective on January 15, 2016.

PASSED AND ADOPTED by the Cochise County Flood Control District Board this _____ day of _____ , 2015.

_____
Richard Searle, Chairman
Cochise County Flood Control District Board

ATTEST:

_____
Arlethe G. Rios,
Clerk of the Board

APPROVED AS TO FORM:

_____
Britt Hanson,
Chief Civil Deputy County Attorney

Cochise County Floodplain Regulations

Revised December, 2015

Cochise County Flood Control District

TABLE OF CONTENTS

SECTION 1
STATUTORY AUTHORIZATION

1.1 STATUTORY AUTHORIZATION

In A.R.S. §§ 48-3601 through 48-3628, the Arizona State Legislature has delegated the responsibility to each county flood control district to adopt floodplain management regulations designed to promote the public health, safety and general welfare of its citizenry. Therefore, the Flood Control District Board of Directors of Cochise County, Arizona, does ordain as follows:

1.2 FINDINGS OF FACT

A. The floodplains of Cochise County are subject to periodic inundation which may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief and impairment of the tax base, all of which adversely affect the public health, safety and general welfare.

B. These flood losses are caused by the cumulative effect of obstructions in floodplains which increase flood heights and velocities and, when inadequately anchored, cause damage in other areas. Uses that are inadequately flood proofed, elevated or otherwise protected from flood damage, also contribute to the flood loss.

1.3 STATEMENT OF PURPOSE

It is the purpose of this ordinance to promote the public health, safety and general welfare, and to minimize public and private losses due to flooding by provisions designed to:

A. Protect human life and health;

B. Minimize expenditure of public money for costly flood control projects;

C. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;

D. Minimize prolonged business interruptions;

E. Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in floodplains;

F. Help maintain a stable tax base by providing for the sound use and development of floodplains so as to minimize blight areas caused by flooding;

G. Participate in and maintain eligibility for flood insurance and disaster relief.

1.4 METHODS OF REDUCING FLOOD LOSSES

In order to accomplish its purposes, this ordinance includes methods and provisions for:

A. Restricting or prohibiting uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
B. Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
C. Controlling the alteration of natural floodplains, stream channels and natural protective barriers, which help accommodate or channel flood waters;
D. Controlling filling, grading, dredging and other development which may increase flood damage; and
E. Preventing or regulating the construction of flood barriers that will unnaturally divert flood waters or which may increase flood hazards in other areas.

1.5 LEVEL OF STANDARDS

The performance requirements as specified in this title are minimum standards and address general floodplain management requirements. Specific projects may warrant additional requirements that may be imposed by the Cochise County Flood Control District. The Cochise County Flood Control District has the authority to establish standards and/or policies, as necessary, to carry out the provisions of this Ordinance. All drainage design standards, river and basin management plans, riparian preservation and mitigation standards, environmental protection, or other land-use plans approved by Cochise County and the Flood Control District are hereby incorporated into this Ordinance. All applicable floodplain management, flood hazard and flood control regulations, rules and standards promulgated by the state of Arizona and the federal government are hereby incorporated into this Ordinance.

SECTION 2
DEFINITIONS

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance it's most reasonable application.

Accessory structure, low-cost and small: A structure that is on the same parcel of property as a principal structure, the use of which is incidental to the use of the principal structure.

Appeal: A request for a review of the floodplain administrator's interpretation of any provision of this ordinance or a request for a variance.

Area of shallow flooding: A designated AO or AH Zone on a community's Flood Insurance Rate Map (FIRM) with a one percent or greater annual chance of flooding to an average depth of one to three feet where a clearly defined channel does not exist, where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow.

Base Flood: The flood having a one percent chance of being equaled or exceeded in any given year. Commonly referred to as the 100-year flood.

Base Flood Depth: The average depth of floodwater above highest adjacent grade anticipated during the base flood.

Base Flood Elevation: The calculated water surface elevation to which floodwater is anticipated to rise during the base flood.

Basement: Any area of the building having its floor sub-grade (below ground level) on all sides.

Board or Floodplain Board: The Board of Directors of the Cochise County Flood Control District. The Cochise County Board of Supervisors is the Board of Directors of the District.

Building: See "Structure".

Community: Any state, area or political subdivision thereof, or any Indian tribe or authorized tribal organization, or authorized native organization, which has authority to adopt and enforce floodplain management regulations for the areas within its jurisdiction.

Development: Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, , mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of materials and equipment

District: The Cochise County Flood Control District. As established by Title 48, Chapter 21 of the A.R.S.

Drainage Analysis: a Drainage report, Hydrology report, or Drainage statement used for the analysis of land improvements.

A. **Drainage Statements:** a brief description of drainage conditions applicable for a site which is not affected by 100-year flows of 500 cfs, or more, and is neither subject to detention requirements nor impacted by flows from a significant watercourse. The objective is to demonstrate adequate site drainage, and to establish finished-floor elevations which assure that all structures are free from flooding during a 100-year flood.

B. Hydrology Report: a report required for development which are not subject to detention requirements, nor which require extensive structural improvements for handling drainage; but which are impacted by flows from significant watercourses and/or affected by 100-year flows of 500 cfs, or more. The objective of a hydrology report is to establish finished-floor elevations which assure that all structures are free from flooding during a regulatory flood. Additional objectives of a hydrology report is to establish the size and configuration of flow-through wall openings and other minor drainage features; and, if required, to develop a grading plan which demonstrates adequate site drainage. Hydraulic mapping of floodplain shall also be required for drainage areas producing flows of 500 cfs or greater.

C. Drainage Report: a report which is required for any site greater than one acre in size or for any site subject to detention requirements or adverse impact on adjacent parcel resulting from the proposed improvement. The drainage report shall contain all elements of a hydrology report, as well as the appropriate components of the required detention facility design. In addition, a drainage report shall be required for any site where extensive structural improvements for mitigating drainage impact are required.

Elevation Certificate: An administrative tool of the NFIP which is to be used to provide elevation information necessary to ensure compliance with the community floodplain management ordinances, to determine the proper insurance premium rate, or support a request for a Letter of Map Amendment (LOMA).

Encroachment: The advance or infringement of uses, plant growth, fill excavation, buildings, permanent structures or development into a floodplain, which may impede or alter the flow capacity of a floodplain.

Erosion: The process of the gradual wearing away of landmasses. This peril is not, per se, covered under the National Flood Insurance Program.

Erosion Hazard Area: Land adjoining a watercourse regulated by this ordinance, which is deemed by the floodplain administrator to be subject to flood-related erosion losses.

Erosion Hazard Setback: The minimum horizontal distance from the top of bank of a watercourse, where a structure must be constructed or placed.

Flood or Flooding: A general and temporary condition of partial or complete inundation of normally dry land areas from: (1) the overflow of flood waters; (2) the unusual and rapid accumulation or runoff of surface waters from any source; and/or (3) the collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm or by an unanticipated force of nature, such as flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in this definition.

Flood Insurance Rate Map (FIRM): The official map of a community on which FEMA has delineated both the areas of special flood hazards and the risk premium zones applicable to the community.

Flood Insurance Study (FIS): The official report provided by FEMA that includes flood profiles, FIRM and the water surface elevation of the base flood.

Floodplain: Any land area susceptible to being inundated by water from any source. See "Flood or looding."

Floodplain Administrator: The County Engineer or designee who oversees administration and enforcement of the floodplain management regulations contained within this ordinance as required by the NFIP.

Floodplain Management: The operation of an integrated natural resource management program, encompassing corrective and preventive measures for reducing flood and erosion damage. Floodplain management includes, but is not limited to, emergency preparedness planning, flood control works and floodplain management regulations.

Floodplain Management Regulations: This ordinance and other zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as grading and erosion controls) and other application of police power which control development in flood-prone areas. This term describes federal, state, or local regulations in any combination thereof which provide standards for preventing and reducing flood loss and damage.

Floodplain Use Permit (FPUP): An official document which authorizes specific activity within a regulatory floodplain or erosion hazard area.

Flood-proofing: Any combination of structural and non-structural additions, changes or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents by means other than elevation.

Flood-Related Erosion: The collapse or subsidence of land along the shore of a lake or other body of water as a result of undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as a flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding.

Floodway: The area of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation. Also referred to as "Regulatory Floodway."

Floodway Fringe: The area of the floodplain on either side of the "Regulatory Floodway" where encroachment may be permitted.

Functionally Dependent Use: A use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, and does not include long-term storage or related manufacturing facilities.

Governing Body: The local governing unit (i.e., Cochise County), which is empowered to adopt and implement regulations to provide for the public health, safety and general welfare of its citizenry.

Hardship: For the purposes of approving variances of regulation under the NFIP, the exceptional hardship which would result from a failure to grant the requested variance. The governing body requires that the variance be exceptional, unusual and peculiar to the property involved. Mere economic or financial hardship alone is not exceptional. Inconvenience, aesthetic considerations, physical handicaps, personal preferences or the disapproval of one's neighbors likewise cannot, as a rule, qualify as an exceptional hardship**.** All of these problems can be resolved through other means without granting a variance, even if the alternative is more expensive, or requires the property owner to build elsewhere or put the parcel to a different use than originally intended.

Highest Adjacent Grade: The highest **natural** elevation of the ground surface prior to construction next to the proposed walls of a structure.

Historic Structure: Any structure that is:

A. Listed individually in the National Register of Historic Places (a listing maintained by the Department of

Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;

B. Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;

C. Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of Interior; or

D. Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:

1. By an approved state program as determined by the Secretary of the Interior or Directly by the Secretary of the Interior in states without approved programs.

Levee: A man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or diverts the flow of water so as to provide protection from temporary flooding.

Levee System. A flood protection system which consists of a levee, or levees, and associated structures, such as closure and drainage devices, which are constructed and operated in accordance with sound engineering practices.

Lowest Adjacent Grade: The lowest natural elevation of the ground surface immediately next to a building.

Lowest Floor: The lowest floor of the lowest enclosed area including basement (see "Basement" definition). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance.

Manufactured Home: A structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. For floodplain management purposes, the term manufactured home also includes mobile homes, park trailers, travel trailers, recreational vehicles, and other similar vehicles placed on a site for more than 180 consecutive days.

Manufactured Home Park or Subdivision: A parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

Market Value: **S**hall be determined by estimating the cost to replace the structure in new condition and adjusting that cost figure by the amount of depreciation which has accrued since the structure was constructed. The cost of replacement of the structure shall be based on a square foot cost factor determined by reference to a building cost estimating guide recognized by the building construction industry. Also defined in the substantial damage and substantial improvement section of this Ordinance. For the purpose of property acquisition, market value will be determined by a certified/qualified appraiser.

Mean Sea Level (MSL): For purposes of the NFIP, the North American Vertical Datum (NAVD) of 1988, or other datum, to which base flood elevations shown on the FIRM are referenced.

New Construction: For the purposes of determining insurance rates, structures for which the "start of construction" commenced on or after the effective date of an initial FIRM (December 4, 1984), or after December 31, 1974, whichever is later, and includes any subsequent improvements to such structures. For floodplain management purposes, "new construction" means structures for which the "start of construction"

commenced on or after the effective date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.

Obstruction: Includes, but is not limited to, any dam, wall, wharf, embankment, levee, dike, pile, abutment, protection, excavation, channelization, bridge, conduit, culvert, building, wire, fence, rock, gravel, refuse, fill, structure, vegetation or other material in, along, across or projecting into any regulated watercourse which may alter, impede, retard or change the direction and/or velocity of the flow of water, or due to its location, its propensity to snare or collect debris carried by the flow of water or its likelihood of being carried downstream.

One-Hundred Year Flood: The flood having a one percent chance of being equaled or exceeded in any given year. *(See "Base Flood" definition)*

Person: An individual or individual's agent, firm, partnership, association or corporation, or agent of the aforementioned groups, or this state or its agencies or political subdivisions.

Recreational Vehicle: A vehicle that is:

- **A.** Built on a single chassis;
- **B.** 400 square feet or less when measured at the largest horizontal projection;
- **C.** Designed to be self-propelled or permanently towable by a light duty truck; and
- **D.** Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel or seasonal use.

Registered Professional Civil Engineer or Surveyor: An engineer or surveyor registered pursuant to Arizona State law.

Regulatory Floodplain: areas associated with a watercourse, including its channel, or any other floodplain or flood prone area that would be inundated by the base flood, including all base floods where the base flood peak discharge is 500 cfs or greater; those areas that are subject to sheet flow; those areas identified on subdivision plats or development plans; those areas designated by FEMA, including areas designated as D, X, and Shaded Zone X; as well as those areas that the Floodplain Administrator, using the best available data, has determined is subject to a flood hazard during the base flood.

Regulatory Flood: a 100-YEAR FLOOD with a peak discharge of 500 cubic feet per second (cfs), or greater, and which has a one percent (1%) chance of being equaled or exceeded in any given year.

Regulatory Flood Elevation: An elevation one foot above the base flood elevation for a watercourse for which the base flood elevation has been determined and shall be determined by the criteria developed by the director of ADWR for all other watercourses.

Regulatory floodway: The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation.

Sheet Flow Area: Those areas which are subject to flooding with depths of one-half foot or greater during the base flood event, where a clearly defined channel does not exist and the path of the flooding is often unpredictable and indeterminate

Special Flood Hazard Area: An area designated by FEMA that is subject to a 1 percent or greater chance of flooding in any given year, and from this point forward abbreviated as SFHA. An SFHA may be designated as a Zone A, AE, AH, & AO (Zones Shaded X, X and D are not considered a FEMA SFHA).

Zone A: Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.

Zone AE: Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. BFEs are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.

Zone AH: Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between one and three feet. Base Flood Elevations BFEs derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply

Zone AO: Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet. Average flood depths derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply. Some Zone AO has been designated in areas with high flood velocities such as alluvial fans and washes.

Start of construction: Includes substantial improvement and other proposed new development and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement, or other improvement was within 180 days from the date of the permit. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

Structure: A walled and roofed building, including a gas or liquid storage tank, which is principally above ground, as well as a manufactured home.

Substantial Damage: Damage of any origin sustained by a structure whereby the cost of restoring the structure to it's before damage condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. In the absence of information to the contrary, the appraised value of the structure as listed in the County Assessor’s records is presumed to be fair market value.

Substantial Improvement: Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred “substantial damage,” regardless of the actual repair work performed. The term does not, however, include either:

A. Any project for improvement of a structure to correct existing violations of state or local health, sanitary or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or,

B. Any alteration of a "historic structure", provided that the alteration would not preclude the structure's continued designation as a "historic structure".

Variance: A grant of relief from the requirements of this ordinance which permits construction in a manner that would otherwise be prohibited by this ordinance.

Violation: The failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in this ordinance is presumed to be in violation until such time as that documentation is provided.

Water Surface Elevation: The height, in relation to the North American Vertical Datum NAVD of 1988, or other datum, of floods of various magnitudes and frequencies in the floodplains of riverine areas.

Watercourse: A watercourse means only the channel and banks of an identifiable drainage way, and not the adjoining floodplain areas.

Watershed: The drainage area above any point on a watercourse.

ACRONYMS:

ARS – Arizona Revised Statutes
BFE – Base Flood Elevation
FEMA – Federal Emergency Management Agency
FIRM – Flood Insurance Rate Map
FIS – Flood Insurance Study
FPUP– Floodplain Use Permit
LOMA – Letter of Map Amendment
LOMC – Letter of Map Change
LOMR – Letter of Map Revision
LOMR-F – Letter of Map Revision based on Fill
MSL – Mean Sea Level
NFIP – National Flood Insurance Program
SFHA – Special Flood Hazard Area

SECTION 3
GENERAL PROVISIONS

3.1 LANDS TO WHICH THIS ORDINANCE APPLIES

This ordinance shall apply to all regulatory floodplain and FEMA special flood hazard areas within the boundaries of Cochise County except those incorporated cities and towns which have adopted a resolution to assume the powers and duties of floodplain management within its area of jurisdiction in accordance with A.R.S. 48-3610, unless and until said resolution is rescinded.

3.2 ESTABLISHING AREAS OF SPECIAL FLOOD HAZARD AND REGULATORY FLOODPLAINS, FLOODWAYS

A. The areas of special flood hazard identified by the Federal Emergency Management Agency (FEMA) in a scientific and engineering report entitled "The Flood Insurance Study for Cochise County, AZ and Incorporated areas, dated August 28, 2008 with accompanying Flood Insurance Rate Maps (FIRMs) date August 28, 2008, and all subsequent amendments and/or revisions, are hereby adopted by reference and declared to be a part of this ordinance. This Flood Insurance Study (FIS) and attendant mapping define the minimum area of applicability of this ordinance and may be supplemented by studies of other areas which are recommended to the Floodplain Board by the Floodplain Administrator. The Board shall delineate (or by rule require developers of land to delineate) areas within its jurisdiction where development is ongoing or imminent, and thereafter as development becomes imminent, floodplains consistent with the criteria developed by the Federal Emergency Management Agency and the Director of Water Resources. The FIS, and FIRMs are on file at the Cochise County Community Development Department, *1415 Melody Lane, Bisbee, Arizona 85603*

B. Due to continuously and episodically changing hydrologic and hydraulic conditions on the watercourses within Cochise County, base flood peak discharges, flow volumes, and associated special flood hazard areas, regulatory floodplain and erosion hazard areas are continuously subject to revision. At a minimum, base flood values will meet or exceed the current values established by FEMA, and reflect historic flood information and general, current, watershed conditions.

C. In those areas where the regulatory floodplain and erosion hazard areas are not delineated pursuant to Sections 3.2.A and 3.2.B, and upon request for a county permit, the Floodplain Administrator may require the land owner to establish the regulatory floodplain and floodway limits through a hydrologic and hydraulic study prepared by an Arizona Registered Professional Civil Engineer.

D. In those areas where a hydrologic and hydraulic study has been prepared by an Arizona Registered Professional Civil Engineer which delineates the regulatory floodplains, floodways and erosion hazard areas, and has been approved by the Floodplain Administrator, the delineation of those boundaries shown within the study shall be the regulatory floodplain, floodway and erosion hazard areas governed by this ordinance.

E. Construction of any improvement which changes the configuration of the delineated floodplain boundaries contained within the Flood Insurance Study, whether upstream or downstream from or adjacent to the parcel under development, the owner shall provide Cochise County a new delineation of regulatory floodplain boundaries affected by the improvement, prior to the release of assurances for subdivisions or certificate of occupancy for development plans. The new delineation and reports shall be prepared in conformance with the requirements of FEMA, the Director of the Arizona Department of Water Resources and this ordinance. The owner, or the owner's engineer, shall submit

the required flood insurance study information to FEMA. The owner shall be responsible for providing Cochise County a copy of all correspondence with FEMA.

3.3 COOPERATIVE AGREEMENTS AND CONSULTANTS

Cochise County may retain consultants and experts, and may enter into cooperative agreements for the delineation of regulatory floodplains, floodways, riparian habitat, and erosion hazard areas or for other assistance and guidance considered appropriate and necessary.

3.4 COMPLIANCE

All development of land, construction of residential, commercial or industrial structures, or future development that is subject to the terms of this ordinance must also comply with all other applicable laws and regulations.

3.5 ABROGATION AND GREATER RESTRICTIONS

This ordinance is not intended to repeal, abrogate or impair any existing easements, covenants or deed restrictions. However, where this ordinance and another ordinance, easement, covenant or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

3.6 INTERPRETATION

In the interpretation and application of this ordinance, all provisions shall be:

A. Considered as minimum requirements;

B. Liberally construed in favor of the governing body; and

C. Deemed neither to limit nor repeal any other powers granted under state statutes.

3.7 WARNING AND DISCLAIMER OF LIABILITY

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside regulatory floodplain and FEMA special flood hazard areas or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of Cochise County, the Cochise County Flood Control District, the State of Arizona, FEMA, or any officer or employee thereof, for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.

3.8 STATUTORY EXCEPTIONS

A. In accordance with A.R.S. § 48-3609(H), unless expressly provided, this and any regulation adopted pursuant to this article do not affect:

1. Existing legal uses of property or the right to continuation of such legal use. However, if a nonconforming use of land or a building or structure is discontinued for twelve months, or substantial damaged to the extent of 50 percent of its market value as determined by an Arizona Certified Appraiser, any further use shall comply with this article and regulations of the Cochise County.

2. Reasonable repair or alteration of property for the purposes for which the property was legally used on August 3, 1984, or on the date any regulations affecting such property take effect, except that any alteration, addition or repair to a nonconforming building or structure which would result in increasing its flood damage potential by 50 percent or more shall be either flood-proofed or elevated to or above the regulatory flood elevation;

3. Reasonable repair of structures constructed with the written authorization required by A.R.S. § 48-3613; and

4. Facilities constructed or installed pursuant to a Certificate of Environmental Compatibility issued pursuant to A.R.S. Title 40, Chapter 2, Article 6.2.

B. Before the following types of construction authorized by A.R.S. § 48-3613(B) begin, the responsible person must submit plans for the construction to the Floodplain Board for review and comments pursuant to A.R.S. § 48-3613(C).

1. The construction of bridges, culverts, dikes and other structures necessary to the construction of public highways, roads and streets intersecting or crossing a watercourse;

2. The construction of storage dams for watering livestock or wildlife, structures on banks of a watercourse to prevent erosion of or damage to adjoining land if the structure will not divert, retard or obstruct the natural channel of the watercourse or dams for the conservation of floodwaters as permitted by A.R.S. Title 45, Chapter 6;

3. Construction of tailing dams and waste disposal areas for use in connection with mining and metallurgical operations. This paragraph does not exempt those sand and gravel operations that will divert, retard or obstruct the flow of waters in any watercourse from complying with and acquiring authorization from the floodplain board pursuant to regulations adopted by the Floodplain Board under A.R.S. Title 48, Chapter 20, Article 1;

4. Other construction upon determination by the floodplain board that written authorization is unnecessary;

5. Any flood control district, city, town or other political subdivision from exercising powers granted to it under A.R.S. Title 48, Chapter 21, Article 1;

6. The construction of streams, waterways, lakes and other auxiliary facilities in conjunction with development of public parks and recreation facilities by a public agency or political subdivision; and

7. The construction and erection of poles, towers, foundations, support structures, guy wires and other facilities related to power transmission as constructed by any utility whether a public service corporation or a political subdivision.

3.9 UNLAWFUL ACTS

A. It is unlawful for a person to engage in any development or to divert, retard or obstruct the flow of waters in a watercourse if it creates a hazard to life or property without securing the written authorization required by A.R.S. § 48-3613. Where the watercourse is a delineated floodplain, it is unlawful to engage in any development affecting the flow of waters without securing written authorization required by A.R.S. § 48-3613.

B. Any person found guilty of violating any provision of this ordinance shall be guilty of a misdemeanor. Each day that a violation continues shall be a separate offense punishable as hereinabove described.

3. 10 DECLARATION OF PUBLIC NUISANCE

All development located or maintained within any regulatory floodplain and FEMA special flood hazard areas after August 8, 1973, in violation of this ordinance is a public nuisance per se and may be abated, prevented or restrained by action of this political subdivision. (*A.R.S. § 48-3614)*

3.11 VIOLATIONS AND ENFORCEMENT

A. Violations:

1. In addition to other enforcement procedures set forth in these Regulations, enforcement may follow an administrative process. The administrative process for determining, enforcing, and appealing citations for violations shall be as established by the Legislature, which currently is codified in A.R.S. §§ 48-3613. -3614. -3615, and -3615.01. In the event the Legislature alters or adds to that process, this section shall be deemed amended accordingly.

2. For the purpose of this Section, "Chief Engineer" shall be the County Engineer or designee.

3. The Chief Engineer is responsible for investigating all complaints of suspected violations of this Ordinance.

4. The board of hearing review shall be the Floodplain Board of Directors.

5. The Chief Engineer shall develop a form to be provided with a notice of violation, as required by statute, in which an alleged violator can admit or deny the allegations, and a form for a decision and order, as also required by statute.

6. The rules of procedure for hearings and review shall be the same as those adopted by the Board of Supervisors as Rules of Procedure on Zoning and Building Code Violations, except that for purposes of Floodplain violation enforcement:

a. Upon receipt of the notice of violation, the person may:

1. Admit the allegation by mailing or delivering to the Chief Engineer where a "complaint" is deemed to be filed upon receipt of a form or written statement, signed by the alleged violator, as provided by statute. The "complaint" will consist of the Notice of Violation.

2. Deny the allegations by mailing or delivering to the chief engineer a form provided with the notice of violation or a written statement, signed by the person, denying the allegations and requesting a hearing on the matter.

b. If allegations are denied a request for a hearing shall be granted. The hearing officer shall set a date, time and place for a hearing and serve a notice of hearing on the person alleged to be in violation, and provide a notice of the hearing to the chief engineer. Service of notice shall be by personal delivery or certified mail, return receipt requested, or by any other method reasonably calculated to effect actual notice on the alleged violator, the chief engineer and every other party to the action.

c. If possible, the hearing officer required by statute will be the hearing officer who hears zoning violations. If not possible, the Floodplain Board of Directors will separately appoint a hearing officer.

d. After completion of the hearing, the hearing officer shall issue a written finding within 30 days and a recommendation for the appropriate measures to be taken to abate or ameliorate any harm or damage arising from the violation and for the imposition of any civil penalties attributed to the violation.

1. On receipt of the hearing officer's findings, determination and recommendation, the chief engineer shall issue a final decision and order. OR

2. If final decision and order are appealed by any party who is subject to the decision and order of the chief engineer, pursuant to this section, the board of hearing review may review any decision and order of the chief engineer. The written request for review shall be delivered to the clerk of the board of directors within fifteen days after the date of the final decision and order. The written request shall identify specifically the section or sections of the chief engineer's final order that is requested to be reviewed by the board of hearing review.

e. Based on the record before the board of hearing review, the board may deny, approve or modify the order of the chief engineer. The board shall issue a written order of its decision, including findings of fact and conclusions of law, and shall submit its final written order on the matter to the chief engineer within thirty days after completion of the hearing.

f. Certain terminology that is used in the Rules of Procedure on Zoning and Building Code Violations is deemed to be changed to harmonize with Floodplain regulation and enforcement terminology. For example, "Floodplain Administrator" instead of "Zoning Inspector" and "Floodplain Board of Directors" instead of "Board of Supervisors"

7. The Chief Engineer is authorized to obtain administrative search warrants in the manner provided by the Legislature, currently codified in A.R.S. § 48-3603.C.26.

B. Enforcement:

1. As provided for by A.R.S. § 48-3613(D), in addition to other penalties or remedies otherwise provided by law, this state, a political subdivision or a person who may be damaged or has been damaged as a result of the unauthorized diversion, retardation or obstruction of a watercourse has the right to commence, maintain and prosecute any appropriate action or pursue any remedy to enjoin, abate or otherwise prevent any person from violating or continuing to violate Subsection 3.9 of this ordinance or any regulations adopted pursuant to A.R.S. Title 48, Chapter 21, Article 1. If a person is found to be in violation of Subsection 3.8.B of this ordinance, the court shall require the violator to either comply with terms of that subsection, if authorized by the Floodplain Board, or to remove the obstruction and restore the watercourse to its original state. The court may also award such monetary damages as are appropriate to the injured parties resulting from the violation including reasonable costs and attorney fees.

3.11 SEVERABILITY

This ordinance and the various parts thereof are hereby declared to be severable. Should any Section of this ordinance be declared by the courts to be unconstitutional or invalid, such decision shall not affect

the validity of the ordinance as a whole, or any portion thereof other than the Section so declared to be unconstitutional or invalid.

3.12 RECOVERY OF ADMINISTRATIVE AND OTHER COSTS

Cochise County shall be entitled to recover all costs, administrative, engineering and legal, as well as actual costs to remove or modify a structure, encroachment and any other work in violation of this ordinance**.**

SECTION 4
ADMINISTRATION

4.1 DESIGNATION OF THE FLOODPLAIN ADMINISTRATOR

The County Engineer or designee is hereby appointed Floodplain Administrator, whose duties include administration and enforcement of the Cochise County Floodplain Management Ordinance and the National Floodplain Insurance Program and the day to day operations of the Cochise County Floodplain Division.

4.2 DUTIES AND RESPONSIBILITIES OF THE FLOODPLAIN ADMINISTRATOR

Duties of the Floodplain Administrator, together with duly authorized representatives shall include, but not be limited to;

A. PERMIT REVIEW

Review all development permits in regulatory floodplains and FEMA special flood hazard areas to determine that:

1. The permit requirements of this ordinance have been satisfied;
2. All other required state and federal permits have been obtained by respective governmental agencies (CFR 60.3(a) (2)).
3. The site is reasonably safe from flooding;
4. The proposed development does not adversely affect the carrying capacity of areas where base flood elevations have been determined but a floodway has not been designated. For purposes of this ordinance, "adversely affect" means that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one tenth of a foot at any point or increase velocities by more than ten (10%) percent on adjacent properties.

B. SUBSTANTIAL IMPROVEMENT AND SUBSTANTIAL DAMAGE ASSESSMENTS

Review all development permits for improvements and/or damages to existing structures to determine if the application of the substantial improvement rules apply, including establishing a definition of market value determination and verifying that the estimated improvement and/or repair costs are less than 50% of the market value of the structure.

C. USE OF OTHER BASE FLOOD DATA

When Base Flood Elevation data has not been provided in accordance with Section 3.2 (A), the Floodplain Administrator shall obtain, review and reasonably utilize any Base Flood Elevation data available from a federal, state or other source, in order to administer Section 5. Any such information shall be consistent with the requirements of the Federal Emergency Management Agency and the Director of the Arizona Department of Water Resources and may be submitted to the Floodplain Board for adoption.

D. OBTAIN AND MAINTAIN FOR PUBLIC INSPECTION

Obtain and maintain the following for public inspection and make available as needed:

1. Certification required by Section 5.1(C) and Section 5.4 (lowest floor elevations, bottom of the structural frame, and utilities);

2. Certification required by Section 5.1(C) (lowest floor elevations or flood proofing of nonresidential structures and utilities);

3. Certification required by Section 5.1(C) **(**flood vents/openings);

4. Certification of elevation required by Section 5.9 (subdivisions and other proposed development standards);

5. Certification required by Section 5.11 (floodway encroachments);

6. Records of all variance actions, including justification for their issuance.

7. Obtain and maintain improvement and damage calculations required in Section 4.2

E. NOTIFICATION TO OTHER ENTITIES

1. Advise any city or town, having assumed jurisdiction over its floodplains in accordance with A.R.S. § 48-3610(B)(1), of any development plan within a regulatory floodplain or floodway which could affect floodplains, floodways or watercourses within one mile of such city's or town's area of jurisdiction. A copy of the development plan shall be provided to the city or town prior to approval of the development.

2. Whenever a watercourse is to be altered or relocated the Floodplain Administrator shall:

   a. Notify adjacent communities and ADWR prior to such alteration or relocation of a watercourse and submit evidence of such notification to FEMA.

   b. Require as a condition of the floodplain use permit that the flood carrying capacity of the altered or relocated portion of said watercourse be maintained.

3. Base Flood Elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information becomes available, the Floodplain Administrator shall notify the Federal Emergency Management Agency of the changes by submitting technical or scientific data in accordance with Volume 44 Code of Federal Regulations Section 65.3. Such a submission is necessary so that upon confirmation of those physical changes affecting flooding conditions, risk premium rates and floodplain management requirements will be based upon current data.

4. Within one hundred twenty (120) days after completion of construction of any flood control protective works which changes the rate of flow during the base flood or the configuration of the floodplain upstream or downstream from or adjacent to the project, the person or agency responsible for installation of the project shall provide to the governing bodies of all jurisdictions affected by the project a new delineation of all floodplains affected by the project. The new delineation shall be done according to the criteria adopted by the Arizona Department of Water Resources.

5. Make interpretations, where needed, as to the exact location of the boundaries of the areas of special flood hazards (e.g., where there appears to be a conflict between a mapped boundary and actual field conditions). The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in Section 6.0.

6. Corporate Boundary Changes:

a. Notify the Federal Emergency Management Agency of acquisition by means of annexation, incorporation or otherwise, of additional areas of jurisdiction.

4.3 ESTABLISHMENT OF FLOODPLAIN USE PERMIT

A Floodplain Use Permit shall be obtained before construction or development begins, including placement of manufactured homes, within any regulatory floodplain and FEMA special flood hazard area established in Section 3.2. Application for a Floodplain Use Permit shall be made on forms furnished by the Floodplain Administrator and may include, but not be limited to, plans in duplicate drawn to scale showing the nature, location, dimensions and elevation of the area in question, existing or proposed structures, fill, storage of materials, drainage facilities and the location of the foregoing. Specifically, the following information is required:

A. Proposed elevation in relation to mean sea level of the lowest floor (including basement) of all structures. In Zone AO, elevation of existing highest adjacent natural grade and proposed elevation of lowest floor of all structures;

B. Proposed elevation in relation to mean sea level to which any non-residential structure will be flood-proofed;

C. Certification by a registered professional engineer or architect that the flood-proofing methods for any nonresidential structure meet the flood-proofing criteria in Section 5.1.C.2;

D. Require that all new subdivision proposals and other proposed developments (including proposals for manufactured home parks and subdivisions) greater than 50 lots or 5 acres, whichever is the lesser, include within such proposals base flood elevation data; and

E. Description of the extent to which any watercourse will be altered or relocated as a result of proposed development.

These applications shall include, but not be limited to, plans drawn to scale showing the north point, nature, location and dimensions of the area in question, existing and proposed structures and utilities, washes, watercourses or drainage ways, fill, storage of materials, walls, fences, adjacent streets and driveways, or other development that may obstruct, divert or retard flow and a description of the extent to which any watercourse will be affected, altered or relocated as a result of proposed development.

A FEMA Elevation Certificate shall be required to demonstrate compliance with regulatory flood elevation requirements for structures, manufactured homes, service facilities, or other improvements.

SECTION 5
PROVISIONS FOR FLOOD HAZARD REDUCTION

5.1 STANDARDS OF CONSTRUCTION

In all regulatory floodplain and FEMA special flood hazard areas, the following standards are required:

A. Anchoring

1. All new construction and substantial improvements shall be anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy; and

2. All manufactured homes and storage tanks shall meet the anchoring standards of section 5.4.B.

B. Construction Materials and Methods

1. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage;

2. All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.

3. All new construction, substantial improvement and other proposed new development shall be constructed with electrical, heating, ventilation, plumbing and air conditioning equipment (including ductwork) and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding; and

4. Adequate drainage paths are required around structures on slopes to guide floodwaters around and away from proposed structures.

C. Elevation and Flood-proofing

1. Residential construction, new or substantial improvement

All shall have the lowest floor, including basement, elevated to or above the Regulatory Flood Elevation:

a. In an AO Zone, elevated to one (1) foot minimum above the number indicated on the FIRM panel or a minimum of two (2) feet if no number is specified.

b. In an A Zone where a BFE has not been determined, generally, a minimum elevation of two (2) feet above the highest adjacent grade is required or be elevated in accordance with the criteria developed by the Director of the Arizona Department of Water Resources.

c. In Zones AE, AH and A1-30, elevated to one (1) foot above the base flood elevation.

Upon completion of the structure, the elevation of the lowest floor including basement shall be certified by a registered professional engineer or surveyor, and verified by the community's building inspector to be properly elevated. Such certification and verification shall be provided to the Floodplain Administrator. Residential structures may not be flood-proofed, only elevated.

2. Non-Residential construction, new or substantial improvement

All shall either be elevated to conform with Section 5.1.C.1 or together with attendant utility and sanitary facilities:

a. Be flood-proofed below the elevation recommended under Section 5.1.C.1 so that the structure is watertight with walls substantially impermeable to the passage of water; and

b. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and

c. Be certified by a registered professional engineer or architect that the standards of this section are satisfied. Such certification shall be provided to the Floodplain Administrator.

3. Flood openings

All new construction and substantial improvement with fully enclosed areas below the lowest floor (excluding basements) that are usable solely for parking of vehicles, building access or storage, and which are subject to flooding, shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwater. Designs for meeting this requirement must meet or exceed the following criteria:

a. Have a minimum of two openings, on different sides of each enclosed area, having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwater; or

b. Alternatively, a registered engineer or architect may design and certify the openings.

4. Manufactured Homes

a. Manufactured homes shall meet the standards in Section 5.4

5. Garages and accessory structures

a. Attached garages

1. A garage attached to a residential structure, constructed with the garage floor slab below the regulatory flood elevation, must be designed to allow for the automatic entry of flood waters. See Section 5.1.C.3. Areas of the garage below the regulatory flood elevation must be constructed with flood resistant materials. See Section 5.1.B.

2. A garage attached to a nonresidential structure must meet the above requirements or be dry flood-proofed.

b. Detached garages and accessory structures

1. "Accessory structure" used solely for parking or limited storage (small, low-cost sheds), as defined in Section 2.0, may be constructed such that its floor is below the regulatory flood elevation, provided the structure is designed and constructed in accordance with the following requirements

a. Use of the accessory structure must be limited to parking or limited storage;

b. The portions of the accessory structure located below the regulatory flood

elevation must be built using flood-resistant materials;

c. The accessory structure must be adequately anchored to prevent flotation, collapse and lateral movement;

d. Any mechanical and utility equipment in the accessory structure must be elevated or flood-proofed to or above the regulatory flood elevation;

e. The accessory structure must comply with floodplain and floodway encroachment provisions in Section 5.7; and

f. The accessory structure must be designed to allow for the automatic entry and exit of flood waters in accordance with Section 5.1.C.3.

Detached garages, storage structures and other accessory structures not meeting the above standards must be constructed in accordance with all applicable standards in Section 5.1.(C)

D. Adverse Impacts

1. The cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one tenth of a foot along adjacent boundaries, and will not increase the flow velocity by more than 10%.

5.2 STANDARDS FOR STORAGE OF MATERIALS AND EQUIPMENT

A. The storage or processing of materials in a regulatory floodplain or FEMA special flood hazard area that are, in time of flooding, buoyant, flammable, and explosive or could be injurious to human, animal or plant life is prohibited.

B. Storage of other material or equipment may be allowed if not subject to major damage by floods and if firmly anchored to prevent flotation, or if readily removable from the area within the time available after flood warning.

5.3 STANDARDS FOR WATER SUPPLY AND WASTE DISPOSAL SYSTEMS

A. All new or replacement water supply and sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the system and discharge from systems into flood waters.

B. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

C. Waste disposal systems shall not be installed wholly or partially in a floodway.

5.4 STANDARDS FOR MANUFACTURED HOMES

All manufactured homes that are placed or substantially improved shall:

A. Meet all State of Arizona Office of Manufactured Housing requirements set forth in the Minimum Standard for Manufactured Housing Foundation in Floodplains. Including the following:

1. Foundations, or fill pad erosion protection, for installation within floodplain shall be designed by an Arizona Registered Professional Civil Engineer and approved by all appropriate local governmental agencies and by the Office of Manufactured Housing

B. Be elevated so that the bottom of the structural frame (I-beam) or the lowest point of any attached utility (this includes duct work and ground mounted air conditioning units), whichever is lower, is elevated at or above the regulatory flood elevation as stated in 5.1 of this ordinance; and

C. Be securely anchored to an adequately anchored foundation system to resist flotation, collapse or lateral movement. Methods of anchoring may include, but are not to be limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable state and local anchoring requirements for resisting wind forces.

D. Certification that the installation of a manufactured home meets all of the requirements of this section is required as outlined in the Floodplain Use Permit. Such certification shall be provided by a licensed installer or an Arizona Registered Professional Civil Engineer.

E. Placement of Manufacture Home shall be placed parallel to the direction of flow.

5.5 STANDARDS FOR RECREATIONAL VEHICLES

All recreational vehicles placed within a regulatory floodplain or FEMA special flood hazard area on site will either:

A. Be on site for fewer than 180 consecutive days, and

B. Be fully licensed and ready for highway use. A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or

C. Meet the permit requirements of Section 4.3 of this ordinance and the elevation and anchoring requirements for manufactured homes in Section 5.4.

5.6 STANDARDS FOR GENERAL LAND DISTURBANCE, COMMERCIAL, AND INDUSTRIAL DEVELOPMENTS

Any land disturbance that occurs within a regulatory floodplain or FEMA special flood hazard area requires a Cochise County Floodplain Use Permit.
Where more than one (1) acre of land is to be altered or disturbed or where imperviousness increases more than fifty (50%) percent from the existing conditions, a drainage analysis will be required. This report shall be certified by an Arizona Registered Professional Civil Engineer. See Appendix A for minimum information required.

A. Plats and development plans to show areas subject to flooding and erosion. The plats/plans shall also include the direction of any flow and drainage area, as well as water surface elevations, the limits of inundation, and erosion hazard setback for the base flood if such a flood has a peak flow rate equal or greater than fifty (500) cubic feet per second (cfs). These requirements are in addition to all Planning and Zoning site plan requirements

5. 7 STANDARDS FOR SAND AND GRAVEL MINING

A. Extraction of sand, gravel and other materials is allowed, if permitted by all other applicable Federal, State, and local regulations, and erosion hazard areas, provided that excavations are not so located nor of such depth, or width, or length, or combination of depth-width-length as to present a hazard to structures (including, but not limited to roads, bridges, culverts, and utilities), to banks or watercourses, or to other property.

B. There shall be no stockpiling of material or tailings that may obstruct, divert or retard the flow of floodwaters except as reviewed and approved by the Floodplain Administrator.

C. Due to the rapidly changing hydraulic characteristics of watercourses in Cochise County, and the effects excavations have on these characteristics, Floodplain Use Permits for excavations shall only be issued for a limited period of time, not to exceed one year, subject to annual renewal upon review by the Floodplain Administrator.

D. In addition to those conditions provided for elsewhere, Floodplain Use Permit for excavations may impose conditions regarding the area and location in which excavations are allowed, the maximum amount of material to be excavated, and other reasonable restraints on methods of operation, including time restraints.

E. Permitting for Sand and Gravel will require a closure plan that addresses flood heights, velocity, erosion, and grade control during and after the periods of extractions. The Floodplain Administrator may require hydrologic, hydraulic and geomorphic analyses addressing the existing conditions as well as the impacts under the proposed method of operation.

F. The Board may grant variances as provided by Section 6 of this ordinance.

G. Standards for minimal impact no permit required.

NOTE: See Appendix A for Drainage Report Requirement/Formatting.

5. 8 STANDARDS FOR SUBDIVISIONS

A. All new subdivision proposals, including proposals for manufactured home parks and subdivisions, greater than 50 lots or 5 acres, whichever is the lesser, shall:

1. Identify the area of the special flood hazard area and the elevation of the base flood.

2. Submit drainage analysis to identify the special flood hazard area or the regulatory floodplain area and the elevation of the base flood identified on the final plans the elevation(s) of the proposed structure(s) and pads. If the site is filled above the base flood elevation, the final lowest floor and grade elevations shall be certified by a Registered Professional Civil Engineer or surveyor and provided to the Floodplain Administrator.

NOTE: See Appendix A for Drainage Report Requirement/Formatting.

B. All subdivision proposals and other proposed development shall be consistent with the need to minimize flood damage.

C. All subdivision proposals and other proposed development shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage.

D. All subdivision proposals shall provide adequate drainage to reduce exposure to flood hazards.

E. Application

1. Land may not be parceled or subdivided in such a manner as to create lots unsuitable for development because of flood or erosion hazards.

2. All subdivision plats, development plans, associated building plans and improvement plans are subject to the design requirements for regulatory floodplains as specified under A. R. S. Section 48-3609 and this ordinance.

F. Plan Information

All tentative plats and development plans submitted to the County shall show location, by survey or photographic methods, of streams, watercourses, canals, irrigation laterals, private ditches, culverts, lakes and other water features, including those areas subject to flooding or erosion. The plats/plans shall also include the direction of any flow and drainage area, as well as water-surface elevations and the limits of inundation for the base flood, if such a flood has a contributing drainage area equal to or greater than four-tenths of a square mile (five-hundred (500) cfs), or is a FEMA mapped floodplain. Plats or plans shall be sealed by an Arizona Registered Land Surveyor or Professional Civil Engineer.

1. Grading and Drainage Improvement

a. A floodplain use permit is required prior to commencement of any site improvements or grading associated with a subdivision development. A grading plan must be submitted to the Cochise County Flood Control District for review and approval. Detailed improvement plans for storm drains or channel improvements must also be submitted to the same department for review and approval. Where a grading plan or detailed drainage improvement plans are not provided, the Floodplain Administrator may require additional information and engineering plans prior to issuing a floodplain use permit.

b. All final plats, tentative plats and development plans shall show proposed grading and drainage improvements.

2. Grading and drainage plans shall demonstrate:

a. The methods for flood proofing and/or drainage control for the development, including sufficient lot grading information to demonstrate adequate finished pad elevations and/or drainage slopes to protect building foundations;

b. That improvements are compatible with the existing upstream and downstream drainage conditions and that any proposed grading and/or grade change will not have an adverse impact on surrounding properties;

c. The methods of erosion and sediment control;

d. The methods of mitigating increased urban peak and volumetric flood water runoff or discharge on downstream properties created as a result of the development.

e. Any necessary erosion and/or sediment control practices such as re-vegetating disturbed areas.

3. Floodplain and Floodway Boundaries - Drainage Areas

a. All final plats and development plans shall indicate the limits of the regulatory floodplains, erosion hazard boundaries, and the limits of the federally established regulatory floodplains and floodway (if applicable), and be delineated in a surveyable manner and sealed by an Arizona Registered Land Surveyor.

b. Where subdivision improvements modify or remove the SFHA that is designated on the federal FIRM, a hydraulic analysis of the impact and the engineering plans for the modifications must be approved by the District and a Conditional Letter of Map Revision (CLOMR) submitted and approved by FEMA prior to the recording of the final plat.

c. Where modification of a federally defined floodway is proposed, approval of a CLOMR by FEMA amending the floodway boundary is required prior to the recording of the final plat.

d. Prior to the release of assurances for subdivisions or certificate of occupancy for development plans, the Letter of Map Revision (LOMR) must be approved by the Flood Control District and FEMA.

4. Street Elevation Requirements

Streets required for paved permanent access shall be designed and constructed so that the flow depths over them do not exceed 1 foot in depth during the base flood.

5. Building Site Location Restrictions

a. Building sites are to be located outside of the regulatory floodplain if possible.

b. No structure or fill is to be placed within the regulatory floodway.

c. Structures shall be constructed/placed in accordance with the erosion hazard setback as described in Section 5.12.

6. Setbacks from Channels

Setbacks from banks of watercourses and/or other protection measures shall be established in accordance with approved studies and this ordinance. Along reaches of watercourses where hazards from eroding banks or channel meandering are considered by the Floodplain Administrator to be severe, special engineering studies, prepared and sealed by an Arizona Registered Professional Civil Engineer may be required of the property owner or developer.

7. Cost recovery for drainage or flood control improvements.

The Floodplain Board may establish a cost recovery system or fee system for the improvement of installation of public flood control systems. The purpose of the fee is to provide a method for off-site improvements necessary to mitigate the effect of urbanization and to provide a systematic approach for the construction of public flood control improvements. If such a system is adopted, it shall demonstrate that the fee will in some manner benefit the property from which the fee is collected and be applied equitably to all property in proportion to floodwaters generated by urban use of the property. The fees will also be restricted to providing flood control improvements necessary for the allowed use of the properties from which the fee is collected, and the fees shall be reasonably related to the actual cost of providing flood control improvements beneficial to the site or surrounding area.

5.10 MAINTENANCE OF PRIVATE DRAINAGE IMPROVEMENTS

When drainage improvements are associated with an approved development plan, subdivision plat or approved engineering report, and are constructed to provide flood protection to remove or reduce flood hazards, including those identified by FEMA or for storm water quality control, and where those improvements are privately owned, then it shall be the responsibility of the property owner(s) to perform maintenance as necessary to ensure the integrity of said drainage improvements and maintenance of the flood carrying capacity to the designed discharge.

A. Covenants, conditions and restrictions shall be required for private drainage improvements, prior to the construction of the improvements. The covenants, conditions and restrictions must outline

maintenance responsibilities of the property owners and must be reviewed and approved by the Floodplain Administrator, prior to the construction of the drainage improvements.

5.11 FLOODWAYS

Located within areas of special flood hazard established in Section 3.2 are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of floodwaters which carry debris, potential projectiles and erosion potential, the following provisions apply:

A. Prohibit encroachments, including fill, new construction, substantial improvements and other development, unless certification by a registered professional engineer or architect is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.

B. If Section 5.11(A) is satisfied, all new construction and substantial improvements shall comply with all other applicable flood hazard reduction provisions of Section 5.0.

5.12 EROSION HAZARD AREAS AND BUILDING SETBACKS

A. Setbacks near major watercourses

For major watercourses with base flood peak discharges of 2,000 cfs or greater, the following build setbacks shall be required where approved bank protection is not required:

1. Along the major natural watercourses such as the San Pedro River and Babocomari River, there will be a minimum building setback of 300 feet. All other major watercourses will follow State Standard methods for calculating setbacks.
2. Along major natural watercourses where unusual conditions do exist that may increase or decrease the required erosion hazard setback, building setbacks shall be established on a case-by-case basis by the Floodplain Administrator using the standard adopted by the ADWR or other applicable engineering methods which establish safe limits for the development. Unusual conditions include but are not limited to historical meandering of the watercourse, large excavation pits, poorly defined or poorly consolidated banks, natural channel armoring, proximity to stabilized structures such as bridges or rock outcrops, and changes in the direction, amount and velocity of the flow of water within the watercourse.
3. When determining building setback requirements, the Floodplain Administrator shall consider the danger to life and property due to existing flood heights or velocities and historical channel meandering.
4. For constructed channels, structural bank protection to prevent erosion is required for major watercourses with base flood peak discharge of more than 2,000 cfs unless a written waiver of the requirement is granted by the Floodplain Administrator. A waiver of the requirement may be granted based on an acceptable engineering study, which has been prepared and sealed by an Arizona Registered Professional Civil Engineer.

B. Setbacks near minor watercourses

For minor natural washes with a base flood peak discharge of less than 2,000 cfs, the following building setbacks shall be required:

A. A distance of 50 feet from watercourses with base flood peak discharges of less than 2,000 cfs, but more than 500 cfs.

B. A distance of 20 feet from watercourses with base flood peak discharges of less than 500 cfs, but more than 100 cfs.

C. Alternative safe limits for erosion setbacks approved in writing by the Floodplain Administrator based on an acceptable engineering study prepared and sealed by an Arizona Registered Professional Civil Engineer. However, at no time shall a setback of less than 20 feet from the top of channel bank be permitted in order to provide for reasonable access and stability of nearby structure foundations, except as allowed pursuant to subpart D of this provision.

D. Along minor natural washes where unusual conditions exist, building setbacks shall be established on a case-by-case basis by the Floodplain Administrator, using ADWR standards or other applicable engineering methods or an acceptable engineering study is prepared and sealed by an Arizona Registered Professional Civil engineer and approved by the Floodplain Administrator. When determining building setback requirements, the Floodplain Administrator shall consider danger to life and property due to existing flood heights or velocities and historical channel meandering. Unusual conditions include but are not limited to historical meandering of the watercourse, large excavation pits, poorly defined or poorly consolidated banks, natural channel armoring, proximity to stabilized structures such as bridges or rock outcrops, and changes in the direction, amount and velocity of flow of the waters in the watercourse.

E. For constructed channels, channel banks are required to be stabilized to prevent erosion along minor watercourses with base flood peak discharges of less than 2,000 cfs, but greater than 500 cfs. Stabilization is required unless a waiver to the requirement is granted by the Floodplain Administrator based on an engineering study prepared and sealed by an Arizona registered Professional Civil engineer who demonstrates an appropriate building setback for an earthen channel, based on soil and natural flow conditions. For constructed channels with a base flood peak discharge of less than 500 cfs, channel stabilization may be required based on engineering analysis and assessment of soil conditions and flow velocities.

SECTION 6
VARIANCE PROCEDURE

6.1 NATURE OF VARIANCES

The variance criteria set forth in this section of the ordinance are based on the general principle of zoning law that variances pertain to a piece of property and are not personal in nature. A variance may be granted for a parcel of property with physical characteristics so unusual that complying with the requirements of this ordinance would create an exceptional hardship to the applicant or the surrounding property owners. The characteristics must be unique to the property and not be shared by adjacent parcels. The unique characteristic must pertain to the land itself, not to the structure (except with respect to Subsection 6.3.B, below), its inhabitants or the property owners.

It is the duty of the Floodplain Board to help protect its citizens from flooding. This need is so compelling and the implications of the cost of insuring a structure built below the regulatory flood elevation is so serious that variances from the flood elevation or from other requirements in the flood ordinance are quite rare. The long-term goal of preventing and reducing flood loss and damage can only be met if variances are strictly limited. Therefore, the variance guidelines provided in this ordinance are detailed and contain multiple provisions that must be met before a variance may be properly granted. These criteria are designed to screen out situations in which alternatives other than a variance are more appropriate.

6.2 APPEAL BOARD

A. The Floodplain Board of Cochise County shall hear and decide:

1. Appeals (other than appeals of notices of violations governed by Section 3.12 above) when it is alleged there is an error in any requirement, decision, or determination made by the Floodplain Administrator in the administration of this ordinance; and
2. Requests for variances from the requirements of this ordinance.

B. Before approving such applications, the Floodplain Board shall consider all technical evaluations, all relevant factors, standards specified in other sections of this ordinance, and:

1. the danger that materials may be swept onto other lands to the injury of others;

2. the danger of life and property due to flooding or erosion damage;

3. the susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;

4. the importance of the services provided by the proposed facility to the community;

5. the availability of alternative locations for the proposed use, which are not subject to flooding or erosion damage;

6. the compatibility of the proposed use with existing and anticipated development;

7. the relationship of the proposed use to the comprehensive plan and floodplain management program for that area;

8. the safety of access to the property in time of flood for ordinary and emergency vehicles;

9. the expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters expected at the site; and,

10. the costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, water system and streets and bridges.

C. Upon consideration of the factors of Section 6.2(c) and the purposes of this ordinance, the Floodplain Board may attach such conditions to the granting of variances as it deems necessary to further the purposes of this ordinance.

D. Any applicant to whom a variance is granted shall be given written notice, signed by the Floodplain Administrator that:

1. the issuance of a variance to construct a structure below the base flood level may result in increased premium rates for flood insurance up to amounts as high as $25 for $100 of insurance coverage; and

2. Such construction below the base flood level increases risks to life and property.

Such notification shall be maintained with a record of all variance actions as required in Paragraph 6.2.E of this ordinance. Such notice will also state that the land upon which the variance is granted shall be ineligible for exchange of land pursuant to any flood relocation and land exchange program. A copy of the notice shall be recorded by the Floodplain Board in the office of the Cochise County Recorder and shall be recorded in a manner so that it appears in the chain of title of the affected parcel of land.

E. The Floodplain Administrator shall maintain a record of all variance actions, including justification for their issuance and report such variances issued in its biennial report submitted to FEMA.

6.3 CONDITIONS FOR VARIANCES

A. Generally, variances may be issued for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the regulatory flood level, provided that the provisions of Sections 4 and 5 of this ordinance have been fully considered. As the lot size increases beyond one-half acre, the technical justification required for issuing the variance increases.

B. Variances may be issued for the repair, rehabilitation or restoration of structures listed in the National Register of Historic Places or the State Inventory of Historic Places, upon a determination that the proposed repair or rehabilitation will not preclude the structures continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.

C. Variances shall not be issued within any designated floodway if any increase in flood levels during the base flood discharge would result.

D. Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

E. Variances shall only be issued upon:

1. A showing of good and sufficient cause;

2. A determination that failure to grant the variance would result in exceptional hardship to the applicant;

3. A showing that the use cannot perform its intended purpose unless it is located or carried out in close proximity to water;

4. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public or conflict with existing local laws or ordinances.

5. A determination that the variance is justified pursuant to A.R.S. § 48-3609.B.7.

SECTION 7
FLOODPLAIN PERMITS AND OTHER FEES

For each floodplain use permit application (for properties in a regulatory floodplain or FEMA special flood hazard area), a nonrefundable filing/permit fee shall be charged based upon the adopted fee schedule. Fees specified herein shall be in addition to any fees required pursuant to other applicable regulations and ordinances.

A. Single and multi-family residence, and manufactured home, for which a drainage/hydrology study has not been submitted and approved - $150.00.

B. Single and multi-family residence, and manufactured home, for which a hydrology and hydraulics report has been submitted and approved - $65.00.

C. Accessory structures or additions, including detached garages, sheds, carport and other structures (per structure or addition) - $40.00 each

D. Permit fees for commercial and other non-residential developments shall be assessed in accordance with cost of the development as follows:

if cost is less than $250,000 - $150.00
if cost is over $250,000 - $250.00

E. For use of outside consultant for plan review and/or inspection - $ at cost

F. Variance requests - $75.00

SECTION 8
ADOPTION OF ARIZONA DEPARTMENT OF WATER RESOURCES (ADWR) STANDARDS

The Director of the Arizona Department of Water Resources has authority outlined in A.R.S. §48-3605(A) to establish base flood elevations. The ADWR with the assistance of the Arizona Floodplain Managers Association and Arizona city and county flood control districts have established standard methodologies for determining base flood elevations and other design standards for floodplain and stormwater studies. The Cochise County Flood Control District hereby adopts the following standards and any modifications and amendments thereto:

8.1 ADWR STANDARD 1-97 - "Instructions for Organizing and Submitting Technical Documentation for Flood Studies"

This standard establishes documentation standards for flood studies that delineate or revise floodplains. It applies to any Level III flood studies submitted to Cochise County.

8.2 ADWR STANDARD 2-96 - "Delineation of Riverine Floodplains and Floodways in Arizona"

This standard provides methodologies for estimating 100-year peak discharges, delineating 100-year floodplain limits and determining administrative floodplains. There are three levels of complexity of analysis. The Floodplain Administrator will determine the level of analysis required.

8.3 ADWR STANDARD 3-94 - "Supercritical Flow"

This standard establishes guidelines for modeling floodways for watercourses with supercritical or near critical flow.

8.4 ADWR STANDARD 4-95 - "Identification of and Development within Sheet flow Areas"

This standard provides minimum standards for identification of sheet flow areas and for development within them.

8.5 ADWR STANDARD 5-96 - "Watercourse System Sediment Balance"

This standard provides guidelines for determining: lateral migration setbacks for riverine floodplains, channel degradation estimation for alluvial channels, and evaluation of river stability impacts associated with Sand & Gravel mining

8.6 ADWR STANDARD 7-98 - "Watercourse Bank Stabilization"

This standard provides standards for design and construction of channel bank protection.

8.7 ADWR STANDARD 8-99 - "Stormwater Detention/Retention"

This standard details methodologies for sizing detention/retention systems when required.

8.8 ADWR STANDARD 9-02 - "Floodplain Hydraulic Modeling"

This standard provides a procedure to use in order to fulfill the requirements of flood insurance studies and county flood damage prevention ordinances.

8.9 ADWR STANDARD 6-05 - "Development of Individual Residential Lots within Flood-prone Areas"

This standard provides guidelines for site plans for individual residential lots to be used for all new construction.

8.10 ADWR STANDARD 10-07 - "Hydrologic Modeling Guidelines"

SECTION 9
AMENDMENTS

Amendments to these Regulations shall be as follows:

9.1 Amendment to the text of these Regulations shall occur only upon a hearing of the Flood Control District Board of Directors after giving not less than fifteen (15) days notice by publication of the proposed change in a newspaper of general circulation in the County. Any interested person may submit an application for an amendment, or the Flood Control District Board of Directors may act upon its own motion.

9.2 A copy of all proposed changes and notice of hearing shall be submitted to the appropriate Flood Insurance Administrator in FEMA and to the Arizona Department of Water Resources for their comment at least thirty days prior to the hearing.

9.3 Approval of an amendment to these Regulations may be granted only if the amendment does not conflict with any applicable federal or state requirements for Floodplain Management Regulations. A copy of any regulation adopted by the district shall within five (5) days thereafter be filed with Arizona Department of Water Resources and with each political subdivision and Municipal Corporation in the area of jurisdiction**.**

Section 10
APPENDIX A

Drainage Report Requirements for:
Regulatory Floodplain and FEMA Special Flood Hazard Areas (Sec 3.2)
General Land Disturbance, Commercial and Industrial Developments - greater than 1 acre or where imperviousness increases by more than 50% (Sec. 5.6),
of the Cochise County Floodplain Regulations

Bound report with cover stating:

- Project title (Address and Parcel No.), Section, Township & Range, City, State
- Prepared for: name of the development/developer/owner
- Prepared by: Engineering Firm & Address
- Date of report & Revised dates if any

Minimum Information required in the Drainage Report

Introduction

- Description of Project
- Purpose & Objective
- Previous Drainage Information
- Flood Insurance Studies: Location within designated Federal Emergency Management Area (FEMA) areas as shown on Flood Insurance Rate Maps (FIRM)

Hydrologic Analysis

- Provide description of Existing Conditions: Land Zoning, Hydrologic parameters [watershed areas, lengths, slopes, basin factors, rainfall values (Per State Standard mean precipitation estimates, per NOAA Atlas 14)], Latitude/Longitude value used for project site (used for selecting rainfall values), soil types, impervious areas, vegetative cover, etc.
- Provide description of Proposed Conditions: Explanation of what is being proposed for the parcel; (buildings, pavement etc.) explain whether or not impervious area (improvements) will result in an increase/decrease in discharge.
- Provide delineations of the offsite and onsite watersheds. The total of individual onsite watershed areas must equal the project site watershed area.
- Preferred hydrologic method used in determining 100-yr discharge for Offsite (if any) and Onsite flows: PC-Hydro software for rural or urban areas with less than 10 sq. mi., have a time of concentration of less than 180 minutes, and are not controlled by flood-control reservoirs or basins. If drainage area is greater than 10 sq. mi., apply acceptable State Standard methods (SS10-07) or Tucson Stormwater Management Study (TSMS) methodology to determine 100-yr discharge values.
- Provide summary table showing pre-development discharges vs. post-development discharges for the 100-year storm events.
- Provide Detention Pond Routing results, if modeling detention/retention basins, using AZ State Standards (SS8-99), HEC-1 or HEC-HMS to demonstrate post-development (proposed condition) flows shall not exceed pre-development (existing condition) flows.

Hydraulic Analysis

- Provide description of analysis results of both existing and proposed conditions with hydraulic summary table comparing results. Submit summary of analysis including: 100-yr water surface elevations, velocities and flow depths through existing conditions and proposed improvements (channels, pipes, box culverts, weirs, etc). The following are items that should be summarized in the analysis of the drainage report and included within tables of the report.
- Describe structure sizes and erosion control requirements if any within the text of the report.

Hydraulic Analysis cont

- Provide 100-yr water surface elevations using Manning's X-section if simple, HEC-RAS X-Sections if more detailed for regulatory flow (Cochise County Regulatory flows per floodplain regulations are areas producing more than 500 cubic feet per second (cfs) or greater).
- For purposes of the Cochise County Floodplain Ordinance, "adversely affect" means that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one tenth of a foot along adjacent boundaries. Provide analysis and discussion that development will not adversely impact adjacent properties. If proposed development will adversely impact adjacent parcels, analyze and explain mitigation plan so as not to adversely impact parcels.
- If flow within a channel is proposed to be re-aligned, improvements should be modeled for maximum depth (sub-critical conditions) for finished floor requirements, maximum velocities (super critical analysis) to determine scour depths, super elevation for flow in a curved channel; provide summary tables within the text of the report showing comparison of the results.
- Provide pipe design flows under roads:
  Arterial, Main Collector: 25-yr flow
  Minor Collector: 10-yr flow
  Local: 2-yr flow
- Recommend all drainage pipes shall be RCP or CMP
- Recommend all drainage pipes be 12 inches in diameter (minimum)
- Recommend minimum cover over pipe shall be 2.5 feet
- Recommend minimum preferred slope of drainage pipe is 1.0% (0.5% absolute minimum)
- Recommend maximum slope of drainage pipe is 9%
- Recommend velocity of flow within the pipe not be less than 3 ft/s (cleaning) or greater than 10 ft/s (scour)
- Description of basin (details, method of construction, sizing etc.)
- Calculations showing time-stage relationship inside basin (peak flow, peak elevation, peak hour)
- Outfall structure detail showing all outfall elevations
- Recommend outfall structure with a low flow discharge and grated top
- Show all outfall structure discharge elevations and 100-year storm event elevation
- Detention basin sections showing all 100-year water surface elevation
- Overflow spillway made of concrete or grouted rip rap
- Basin discharge shall have flared end with concrete or grouted rip rap apron
- Recommend 3:1 basin side slopes
- Recommend 10 foot wide level access around entire basin for maintenance
- Recommend enclosing basin with gated fence
- Verify groundwater elevations do not impact operation of basin
- Detention basin shall drain within 24 hrs so as not to cause a mosquito issue.

Scour Analysis & Sedimentation

- Provide Analysis to demonstrate the controlling of scour and/or the transporting of sediment is minimized. This includes but is not limited to controlling scour at pipe outlets, scour along channel bottoms, channel banks, detention/retention sloped areas, stabilization, etc. Provide analysis of pipe outlet velocities, channel velocities and provide erosion protection per ADWR SS7-98 Bank Stabilization, Section 9 Channel Stabilization and Hydraulic Structures methods per City of Tucson Standards Manual for Drainage Design and Floodplain Management (SMDDFM). Scour analysis stability for structures should follow Erosion and Sedimentation (Ch 6) requirements from the SMDDFM.

Maintenance Instructions

- Provide instruction on how drainage improvements are to be maintained. Culverts within in Cochise County frequently get plugged up from sediment transport. If clogged pipes are not cleaned, flows frequently get diverted to adjacent parcels resulting in property damage. Therefore it is important that maintenance inspections and procedures are performed periodically (monthly, bi-monthly, before a storm, after a storm, yearly, etc.) to ensure conveyance systems are working properly.

Summary and Conclusions

Provide a summary of the results of the proposed improvements

References

Provide a list of references used for the analysis provided in the drainage report

List of Figures

Scales shall be engineering scale: (1"= 10', 20', 30', 40', 50', 60', 100', 1000', etc.) provided on 8.5" x 11", 11"x 17", 24" x 36" paper

- Provide a Vicinity Map
- Provide a location of the project site on a current FEMA Firm Panel, Fema Firmettes etc.
- Provide an Existing Conditions Watershed Map (showing concentration points, flow direction, parcel no., existing contours, watershed delineations of offsite areas that affect the project, onsite watershed delineations within the project site, 100-yr existing conditions discharge values, hydrologic soil type delineations, subwatershed areas values, 100-yr existing hydraulic cross sections [river stations in HEC-RAS], 100-yr existing conditions water surface elevations (WSE), 100-yr existing conditions floodplain delineations legend, etc.).
- Provide an Existing Conditions Floodplain map (showing concentration points (consistent with existing conditions), flow direction, parcel no., proposed contours, onsite watershed delineations, 100-yr proposed condition discharge values, 100-yr proposed hydraulic cross sections [river stations in HEC-RAS], 100-yr water surface elevations (WSE), 100-yr floodplain delineations, finished floor elevation, detention basin WSE, legend information.
- Proposed Conditions Floodplain (showing concentration points, flow direction, parcel no., proposed contours, Cross sections [river stations in HEC-RAS], legend information, etc.
- Provide watershed shape files, electronically

List of Tables

- Pre-development/Post-development discharges
- Pre-development/Post-development Water Surface Elevations (if base flow is greater than the regulatory base flow.

List of Appendices

- Provide Hydrologic and hydraulic analysis calculations, Hydraulic, pipe design sizing if not in hydrologic files, erosion control calculations, scour calculations, weir calculations, curb opening calculations, detention/retention basin calculations (if using retention basins, dry wells must be registered with the Arizona Department of Water Resources (ADWR). NOTE: IF ANALYSIS FILES CAN BE PROVIDED ELECTRONICALLY, PLEASE PROVIDE ELECTRONIC COPIES IN LIEU OF HARD COPIES.

Drawings

- Pre and post-development plans on 24"x36" sheets in AutoCAD or ArcView format. Can be on same drawings with dashed or ghost lines for existing conditions. (scales: same as list of figures)
- Detail sheets showing pertinent design specifications.
- Copies of electronic files used in drainage analysis (hydrology, hydraulics, scour analysis, etc.) is requested to be provided on disk and attached in the drainage report.

Action 3.

Flood Control District Meeting **Community Development**

Meeting Date: 12/15/2015

Accept Grant Award from The Nature Conservancy for stream channel monitoring: recharge projects

Submitted By:	Karen Riggs, Community Development		
Department:	Community Development	**Division:**	Floodplain
Presentation:	No A/V Presentation	**Recommendation:**	Approve
Document Signatures:	BOS Signature Required	**# of ORIGINALS Submitted for Signature:**	2
NAME of PRESENTER:	Karen Riggs	**TITLE of PRESENTER:**	Highway/Floodplain Director
Mandated Function?:	Not Mandated	**Source of Mandate or Basis for Support?:**	

You will use this Agenda Item template if your item involves a Grant (whether a new or renewal grant). You also must attach the Grant Approval Form to the item before Finance will approve it. Select the SPECIAL LINKS on your left-hand menu and Click on "Grant Approval Form". Then complete the form, save it and attach it to your item (on the Attachments tab).

Information

Agenda Item Text:

Approve grant award from The Nature Conservancy of $70,375 to Cochise County Flood Control District for streamflow monitoring for Palominas Recharge Project and two potential future recharge sites and for match for the next approved recharge project analysis and conceptual design.

Background:

The Nature Conservancy has funding available for streamflow monitoring, which has been recognized as needed both for effectively planning new recharge projects and for determining better flow and available recharge amounts for the existing Palominas recharge project. They wish to grant these funds to Cochise County FCD to manage a contract for this purpose. Also granted are funds for analysis and conceptual design of the next approved recharge project.

Department's Next Steps (if approved):

FCD staff will finalize scope of work and contract for services for streamflow monitoring: purchase, installation, data collection/analysis and a final report for one year of monitoring at selected locations. FCD staff will also finalize scope of work and contract for services for analysis and conceptual design of next approved recharge project.

Impact of NOT Approving/Alternatives:

Over $70,000 in grant funds will not be available for needed streamflow monitoring for existing and future recharge projects and future recharge projects or for analysis and design of the next approved recharge project.

To BOS Staff: Document Disposition/Follow-Up:

Nothing needed except Board approval of this item. A contract for professional services will come before the Board for approval for actual use of the funds.

Budget Information

Information about available funds

Budgeted: ☐	**Funds Available:** ☐	**Amount Available:**
Unbudgeted: ☐	**Funds NOT Available:** ☐	**Amendment:** ☐

Account Code(s) for Available Funds

1:

Fund Transfers

Attachments

Grant Approval Form

Grant

COCHISE COUNTY GRANT APPROVAL FORM

Form Initiator: Date Prepared:

Point of Contact: Phone Number:

Department:

PRIMARY GRANT

Primary Grantor: CFDA: www.CFDA.gov

Grant Title:

Grant Term From: To: Total Award Amount:

New Grant: Yes No Grant No:

Amendment: Yes No Amendment No:

GL Account No: If new, Finance will assign a fund number.

Strategic Plan: District: Mandated by Law Yes No

Number of Positions Funded:

Asset(s) Acquired:

Grantor's reimbursement mileage rate:

Health or pension reimbursement: Other reimbursement:

Briefly describe the purpose of the grant:

If this is a mandated service, cite the source. If not mandated, cite indications of local customer support for this service.

PRIMARY FUNDING SOURCE

Funding Year: Federal Funds 332.100

State Funds 336.100

County Funds 391.000

Other Funds:

Total Funds:

Has this amount been budgeted? Yes No

Method of collecting funds: Lump Sum Quarterly Draw Reimbursement

Is revertment of unexpected funds required at the end of grant period? Yes No

(a) Total indirect (A-87) Cost Allocation: (b) Amount of overhead allowed by grant:

County Subsidy (a) - (b) =

Is there a Secondary Grant Award associated with this Grant? Yes No

Name of Grant: Funder:

If yes please complete an additional grant approval form.

Is County match required? Yes No

County match source:

County match dollar amount or percentage:

NOTE: Please attach this Grant Approval form to the AgendaQuick item. The AgendaQuick "Grant Approval template" must be used. Once approved by the Board of Supervisors, the department is responsible for sending a copy of the fully executed GRANT DOCUMENT *(not this approval form)* to the Finance Department.

The Nature Conservancy.
Protecting nature. Preserving life.

PRIVATE GRANT AGREEMENT

TNC Accounting Information	
Agreement #:	AZFO-151124
Project Record ID / Activity#:	P102103 102138
Account #:	5076
Prime Grant:	WFF V 2014-15

December 8, 2015

Cochise County
Attn: Karen Riggs, Cochise County Engineer
1415 Melody Lane, Building F
Bisbee, AZ 85603

Re: Grant to Cochise County for up to $70,375 to Support 1) San Pedro Ephemeral Streamflow Monitoring and 2) Complete two Recharge Feasibility Studies

Dear Ms. Riggs,

We are very pleased to inform you that The Nature Conservancy (the "Conservancy") has agreed to make this Grant to Cochise County Flood Control District ("Awardee") in the amount not to exceed $70,375. These funds are under the grant **dated December 2, 2013** ("Prime Award") between The Conservancy and The Walton Family Foundation, to work with partners, such as Cochise County, to design and develop a Regional Aquifer Recharge Network, and ensure that water supplies are optimally managed to sustain riparian health within the San Pedro Riparian National Conservation Area (SPRNCA), thereby protecting Arizona's San Pedro River.

I. OBJECTIVE

The purpose of this Grant is to provide funds to support two projects: 1) $29,515 to establish an ephemeral streamflow monitoring network to quantify the actual amount of urban enhanced runoff flowing to the Upper San Pedro River recharge sites ("Program 1") more particularly described in the draft Scope of Work (SOW) (Attachment A), and 2) $40,860 for the technical analysis, feasibility study and conceptual design of the next recharge project/s agreed upon by the Cochise Conservation and Recharge Network ("Program 2") more particularly described in the draft Scope of Work (SOW) (Attachment B). The Grant will be contingent upon Grantee providing matching funds in the amount of $33,000 and $280,000.00 for Program 2.

II. TERM

This grant shall commence upon execution and shall expire on **December 23, 2016**.

III. REPORTING

Awardee shall submit programmatic and financial reports as follows:

1. Copy of Contract as Awarded between Cochise County and JE Fuller Hydrology & Geomorphology, Inc. for Ephemeral Streamflow Monitoring Proposal (Program 1).

2. Quarterly Program 1 updates, final monitoring report and copy of monthly invoices.

3. Copy of Contract as Awarded between Cochise County and selected contractor for Recharge Feasibility Study Scope of Work (Program 2) schedule laid out by task name and number, start and finish dates, and formatted in Microsoft Project or similar project management program.

4. Recharge Feasibility Study (Program 2) progress updates presented **monthly** at recharge project team meetings, copy of deliverables as listed in the Scope of Work, and copy of invoices.

5. Final financial reports for both Program 1 and 2 demonstrating full expenditure of TNC funds using the attached forms ("Attachments C & D"), due by **12/16/2016.**

Such reports shall be submitted via post or email to:

Brooke Bushman
TNC Arizona Water Projects Coordinator, 1510 E. Fort Lowell Road, Tucson, AZ 85719
bbushman@tnc.org

IV. PAYMENTS

A full disbursement of **$70,375** will be made upon signing.

V. EXPENDITURE LIMITED TO DESIGNATED PURPOSES

Grant funds may be spent only in accordance with the provisions of the Awardee's funding request and budget submitted to the Conservancy. Expenditure of Grant funds is subject to modification only with the Conservancy's prior written approval. Any Grant funds not expended or committed for the purposes of this Grant must be returned to the Conservancy.

The Conservancy may monitor and evaluate the Program's activities, which may include visits by personnel and agents, discussions with Awardee's personnel, and review of financial and other records and materials related to the Program activities financed by this Grant in an effort to determine whether Awardee's activities meet the Conservancy's funding objectives.

To the extent that all activities described in the Scope of Work (Attachment A and Attachment B) are not completed before the Grant Term expires, Grant funds dedicated to, or associated with completion of the incomplete activities under the Scope of Work shall be returned to the Conservancy or shall be disbursed pursuant to directions from the Prime Award.

VI. PROVIDING FUNDS TO OTHERS

The Awardee is prohibited from using the Conservancy's funds and/or assets for grants to others without the Conservancy's written permission.

VII. DISCLOSURE OF INTERNAL CONFLICTS OF INTEREST

The Awardee must disclose to the Conservancy any proposed use of funds and/or assets for activities in which there is an apparent or actual conflict of interest between the Awardee and its employees, board members, or close relatives of the Awardee's employees or board members and make such expenditure subject to prior Conservancy approval.

VIII. PROCUREMENT

The Awardee will follow its own policies with regard to documentation of procurements and maintain that documentation in their organization's grant files. If the Awardee does not have written procurement policies, it must retain documentation for procurements (over US $5,000 outside the U.S. or over $10,000 in the U.S.). Such documentation will include sole source justification, if appropriate, or documentation of a competitive process or comparison shopping.

IX. RECORDS AND AUDITS

The Awardee agrees to maintain books, records, documents and other evidence pertaining to all costs and expenses incurred and revenues acquired under this Award to the extent and in such detail as will properly reflect all costs and expenses for which reimbursement is claimed. These records shall be maintained for a period of three years after the final expenditure report is submitted.

The Conservancy and its auditors (internal and external) will have access to all records relating to the award for three years after the final financial and programmatic reports for the award have been submitted to TNC, unless local law requires a longer retention period.

The Awardee shall be responsible for reimbursing for any disallowance of any expenditures related to the work the Awardee has performed.

X. SEGREGATION OF COSTS

The Awardee will segregate the costs of the project described herein from other projects that it currently administers.

XI. TITLE TO AND USE OF PROPERTY

Title to any property purchased with Award funds vests in the Awardee. The Conservancy may not be charged for use of any property purchased with Grant funds.

XII. INTELLECTUAL PROPERTY LICENSE

Title to any Materials developed with Grant funds vests in the Grantee, with the Conservancy getting free irrevocable license to use, publish or distribute all such copyrighted, trademarked, patented Materials, or inventions, trade secrets or other intellectual property rights. The word "Materials" may include, but is not limited to reports, studies, photographs (and negatives), computer programs, drawings, writings or other similar works or documents, along with all supporting data and material, produced under this Grant. The Grantee agrees to provide the Conservancy, and, if applicable, the Grantor to the Conservancy with copies of the Materials at no cost.

XIII. ACKNOWLEDGMENTS

The Awardee agrees to acknowledge the Conservancy's support of the project, including funding contributions and sponsorship, on all media announcements, programs and publications.

XIV. ASSIGNMENT

This Award may not be assigned by the Awardee in whole or in part without the prior written consent of the Conservancy.

XV. NO AGENCY

No legal partnership or agency is established by this Award. Neither party is authorized or empowered to act as an agent, employee or representative of the other, nor transact business or incur obligations in the name of the other party or for the account of the other party. Neither party shall be bound by any acts, representations, or conduct of the other.

XVI. TERMINATION AND REMEDIES

The Conservancy shall have the right to terminate this Award by giving 30 (thirty) days written notice to the Awardee of intent to terminate. Should this occur, payment for work satisfactorily completed will be adjusted accordingly. In addition, if in the judgment of the Conservancy the Awardee defaults in performance of Awardee duties under this Award, whether for circumstances within or beyond the control of the Awardee, the Conservancy may immediately terminate this Award by written notice to the Awardee. Upon receipt of the termination notice from the Conservancy, the Awardee shall take all necessary action to cancel outstanding commitments relating to the work under this Award. In the event of termination prior to the originally agreed upon expiration, the Conservancy shall pay of any obligations incurred by the Awardee that could not reasonably be canceled.

If at any time the Prime Award is terminated, this Award shall also be automatically terminated as of the termination date of the Prime Award.

XVII. LOBBYING AND POLITICAL CAMPAIGNING

Awardee shall not use any portion of funds transferred under this Award to engage in any lobbying activities unless the parties specifically agree to such lobbying activities in this agreement.

Awardee shall not use any portion of funds transferred under this Award to participate or intervene in any political campaign on behalf of or in opposition to any candidate for public office, to cause any private inurement or improper private benefit to occur, or to take any other action inconsistent with Section 501(c)(3) of the US Internal Revenue Code.

XVIII. LIABILITY

Awardee shall be solely responsible for the payment of any and all claims for loss, personal injury, death, property damage, or otherwise, arising out of any act or omission of its employees or agents in connection with the performance of this Program. Awardee agrees to indemnify and hold the Conservancy harmless from any and all claims, loss, damages, costs and expenses, including attorney fees through the appellate levels, made against or incurred by the Conservancy arising out of work performed by the Awardee under this Award, or arising out of any act or omission of the Awardee. Conservancy agrees to indemnify and hold the Awardee harmless from any and all claims, loss, damages, costs and expenses, including attorney fees through the appellate levels, made against or incurred by the Awardee arising out of work performed by the Conservancy under this Award, or arising out of any act or omission of the Conservancy.

XIX. USE OF CONSERVANCY NAME/LOGO

The Awardee may not use the Conservancy's name and/or logo in any way without prior written consent from the Conservancy, except to the extent the work performed contemplates their inclusion in the final work product.

XX. CONFIDENTIAL INFORMATION.

During the course of the performance of this Award, the Awardee may have access to materials, data, strategies, other information relating to the Conservancy and its programs, or systems, which are intended for internal use only. Subject to Arizona's Open Meeting Law, any such information acquired by the Awardee shall not be used, published, or divulged by the Awardee to any person, firm, or corporation or in any advertising or promotion regarding the Awardee or the Awardee's services, or in any manner or

connection whatsoever without first having obtained the written permission of the Conservancy, which permission the Conservancy may withhold in its sole discretion.

XXI. TAXES

The Awardee agrees to be responsible for any and all filing and payment of taxes and for compliance with any and all provisions and requirements arising under any applicable tax laws. Neither federal, nor state, nor local income tax, nor payroll tax of any kind shall be withheld or paid by the Conservancy on behalf of the Awardee, or employees of the Awardee. If appropriate, the Conservancy shall report all fees paid to the Awardee to the IRS on Form 1099.

XXII. COMPLIANCE WITH LAWS

The Awardee represents, warrants, and agrees that, in connection with the transactions contemplated by this Award: (a) the Awardee can lawfully work in the United States; (b) the Awardee shall obtain, at its own expense (except to the extent otherwise explicitly stated in this Award) any permits or licenses required for the Awardee's services under this Award; and (c) the Awardee shall comply with all statutes, laws, ordinances, rules, regulations, court orders, and other governmental requirements of the United States, the State of Arizona, and any other jurisdiction(s) in which the Awardee is organized or authorized to do business, including but not limited to any applicable anti-bribery statutes, which are applicable to the work to be done by the Awardee under this Award (in each case, an "Applicable Law"). The Awardee shall not take any actions that might cause the Conservancy to be in violation of any of such Applicable Laws.

XXIII. COMPLIANCE WITH ANTI-TERRORISM LAWS.

The Contractor agrees that it will use any funds received under this Contract in compliance with all applicable antiterrorist financing and asset control laws, regulations, rules and executive orders, including, but not limited to the USA Patriot Act of 2001 and Executive Order 13224.

XXIV. CHOICE OF LAW/FORUM

This Award shall be interpreted, construed and governed by the laws of the State of Arizona and such laws of the United States as may be applicable. In the event of any litigation over the interpretation or application of any of the terms or provisions of this Award, the Conservancy and the Awardee agree that litigation shall be conducted in the State of Arizona.

XXV. BINDING EFFECT/AMENDMENTS

This Award shall become binding when signed by the parties. This Award supersedes all prior or contemporaneous communications and negotiations, both oral and written and constitutes the entire Award between the parties relating to the work set out above. No amendment shall be effective except in writing signed by both parties.

XXVI. SEVERABILITY

If any provision of this Award is held invalid, the other provisions shall not be affected thereby.

COCHISE COUNTY FLOOD CONTROL DISTRICT

Richard Searle, Chair,
Cochise County Flood Control District Board

_____

Date: _____

Attest:

_____
Arlethe Rios, Clerk of the Board

THE NATURE CONSERVANCY

Sonja Stupel
AZ Chapter, Director of Finance & Operations

Sonja Stupel 12/8/15

Melinda Ching (by email) 12/03/2015
Attorney Date

Approved by Melinda Ching
Attorney

on 12/03/15

by email

Attachments:

A- Draft Ephemeral Streamflow Monitoring proposal

B- Draft Scope of Work Outline, Recharge Feasibility Study

C- Financial Report, TNC – Cochise County AZFO-151124 Grant SOW A

D- Financial Report, TNC- Cochise County AZFO-151124 Grant SOW B

AZFO-151124
Attachment A

GeoSystems Analysis, Inc.
Innovations in Hydrology

June 4, 2015

Karen Riggs
Cochise County Highway & Floodplain Department
1415 Melody Lane, Bldg F.
Bisbee, AZ 85603

Re: Proposal for San Pedro Ephemeral Streamflow Monitoring

Dear Karen,

GeoSystems Analysis, Inc. (GSA) is pleased to present this proposal for ephemeral streamflow monitoring in the San Pedro Basin using the continuous slope area (CSA) method. The proposed work will be performed by GSA, in collaboration with JE Fuller/Hydrology & Geomorphology, Inc. (JEF). Also included in this document are estimated costs to complete the proposed work, as well as our basic assumptions.

We look forward to your comments and review of this proposal. If you have any questions, please feel free to contact me or Lindsey Bunting.

Sincerely,

Michael Milczarek
Program Director
GeoSystems Analysis, Inc.

cc: Brooke Bushman, Upper San Pedro Program Coordinator, the Nature Conservancy

3393 North Dodge Boulevard
Tucson, Arizona 85716

phone: 520-628-9330
fax: 520-628-1122

WWW.GEOSYSTEMSANALYSIS.COM

1.0 INTRODUCTION

The continuous slope-area (CSA) method is an indirect method for calculating flow rates (instantaneous discharge) from ephemeral streams, and allows for estimation of stormwater runoff volumes and recharge potential (Smith et al. 2010). CSA monitoring provides advantages over traditional direct methods in that it does not require installation of costly stages, cableways/bridges with current meters, or mobilization to stream channels to manually measure flow velocity during runoff events.

A CSA gauge monitoring network is proposed for several stream channels within the San Pedro River basin to monitor streamflow for a period of time prior to the installation of any proposed stormwater capture and groundwater recharge facilities. This will allow for better estimates of streamflow in response to precipitation and improve any predictions of potential groundwater recharge. The proposed CSA monitoring locations are presented in Figure 1 through Figure 3. All stream channels are located within Cochise County, within watersheds that originate in developed areas of Sierra Vista and are subject to urban enhanced runoff.

Proposed monitoring at each CSA monitoring location consists of four stilling wells installed at equal spacing along the channel reach equipped with datalogging pressure transducers (Rugged TROLL 100, In-Situ, Inc, Fort Collins, CO). Installation of equipment at proposed locations is contingent upon obtaining permission for site access and monitoring for the duration of the project.

Four CSA streamflow monitoring locations are proposed within or adjacent to the Bella Vista parcel, with two in Coyote Wash, and two in Charleston wash (Figure 1). Two of the proposed monitoring locations (CY1 and WCC1) will be replicated from Stewart et al (2012). Two CSA streamflow monitoring locations are proposed in the Palominas watershed, and also two stilling well stations installed upstream of culverts in the King's Ranch area (Figure 2). One flowtography monitoring station will also be installed at the county parcel NW of the Palominas Flood Control and Recharge Facility (Figure 2) to monitor the extent of flow across the landscape in this undefined channel area. There is also an existing CSA monitoring location in Carr Canyon Wash and three stilling wells in retention basin and outfall areas in Ramsey Canyon and Golden acres (installed in July 2014) within the Riverstone parcel that will be monitored under this proposal (Figure 3).

CSA monitoring locations will be analyzed following methods provided in Smith et al (2010). Calculation of the complete-event hydrograph of discharge will be automated by using the CSA2SAC computer program, adapted from the USGS Slope-Area Computation (SAC) program (Fulford 1994) by the Arizona Water Science Center (provided by S. Wiele,

2014). A modified CSA method (Norman et al. 2015) will be used to analyze data from the 2014 monsoon season in Carr Canyon wash (Riverstone), as one stilling well was lost and data is only available for two stilling wells. Three additional stilling wells installed at Riverstone in retention basin and outfall areas in Ramsey Canyon and Golden acres will be utilized to estimate discharge and runoff storage volumes. Discharge and associated outflow volumes at the drop structure in Ramsey Canyon (SW-2) will be estimated using a broad-crested weir rating. Runoff volumes delivered to the two storage areas (SW-1 and SW-3) will be estimated for frequent low-intensity storms which do not supply water in excess of basin overflow elevations, using stage-storage relationships defined through the use of Cochise County's 2-foot topography data. Calculation of discharge estimations for large flow events which result in basin overflow would necessitate highly accurate ground survey data to support calculations, and will not be included in this study.

Descriptions of proposed work for each task are provided in the following sections. Budgeted costs for each task are provided in Table 2, and a detailed budget is provided in Table 3. Costs cover the purchase and installation of all monitoring equipment, and one year of monitoring, data analysis, and generation of a final report.

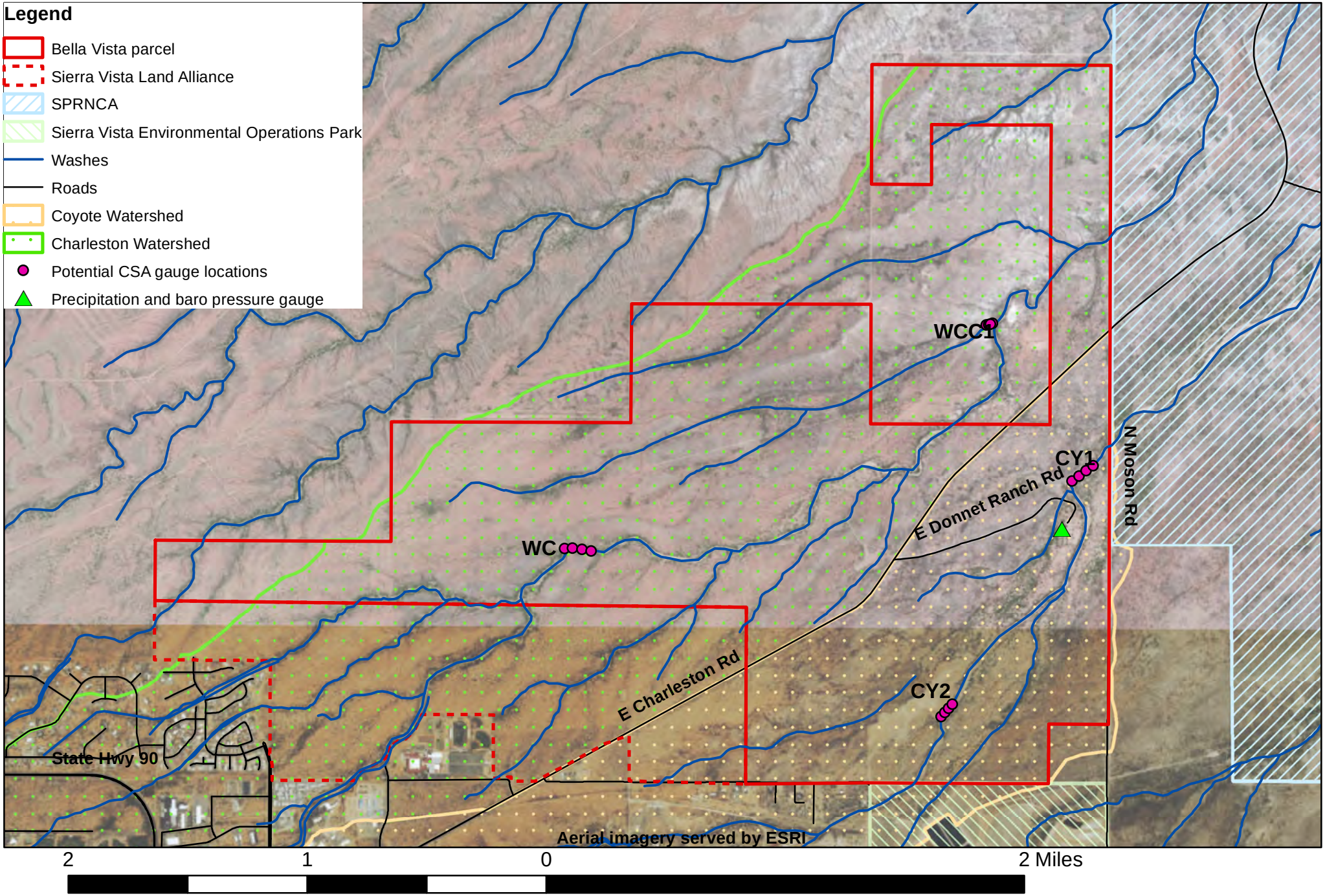

Figure 1. Proposed CSA monitoring locations: Bella Vista

GSA GeoSystems Analysis, Inc. Innovations in Hydrology

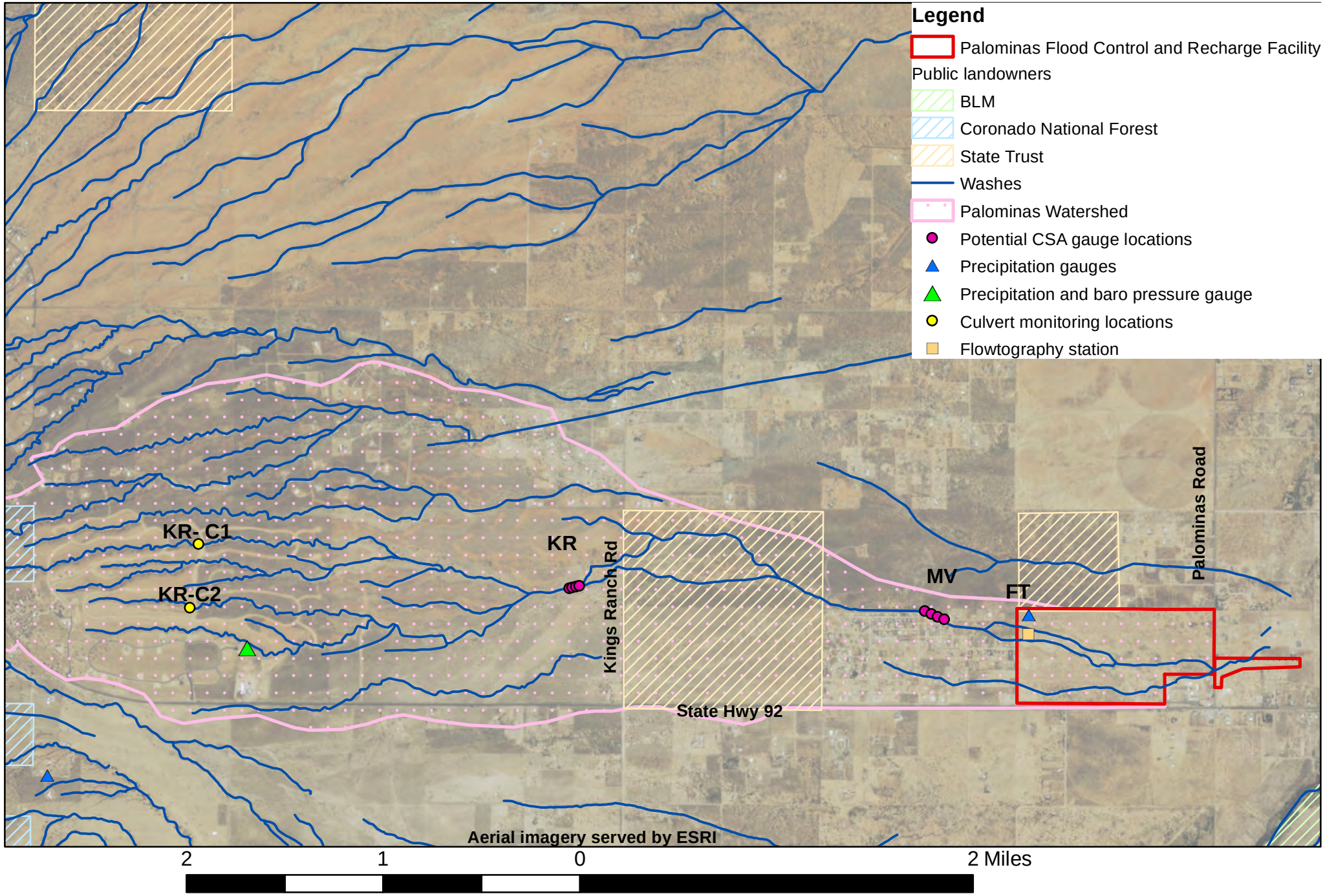

Figure 2. Proposed CSA and Stilling well (culvert) monitoring locations: Palominas

GSA GeoSystems Analysis, Inc. Innovations in Hydrology

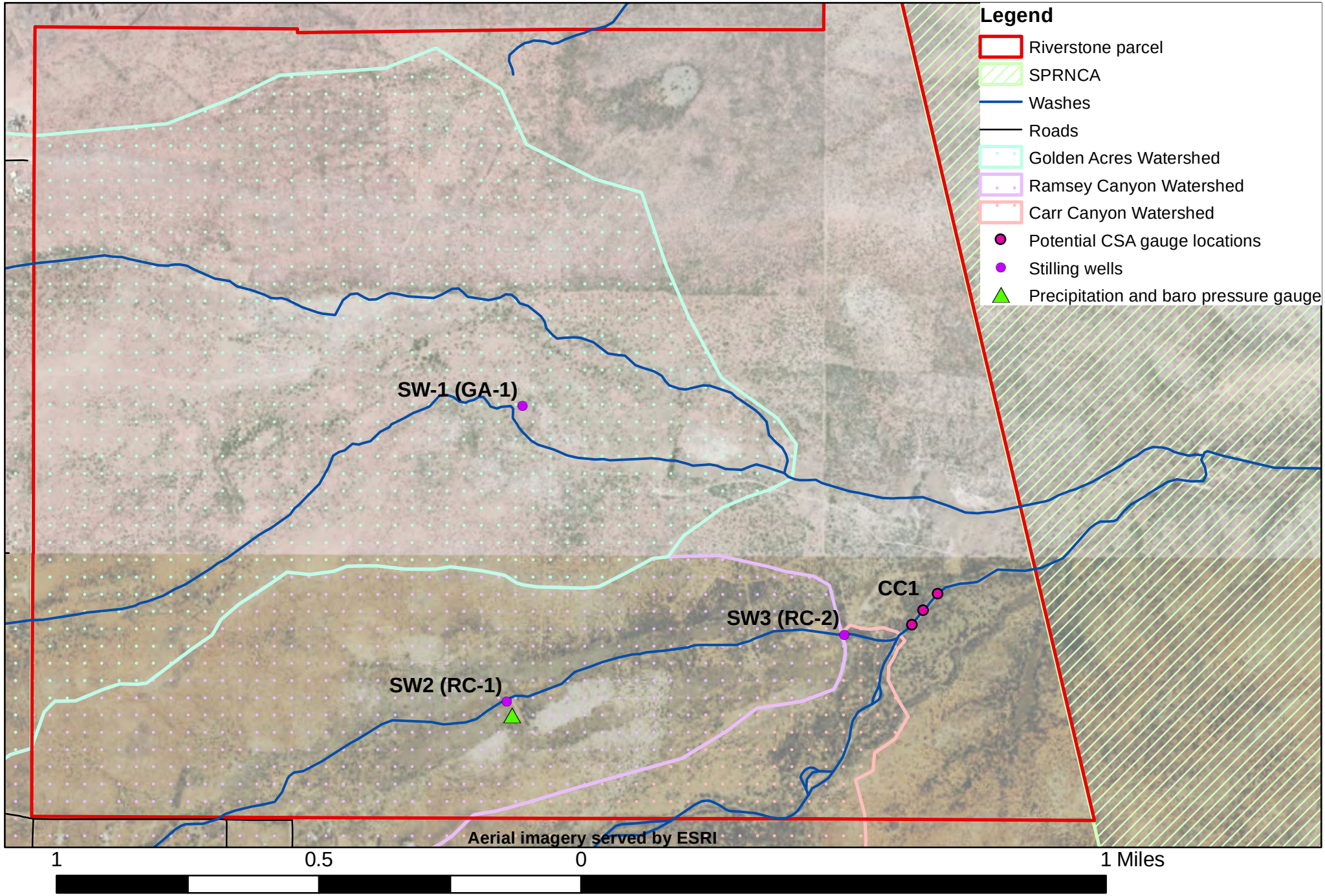

Figure 3. Proposed CSA and stilling well (retention basin) monitoring locations: Riverstone

GSA GeoSystems Analysis, Inc. Innovations in Hydrology

2.0 PROPOSED TASKS

2.1 Task 1 - Project Management

Project management activities will include correspondence with Cochise County, project and field installation coordination, billing, and other administrative tasks. It will also include any necessary coordination of site use permission and access, and development of project specific health and safety and quality assurance plans.

2.2 Task 2 - Site Survey and Monitoring Equipment Installation

2.2.1 Task 2a - Purchase and Preparation of Monitoring Equipment

Monitoring equipment will be purchased and prepared immediately in order to expedite installation for streamflow monitoring during the 2015 monsoon season. Information on equipment type, use, and quantities is provided in Table 1. Holsters for CSA gauge installation will be constructed from three foot sections of 2" schedule 40 stainless steel pipe sealed with locked 2" aluminum well caps. Three 3/8" holes will be drilled in each pipe to allow inflow of water into the pressure transducer housing. A rain gauge will be purchased for precipitation monitoring at Bella Vista, and two barometric pressure transducers will be purchased for installation at Bella Vista and Palominas. Barometric pressure transducers allow for atmospheric pressure compensation of datasets generated from absolute pressure transducers.

Table 1. Proposed monitoring equipment for CSA streamflow monitoring.

Monitoring Equipment	Make/Model	Purpose	Quantity
Data Logging Pressure Transducer	In-Situ, Inc Rugged TROLL 100	CSA streamflow monitoring, culvert flow monitoring	26
Data Logging Barometric Pressure Transducer	In-Situ, Inc Rugged Baro Troll	Barometric pressure compensation	2
Rain Gauge	Onset Comp Corp, RG3	Precipitation monitoring	1
Flowtography Camera	Moultrie, Game Spy M-900Ai	Flowtography monitoring	1
Staff Gauge	Ben Meadows, Style A	Flowtography water depth	2

2.2.2 Task 2b - Survey of Monitored Channel Reaches

Selection of suitable channel reaches is of great importance for successful application of the CSA method. Prior to installation of CSA gauges, each of the proposed channel reaches will be visually assessed for straightness, uniformity, roughness, and accessibility. A Manning's n value will be assigned to each reach which describes the channel and bank roughness. Channel cross section elevations at each CSA gauge location (4) will be surveyed using real-

time kinematic satellite positioning. Information gathered during site surveys will be used to modify monitoring locations as needed, and to generate data necessary for input into the CSA2SAC computer model.

2.2.3 Task 2c – Installation of Monitoring Equipment

Installation of monitoring equipment will occur concurrently with Task 2b. CSA gauge housings will be installed in channel bottoms by driving the pipe approximately two feet below ground surface at an angle of 45 degrees. Concrete will be used as needed to secure the housings in place. Pressure transducers will be suspended immediately at ground surface inside the pipe using stainless steel wire fixed to locking well caps. They will be programmed to record water level when a pressure change of greater than 5 mm is detected (event-based logging), with sensor readings checked at one-minute intervals. Installation methods will be identical for the two stilling wells installed immediately upstream of culverts in Kings Ranch (Figure 2).

A barometric pressure transducer will be installed at the fenced Liberty Utilities facility at Kings Ranch Estates, where a rain gauge is currently installed (Figure 2). A barometric pressure transducer and rain gauge will be installed in an open area near the ranch at Bella Vista (Figure 1). Both will be mounted to a steel post approximately five feet above ground surface. The rain gauge will be set to record temperature data hourly, in addition to instantaneous tip times. Barometric pressure transducers will record data every 15 minutes. A flowtography camera will be installed in the county parcel east of Miracle Valley, and mounted approximately 5 feet above ground surface on a steel post and set to record images every 30 minutes. Two 3.3 foot staff gauges will be installed 15 and 30 feet from the camera to allow for documentation of surface water depth.

2.3 Task 3 – Monitoring and Reporting

2.3.1 Task 3a – Quarterly Data Downloads

Data will be manually downloaded from all monitoring equipment at Riverstone, Bella Vista, and Palominas (Figure 1 through Figure 3) four times during the annual monitoring period. All pressure transducers, rain gauges, and the flowtography station will be assessed for functionality, battery life, and sensor and clock drift. Data trends will be examined in the field to assure data quality, and any necessary adjustments will be made.

2.3.2 Task 3b – Equipment Maintenance

Large flow events have the potential to scour channel bottoms and may necessitate adjustments to sensor installation locations and depths, as well as re-survey of channel cross

sections and characteristics (roughness, uniformity, etc). One additional site visit is budgeted to allow for such maintenance, as changes may not be evident until data has been processed and analyzed.

2.3.3 Task 3c – Data Processing and Analysis

Data from the July 2015 – 2016 monitoring period at all CSA gauge locations will be analyzed following methods provided in Smith et al (2010). 2014 monsoon season data from the two CSA gauges installed in Carr Canyon Wash (Riverstone) will be analyzed following methods provided in Norman et al (2015). Vandalism of one of the three CSA gauges installed meant that data from only two CSA gauges are available for analysis, which necessitates a different approach to CSA monitoring. A third CSA gauge was re-installed at the site on November 19, 2014. Data for individual runoff events will be pre-processed and formatted as necessary for input into the CSA2SAC program developed by the USGS AZ Water Science Center (provided by Steven Wiele). Output files provide instantaneous stream discharge estimates which will be used to develop complete event hydrographs of discharge.

2.3.4 Task 3d – Data Quality Assurance/ Quality Control

Data will be reviewed internally by a GSA staff member to assure accuracy of data entry, processing, and analysis. JEF's hydrologic engineer will also review all input parameters, results, and findings for accuracy. Any errors encountered will be remedied and documented in detail.

2.3.5 Task 3e – Reporting

Following analysis of monitoring data, an annual report will be generated which summarizes project findings. The following metrics will be calculated for each of the CSA monitoring locations:

- Complete event hydrographs of discharge
- Total annual and individual event flow volumes (acre-feet, m3)
- Peak channel discharge (cfs)
- Event flow durations (hours)

At culvert stilling well locations (Palominas), culvert rating tables will be generated which provide stage-discharge relationships to estimate flow volumes. Data from the flowtography station will be summarized to provide estimates water depth and extent during flow events. At Riverstone stilling wells, discharge and outflow volume will be provided for the outfall structure in Ramsey Canyon, and storage volumes will be estimated for detention basin areas.

A draft annual report will be submitted to the project team at the end of the one year monitoring period. A final annual report will be submitted within one month of receipt of comments from the project team. All project activities will be clearly documented, including data interpretation and analysis. All associated data will be provided in electronic format, as an appendix to the final report.

3.0 PROPOSED BUDGET AND SCHEDULE

An estimated summary budget is provided in Table 2. Table 3 presents a detailed estimated task-by-task budget.

A proposed schedule is to complete Task 2 by July 3, 2015, to prevent loss of streamflow data during summer rains. Manual data downloads (Task 3a) will occur at the end of July 2015, October 2015, February 2016, and June 2016. Data analysis and QA/QC (Tasks 3c and 3d) will begin following the preliminary download in July 2015, and will continue following each of the subsequent site visits. A draft annual report (Task 3e) will be submitted at the end of the first year monitoring period. A final report will be submitted within one month of receipt of comments from the project team.

4.0 REFERENCES

Fulford 1994. User's Guide to SAC, a Computer Program for Computing Discharge by Slope-Area Method, United States Geological Survey OFR 94-360. SAC Software and Supporting Documentation at http://water.usgs.gov/software/SAC/.

GSA 2014. Riverstone Stilling Well Installation Memo. Prepared for the Nature Conservancy, August 5, 2014.

Norman et al, 2015. Hydrologic Response of Streams Restored with Check Dams in the Chiricahua Mountains, Arizona. River Research and Applications, DOI: 10.1002/rra.2895.

Smith et al 2010. The Continuous Slope-Area Method for Computing Event Hydrographs. U.S. Department of the Interior, U.S. Geological Survey. Scientific Investigations Report 2010-5241.

Stewart et al, 2012. Use of the continuous slope-area method to estimate runoff in a network of ephemeral channels, southeast Arizona, USA. Journal of Hydrology 472-473, 148-158.

San Pedro CSA Monitoring
Table 2 - Cost Summary by Task

	Total Costs
1 - Project Management	$2,942.00
2 - Site Survey and Monitoring Equipment Installation	$22,821.82
3 - Monitoring and Reporting	$36,949.80
Proposal Grand Total	**$62,713.62**

San Pedro CSA Monitoring
Table 3 - Detailed Costs

Task: 1 - Project Management

		Quantity	Unit Cost	Shipping	Total Cost
Personnel Costs					
Subtask: 1a - Project Coordination and Management					
Program Director	Milczarek	8	$145	NA	1160
Staff Hydrologist	Bunting	16	$85	NA	1360
Clerical Staff	Torres	4	$65	NA	260
			Subtask Total:		*$2,780*
Other Direct Costs					
Subtask: 1a - Project Coordination and Management					
Miscellaneous		2	$50	NA	100
Communications		1	$50	NA	50
			Subtask Total:		*$162*
	8.00% Overhead: $12.00		**Task Total**		**$2,942**

San Pedro CSA Monitoring
Table 3 - Detailed Costs

Task: 2 - Site Survey and Monitoring Equipment Installation

	Quantity	Unit Cost	Shipping	Total Cost
Personnel Costs				
Subtask: 2a - Purchase and Prepare Monitoring Equipment				
Program Director Milczarek	0.5	$145	NA	72.5
Staff Hydrologist Bunting	4	$85	NA	340
Technician Harris	8	$65	NA	520
		Subtask Total:		*$933*
Subtask: 2b - Survey Monitored Channel Reaches				
Program Director Milczarek	0.5	$145	NA	72.5
Hydrologic Engineer Miller	12	$105	NA	1260
Staff Hydrologist Bunting	8	$85	NA	680
		Subtask Total:		*$2,013*
Subtask: 2c - Install Monitoring Equipment				
Program Director Milczarek	0.5	$145	NA	72.5
Staff Hydrologist Bunting	24	$85	NA	2040
Technician Harris	24	$65	NA	1560
		Subtask Total:		*$3,673*
Other Direct Costs				
Subtask: 2a - Purchase and Prepare Monitoring Equipment				
Hobo Rain Gauge	1	$420	NA	420
In-Situ Rugged Baro Troll	2	$380	NA	760
In-Situ Rugged Troll 100	26	$380	NA	9880
Flowtography Locked Enclosure	1	$200	NA	200
Flowtography Camera	1	$150	NA	150
Stainless Steel Pipe	9	$100	NA	900
Shipping	1	$50	NA	50
Miscellaneous Items	3	$50	NA	150
2" locking well cap	26	$20	NA	520
Padlock	26	$10	NA	260
		Subtask Total:		*$14,353*
Subtask: 2b - Survey Monitored Channel Reaches				
RTK GPS Rental	2	$400	NA	800
Miscellaneous Items	3	$50	NA	150
Subsistence	2	$46	NA	92
4WD Truck	200	$1	NA	130
		Subtask Total:		*$1,266*
Subtask: 2c - Install Monitoring Equipment				
Lodging	2	$85	NA	170

San Pedro CSA Monitoring
Table 3 - Detailed Costs

Miscellaneous Items		3	$50	NA	150
Subsistence		2	$46	NA	92
4WD Truck		200	$1	NA	130
				Subtask Total:	*$585*
	8.00% Overhead: $1200.32			**Task Total**	**$22,822**

San Pedro CSA Monitoring
Table 3 - Detailed Costs

Task: 3 - Monitoring and Reporting

		Quantity	Unit Cost	Shipping	Total Cost
Personnel Costs					
Subtask: 3a - Quarterly Data Downloads					
Program Director	Milczarek	2	$145	NA	290
Staff Hydrologist	Bunting	48	$85	NA	4080
			Subtask Total:		*$4,370*
Subtask: 3b - Equipment Maintenance					
Program Director	Milczarek	1	$145	NA	145
Staff Hydrologist	Bunting	12	$85	NA	1020
			Subtask Total:		*$1,165*
Subtask: 3c - Data Processing and Analysis					
Program Director	Milczarek	4	$145	NA	580
Hydrologic Engineer	Miller	72	$105	NA	7560
Staff Hydrologist	Bunting	120	$85	NA	10200
			Subtask Total:		*$18,340*
Subtask: 3d - Data QA/QC					
Hydrologic Engineer	Miller	16	$105	NA	1680
Staff Hydrologist	Bunting	4	$85	NA	340
Hydrologist 1	Calabrese	8	$75	NA	600
			Subtask Total:		*$2,620*
Subtask: 3e - Reporting					
Program Director	Milczarek	4	$145	NA	580
Hydrologic Engineer	Miller	12	$105	NA	1260
Staff Hydrologist	Bunting	64	$85	NA	5440
AutoCAD/GIS	Buchanan	8	$85	NA	680
			Subtask Total:		*$7,960*
Other Direct Costs					
Subtask: 3a - Quarterly Data Downloads					
Communications		1	$50	NA	50
Miscellaneous		2	$50	NA	100
Subsistence		4	$46	NA	184
4WD Truck		1000	$1	NA	650
			Subtask Total:		*$1,063*
Subtask: 3b - Equipment Maintenance					
Equipment Replacement		1	$800	NA	800
Miscellaneous Items		2	$50	NA	100
Communications		1	$50	NA	50
Subsistence		1	$46	NA	46

San Pedro CSA Monitoring
Table 3 - Detailed Costs

	4WD Truck	200	$1	NA	130
			Subtask Total:		*$1,216*
Subtask: 3c - Data Processing and Analysis					
	Communications	1	$50	NA	50
			Subtask Total:		*$54*
Subtask: 3e - Reporting					
	Communications	1	$50	NA	50
	Reproduction	2	$50	NA	100
			Subtask Total:		*$162*
	8.00% Overhead: $184.80		**Task Total**		**$36,950**
			PROPOSAL GRAND TOTAL:		**$62,714**

Attachment B

DRAFT SCOPE OF WORK OUTLINE
RECHARGE FEASIBILITY STUDY
Dated December 8, 2015

Introduction

Through hydrological, geological, hydrogeological, and geotechnical investigation the feasibility of an urban enhanced runoff recharge facility on locations identified in the Phase 1 Site Investigation on Coyote Wash (Bella Vista) will be assessed. Additionally, a potential site on the east side of the San Pedro River will be analyzed for feasibility as a recharge project. Both projects are aimed at increasing baseflows in the San Pedro River to the maximum extent possible.

Project deliverables will include identified locations for potential recharge, based on the analyses and field work. Design tasks are not part of this scope of work; the following paragraphs discussing potential design focus areas are intended to guide this scope of work and development of future phases and budgets. If recharge proves to be feasible, budgeting for future phases will include 100% design and bid package deliverables.

Summary of Approach

The approach to recharge feasibility study will include decision points following each primary field task that may affect the type and/or extent of subsequent investigations due to the different recharge options being evaluated and their dependence on site-specific conditions. The goal is to maintain flexibility in the approach to ensure a cost-effective program for obtaining sufficient and critical data to evaluate feasibility of potential recharge methods to meet the project's recharge goals, while acknowledging that significant departure from scope could have substantial effects on cost and schedule.

Scope of Work Outline

The tasks listed below are the proposed elements to this draft scope of work. Exact tasks and deliverables achievable with available budget will be determined at time of SOW finalization.

Task 1: Project Management

A Consultant shall:

- Identify a project manager responsible for managing the budget, schedule, and deliverables throughout the project, including the management of budget, schedule, and deliverables of any Sub consultants, as well as report directly to the County's project manager;
- Identify all Sub consultants who will be involved in the project;
- Participate in and/or lead as appropriate all monthly conference calls/meetings;

- Suggest modification of project scope details, including phasing, critical path items and decision points, as the project progresses;
- Suggest modifications to clarify and prioritize recharge goals/approaches;
- Suggest additional milestones leading to ensure achievement of project goals; and
- Assign roles and communication system for Consultant and Sub-consultant project team members.

Task 2: Data Collection and Evaluation

Data collection and evaluation of existing documentation appropriate to the project and related to other aquifer recharge efforts, and build upon the 'living document' prepared during previous work on Riverstone and Bella Vista site investigations by adding documents and references to that bibliography as appropriate. The Contractor shall finalize the Bibliography with additional data and documentation appropriate to the project, and finalize the updated bibliography during the final task.

Task 3: Review Existing Preliminary Hydrologic Analyses for East side site

Task 4: Pipeline Preliminary Design and Cost Estimate for East side site

Task 5: Screening Site Investigation for Recharge Feasibility for East side site

Comprehensive preliminary site investigation (geologic, hydrogeologic, and geotechnical) regarding the feasibility of recharge on this site, including, but not necessarily limited to evaluating hydrogeologic, soil, and surface geology data to determine suitability for recharge.

Task 6: Conduct Near Surface Recharge Feasibility Study on East side site

A recharge feasibility study with subtasks that may include, but are not necessarily limited to:

- Conducting shallow subsurface geologic, hydrogeologic, and geotechnical site characterization to determine recharge feasibility and to help develop options to maximize recharge effectiveness, including, but not necessarily limited to:
  - Backhoe test pit/trenching investigations for lithologic characterization of sediments,
  - Collecting geotechnical soil samples for determination of geotechnical parameters, and
  - Infiltration testing for evaluation of infiltration rates pertaining to possible recharge methods, including but not necessarily limited to recharge basins, in-channel recharge, injection wells (vadose zone and/or saturated zone), and other emerging technologies;
- Developing estimates of "achievable" recharge volume (that the aquifer can accept) for possible recharge methods;
- Proposed additional testing, including, but not necessarily limited to:

- Number and selected locations for exploration of deeper subsurface site characterization
- Appropriate drilling method at selected locations for characterization of upper 50 to 100 feet of subsurface sediments, and
- Appropriate testing methods (if necessary) such as down-borehole permeability tests to evaluate subsurface hydraulic properties.

Task 7: Coordination Meeting to Present Initial Feasibility Study Results and Recommendations for Detailed Recharge Feasibility Study for Field Investigations at both East side site and Coyote Wash (Bella Vista)

The Consultant shall prepare a visual presentation summarizing the results of the Initial Feasibility Studies from both sites and develop recommendations for the Detailed Recharge Feasibility Study. Supporting groundwater modeling information will also be presented.

Task 8. Conduct Deeper Subsurface Recharge Feasibility Study

Based decisions resulting from Task 7, and subsequent decision of the Cochise Conservation and Recharge Network leadership team (the "Leadership Team"), the Contractor shall conduct deeper subsurface geologic, hydrogeological, and geotechnical site characterizations at locations identified in Task 7. Resulting data will include engineering soil descriptions, graphic logs, cross sections, and contoured geophysical survey results.

Task 9. Install Shallow Monitor Wells

Install a minimum of three to a maximum of 5 shallow (exact depth to be determined) monitoring wells at each property in a method and at locations agreed upon by the Leadership Team based upon previous study findings. Three monitoring wells are the minimum number capable of determining groundwater flow direction and gradient. Also, conduct aquifer pumping tests for determining transmissivity of the alluvial or shallow regional aquifer (depending on aquifer that is present below the site).

Task 10. Coordination Meeting to Present Deeper Subsurface Feasibility Study Results and Recommendations for Additional Field Investigations/Tasks

A visual presentation summarizing the results of the Detailed Feasibility Study and recommendations for the additional field investigations if necessary.

Task 11. Perform additional tasks. Cost to be negotiated if required.

The Contractor shall perform additional tasks as determined in Task 10 if needed to refine recharge methods and locations.

Task 12. Preparation of Draft and Final Conceptual Recharge Facility Technical Memorandum

A draft and final Technical Memoranda that summarizes and analyzes recharge feasibility results. Conceptual designs (10% level designs, maximum 2 locations/facilities) shown on letter-size sheets will also be developed, including engineering calculations on facility sizing and resulting impacts to flood flow/low-flow conditions and elevations. The results from any associated groundwater modeling efforts will also be included. The Project Team will present its recommendations to the Leadership Team for conceptual design review and approval. This report shall recommend recharge facilities for both Coyote Wash (Bella Vista) and the East side site, including recharge method(s), locations, and source water quantities according to the conceptual designs of potential future facilities. The Consultant shall also review the Revised Regulatory Review Report (Mulhern, 2014) and identify the state, federal and local requirements for the conceptual designs.

Schedule

The Contractor shall work closely with the County's project manager to develop a schedule for review and approval by the Project Team within 10 days of contract award.