# TIER-1 APPLICATION TO THE NEW MEXICO INTERSTATE STREAM COMMISSION FOR NEW MEXICO UNIT OR WATER UTILIZATION ALTERNATIVE UNDER THE ARIZONA WATER SETTLEMENTS ACT

**APPLICANT INFORMATION (PRINT OR** **DATE:**

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|---|---|
| 1. Legal Name:<br>Grant Soil and Water Conservation District | 2. Organization:<br>Grant Soil and Water Conservation District |
| 3. Address (street, city, county, state, and zip code):<br>3082 32nd Street<br>Bypass Suite C<br>Silver City, New Mexico 88061 | 4. Name, email, and phone number of contract person:<br>William D. Woodward<br>wwoodward7@yahoo.com<br>(575) 538-8034 |
| 5. TYPE OF APPLICATION (check one):<br>[ ] Final [] Preliminary for review [x ] Revised | 6. TYPE OF APPLICANT (CHECK BOX):<br>[ ] local governments or municipalities<br>[x] Soil and water conservation districts, irrigation districts or commissions, acequias, or other political subdivision of the State of New Mexico<br>[ ] institutions of higher education or a consortium of such institutions<br>[ ] non-profit organizations or associations<br>[ ] private individual/s<br>[ ] federal agency (ies)<br>[ ] Other (specify) |
| 7. BRIEF PROJECT DESCRIPTION:<br>This proposal is for a feasibility study of water recharge for Silver City, NM well fields using AWSA water and natural precipitation. This would entail a study of percolation and lateral movement of water within the defined aquifer. | |
| 8. AREAS AFFECTED (describe by county, municipality, township, etc. as applicable):<br>Grant County and Silver City, New Mexico | |

| 9. TOTAL FUNDING REQUESTED (in $1,000): | | | | |
|---|---|---|---|---|
| 2012: $105 | 2013: | 2014: | 2015: $100 | 2016: |
| 2017: | 2018: | 2019: | 2020: | 2021: |

10a. **TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION ARE TRUE AND CORRECT, THE DOCUMENT HAS BEEN DULY AUTHORIZED BY THE GOVERNI9NG BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED REQUIREMENTS AND ASSURANCES IF THE PROPOSAL IS ACCEPTED.**

| 10b. TYPED OR PRINTED NAME OF AUTHORIZED REPRESENTATIVE: | 11. TITLE: | 12. PHONE NUMBER: |
|---|---|---|
| William Woodward | Supervisor | (575) 538-8034 |
| 13. SIGNATURE: William Woodward | | DATE: May 2, 2011 |

14. Evaluation criteria. Comprehensive responses to criteria A through D should be supported where possible by the best available science and scientific data, studies, models, and, where applicable, cite state, regional, or other water plans. Where such data and information is not available, applications should include best estimates and describe how such information would be obtained. Applications that do not include the requested information will not satisfy Tier-1 standards and, therefore, will not be eligible for Tier-2 consideration. Use Form 14a if needed.

A. State whether the proposal is for the "New Mexico Unit," a "water utilization alternative," or both.

This proposal is for a hydraulic study that will be used to determine the validity of recharging the aquifer with New Mexico Unit water and natural precipitation under the water utilization alternative. The well fields have been in production since 1946 with depletions well over 100,000 acre feet. It is well documented that direct injection is practical if the water is pretreated. This pretreatment will add a considerable cost to the water. What is unknown is how well a surface recharge approach will work in this geologic setting.

B. Describe how the proposal will meet a "water supply demand" in the Southwest New Mexico Water Planning Region, comprised of Catron, Grant, Hidalgo and Luna Counties.

Currently these two well fields are Silver City's (and those out-of- town users attached to the infrastructure) primary water sources. There is no question that there is currently a "demand" for water in this area. Infrastructure is already in place to utilize water resources, whether it is from existing water or future New Mexico Unit water. A cone of depression exists that could have a holding capacity of 100,000 acre feet. The study will answer the question as to whether these well fields will be able to supply water past there projected useful life. The study will also be able to answer questions as to the impacts that recharging the target area would have on downstream users. It is very feasible for the towns of Santa Clara, Bayard and Hurley to form a regional water association utilizing the water from these well fields. Prolonging the life of the aquifer feeding these well fields will greatly improve the economic vitality of central Grant County by reducing the need to convert "industrial water" to municipal uses.

C. Describe how the proposal considers the Gila environment and describe how any negative impacts might be mitigated.

This proposal will have no impacts on the Gila environment.

D. Describe how the proposal considers the historic uses of and future demands for water in the Southwest New Mexico Water Planning Region and the traditions, cultures and customs affecting those uses.

This project is for a hydraulic study. It is impossible to predict what the conclusions will be. With that said, we feel it is safe to say that the study will either prove or disprove the feasibility of recharging the aquifer. If recharge is found not to be feasible, the status quo will remain, and no immediate effects will result to use and demand. If recharge is found to be a viable alternative then long term effects will be seen if a project is implemented. Water users will have a higher chance of retaining the historic uses of water (agriculture and mining) and prolong the time until these historic uses must be transformed to meet municipal needs. Removing water from mining activies will have a devastating effect on the local economy. In addition, the Town of Silver City will not have to utilize financial resources to move water rights or infrastructure to new locations to satisfy water demands of the users they service.

## Exhibit A. Interstate Stream Commission Gila Policy Statement, September 2004, and 2004 Arizona Water Settlements Act, Section 212 (i)

### INTERSTATE STREAM COMMISSION GILA POLICY STATEMENT, SEPTEMBER 2004:

The Interstate Stream Commission recognizes the unique and valuable ecology of the Gila Basin. In considering any proposal for water utilization under Section 212 of the Arizona Water Settlements Act, the Commission will apply the best available science to fully assess and mitigate the ecological impacts on Southwest New Mexico, the Gila River, its tributaries and associated riparian corridors, while also considering the historic uses of and future demands for water in the Basin and the traditions, cultures and customs affecting those uses.

### 2004 ARIZONA WATER SETTLEMENTS ACT, SECTION 212 (i)

(i) NEW MEXICO UNIT FUND- The Secretary shall deposit the amounts made available under paragraph (2)(D)(i) of section 403(f) of the Colorado River Basin Project Act (43 U.S.C. 1543(f)) (as amended by section 107(a)) into the New Mexico Unit Fund, a State of New Mexico Fund established and administered by the New Mexico Interstate Stream Commission. Withdrawals from the New Mexico Unit Fund shall be for the purpose of paying costs of the New Mexico Unit or other water utilization alternatives to meet water supply demands in the Southwest Water Planning Region of New Mexico, as determined by the New Mexico Interstate Stream Commission in consultation with the Southwest New Mexico Water Study Group or its successor, including costs associated with planning and environmental compliance activities and environmental mitigation and restoration.

**FORM 14A**

**USE THIS FORM TO COMPLETE ANSWERS TO CRITERIA 1 THROUGH 4. NUMBER EACH ADDITIONAL RESPONSE WITH THE CORRESPONDING CRITERIA NUMER AND SUB-CRITERIA. USE AS MANY PAGES AS NEEDED.**

**Project: Franks/Woodward Well Fields, Recharge**

**Location: Franks/Woodward Well Fields, Southwest of Silver City**

These well fields are Silver City's primary source of water and have been in production since 1946. Water levels are dropping 2 – 3 feet per year and the aquifer is expected to be depleted in 40 – 50 years. Depletions from the well fields are in excess of 100,000 acre feet and have created a large cone of depression. The aquifer runs in a northwest to southeast direction between the Little Burro Mountains and the Silver City Range. It is comprised of decomposed granite rock in layers of varying degrees of porosity. These layers are from a few inches to several feet thick and can be composed of larger sized gravels to fine sands/clays. A tilting of this formation can be seen in road cuts on both Highway 90 and 180 (Trauger, 1972 hydrologic Report 2 page 67). Natural percolation of surface water down to the water table has been documented to take over three years (Trauger, 1972 hydrologic Report 2 page 54). In the early 1970's, a project to increase natural infiltration of storm water runoff was proposed on 3,600 acres on the east side of the Continual Divide. Due to a lack of funding, this project has not been implemented to its full potential. Currently, the Town of Silver City is proposing to recharge the Franks field using Freeport McMoran waters using either surface recharge or direct injection of the water.

Several issues must be addressed before a decision can be made on the best method of recharge. 1. Will the water be clean enough i.e. (free of silts, bacteria and organic material) and chemically compatible for direct injection. 2. If surface infiltration is used, how will lateral movement between the bands affect where the water enters the cone of depression? If the injection site is close to either the Northwest end or the Southeast end of the aquifer is it possible that water could escape from the cone of depression? Will in-channel infiltration be adequate for potentially high volumes of N.M. Unit water, or will infiltration ponds be needed? 3. How reliable are hydraulic models that are already in use?

Phase 1: Hydraulic study:

The proposal is to have a peer reviewed study that would focus on the geology, hydrology and surface environment of the aquifer. We envision placing piezometers at varying depths in two identical 70 acre watersheds. Two to three years of baseline data will be gathered before any vegetative treatments are conducted. During this time, infiltration testing will be done using either, or both, private water rights

owned by Mr. David Woodward (20 acre feet) and water leased by the Town of Silver City. At the present time Mr. Woodward's private well is unable to produce water fast enough to function as a source for infiltration testing. There is however, a four inch transfer line from Silver City's Woodward's booster station to within 100 yards of the earthen structure selected as an infiltration site. Pumping costs for the 20 acre feet would be approximately $5,000. In addition, tracking water movement with the use of piezometers and isotope trackers could be conducted.

The primary questions we hope to answer in this phase are:

1. How long will it take for the water to reach the static water table and how much lateral movement will be experienced? The study area is 1¼ mile west from Silver City's Woodward well #1, 1 mile west from Woodward #2, 2 miles south from Franks #7 and 1/4 mile west from Mr. David Woodward's private wells.
2. Will higher volumes of water produce differences in the speed it reaches the water table and the lateral movement?

Phase 2: Vegetative Study (2015)

Will changing the surface vegetation from brushy species to grass species produce recoverable water for recharge?

On one of the study areas we propose an intensive thinning regime with the end result being as close to an exclusively grass cover as possible. On the second area, we propose the thinning remain primarily in the canyon bottoms, and these returned to grass species. In both study areas, small erosion control structures will be constructed as needed. The confluences of these watersheds flow into an earthen structure with a highly permeable bottom. Small gauging stations should be installed on both tributaries to determine surface flow, and from that, determine infiltration rates within the earthen structure. This combined with the piezometers data should determine rates of recharge. Primary estimates for instrumentation would be approximately $20,000.

**Funding request**.

Project funding request for 2012 is $105,000.

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|---|---|---|
| instrumentation | | $20,000 |
| Pumping costs | | $5,000 |
| Professional services | | $80,000 |

Project funding for 2015 is $100,000 for thinning of project area.

Phase 3: Watershed treatment:

It would not be logical to begin any treatment regime until rational conclusions can be drawn from the hydraulic study. We must assume that it will take at least five years before we have a high confidence level in our results to justify further funding. At this time, it would be presumptuous to attempt a detailed budget for this phase, but three alternative plans will be presented.

The target area for this project is approximately 8,200 acres. The target area of the watershed is owned by 3 private land owners and the State of New Mexico. The vast majority of the watershed is overgrown with oak brush with pockets of piñon and juniper. Gullying of canyon bottoms is problematic over much of the target area.

There are 8 primary dams and erosion control structures in the watershed that function as recharge sites. These structures are earthen dams and structures with highly permeable bottoms. These structures are being filled with fine silty material that decreases the permeability of the bottoms. Landowners in the watershed have maintained these structures, but it is estimated that 15,000 – 20,000 cubic yards of material need to be removed to return them to their original design specifications. The cost to remove this material and reinforce the structures is estimated at $\$4.00/yd^3$ or a total of $60,000 - $80,000. In addition, new structures need to be built to catch sediment before it can enter the primary structures. Small gully plugs in the tributary of the main drainage are ideal for this task. A structure 5 ft. high by 100 ft. wide, built to the Natural Resources Conservation Service specifications would cost approximately $1,000/ structure. Preliminary estimates indicate a need for 20 of these additional structures.

The major component of this project is brush control. In the 1970's, this component was not considered a significant impediment even though much of the watershed was covered in woody species. Now, however, brush/woody vegetation is decreasing the ability of the watershed to deliver surface water. Thirty years ago numerous springs were productive in moderately wet years. Currently, these springs are non-existent. Surface flows in the watershed now require heavy rainfall events and these events are high in turbidity due to soil erosion. Almost all of the approximated 8,200 acres are in need of brush control. The most economical way to accomplish this is with herbicide at approximately $50/acre or about $400,000. A mechanical thinning and removal project would cost approximately $1,000/acre for a total of $8.2 million.

An aditional component of this project is maintenance of the watershed and recharge structures. Silt removal and breaking up the bottoms of the recharge structures will be needed at least every 10 years. With reduced erosion, the cost should be significantly less than the original $60,000 - $80,000. Estimates for maintenance are approximately $15,000 every 10 years. Maintenance of the watershed with prescribed fire is probably the most economical solution. Research has shown that the pre-settlement fire cycles in this region were every 7 – 10 years. It is suggested that a percent of the watershed is to be treated annually dependent upon the availably of fine fuels (grasses). The cost of treatment should be approximately $40/acre or $33,000/year if a target of 10% per year can be maintained.

The benefits of this project are difficult to calculate with any degree of accuracy. In 1970, it was estimated that approximately 150 acre feet/year of water was escaping the area due to insufficient recharge in the watershed and evaporation of standing water. This figure is comparable to .5 in. of rainfall over the entire watershed. If this number is still relevant, then 340 acre feet could be developed over the target area. Since that time the earthen structures have filled with silt, sealing the bottoms and decreasing the storage capacity. Furthermore, brush has grown much denser and is depleting the water found in the root zone, and consequently reducing natural recharge.

**Conclusions:**

Alternative 1:

Under this scenario, it is assumed that brush management will not create rechargeable water at a cost less than $1,000 per acre foot (cost estimate of Silver City's Franks field infiltration project). Slow release structures would be proposed to aid in the natural recharge of the aquifer. We envision about 20 structures being built at a cost of around $5,000 each, or approximately $100,000.

Alternative 2:

If brush management can produce water at, or below $1,000 per acre foot, we would propose treating the valley bottoms corresponding to approximately 2,500 acres. This would include construction of the slow release structures and rehabilitation of existing sights. If herbicide can be used, the cost will be far lower than if mechanical treatment is employed. Costs for brush management would range from a low of $125,000 to 2.5 million.

Alternative 3:

In this scenario, aggressive brush management produces rechargeable water at a cost far below $1,000 per acre. The entire watershed would be treated and earthen structures constructed. Cost for brush control would range from a low of $410,000 to $8.2 million.