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DRINKING WATER SYSTEM, EFFICIENCY AND IMPROVEMENT PROGRAM: WATER METER REPLACEMENT

NOGALES, AZ

Applicant	
Name	City of Nogales
Address	777 North Grand Avenue Nogales, AZ 85621
Website	www.nogalesaz.gov

Project Manager	
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Executive Summary

Drinking Water System Efficiency and Improvement Program
Water Meter Replacement

January 12, 2015

Applicant	
Name	City of Nogales
City	Nogales
County	Santa Cruz
State	Arizona

The project consists of the purchase and installation of new water meters for the City of Nogales' drinking water system, for the community of Nogales, Arizona (the "Project")

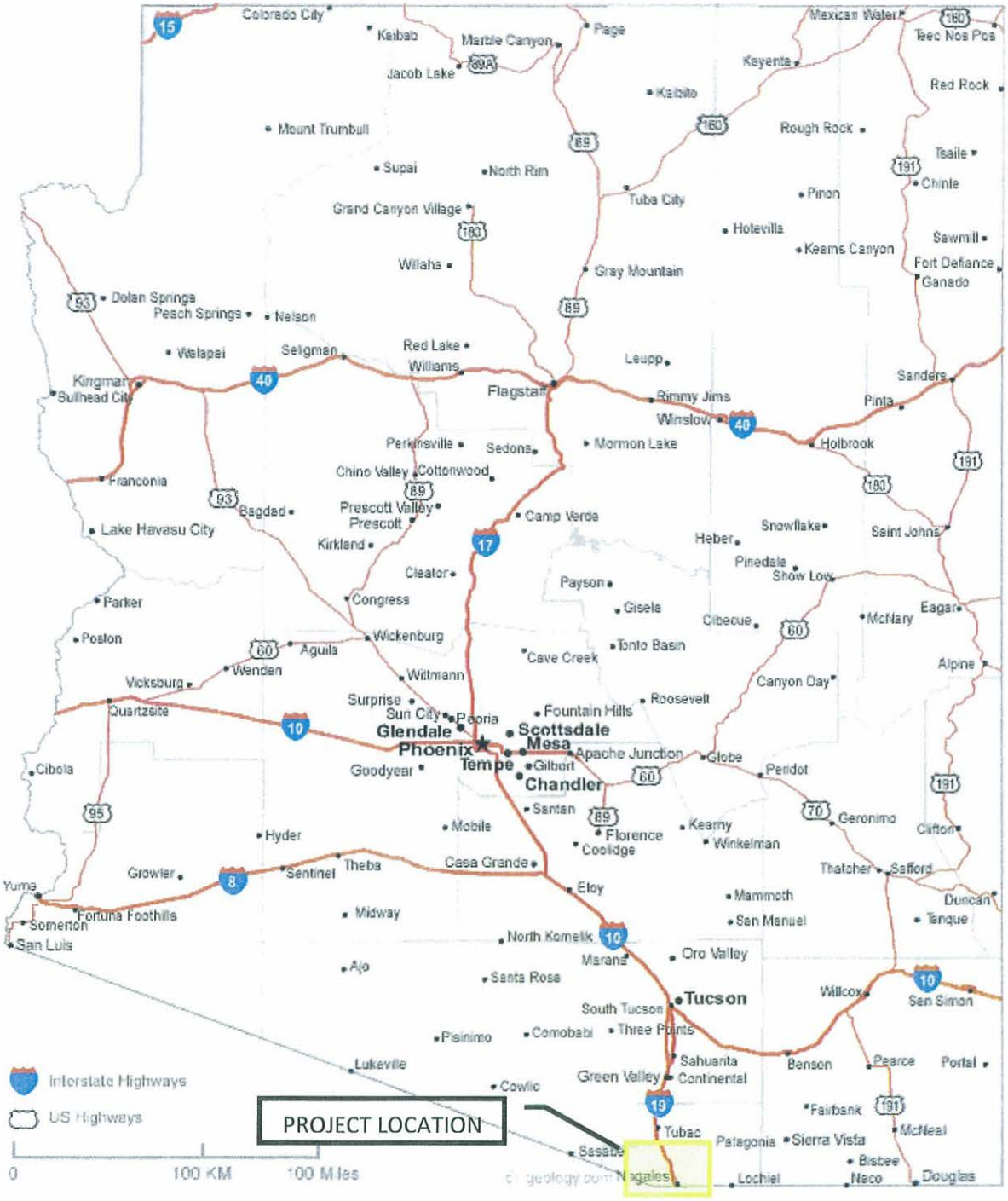
The Project shall increase efficiency and reduce water loss and accountability for a sustainable potable water service through improved water resource management and overall system operation. This will help conserve a natural resource, water, and increase the financial stability of the utility and service reliability. This will be achieved by installing a new meter system that will conserve water by improving the utility's ability to detect leaks, audit water usage, and accurately meter usage at each connection. The anticipated target for billing accuracy is 90% or greater. The new meter system will improve the operational efficiency of the utility.

The project length of time is projected to be two years and completed by September 30, 2017

The project is not located on a Federal facility.

Background Data

Map 1: Geographic Location



Map 1 is a map of Arizona, showing the location of the City of Nogales, bordering Mexico, in Santa Cruz County and the nearest U.S. cities and towns. Nogales is about 60 miles south of Tucson via Interstate 19.

As applicable, describe the source of water supply, the water rights involved, current water uses (i.e., agricultural, municipal, domestic, or industrial), the number of water users served, and the

current and projected water demand. Also, identify potential shortfalls in water supply. If water is primarily used for irrigation describe major crops and total acres served.

Twenty (20) wells supply the City of Nogales 6,005 water service connections to residential, commercial and industrial customers with approximately 6,322 acre feet of water rights allocation and approximately 3,534 acre feet of water usage. The City does not provide water for crop irrigation.

In addition, describe the applicant's water delivery system as appropriate. For agricultural systems, please include the miles of canals, miles of laterals, and existing irrigation improvements (i.e., type, miles, and acres). For municipal systems, please include the number of connections and/or number of water users served and any other relevant information describing the system.

The City of Nogales' 15 active wells range in depth from 100 to 1,000 ft/deep. Horsepower for these wells range from 10 HP to 40 HP. New accurate MAG meters are being added to each of the wells. The City has nine booster stations, 6 within the City, two in Kino Springs and one serving a county island. The booster pumps range in size from 5HP to 200 HP, which is needed for fire protection. Usually, the smaller pump can provide sufficient pressure for routine requirements.
There are 120 miles of distribution piping ranging in size from 1" to 16. "

The City has seven elevated water storage tanks, four with a capacity of 1,200,000 gallons, one with a 300,000 gallon capacity, two in the remote area of Kino Springs, one with 65,000 gallon capacity and the other with a 30,000 gallon capacity.

Exhibit 1: Water Distribution System

City Water Distribution System Approximate length of pipe					
	Diameter	Length (ft)	Length (Miles)		
	0	10537	1.995643939	"0" indicates 3/4"	
	0	1910	0.361742424	service lines	
	1	1356	0.256818182		
	2	13197	2.499431818		
	3	481	0.091098485		
	4	87172	16.50984848		
	6	132750	25.14204545		
	8	152478	28.87840909		
	10	21755	4.120265152		
	12	110578	20.94280303		
	14	21135	4.002840909		
	16	81,243.00	15.39		
Total Length of pipe in Miles			120.1878788		
Pipe Diameter and Lengths from					
available documents(as-builts - 2014)					
Entire lengh of Water Distribution main is approximate					
Any Water Distribution Lines in Kino Springs Not					
shown or included in table					
Source: CityWaterDistributionSystemGIS					

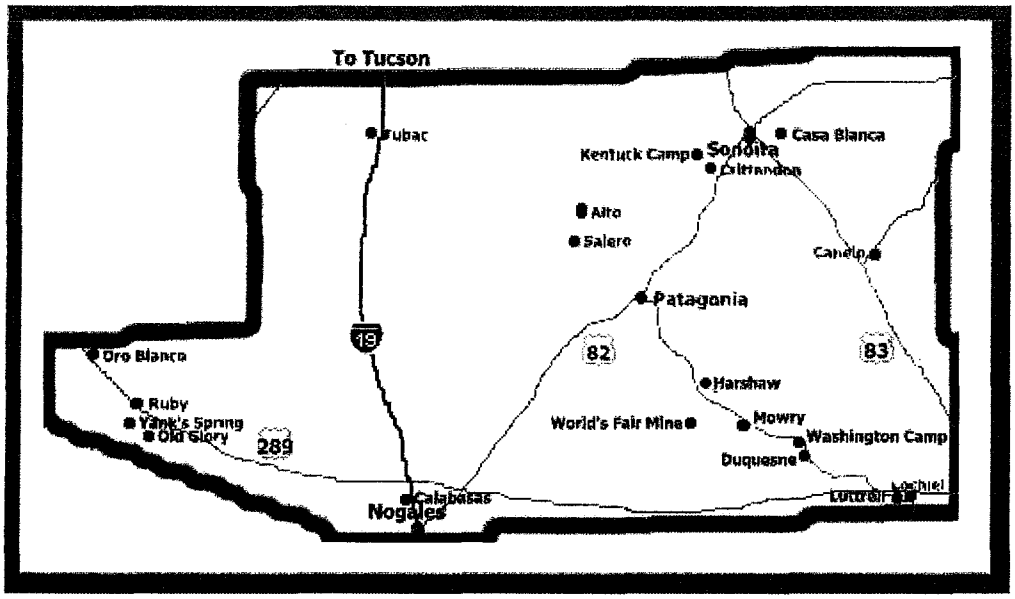
If the application includes renewable energy or energy efficiency elements, describe existing energy sources and current energy uses.

No renewable energy source is planned at this time. However this project will result in energy efficiency by reducing water pumped and miles driven.

Identify any past working relationships with Reclamation. This should include the dates(s), description of prior relationships with Reclamation, and description of the projects(s).

The City has no previous working relationship with the Bureau of Reclamation.

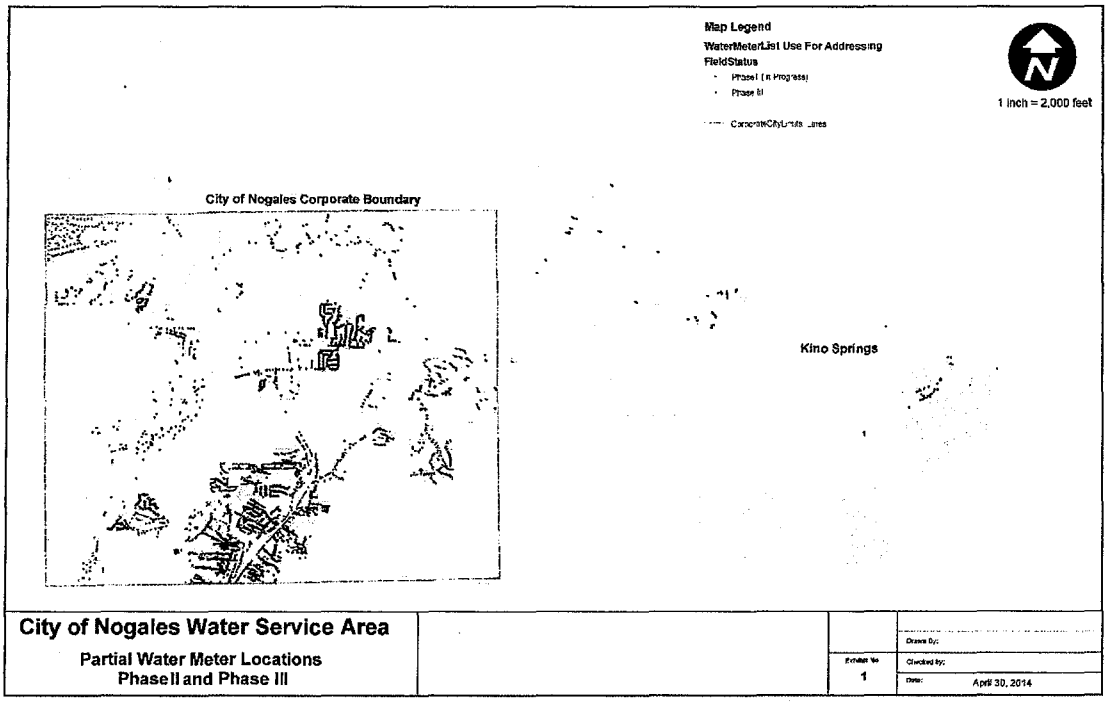
Map 2: Detail Map of neighboring cities and towns.



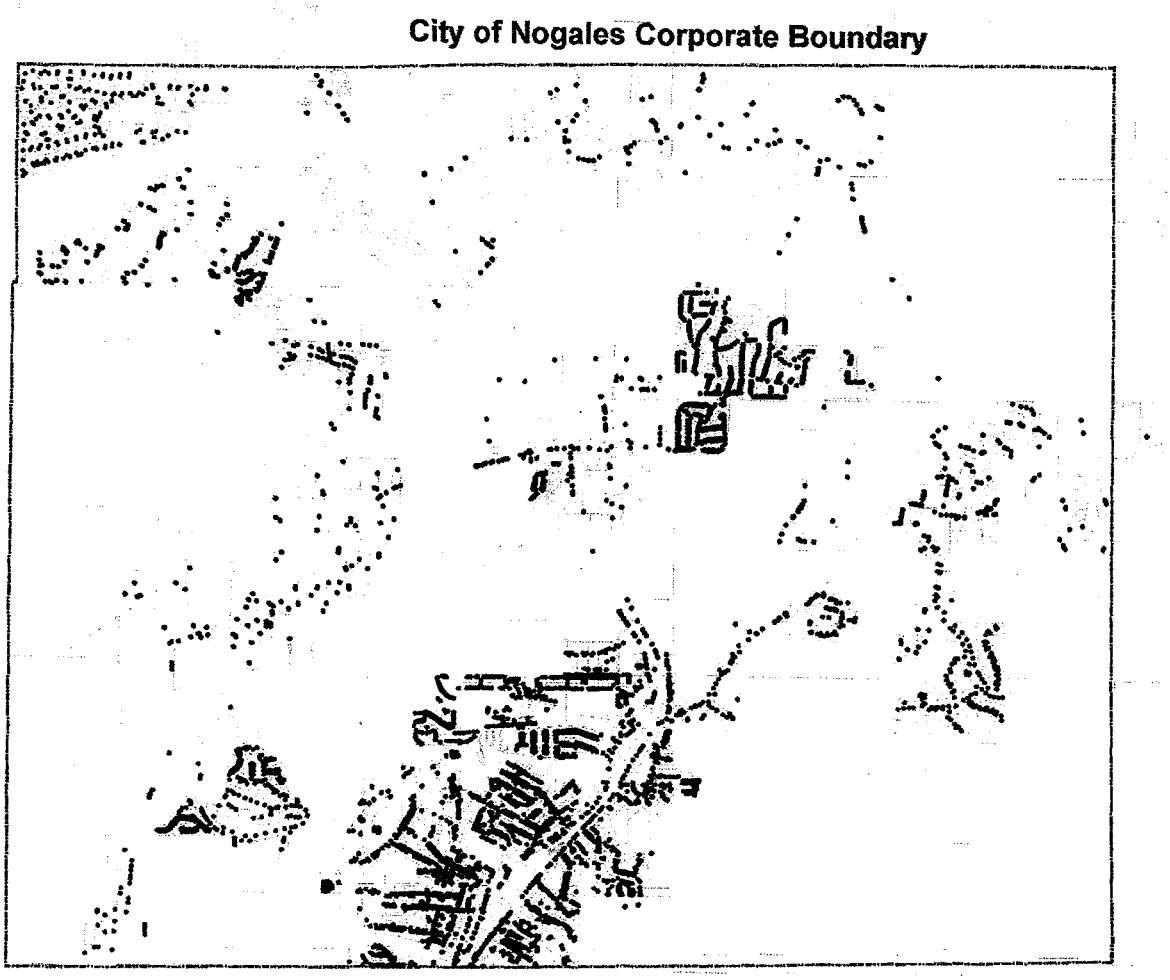
The City of Nogales is located in Santa Cruz County, Arizona, where it borders Nogales, Sonora, Mexico to the south. The City is approximately 60 miles south of the metropolitan area of Tucson and lies within the Sonoran Desert. It is located in a dissected foothills-like setting that contains the headwaters and main reach of Nogales Wash. Several northeast flowing tributaries, Las Canoas, Mariposa Canyon, Potrero Creek, Alamo Canyon and Pesquiera Canyon flow directly into the main reach of the Nogales Wash system. The average high and low maximium temperature ranges is 93.9F - 27.4 F. with only an average of 17.66 inches of annual precipitation, almost all of which occurs in summer months of July and August. These arid conditions indicate a potential water shortage[1]. area is in the Sonoran DesertThe region is semi-arid, The City of Nogales' water service begins at the U.S.-Mexico border in Nogales, Arizona and extends north for approximately five miles.

[1] Brady, L, Gray (n.d.) (Critical U.S.-Mexico Borderland Watershed Analysis, Twin Cities Area of Nogales, Arizona And Nogales, Sonora . U.S. Geology Survey, Geologic Division, Tucson, AZ.

Map 3: Service Area Map



4: Service Area Detail Map



Map Legend

WaterMeterList Use For Addressing

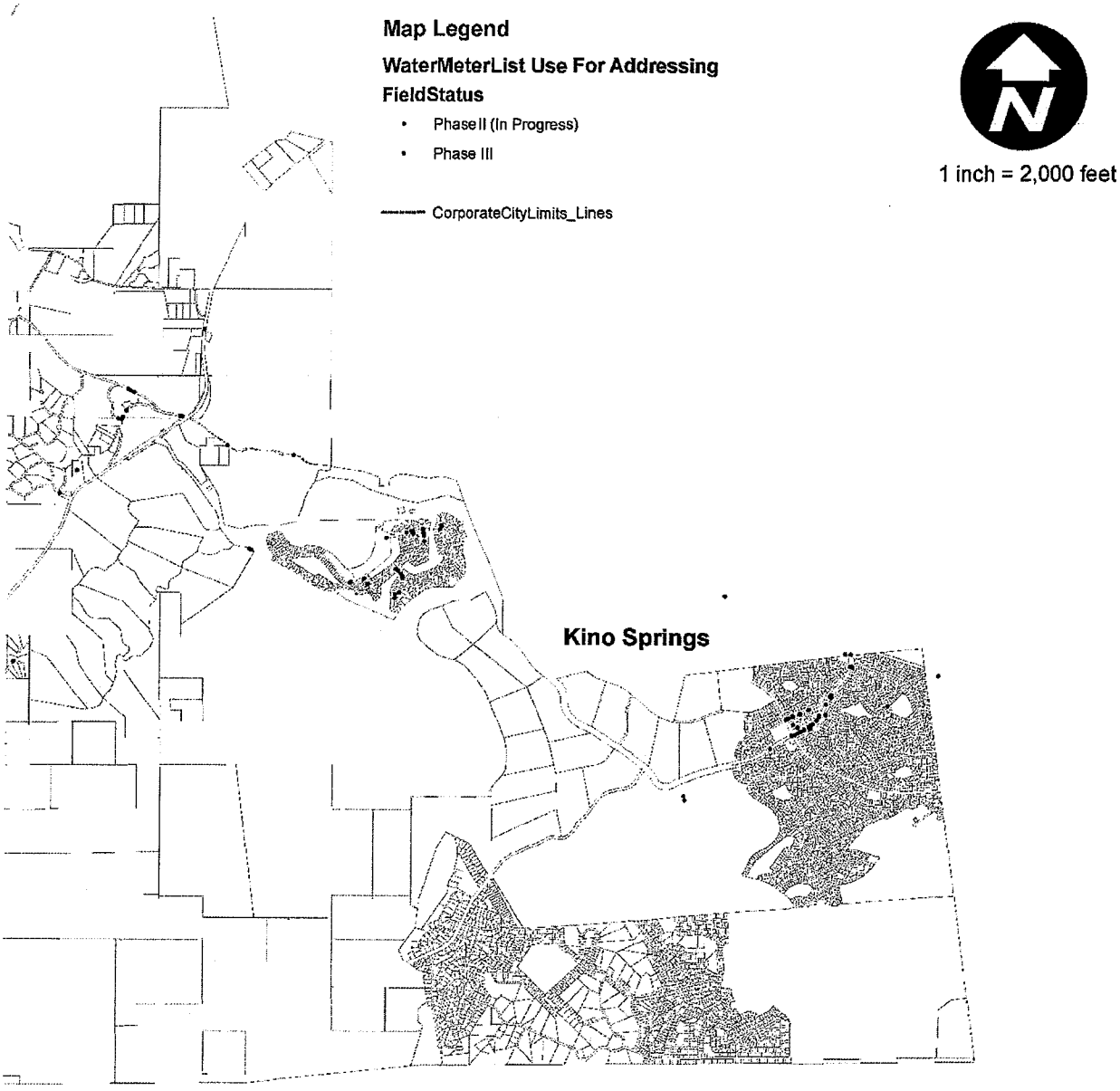
FieldStatus

- Phase II (In Progress)
- Phase III

CorporateCityLimits_Lines

1 inch = 2,000 feet

Map 5: Service Area Detail Map Kino Springs (remote system)



The City of Nogales source of water supply, water rights, current water uses, number of water users served, and the current and projected water demand is described in Exhibit 2.

Exhibit 2: Water Supply

Water Supply	
Coverage	20+ square miles
Supply Source	Santa Cruz River Potrero Canyon
Active Groundwater Wells	15
Water rights	City of Nogales
Total number of water connections	6,005

The City of Nogales is located in the Sonoran Desert. The average annual rainfall is 18.11 inches.[2] Water conservation is critical for current populations and future growth.

The economic activities of both Nogales, Arizona and Nogales, Sonora are primarily trade and services. The 2013 population estimate for the City of Nogales is 20,456, with an estimated 6,314 households. Household sizes are larger than the state average comprised of 3.24 persons per household as compared to the state average of 2.67.[3] The economically active population of Nogales, Arizona is estimated to be 8,227 persons. The median household income is $26,333 compared to the state average of $49,774. Based on the U.S. Census data, 35.9% of Nogales' population is living below the poverty level, compared to 17.9% of the state population.

Water Meter System

The City of Nogales' existing water meters are antiquated, resulting in an inability to read and accurately and to read low flows, and do not have the capabilities typically associated with modern metering systems. The meters must be read manually, do not have any data storage capabilities, and cannot be integrated with the billing system. Reading all the system's meters requires 150 man-hours per month. Due to the utility's limited resources, man-hours have to be diverted from more important activities related to the utility's operations and maintenance. The data collected from the existing meters provides only one monthly reading and is not integrated with the billing software, resulting in an inability to monitor water usage patterns or help detect leaks. Anticipated benefits of the meter replacement program include automated meter readings integrated with data collection and billing software.

Technical Project Description

The technical project description should describe the work in detail, including specific activities that will be accomplished as a result of this project. This description shall have sufficient detail to permit a comprehensive evaluation of the proposal

The City currently has water meters installed that are in need of replacement. The current meters are not reading accurately which causes water bills to be lower than the actual amount of water consumed. From already replacing several hundred new meters the City estimates that readings were on average 18% lower than actual consumptions.. The City is replacing the outdated water

[2] U.S. Climate Data 2014) http://www.usclimatedata.com/climate/nogales/arizona/united-states/usaz0146

[3] U.S. Census Bureau (04-Dec-2014) http://quickfacts.census.gov/qfd/states/04/0449640.html

meters with patented new metering technology that uses a pulse of energy to magnetize small strips of remanent material. This new meters technology will allow to track changes in usage and alert for possible leaks. The new meters also save a significant number of man hours and reduce the carbon footprint due to reduction in vehicle miles driven for meter readings. These items are described in more detail later.

The new meter technology also allows to chart and observe trends over time to get a better understanding of historical water usage patterns. The City can use this information for water conservancy and education of customers.

The City of Nogales established a four phase plan to replace all 6,005 water meters. The City has initiated Phase I with the purchase of 600 "smart" meters which are being installed upon receipt. Upon completion of the proposed Phases 2 and 3, the City shall commence with Phase 4 with the purchase and installation of an additional 2,005 meters to complete the meter replacement. Thus at the end of four years all 6,005 water meters shall be replaced.

The proposed project:
Phase 2 shall commence 10/01/2015 with the purchase and installation of 1,400 "smart" meters by 09/30/2016. The Phase 3 schedule is 10/01/2016 – 09/30/2017 with the purchase and installation of 2,000 "smart" meters.

To achieve overall efficiency the City's decision to replace current meters over a four year period will ensure future replacement/updates will be on a staggered schedule, thus more cost effective and without disruption of services.
Project components include:

- Meter reading equipment: Two drive-by receivers, one hand-held receiver, and two laptops;
- Data collection and billing software; and
- Meters: 3,400 meters and related interface units and box lids, as well as evolving into a direct read to billing department every four hours. Advanced Meter Infrastructure (AMI).

The project will comply with the standards established by the American Water Works Association (AWWA) for drinking water systems, and the meters will be lead-free.

The **Sensus iPERL™ Water Management System**. These run on a solid state, battery operated electromagnetic flow-measure system with a hermetically sealed, glass covered, electronic register with programmable 9-digit display. Per the Iowa Curves of asset life expectancy, water meters are included in asset class 346 which has an average expected usable life of 30 years.

Selected Technology

- In considering meter system options, the following were reviewed to identify the most appropriate technology:
- Accuracy in metering water consumption;
- Ability to perform drive-by readings and evolve into an AMI from AMR system;
- Ability to store historical data in order to analyze user consumption patterns or identify system inefficiencies;

- Compatibility with the existing system;
- Cost of the initial investment, as well as ongoing operation and maintenance costs;
- Training requirements; and
- Software will upload billing information directly to the City's water accounting system and automated mailing of water bills thus reducing administrative time.

Once installation is completed, all necessary software will be installed and with a vendor, develop 24/7 real-time computer access for Nogales Public Works staff and water customers.

Phase II meter installation is shown in Map 4 above with blue locations. Phase III is shown in maps 4 and 5 with black locations.

Exhibit 3: Project Implementation Plan

The project will start in the southern part of Nogales, where the oldest meters are located and proceed north.

No.	Timeline Major Project Tasks	Quarters 2015/2016				Quarters 2016/2017			
		1	2	3	4	1	2	3	4
1	Execute contract with Bureau of Reclamation								
2	Inform City Council								
3	Media release and information to public								
4	Order 1,400 water meters								
5	Schedule meter replacement for Phase 2 water customers								
6	Inform customers located in Phase 2 of a meter replacement schedule via mail, newspaper, and door hangers								
7	Mail water conservation materials to customers located in Phase 2								
8	Install meters								
9	Order 2,000 water meters								
10	Schedule meter replacement for Phase 3 customers								
11	Inform customers located in Phase 3 of a meter replacement schedule via mail, newspaper, and door hangers								
12	Mail water conservation materials to customers located in Phase 3								
13	Establish contract with vendor for laptops, software, training and set-up								
14	Set-up completed and 24/7 real time computer access for Nogales Public Works and water customers								

15	Project completion and close out grant								
16	Evaluate effectiveness (will continue after project is completed)								

The City of Nogales will be responsible for the management, construction, and operation of the project, which is currently managed by the Utilities Department, Water Division. As managing authority, the City will ensure sufficient resources, training, and staff is available for the proper operation of the new meter system.

City of Nogales currently provides water and wastewater services to parts of the unincorporated areas of the county and has established procedures for the operation and maintenance of both systems.

An installation and Operation Manual has been obtained from the meter manufacturer. Maintenance of the hardware and software for the new meters may result in minor operational cost increases (approximately $15,000 per year); however, the reductions in man-hours associated with reading the new meters and vehicle driving and wear on vehicles and employees will provide a significant savings. Similar to the current practice, meters will continue to be read on a monthly basis. With the new meters, it is estimated that the man-hours required to complete this task will be reduced from 240 hours/month to 40 hours/month.

The Sensus Iperl Meters characteristics include: leak and backflow detection, accurate to 1/8 gpm, a 20-year warranty, 96-day data storage, a broadcast range of several miles, collection at two tower locations and software compatibility with City of Nogales' system and topographic challenges

Currently, the equipment supplier is studying the topography of the area and is hopeful that new control towers will not be needed. The plan is to use existing structures such flagpoles instead of the communication towers to mount the transmittal equipment.

Evaluation Criterion A: Water Conservation
Up to 28 points may be awarded for a proposal that will conserve water and improve efficiency. Points will be allocated to give consideration to projects that are expected to result in significant water savings.

Subcriterion No. A. 1: Quantifiable Water Savings
Up to 24 points may be allocated based on quantifiable water savings expected as a result of the project.

Describe the amount of water saved. For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project. Provide sufficient detail supporting how the estimate was determined, including all supporting calculations. Be sure to consider the questions associated with your project type (listed below) when determining the estimated water savings, along with the necessary support needed for a full review of your proposal (this is not an exclusive list of eligible project types. If your project does not align with any of the projects listed below, please be sure to provide support for the estimated project benefits, including all supporting calculations and assumptions made).

The City of Nogales has determined that the discrepancy between the amount of water pumped versus the amount of water billed to the end user (determined from meter readings) is 29%. This difference is due to a) water losses in the system and b) somewhat low meter readings. Over the past year 600 meters have been replaced by the City. The average change in meter readings is 18% higher (users are charged for an average of 18% more than in comparable time segments before the new meter was installed). The City therefore estimates that the actual loss of water in the system is around 16% of the total amount pumped in the sample year 2013. A sample calculation is included below.

In addition, all applicants should be sure to address the following:

- *What is the applicant's average annual acre-feet of water supply?*

Average annual acre-feet of water supply*	
Available water	6,322 acre feet
Water use	3,534 acre feet

*City of Nogales (2013) Arizona Department of Water Resources Annual Water Withdrawal and Use Report, Schedule AWS

- *Where is the water currently going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground, etc.)?*

End user consumption, the water user is consuming the water.

- *Where will the conserved water go?*

The conserved water will remain in the aquifer or be available downstream in the Santa Cruz River. It will not be withdrawn from the sources (river or aquifer).

- *Include a specific quantifiable water savings estimate, do not include a range of potential water savings.*

The City is committed to this project and has replaced all of the propeller meters at wells (16 replacements) with new MAG meters from 6" to 10" at wells and installed, per manufacturers recommendations and has started a calibration program for well meters. This will also help tracking more accurately how much water is pumped (and metered at the source) versus how much water is billed at end user locations to pinpoint system losses.

Water pumped: 3,534 acre feet

Water billed: 2,522 acre feet

Sample calculation:

Using old meters:
Amount of water pumped: 100,000 gal
Amount of water billed (meter readings) 71,000 gal

After installation of new meters:
Amount of water pumped: 100,000 gal
Amount of water billed (meter readings) 83,780 gal

1 - 83,780 gal/71,000 gal = 18% (percent of water billed)

The amount of water not read correctly per 100,000 gal is 12,780 gal or **13%** (percent of total)
That leaves 16,220 gal that is lost due to leaks or **16%** (percent of total)

Actual numbers:

Water pumped per year: 3,534 acre feet
Water billed now: 2,522 acre feet
Water billed with new meters: 2,976 acre feet
Difference in water billed: 454 acre feet
Water that can potentially be saved: 558 acre feet

Subcriterion No. A.2: Percentage of Total Supply

Up to 4 additional points may be allocated based on the percentage of the applicant's total average water supply (i.e., including all facilities managed by the applicant) that will be conserved directly as a result of the project.

***Provide the percentage of total water supply conserved**: State the applicant's total average annual water supply in acre feet. Please use the following formula:*

$$\frac{\text{Estimated Amount of Water Conserved}}{\text{Average Annual Water Supply}}$$

$$\frac{558 \text{ acre feet}}{3{,}534 \text{ acre feet}}$$

This is 16% potential savings in water supply (percent of total water pumped).

Municipal Metering: *Municipal metering projects can provide water savings when individual user meters are installed where none exist to allow for unit pricing and when new meters are*

installed within a distribution system to assist with leakage reduction. Applicants proposing municipal metering projects should address:

- *How has the estimated average annual water savings that will result from the project been determined? Please provide all relevant calculations, assumptions, and supporting data.*

The City has over the past few years compared the amount of water pumped versus the amount of water billed. The discrepancy was on average 29%. The City suspects that some of the discrepancy results from faulty meter readings and some of it is a loss of water due to leaks in the system. The City has replaced several hundred water meters over the past year and compared the water usage for those replaced meters with the water usage at the same location over similar periods measured by old meters. On average customers are now charged for18% (percent of water billed) more water used than before the meter replacement. That leaves an estimated 16% (percent of total water pumped) of the water pumped yearly to fall in the category of water lost due to leaks. This is the portion of water that could potentially be saved. The actual calculations are shown in Subcriterion A.1. above.

- *How have current distribution system losses and/or the potential for reductions in water use by individual users been determined?*

The potential for water use reductions by users has not been determined or included as a potential savings but the new meter system will allow to track usage historically and to educate users in the future about adjusted water use.

- *For individual water user meters installation, refer to studies in the region or in the applicant's service area that are relevant to water use patterns and the potential for reducing such use. In the absence of such studies, please explain in detail how expected water use reductions have been estimated and the basis for the estimations.*

Many water connections are not properly metered or have outdated meters some more than 10 years outdated, making it difficult to determine how much of the utility's water production is being used and how much is lost due to leakage. The new metering system will allow the utility to conserve water by aiding with leak detection and by promoting conservation incentives and assisting residence by more accurately immediately addressing leaks.

- *If installing distribution main meters will result in conserved water, please provide support for this determination (including but not limited to leakage studies, previous leakage reduction projects, etc.). Please provide details underlying any assumptions being made in support of water saving estimates (e.g., how leakage will be reduced one identified with improved meter data).*

The new water meters have a feature included that will alert the City to potential leaks. Before the installation of these meters it was not possible for the City to determine where leaks are or

the extent of leaks.

- What types (manufacturer and model) of devices will be installed and what quantity of each?

The City of Nogales has purchased 600 "smart" water meters and is in the process of installing them.

The City of Nogales plans to purchase and install **4,000 Sensus iPERL™ Water Management System** water meters for this project and will complete the installation by 09/30/2017.

The City is purchasing Sensus iPERL™ water meters. These meters have a front end amplifier designed and sigma-delta analog to digital conversation which improves low flow measurement accuracy over traditional battery-powered mag meters. This is critical for leak detection. The advantage of sigma-delta analog to digital conversion allows the City to continuously record flow with no gaps in measurement. This is advantageous where water flow is frequently intermittent, which occurs in Nogales.

- *How will actual water savings be verified upon completion of the project?*

The City of Nogales will be able to monitor water usage and record historical usage in real time. Detection of leaks will also be possible and successful remediation will be easily determined by comparing actual volumes of water pumped with the volume of water billed. The software will allow the City to set parameters and set alarms for end users.

Subcriterion No. B-1: Implementing Renewable Energy Projects Related to Water Management and Delivery

This project is addressing Subcriterion No.B.2: Increasing Energy Efficiency in Water Management

Subcriterion No B.2: Increasing Energy Efficiency in Water Management

If the project is not implementing a renewable energy component as described in Subcriterion No B1, up to 4 points may be awarded for projects that address energy demands by retrofitting equipment to increase energy efficiency and/or through water conservation improvements that result in reduced pumping or diversions.

Under another project the City is designing energy efficient pumps at the Hospital Booster Station. Installation is schedule to be completed by12/01/2015. The City is also modifying all well pumps to VFD's which reduces energy consumption. They are in the process of updating their SCADA system which will increase control of pumping times allowing the City to use the lower night electrical rates instead of the high daytime rates. These improvements are all part of other projects not associated with this grant application.

Describe any energy efficiencies that are expected to result from implementation of the water conservation or water management project (e.g., reduced pumping)

- *Please provide sufficient detail supporting the calculation of any energy savings expected to result from water conservation improvements. If quantifiable energy savings are expected to result from water conservation improvements, please provide sufficient details and supporting calculations. If quantifying energy savings, please state the estimated amount in kilowatt hours per year.*

Energy savings will be mainly due to decreased pumping. Currently estimated amount of water lost due to leakage is 813 acre feet. Total electricity used for pumping was 1,114,294 kWH in 2013. An estimated potential 256,288 kWH could be saved with leak detection and repair.

- *Please describe the current pumping requirements and the types of pumps (e.g., size) currently being used. How would the proposed project impact the current pumping requirements*?

City Of Nogales / Kino Springs Water Reservoir Tanks

Kino Springs Area	Capacity
Kino Springs Village Tank	30,000 Galls
Kino Springs Pro Shop	65,000 Galls
ForeBay	300,000 Galls

Nogales Area	Capacity
Royal road	1.2 Million Galls
Crawford	2.0 Million Galls
West Hills	1.2 Million Galls
High School	1.2 Million Galls
North	1.2 Million Galls

City Of Nogales / Kino Springs Booster Stations

Kino Springs Area	H.P
Kino Springs Well # 19	#1) 25 hp Suction side 2" Discharge 2" #2) 5 hp Suction side 2" Discharge 2"
Kino Springs Pro Shop	#1) 30 hp Suction side 4" Discharge 2" #1) 25 hp Suction side 2" Discharge 2"
Santa Cruz Pumping Plant	#1) 200 hp Suction side 8" Discharge 4" #2) 200 hp Suction side 8" Discharge 4" #3) 200 hp Suction side 8" Discharge 4"

Nogales Area	H.P
Royal road	#1) 30 hp Suction side 8" Discharge 6" #2) 30 hp Suction side 8" Discharge 6"

Elm	#1) 25 hp Suction side 3" Discharge 2 1/2" #2) 25 hp Suction side 3" Discharge 2 1/2" #3) 25 hp Suction side 3" Discharge 2 1/2"
Hohokam	#1) 75 hp Suction side 10" Discharge 8" #2) 40 hp Suction side 6" Discharge 6" #3) 75 hp Suction side 10" Discharge 8"
Hospital	#1) 50 hp Suction side 8" Discharge 6" #2) 5 hp Suction side 2" Discharge 1 1/2"
High School	#1) 25 hp Suction side 6" Discharge 4" #2) 25 hp Suction side 6" Discharge 4"
Meadow Hills	#1) 50 hp Suction side 8" Discharge 6" #2) 50 hp Suction side 8" Discharge 6" #3) 50 hp Suction side 8" Discharge 6"

City Of Nogales / Kino Springs Wells

Kino Springs Area	Type / HP
Kino Springs Well # 19	Submersible 2" 10 hp 45gpm
Kino Springs Well # 19-A	Submersible 2" 5 hp 25gpm
Santa Cruz # 1	Turbine 8" 40 hp.
Santa Cruz # 2	Turbine 8" 40 hp.
Santa Cruz # 3	Submersible 6"
Santa Cruz # 4	Submersible 4"
Kino Springs Well # 3	Turbine 8"
Kino Springs Well # 5	Turbine 8"
Kino Springs Well # 5 A	Turbine 8"
Guavavi Well # 1	Turbine 6" 40 hp.
Guavavi Well # 2	Turbine 6" 40 hp.

Nogales Area	Type / HP
Coronado Well # 6	Turbine
Meadow Hills # 1	Submersible 8"
Meadow Hills # 2	Submersible 6"
Meadow Hills # 3	Submersible 4"

- *Please indicate whether the energy savings estimate originates from the point of diversion or whether the estimate is based upon an alternate site of origin.*

The estimate is based on better leak detection with new water meter technology.

- *Does the calculation include the energy required to treat the water?*

The energy to treat the water is not included. Nogales uses chlorination which uses very low amounts of energy compared to energy used for pumping. The use of chlorine, however, can be reduced when the total amount of water pumped is reduced. Currently chlorination costs are around $11,570 per year.

- *Will the project result in reduced vehicle miles driven, in turn reducing carbon emissions? Please provide supporting details and calculations. Describe any renewable energy components that will result in minimal energy savings/production (e.g., installing small-scale solar as part of a SCADA system).*

The project will result in significant vehicle miles savings. The City tracks vehicle miles driven with GPS units in their vehicles. Miles driven by the vehicle used for checking the old meters are estimated at 18,857 miles per year. The City anticipates that the new meters will only require approximately 1,571 miles driven per year due to remote reading technology and historical reading retention. As part of the City's Operations and Maintenance program for meters, the City will visit each meter at least once per year, rather than 12 times a year. That is a savings of 90+% or 17,286 miles per year which is also a significant reduction in greenhouse gas emissions.

Subcriterion E.1: Addressing Adaptation Strategies in a WaterSMART Basin Study
This project is addressing water meter replacement

Subcriterion E.2: Expediting Future On-Farm Irrigation Improvements
This project is addressing water meter replacement

Subcriterion E.3: Building Drought Resiliency

Up to 14 points may be awarded for projects that will build long-term drought resilience in an area affected by drought

If the proposed project will make water available to alleviate water supply shortages resulting from drought, please address the following:

This project will help to alleviate water shortages by conserving water through early leak detection and repairs. Real-time water usage and historical water use data will be recorded with the new meters. The ordinance mandates the notification of the public of the mandatory restrictions non-essential water usage. Real-time data will also allow the City to identify water users in violation of the Emergency Water Conservation Ordinance.

"A water emergency may be declared for the entire service area of the city municipal water utility system, or portions thereof, which is unable to: provide adequate quantities, qualities or pressure of water delivery in compliance with the Arizona Department of Environmental Quality standards or regulations; or which is unable to provide adequate water supplies to meet public fire flow requirements; or, which is unable to provide an adequate water supply due to drought conditions; and which constitutes a danger to the public health, safety and welfare of customers of the city municipal water utility" (Sec. 19-84. – Emergency water conservation response).

- **Sec. 19-84. - Emergency water conservation response.**

(a)

Declaration of policy. It is hereby declared that, because of varying conditions related to water resource supply and distribution system capabilities within the city, it is necessary to establish and to enforce methods and procedures to ensure that, in time of emergency shortage of the local water supply, the water resources available to the residents of the city and customers of the city municipal water utility are put to the maximum beneficial use, that the unreasonable use, or unreasonable method of use is prevented, and that conservation of water is accomplished in the interests of the customers of the city municipal water utility, and for the public health, safety, and welfare of the residents of the city.

(b)

Application. This section applies to all city municipal and industrial water utility customers who own, occupy, or control water used on any premises.

No person shall make, cause, use, or permit the use of water received from the city municipal water utility for residential, commercial, industrial, governmental or any other purpose in any manner contrary to any provision in this section.

Mandatory emergency conservation measures shall be implemented based upon the declaration of an emergency pursuant to paragraph (c) of this section.

(c)

Declaration of water emergency authorized. The Mayor and Board of Aldermen, or, in the absence of a quorum, the Mayor or the Vice-Mayor, upon the recommendation of the Assistant City Administrator, is hereby authorized to declare a water emergency and to implement mandatory conservation measures as set forth in this section.

(d)

Implementation, termination.

(1)

The Assistant City Administrator shall develop guidelines which set forth general criteria to assist the Mayor and Board of Aldermen, or in the absence of a quorum, the Mayor or the Vice-Mayor in determining when to declare a water emergency. Upon declaration of a water emergency, the Assistant City Administrator shall report in writing to the Mayor and Board of Aldermen providing the reasons for and expected duration of such emergency and describing implementation of emergency water conservation measures, including a specification of which mandatory emergency water conservation measures (described in paragraph (e) of this section) will be in effect during the declared water

emergency.

(2)

A water emergency may be declared for a the entire service area of the city municipal water utility system, or portions thereof, which is unable to: provide adequate quantities, qualities or pressure of water delivery in compliance with state department of environmental quality standards or regulations; or, which is unable to provide adequate water supplies to meet public fire flow requirements; or, which is unable to provide an adequate water supply due to drought conditions; and which constitutes a danger to the public health, safety and welfare of the customers of the city municipal water utility.

(3)

Upon the cessation of the condition or conditions giving rise to the water emergency, or upon majority vote of the Mayor and Board of Aldermen, or in the absence of a quorum, the Mayor or the Vice-Mayor shall declare the water emergency terminated. Upon such termination, the mandatory conservation measures shall no longer be in effect.

(e)

Mandatory emergency water conservation measures. Upon declaration of a water emergency and notification to the public, any or all of the following mandatory restrictions upon non-essential users (as specified in the declaration of the water emergency pursuant to paragraph (d) of this section) shall be enforced as to the customers of the city municipal water utility:

(1)

All outdoor irrigation, except for those areas irrigated with reclaimed water, is prohibited. If the Assistant City Administrator deems it appropriate, a schedule designating certain outdoor watering days or time periods may be implemented in place of the irrigation ban.

(2)

Washing of sidewalks, driveways, parking areas, tennis courts, patios, or other paved areas with water from any pressurized source, including garden hoses, except to alleviate immediate health or safety hazards, is prohibited.

(3)

The outdoor use of any water-based play apparatus connected to a pressurized source is prohibited.

(4)

Operation of water cooled space and equipment cooling systems below an operating efficiency level of two cycles of concentration is prohibited.

(5)

Restaurants and other food service establishments are prohibited from serving water to their customers unless water is specifically requested by the customer.

(6)

The operation of outdoor misting systems used to cool public areas is prohibited.

(7)

The filling of swimming pools, fountains, spas, or other related exterior water features is prohibited.

(8)

The washing of automobiles, trucks, trailers and other types of mobile equipment is prohibited, except at facilities equipped with wash water re-circulation systems, and for vehicles requiring frequent washing to protect public health, safety and welfare.

(f)

Variance. The Assistant City Administrator is authorized to review hardship cases and special cases within which strict application of this section would result in serious hardship to a customer. A variance may be granted only for the reasons involving health, safety, or economic hardship. Application for a variance from requirements of this section must be made in writing stating the health, safety or economic hardship involved and the nature of the variance requested.

(g)

Violation. In the event of any violation of this section, the city shall place a written notice on the property where the violation occurred and a duplicate of said notice shall be mailed to the person who is regularly billed for the service where the violation occurred and to any person known to the city who is responsible for the violation and order that it be corrected, ceased, or abated immediately or within such specified time as the city determines is reasonable under the circumstances and shall contain a description of the fees and penalties associated with said violation. If said order is not complied with, the city may forthwith disconnect the service where the violation occurred. A $250.00 fee shall be imposed for the reconnection of any service disconnected pursuant to noncompliance, which shall be in addition to other fees or charges imposed by this article for disconnection of service.

In addition to being grounds for disconnection of service, violation of any provision of this section shall be a civil infraction. An individual or corporation convicted of violating provisions of this section shall be assessed a civil penalty of not less than $250.00.

(h)

Enforcement. The Assistant City Administrator is authorized to designate city employees to enforce the provisions of this section.

(i)

Definitions.

Economic hardship. A threat to an individual's or business' primary source of income.

Notification to public. Notification through local media, including interviews, and issuance of news releases.

Outdoor watering day. A specific day, as described in a specific outdoor watering plan, during which irrigation with sprinkler systems or otherwise may take place.

(Ord. No. 97-07-04, § 1, 7-16-1997)

- **Sec. 19-85. - Violations, fines and penalties.**

(a)

Installations, repair by individuals prohibited; violation declared a civil infraction. All

water services to be installed by the City of Nogales Water Department shall be installed by the city or its authorized employees or agents as provided for in this article. It shall be unlawful for any person to install any such service or any part of such service, or to repair any service now existing or any part thereof, from the water mains to and including the meter, or disturb any right-of-way easement, street or alley in any manner for the purpose of locating problems with the water system or for any other reason whatsoever. It shall be a civil infraction for any person to violate the provisions this subsection.

(b)

Turning on water without authority; violation declared a civil infraction. No person shall, by false key or otherwise, after the water has been shut off from any premises, cause such premises to be supplied with water. It shall be a civil infraction for any person to violate the provisions of this subsection.

(c)

Escaping water; violation declared a civil infraction. No person shall allow water to escape from his premises upon public property, such as alleys, roads or streets, nor upon any other person's property. It shall be a civil infraction for any person to violate the provisions of this subsection.

(d)

Interfering with, tampering with water facilities; removing water; violation declared a civil infraction. No person shall open or close any fire hydrant or stopcock connected with the water system of the City of Nogales, or lift or remove the covers of any gate valves or shutoff, or tap into city water mains or otherwise remove water from the city water utility system without a permit from the city water utility, or in violation of conditions of a permit, except in case of fire, and then under the direction of the officers of the Fire Department. It shall be a civil infraction for any person to violate the provisions this section.

(e)

Penalties for civil infraction. An individual or corporation convicted for the first time of the civil infraction offense prohibited by this article shall be punished by a fine of not less than $25.00 nor more than $250.00. An individual or corporation convicted of a second civil infraction offense prohibited by this article shall be punished by a fine of not less than $500.00. A person convicted of a third or subsequent civil infraction offense prohibited by this article shall be punished by a fine of not less than $1,000.00 nor more than $2,500.00.

(f)

Damaging, defacing water facilities. If a person shall destroy, deface, impair, injure or wantonly force open any gate or door, or in any way whatsoever destroy, injure or deface any reservoir, building, storage tank, or appurtenances, fences, trees, or fixtures or property appertaining to the water utility of the city, such person shall be guilty of a Class 1 misdemeanor.

(g)

Penalties. Any person, firm, partnership, or corporation violating any of the provisions of this article which have not been designated as civil infractions shall be guilty of a Class 1 misdemeanor, and upon conviction thereof shall be punishable by a fine of not more than

$2,500.00 or imprisonment for not more than six months, or both fine and imprisonment. Each day that a violation is permitted to exist shall constitute a separate offense. The imposition of any sentence or fine shall not exempt the offender from compliance with the provisions of this article.

(Ord. No. 92-09-11, § 8, 12-2-1992; Ord. No. 93-03-07, § VI, 5-5-1993)

- *Explain in detail the existing or recent drought conditions in the project area. Describe the severity and duration of drought conditions in the project area. Describe how the water sources that is the focus of the project (river, aquifer, or other source of supply) is impacted by drought.*

Drought conditions were noticed over the past two years. Static water levels in the aquifer wells have lowered. The City has hired a hydrology firm to evaluate the wells and make recommendations for modifying or deepening of the wells. The City has in place a water emergency ordinance addressing limited water usage, legal consequences, during times of drought.

Another major factor in water management has recently changed in the Santa Cruz Watershed. The City of Sonora Mexico has traditionally discharged all its wastewater flow to the Santa Cruz River for infiltration into the aquifers. Since much of the water supply for Sonora Mexico is drawn from the Santa Cruz river aquifer in Mexico, the net acre feet of water withdrawn and replenished downstream was approximately equal. Recently, Mexico has constructed a pump back system that allows them to pump approximately 2 MGD back up to the Los Aliso watershed. The plan is to expand this pumping capacity to 4 MGD. This means that the Santa Cruz River watershed in the U.S will lose approximately 4,500 acre feet per year. This could lead to aquifer depletion and earlier drought conditions; This Nogales project to conserve water is forward thinking to anticipate future drought conditions

- *Describe the impacts that are occurring now or are expected to occur as a result of drought conditions. Provide a detailed explanation of how the proposed WaterSMART Grant project will improve the reliability of water supplies during times of drought. For example, will the proposed project prevent the loss of permanent crops and/or minimize economic losses from drought conditions? Will the project improve the reliability of water supplies for people, agriculture, and/or the environment during times of drought? Please note that all proposed projects must meet the project eligibility requirements described in Section III.B. of this FOA. In accordance with these requirements, project proposals requesting compensation for economic losses resulting from drought, and proposals for the purchase of water are not eligible for funding under this program. Please see Section III.B.of this FOA for detailed description of the types of projects eligible for funding*

This proposed project will improve water supply sustainability in the region. Historically, Arizonans have pumped groundwater faster than it was replaced naturally – a condition known as "overdraft". Groundwater overdraft creates significant problems, including increased costs for

drilling and pumping and the eventual loss of supply. Water quality also suffers because groundwater pumped from greater depths typically contains more salts and minerals. In areas of severe groundwater depletion, the earth's surface may sink, or "subside", causing cracks or fissures that can damage roads, building foundations, and other underground structures. Without artificial recharge/replenishing, groundwater is a finite water source. Improving water conservation, reducing groundwater mining will preserve groundwater supplies and providing adequate water for population growth in the Town, the City, and the County in the Santa Cruz AMA.

Installing smart meters will help conserve the resource by detecting system leaks and allowing the City to repair them before a substantial; amount of water has been wasted. It will also help the City identify potential areas where special measurements can be implemented during times of severe drought. A commercial (and less likely residential) user who is identified as using excessive amounts of water may be approached to collaborate and replace potable water in some areas of water use with alternative sources such as effluent.

Accurate meter readings will improve the reliability of water supplies during times of drought with the ability to account for water usage in real time and compare it to historical usage. The new water meters will enable the City to manage its municipal water during times of drought and will reduce loss of water through early leak detection and quick repairs.

The City of Nogales shall enact its Emergency Water Conservation Ordinance in times of drought. The "smart" meters track usage and records historical data, which will allow the City to identify customers who are not reducing their water usage. An expeditious identification and notification of customers violating the water usage restrictions will reduce water loss. Written notification shall be placed on the property where the violation occurred and a duplicate shall be mailed to the person who is regularly billed for the service where the violation occurred and to any person known to the city who is responsible for the violation and order that it be corrected, ceased, or abated immediately or within specified time determined by the city. If the order is not complied with, the city may disconnect the service where the violation occurred and impose a $250.00 fee to reconnect the water services.

Subcriterion E.4: Other Water Supply Sustainability Benefits

Up to 10 points may be awarded for projects that include ***other benefits*** *to water supply sustainability.*

- *Will the project make water available to address a specific concern? For example:*
    - *Will the project directly address a heightened competition for finite water supplies and over allocation (e.g., population growth)?*

    The project will result in accurate usage metering and recording of historical usage trends to better assess usage and availability.

- *Describe how the water source that is the focus of the project (river, aquifer, or other source of supply) is impacted by climate variation.*

The Santa Cruz River is the main water source for Nogales. The area receives an average of only 18" a year of rainfall.

The water sources (aquifer and surface water) are only impacted by increased demand during dryer periods. The City tries to mitigate drought conditions, which vary between moderate to severe drought conditions. City ordinance, Sec. 19-84 "Emergency water conservation response" addresses the enforcement methods and procedure to ensure water resources are available to residents of the city and customer to the city municipal water utility in times of emergency water shortage.

- *Will the project help to address an issue that could potentially result in an interruption to the water supply if unresolved?*

The new water meters will detect water leaks before major damage occurs to the system and other infrastructures that would occur with extended leaks and associated erosion.

The installation of the new water meters will provide the opportunity to locate pipes needing replacement or repair. There is the possibility that there may still be some wooden pipes in the ground and as recently as 2011, the city was replacing steel pipes.

- *Will the project make additional water available to Indian tribes?*

The Santa Cruz River runs from South to North in the Nogales area. Nogales is the southernmost U.S. city to draw water from the Santa Cruz River Basin. As the river travels northward, several communities such as Rio Rico, Tubac and others draw water from the basin. Approximately 50 miles north of Nogales is the Tohono O'odam Indian nation which also draws water from the Santa Cruz Basin. As water is conserved upstream in the basin, more will be available for downstream users.

- *Will the project make water available for rural or economically disadvantaged communities?*

According to the U.S. Census Bureau's urban and rural areas, 2012, Nogales, Arizona and Santa Cruz County is considered rural. According to the U.S. Census Bureau:

Population	Nogales	Arizona
Persons below poverty level	35.9%	17.9%
Per capita money income in past 12 months	$13,980	$25,358
Median household income	$26,333	$49,774

- *Does the project promote and encourage collaboration among parties?*

The Santa Cruz Active Management Area (SCAMA) is a sub group of the Arizona Water Resources Department (ADWR). All the water users in the SCAMA have agreed to abide by

goals set up to conserve water usage.

- *Is there widespread support for the project?*

There is widespread support for the project as noted by the letter of support from ADWR (see attachments below). Also see letters from Chamber of Commerce and the Produce Association. Accurate metering of water consumption will alleviate billing disputes between the provider and the consumer thus encouraging better relationships.

Nogales Chamber of Commerce, representing local businesses, recognizes the significant benefits for current and future business development. Businesses will have the tools to monitor their own water use while supporting the City in conserving water resources.

Santa Cruz Active Management Area (AMA) Ground Water Advisory Committee goal is to maintain a safe-yield condition in the active management area and to prevent local water tables from experiencing long term declines.

- *What is the significance of the collaboration/support?*

The support of key community stakeholders demonstrates the importance of water conservation, water management, and energy efficiency for community members, its economic impact and natural habitats.

- *Will the project help to prevent a water-related crisis or conflict?*

Yes, the project will help to prevent a water-related crisis by providing real-time water usage, immediate awareness and remediation of water leaks, theft or tampering that currently take a month or more to identify.

Nogales average rainfall is 18" a year, as reported by the U.S. Climate Data (2014). Drought conditions exist. According to the U.S. Drought Monitor, 12/23/2014, moderate drought conditions exists, this has been consistent since the start of the water year, 2014-09-30. During spring and summer months the area is under severe drought conditions.

- *Is there frequently tension or litigation over water in the basin?*

There has been no know litigation over water right up until now, this project could help prevent future water rights problems by conservation and the SCAMA users all moving to the same goal.

- *Is the possibility of future water conservation improvements by other water users enhanced by completion of this project?*

Accurate water usage records will allow for informed future decisions.

- *Will the project increase awareness of water and/or energy conservation and efficiency efforts?*

The project will increase awareness of water conservation and efficiency efforts. The current water meters do not have the capacity to record historical water usage. Water leaks are not immediately detected and remediated. Water conservation will be achieved by immediately identifying leaks for repair.

The new meters will provide real-time water usage, record historical data, and allow the utility department to monitor usage and detect leaks.

Residents and businesses owners shall be notified of the plans for replacing the old, outdated water meters with new "smart meters." This information will be in printed in both English and Spanish on the utility bills, on the City of Nogales website, and in the through local media. Explanation of the benefits of the new meters – real time tracking of water usage, historical water usage data and the ability to efficiently and immediately identify leaks for repair will be promoted. Water-saving tips will be promoted to encourage customers to monitor their usage and how to reduce/conserve water such usage.

- *Will the project serve as an example of water and/or energy conservation with a community?*

Yes, water users will learn how to track their water usage, identify peak water usage times, and better understand water conservation. Information will be sent to residential and commercial customers with tips for water savings and encouragement to use their historical water usage to conserve.

- *Will the project increase the capability of future water conservation or energy efficiency efforts for use by others?*

Yes. This project increases the capability of future water conservation and energy efficiency efforts for use by others. Early detection and repair of water pipes will conserve water. Energy efficiency shall be achieved by eliminating wasteful pumping of water due to water leaks.

The City of Nogales will promote this project to teach the importance of water conservation and educate residential and commercial customers to take a proactive role in their water usage by tracking water usage through the computerized interface of real time water usage and educational material the City will provide when installing the new meters.

- *Does the project integrate water and energy components?*

This project integrates water and energy components. Historical data on water usage will show early water leak detection which the City can expeditiously repair. Water leaks waste water and energy. The energy waste is caused by increasing the electrical water pumps. Conserving water conserves electricity usage and overuse of the pumps requiring additional maintenance and early replacement.

Evaluation Criterion F: Implementation and Results

Subcriterion No. F1: Project Planning

Does the project have a Water Conservation Plan, System Optimization Review (SOR), and/or district or geographic area drought contingency plans in place? Does the project relate/have a nexus to an adaption strategy developed as part of a WaterSMART Basin Study)? Please self-certify, or provide copies of these plans where appropriate, to verify that such a plan is in place.

Provide the following information regarding project planning:

- *Identify any district-wide, or system-wide, planning that provides support for the proposed project. This could include a Water Conservation Plan, SOR, Basin Study, drought contingency plan, or other planning efforts done to determine the priority of this project in relation to other potential projects.*

The project area has a City Ordinance regarding Water Conservation during drought periods:

The City is part of the Santa Cruz Active Management Area (AMA). The management goal of the Santa Cruz AMA is to maintain a safe-yield condition in the active management area and to prevent local water tables from experiencing long term declines. A letter from the Active Management Area Director is located in the Letters of Project Support.

- *Describe how the project conforms to and meets the goals of any applicable planning efforts, and identify any aspect of the project that implements a feature of an existing water plan(s).*

The City complies with the goals and planning efforts of the Santa Cruz Active Management Area and the statewide conservation plan.

Subcriterion No. F.2: Readiness to Proceed

Points may be awarded based upon the extent to which the proposed project is capable of proceeding upon entering into a finance assistance agreement.

Describe the implementation plan of the proposed project. Please include an estimated project schedule that shows the states and duration of the proposed work, including major tasks, milestones, and dates

Phases 2 & 3 – Proposed Project October 1, 2015 – September 30, 2017		
Major Tasks	**Milestones**	**Dates**
Order and purchase 1,400 water meters – Phase 2	Purchase order	With 15-days of contract award
Establish water meter installation	Post on City of Nogales website,	Within 30-days of contract

schedule and inform public of water meter installation	newspaper to publish the new water meter installations and benefits, and information sent in utility bills	award 11/2015
Water meter delivery	Take delivery of water meters and store in secure City warehouse	Within 90-days of order water meters begin to arrive and ongoing 12/2015
Inform individual property owners of water meter installation schedule and impact on water service during installation. Information includes information on tracking real-time water usage and water conservation information	Written notification in English and Spanish delivered property owners and locations of new meter installation	Within 30-days of scheduled installation – activity is ongoing throughout project
City of Nogales Public Works employees install new water meters and water meter testing	New meters installed	On-going upon delivery of water meters
Employees complete software training and set-up	Electronic water meter readings and collection of historical data	Within 45-days of laptop and software delivery
Order and purchase 2,000 water meters – Phase 3	Purchase order	By month 8 – 06/ 2016
Publish Phase 3 water meter installation schedule	Post on City of Nogales website, publish in newspaper and with utility bills	By month 10 – 8/2016
Water meter delivery	Take delivery of water meters and store in secure City warehouse	Within 90-days of order water meters begin to arrive
Completion of installation of water meters and testing	Electronic water meter readings, historical data collection	09/30/2017
Order laptops and software for new water meters, set-up and training	System operational	09/30/2017

The project will be completed in four phases. *Phase 1* has already been started with the City of Nogales purchase of 600 "smart" water meters and the installation as they arrive. Phase 1 shall be completed by 09/30/2015. The proposed project, *Phases 2 and 3*, is the purchase of 3,400 "smart" water meters, three lap top computers, software, and training and set-up shall begin 10/01/2015 and be completed by 09/30/2017. *Phase 4* shall begin upon completion of Phase 3, with the City purchasing and installed the remaining 2,005 "smart" water meters. By the end of four years 6,005 "smart" meters will be installed.

- *Please explain any permits that will be required, along with the process for obtaining such permits. Identify and describe any engineering or design work performed specifically in support of the proposed project.*

No permits
No engineering required

Upon entering into a financial agreement, the City of Nogales is ready to move forward with the

purchase of the meters, computers, software, and training and set-up. Due to the nature of the project, which focuses on the purchase and replacement of water meters, no environmental studies are required, no permits required, and no engineering required.

Subcriterion No. F3: Performance Measures

Applicants are required to propose a method (or "performance measure") of quantifying the actual benefits of their project once it is completed. Actual benefits are defined as water actually conserved, marketed, or better managed, as a direct result of the project. Quantifying project benefits is an important means to determine the relative effectiveness of carious water management efforts, as well as the overall effectiveness of WaterSMART Grants.

Provide a brief summary describing the performance measure that will be used to quantify actual benefits upon completion of the project (e.g., water saved, marketed or better managed, or energy saved). For more information calculating performace measure, see Section VIII.A.1 "FY2015 WaterSMART Water and Energy Efficiency Grants: Performance Measures."

Note: All WaterSMART grant applicants are required to propose a "performance measure" (a method of quantifying the actual benefits of their project once it is completed). A provision will be included in all assistance agreements with WaterSMART Grant recipients describing the performance measure, and requiring the recipient to quantify the actual project benefits in their final report to Reclamation upon completion of the project. If information regarding project benefits is not available immediately upon completion of the project, the financial assistance agreement may be modified to remain open until such information is available and until a Final Report is submitted. Quantifying project benefits is an important means to determine the relative effectiveness of various water management efforts, as well as the overall effectiveness of WaterSMART Grants.

The City will use the following performance measures to evaluate the performance of the newly installed meters and the associated water, energy, greenhouse gas emissions, and time savings.
1} Amount of water conserved. This will be measured by having City staff review water usage reports for two years prior to meter installation and directly compared data with usage after all meters are installed and detected leaks repaired. This will allow the City to evaluate the actual amount of acre feet per year saved as directly correlated with the meter replacement project installation and the meter's ability to detect leaks. The new meters allow for historical usage data review. The City will also conduct annual water usage reviews for accounts with high usage fluctuation and accounts with excessive water use as compared to similar users. These customers can be educated individually about water conservation.
2} Amount of water losses mitigated/unaccounted for water recuperated. City staff will review water usage reports as well as review water bills for the service area to ascertain the reduction in water losses and unaccounted for water that has been recuperated in relation to the meter replacement project.
3} Amount of metering staff/contractors reduced. The City will compare staff/metering contract costs with previous years to ascertain budget savings associated with metering staff and contractors reduced as directly related to this project.

4) Amount of electricity saved. In correlation to the amount of water saved as listed above, the City will also compare kWH saved by reviewing electricity used for pumping prior to meter installation with electricity used for a comparable time period after all meters are installed and detected leaks repaired.
5} Amount of greenhouse gas emissions reduced. The City will compare mileage logs of vehicles used for meter readings after the meters are installed to historic mileage use data to ascertain greenhouse gas emissions saved per year.
6} Amount of chlorine saved for water treatment. The City will compare the annual totals of chlorine purchased for water treatment prior to meter installation with the annual amounts used after meter installation. Savings are expected to be in line with the amount of water saved and the amount of electricity saved.

Subcriterion No. F.4: Reasonableness of Costs

Points may be awarded based on the reasonableness of the cost for the benefits gained.

Please include information related to the total project cost, annual acre-feet conserved, energy capacity, or other project benefits and the expected life of the improvement(s)

For all projects involving physical improvements, specify the expected life of the improvement in number of years and provide support for the expectation (e.g., manufacturer's guarantee, industry accepted life-expectancy, description of corrosion mitigation for ferrous pipe and fittings, etc.). Failure to provide this information my result in a reduced score for this section.

The City of Nogales plans to replace an estimated 6,005 water meters within four years. The City has already purchased 600 meters which shall be installed by 09/30/2015. The proposed project is for two years to replace approximately 3,400 water meters, purchase of two laptop computers, software, training and set-up.

The overall replacement of water meters is planned on a staggered schedule as the meters' life expectancy is at a minimum 12 – 20 years but according to the Iowa curves 30 years. Iowa curves are used to assess useful life expectancy and current value of assets in various industries. Water meters are listed under the asset class 346 which has an average length of useful life of 30 years. The staggered schedule will reduce disruption of services and costs. In addition, as the new meters detect leaks and reduce water loss, pumping will be reduced, thus increasing the life expectancy of the pumping equipment and reducing electrical expenses.

The potential amount of water savings is 813 acre feet per year. Savings in electrical cost for reduced pumping could be 256,000 kWH. A significant reduction in greenhouse gas emissions will also be achieved by reducing the vehicle miles necessary to check the meters. Miles saved per year are on the order of 90+% or 17,286 miles.

Evaluation Criterion G: Additional Non-Federal Funding

Additional Non-Federal Funding – up to 4 points may be awarded to proposals that provide non-Federal funding in excess of 50% of project costs

The total proposed project is $1,100,000

The City of Nogales shall match the $300,000 federal funds with $800,000 loan from the Water Infrastructure Finance Authority of Arizona (WIFA). Nogales match is 73%.

WIFA is an independent agency of the state of Arizona and is authorized to finance the construction, rehabilitation and/or improvement of drinking water, wastewater, wastewater reclamation, and other water quality facilities/projects. WIFA offers borrowers below market interest rates on loans.

As a "bond bank," WIFA is able to issue water quality bonds on behalf of communities for basic water infrastructure. Through active portfolio and financial management, WIFA provides significant savings due to lower interest rates and no closing costs. WIFA is able to lower a borrower's interest costs to between 70 and 95% of WIFA's tax-exempt cost of borrowing.

Environmental and Cultural Resources Compliance

- *Will the project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity, animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on surrounding environment and any steps that could be taken to minimize the impacts.*

The project will not impact the surrounding environment as it is replacing existing water meters in existing locations and will not disturb additional areas.

- *Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?*

The project area is the City of Nogales. There are no species listed or proposed to be listed as a Federal threatened, or endangered species, or designated critical habitat in the project area.

- *Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "waters of the United States?" If so, please describe and*

estimate any impacts the project may have.

There may be wetlands or other surface waters inside the project boundaries. The project will replace outdated water meters with efficient smart meters. There will be no effect to the wetlands as there are no buildings in the wetland area.

- *When was the water delivery system constructed?*

There are water lines dating to 1910. Leopold Ephraim had developed the first water company in Nogales. He dug a large well and ran water lines to Nogales homes. Just before Arizona became a state, Nogales incorporated and decided to buy the water company. However, the town was so poor that no one would buy bonds to facilitate the sale. Finally on Feb. 12, 1912, two days before Arizona became a state, private financiers were found and the sale was completed for $60,000.

- *Will the project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.*

The project will not result in any modification of or effects to individual features of an irrigation system as current water meters shall be replaced with smart meters.

- *Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A culture resource specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this questions.*

There buildings within the city limits that may be eligible for historic preservation. No work will be performed on these buildings, only the water meter will be replaced on the city owned right-of-way.

- *Are there any known archeological sites in the proposed project area?*

There are no known archeological sites in the proposed project area. The project will be replacing existing water meters.

- *Will the project have a disproportionately high and adverse effect on low income or minority populations?*

The project will not have an adverse effect on low income or minority populations. It is anticipated that the project shall benefit low income or minority populations. The new meters will provide accurate water usage metering, historical water usage will be tracked, and leaks will be easily identified and repaired, thus saving water and insuring accurate billing to the end-user. Customers will be able to accurately monitor their water usage for water usage savings.

- *Will the project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?*

The project will not limit access to and ceremonial use of Indian sacred sites or result in any impact on tribal lands.

- *Will the project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?*

The project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area.

Required Permits or Approvals

Applicants must state in the application where any permits or approvals are required and explain the plan for obtaining such permits or approvals.

The City of Nogales does not anticipate the permits will be required as all meters will be installed in the place of existing City of Nogales water meters. All project-related approvals will be handled by City staff and executed in a timely and efficient manner.

Letters of Project Support

CITY OF
NOGALES

January 2, 2015

Bureau of Reclamation
Acquisition Operations Branch
Attn: Mr. Shaun Wilken
Mail Code: 84-27852
P.O. Box 25007
Denver, CO 80225

RE: WaterSMART: Water and Water Conservation
City of Nogales – Drinking Water System Efficiency and Improvement Program
Water Meter Replacement

Dear Mr. Wilken;

On behalf of the City of Nogales, I am writing to support the City of Nogales' Drinking Water System Efficiency and Improvement Program – Water Meter Replacement grant application. Nogales is located in the Sonoran Desert with an annual precipitation average of 19 inches. Water conservation is critical for our city.

The new meter system will increase access to sustainable potable water service through improved water resource management and overall system operation. It will increase the financial sustainability of the utility and service reliability, as well as conserve a natural resource. The new system will help conserve water by improving the utility's ability to detect leaks, audit water usage, and accurately meter usage at each location. This new meter system will improve the operational efficiency of the utility, saving man-hours associated with meter reading activities each month.

This project is the first step in a larger City-wide effort to improve water resource management and conservation, through real-time metering capabilities, leak detection, and audit water usage.

We encourage you to support the City of Nogales' efforts to replace the water meters drinking water and our water conservation efforts.

Thank you.

Sincerely,

John F. Doyle

John F. Doyle
Mayor
City of Nogales

777 NORTH GRAND AVENUE · NOGALES, ARIZONA 85621 · (520) 287-6571 · FAX (520) 287-9159 · T.D.D. (520) 287 5477

DOUGLAS A. DUCEY
Governor

MICHAEL J. LACEY
Director

ARIZONA DEPARTMENT of WATER RESOURCES
3550 North Central Avenue, 9th Floor
Phoenix, Arizona 85012-2105
602.771.8500
azwater.gov

January 9, 2015

Bureau of Reclamation
Acquisition Operations Branch
Attn: Mr. Shaun Wilken
Mail Code: 84-27852
P.O. Box 25007
Denver, CO 80225

RE: City of Nogales Grant Opportunity

Dear Mr. Wilken:

This letter is in reference to the WaterSMART Drinking Water System Efficiency and Improvement Program – Water Meter Replacement grant application that the City of Nogales will be submitting to the Bureau of Reclamation. The City of Nogales (City) is classified as a Large Municipal Provider under the Arizona Department of Water Resources Third Management Plan for the Santa Cruz Active Management Area. A large municipal provider is required to maintain its distribution system in such a manner that lost and unaccounted for water does not exceed 10 percent of the total quantity of water, from all sources except direct use effluent, withdrawn, diverted, or received for non-irrigation uses. The Water Meter Replacement grant will benefit the City in meeting this Third Management Plan requirement and in using its supplies as efficiently as possible.

The Arizona Department of Water Resources supports the City's efforts in improvement of the efficiency of its distribution system, and we appreciate your consideration of the City's grant application.

Sincerely,

Jeff Tannler
Active Management Area Director

cc: Alejandro Barcenas, City of Nogales

NOGALES-SANTA CRUZ COUNTY CHAMBER OF COMMERCE * VISITOR & TOURISM CENTER

123 W. KINO PARK * NOGALES, ARIZONA
85621
Phone: 520 - 287-3685 * Fax: 520- 287-3687
Email: info@thenogaleschamber.org

January 15, 2015

Bureau of Reclamation
Acquisition Operations Branch
Attn: Mr. Shaun Wilken
Mail Code: 84-27852
P.O. Box 25007
Denver, CO. 80225

RE: WaterSMART: Water and Water Conservation
City of Nogales— Drinking Water System Efficiency and Improvement Program
Water Meter Replacement

Dear Mr. Wilken;

The Nogales-Santa Cruz County Chamber of Commerce supports the City of Nogales' funding application for water meter replacement to create "smart" water savings solutions through technology. Water is a precious resource.

By installing new water meters with its new technology, the City of Nogales will help local businesses better manage their bottom line when it comes to water usage and water bills. Commercial customers, along with residential customers will be active participants in water conservation efforts to preserve this region's precious resources.

This project is a benefit to local businesses by allowing them to better manage water usage and for the City to address issues with over use and water leaks in a timely and efficient manner.

The Chamber of Commerce is committed to partnering with the City of Nogales to bring this vital project to fruition.
I urge you to give favorable consideration to the City of Nogales' Drinking Water System Efficiency and Improvement Program—Water Meter Replacement grant.

Thank you for your consideration.

Sincerely,

Olivia Ainza Kramer

Olivia Ainza Kramer
President/CEO

Official Resolution

Order No. 2015-01-008

A ORDER OF THE CITY COUNCIL OF THE CITY OF NOGALES, ARIZONA AUTHORIZING THE SUBMISSION OF AN APPLICATION FOR A WATERSMART: WATER AND ENERGY EFFICIENCY GRANT FROM THE BUREAU OF RECLAMATION. (PW)

WHEREAS, the City of Nogales has identified a need for a water meter replacement project; and

WHEREAS, the City of Nogales is eligible for financial assistance through the U.S. Department of the Interior, Bureau of Reclamation WaterSMART Water and Energy Efficiency grant; and

WHEREAS, the City of Nogales is required to provide fifty percent (50%) of the project costs as a local match and commit to legal obligations associated with receipt of the WaterSMART Grant financial assistance; and

WHEREAS, it is in the best interest of the City of Nogales to pursue and apply for financial assistance from the Bureau of Reclamation for the water meter replacement project through the WaterSMART Water and Energy Efficiency grant; and

NOW, THEREFORE, BE IT ORDER BY THE COUNCIL OF THE CITY OF NOGALES that:

1.) The City Manager is authorized to negotiate and execute any and all agreements or documents necessary for the Water and Energy Efficiency Grant Program from the U.S. Department of the Interior, Bureau of Reclamation.

2.) The City of Nogales is committed to work with the Bureau of Reclamation to meet established deadlines and enter into a cooperative agreement.

PASSED, ADOPTED, AND APPROVED by the Council of the City of Nogales, Arizona, this 14th day of January, 2015.

John F. Doyle, Mayor

ATTEST:

APPROVED AS TO FORM:

STAFF SUMMARY

SUBJECT: Drinking Water System Efficiency and Improvement Program: Water Meter Replacement

BACKGROUND:
The City of Nogales, Arizona has a project which is eligible for financial assistance through the U.S. Department of the Interior, Bureau of Reclamation Policy and Administration, WaterSMART: Water and Energy Efficiency Grants Program for the Drinking Water Efficiency and Improvement Program - Water Meter Replacement.

If financial assistance is awarded through the WaterSMART: Water and Energy Efficiency Grants the City is required to provide 50 percent of the grant award as a local match and commit to legal obligations associated with receipt of WaterSMART Grant financial assistance. The maximum grant award is $300,000.

The Bureau of Reclamation requires an official authorization certifying review and support of application(s) by the applicant's governing board before submission of said application(s), providing the identity of the official with legal authority to enter into any necessary agreements, verifying that the City is capable of providing the local match, and verifying that the applicant will work with Reclamation to meet established deadlines for entering into a cooperative agreement.

COST & SOURCE OF FUNDING:
Cost of Project: $450,000 - ($300,000 U.S. Department of the Interior, Bureau of Reclamation; and $150,000 in a local match. The City has applied for various grants with the intended match being 2006 bond funds allocated for water system improvements in the Council-approved FY 2015 budget. If the city is awarded more than one grant, then the city must choose which grant to accept as the bond funds are limited.

STAFF RECOMMENDATION/CITY OPTION: Approve Order as presented.

SUGGESTED MOTION:

"I move to approve Order No: 2015-01-008"

Sherry M. Schuerhammer — 1/12/2015

Joe Machado, City Attorney — 1/12/2015

Alejandro Barcenas, Public Works Director 1/12/2015 Shane Dille, City Manager 1/12/2015

Funding Plan and Letters of Commitment

CITY OF
NOGALES

January 2, 2015

Bureau of Reclamation
Acquisition Operations Branch
Attn: Mr. Shaun Wilken
Mail Code: 84-27852
P.O. Box 25007
Denver, CO 80225

RE: Letter of Commitment
WaterSMART: Water and Water Conservation
City of Nogales – Drinking Water System Efficiency and Improvement Program
Water Meter Replacement

Dear Mr. Wilken;

The City of Nogales is committed to water conservation by improving the efficiency of our drinking water system by replacing water meters. The total estimated cost of the project is estimated to be $1,580,000. The City is requesting $300,000 from the Bureau of Reclamation and intends to match it with a pending application for a $1,280,000 loan from the Water Infrastructure Finance Authority (WIFA).

The City of Nogales has an excellent credit rating. Its Municipal Facilities Revenue Bonds rating is A2.

WIFA is an independent agency of the state of Arizona and is authorized to finance the construction, rehabilitation and/or improvement of drinking water, wastewater, wastewater reclamation, and other water quality facilities/projects. WIFA is able to offer borrowers below market interest rates on loans as well as partial or even forgivable loans.

As a "bond bank," WIFA is able to issue water quality bonds on behalf of communities for basic water infrastructure. Through active portfolio and financial management, WIFA provides significant savings due to lower interest rates and no closing costs. WIFA is able to lower a borrower's interest costs to between 70 and 95% of WIFA's tax-exempt cost of borrowing.

Thank you for your consideration of the City of Nogales proposal to replace its water meters.

Sincerely,

Shane Dille
City Manager

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- *How will you make your contribution to the cost share requirement, such as monetary and/or in-kind contributions and source funds contributed by the applicant (e.g., reserve amount, tax revenue, and/or assessments).*

- The City of Nogales shall contribute to the cost share requirement by borrowing the funds, at below market interest rate from the Water Infrastructure Finance Authority of Arizona (WIFA). WIFA is an independent Arizona agency authorized to finance the construction, rehabilitation and/or improvement of drinking water, wastewater, wastewater reclamation, and other water quality facilities/projects. The loan shall be repaid with general utility bond funds.

- *Describe any in-kind costs incurred, before the anticipated project start date that you seek to include as project costs.*

There are no in-kind costs occurred that the City of Nogales plans to include in the project costs.

- *What project expenses have been incurred?*

None anticipated

  - H*ow will they benefit the projec*t
    N/A
  - *The amount of the expense*
    N/A
  - *The date of the cost occurrence*
    N/A

- *Provide the identity and amount of funding to be provided by funding partners, as well as the required letters of commitment*

The City of Nogales shall secure funds from the Water Infrastructure Finance Authority of Arizona (WIFA). WIFA is an independent Arizona agency authorized to finance the construction, rehabilitation and/or improvement of drinking water, wastewater, wastewater reclamation, and other water quality facilities/projects. These loans are below market interest rates. "WIFA's mission is to maintain and improve water quality in Arizona by providing financial and technical assistance for basic water infrastructure."

The City of Nogales shall borrow $800,000 for the entire project.

- *Describe any funding requested or received from other Federal partners.*

No other federal funds have been requested or received for proposed project.

- *Describe pending funding requests that have not yet been approved and explain how the*

project will be affected if such funding is denied.

There are no pending funding requests. The City of Nogales has committed to using Water Infrastructure Finance Authority of Arizona (WIFA) funds to finance the match. WIFA offers borrowers below market interest rates on loans. As a "bond bank," WIFA is able to issue water quality bonds on behalf of communities for basic water infrastructure. The City of Nogales will repay of the low interest loan with general utility bond funds.

Please include the following chart (table 1) to summarize your non-Federal and other Federal funding sources. Denote in-kind contributions with an asterisk (*). Please ensure that the total Federal funding (Reclamation and all other Federal sources) do not exceed 50 percent of the total estimated project cost.

Table 1. – Summary of non-Federal and Federal funding sources

Funding Sources	Funding Amount
Non-Federal entities	
Water Infrastructure Finance Authority of Arizona (WIFA)	$800,000
Non-Federal subtotal:	$800,000
Other Federal entities	0
Other Federal subtotal:	0
Requested Reclamation funding:	$300,000
Total project funding	$1,100,000

Project Budget

The project budget shall include detailed information on the categories listed below and must clearly identify all project costs. Unit costs shall be provided for all budget items including the cost of work to be provided by contractors. Additionally, applicants shall include a narrative description of the items included in the project budget, including the value of in-kind contributions of goods and services provided to complete the project. It is strongly advised that applicants use the budget proposal format shown below on tables 3 and 4 or a similar format that provides this information. If selected for award, successful applicants must submit detailed supporting documentation for all budgeted costs.

Table 3. – Funding Sources

Funding sources	Percent of total project cost	Total cost by source
Recipient funding	73%	$800,000
Reclamation funding	27%	$300,000
Other Federal funding	0	0
3Totals	**100%**	$1,100,000

Table 4. – Budget Proposal – Total Project

Budget item description	Computation		Quality type (hours/days)	Total cost
	$/Unit	Quantity		
Salaries and wages	$0	$0	N/A	$0
Not applicable				
Fringe benefits	$0	$0	N/A	$0
Not applicable				
Travel	$0	$0	N/A	$0
Not applicable				
Equipment				
Computers	$10,000/each	3		$30,000
Software	$25,000			$25,000
New Water Meters	$300/each	3,400		$1,020,000
Equipment Subtotal				**$1,075,000**
Supplies/materials				
Not applicable				
Other				
Training and Set-Up	$25,000	1	N/A	$25,000
Other Subtotal				**$25,000**
Environmental and Regulatory Compliance				
Not applicable				
Indirect				
Not applicable				
Total Project Costs				**$1,100,000**

Budget Narrative

- Salaries and Wages

N/A

- Fringe Benefits

N/A

- Travel

No travel costs

- Equipment

Equipment costs are estimated to be $1,075,000 and includes: three (3) computers at $10,000 each for a total of $30,000. The software cost is $25,000, and 3,400 new water meters with transmittal equipment costs $300/each for $1,020,000. The software will be used to create a user interface and City of Nogales Public Works staff and customers will be able to access data online in real time for $25,000.

- Supplies/materials

There are no supplies or materials for this project.

- Other

Employee training for use of the equipment and system and system set-up estimate is $25,000

- Environmental

No environmental costs associated with this project.

- Indirect

There are no indirect costs associated with this project