CERTIFICATION AND FINANCING PROPOSAL

WATER MAIN REPLACEMENT ON CRAWFORD STREET
NOGALES, ARIZONA

Revised: May 8, 2015
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EXECUTIVE SUMMARY

WATER MAIN REPLACEMENT ON CRAWFORD STREET
NOGALES, ARIZONA

Project: The project consists of the replacement of the Crawford Street water main in Nogales, Arizona (the “Project”).

Project Objective: The purpose of the Project is to increase potable water service reliability and reduce incidents of service interruption and/or low pressure, contributing to the reduction of the risks associated with waterborne diseases.

Expected Project Outcome: The Project is expected to generate environmental and human health benefits related to the following Project outcomes:

- Provide access to safe and reliable drinking water services, directly benefiting 330 residential connections.
- Eliminate interruption of service and reduce water losses.

Population Benefitted: 1,178 residents of city of Nogales, AZ

Project Sponsor: The City of Nogales, AZ

Project Cost: US$645,000

NADB Grant: US$500,000 from NADB’s Community Assistance Program (CAP)

<table>
<thead>
<tr>
<th>Uses &amp; Sources of Funds:</th>
<th>Uses</th>
<th>Amount</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction*</td>
<td></td>
<td>$645,000</td>
<td>100.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>$645,000</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sources</th>
<th>Amount</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Nogales, Arizona</td>
<td>$145,000</td>
<td>22.5</td>
</tr>
<tr>
<td>NADB CAP Grant</td>
<td>$500,000</td>
<td>77.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$645,000</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* includes costs related to water main construction only.

1 Population benefitted is estimated based on the number of service connections receiving improved service and 3.57 persons per household, as provided by the U.S. Census 2008-2012 projections.
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NOGALES, ARIZONA

1. ELIGIBILITY

Project Type
The Project falls within the eligible sector of drinking water.

Project Location
The Project is located in the city of Nogales, Arizona, which is directly adjacent to the U.S.-Mexico border.

Project Sponsor and Local Authority
The public-sector project sponsor is the City of Nogales, AZ (the “Sponsor” or the “City”). Pursuant to Arizona Revised Statutes (A.R.S.) 9-511 and 9-514, the City of Nogales has the legal authority to operate and maintain water treatment, storage and distribution systems, as well as wastewater collection and treatment systems. The Public Works Department of the City of Nogales is authorized to provide water services to the community and is responsible for developing infrastructure improvement projects.

2. CERTIFICATION CRITERIA

2.1. TECHNICAL CRITERIA

2.1.1. Project Description

Geographic Location
The city of Nogales is located in Santa Cruz County in the south eastern part of the state of Arizona, directly across the international border from Nogales, Sonora. Figure 1 shows the location of Nogales.
General Community Profile

According to the population projections of the U.S. Census Bureau, the city had 20,456 residents in 2013, having decreased at an average annual rate of -1.8% over the last ten years from a population of 20,837 in 2010.\textsuperscript{2}

The city's economic activities are based primarily on trade, particularly winter produce imports. The unemployment rate is approximately 13%. The poverty level for Nogales is estimated at 36.5%, more than double the 17.2% poverty level estimated for the state. The median household income (MHI) is estimated at US$27,500, which is 45% less than the state MHI of US$50,256.\textsuperscript{3}

The status of public services in Nogales, Arizona is described in the following table.

\textsuperscript{2} U.S. Census Bureau, 2008-2012 projections.
\textsuperscript{3} U.S. Census Bureau, 2006-2012 projections.
Table 1
BASIC PUBLIC SERVICES AND INFRASTRUCTURE

<table>
<thead>
<tr>
<th>Water System</th>
<th>Coverage</th>
<th>100% (10% Valle Verde Water Co. – private)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supply source</td>
<td>Groundwater (14 wells)</td>
</tr>
<tr>
<td></td>
<td>Number of hookups</td>
<td>5,807 connections (5,112 residential; 695 commercial)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wastewater Collection</th>
<th>Coverage</th>
<th>90% within city limits (remainder on septic systems)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of connections*</td>
<td>5,068 (4,540 residential; 528 commercial)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wastewater Treatment</th>
<th>Coverage</th>
<th>100%</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Treatment facilities</th>
<th>Plant</th>
<th>Type</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nogales International Wastewater Treatment Plant</td>
<td>Modified Ludzack - Ettinger</td>
<td>17.2 mgd</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solid Waste</th>
<th>Collection coverage</th>
<th>100% city garbage collection, with approximately 12% diverted for recycling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Final disposal</td>
<td>Landfill</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Street Paving</th>
<th>Street paving coverage</th>
<th>98%</th>
</tr>
</thead>
</table>

Source: City of Nogales, 2014.
mgd = millions gallons a day

*Some commercial sewer connections serve multiple users. Service area outside city limits not included (i.e. Pena Blanca Highlands and Rio Rico)

Local Water and Wastewater Systems

Water and wastewater collection services are provided by the City through its Public Works Department. Currently, the City has two separate well field sources (WFS). The Santa Cruz River WFS is located northeast of the city and has six well sites that conveys water via a 16-inch transmission line to the Royal Road Tank (a 1-million-gallon reservoir) and the Crawford Tank (a 2-million-gallon reservoir). The City also provides potable water service to the Kino Springs area (outside the city limits) with five additional well sites along the Santa Cruz River.

Potrero Creek supports the other WFS, supplying three well sites that convey water via a 16-inch transmission line to the North Tank (a 1-million-gallon reservoir), High School Tank (a 1-million-gallon reservoir) and West Hill Tank (a 1-million-gallon reservoir). A fourth well site was taken offline due to contamination from tetrachloroethylene (TCE), a metal cleaning solvent discharged by United Musical Instruments (a factory no longer in operation).

The existing water main on Crawford Street consists of a 4-inch cast iron pipe with lead fittings and a 6-inch cement asbestos pipe that were installed in 1918. It is a shallow main that has experienced breaks over the last few decades, as well as service line repairs and replacements.
Breaks are now occurring more frequently, causing frequent water losses and interrupting service, which lends to a potential for water quality and public safety issues.

Wastewater collected in both Nogales, Arizona and Nogales, Sonora, is treated at the Nogales International Wastewater Treatment Plant (NIWWTP). The plant has a capacity 17.2 million gallons a day (mgd), of which approximately 9.9 mgd is allotted to serve Nogales, Sonora, as specified in International Boundary and Water Commission Minute 276. The NIWWTP has a remaining capacity of 7.3 mgd, which is used to serve Nogales, Arizona, and surrounding areas. Average wastewater flows from Nogales, Arizona, are currently estimated at 2.0 mgd.  

**Project Scope and Design**

The Project consists of the replacement of the Crawford Street water distribution main, which includes the following components:

- 8-inch DR 14 (CL 305) PVC water main – 2,967 linear feet
- 8-inch (CL 305) ductile iron water main – 15 linear feet
- 49 water connections and flow meters replaced
- 4 combination air release valve
- 24 gate valves
- 7 fire hydrants

Figure 2 shows the general location of the Project within the city of Nogales. The red line shows the alignment of the proposed Crawford Street water main replacement.

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4 Source: U.S. IBWC, Nogales Field Office, NIWWTP operators.
The City has obtained the construction permit for the distribution line from the Arizona Department of Environmental Quality (ADEQ). According to the permit, construction must initiate before August 2015. Table 2 shows the proposed schedule for Project implementation milestones.

<table>
<thead>
<tr>
<th>Key Milestones</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procurement</td>
<td>Anticipated: 3rd quarter 2015</td>
</tr>
<tr>
<td>Construction duration</td>
<td>Six months from initiation</td>
</tr>
</tbody>
</table>

**2.1.2. Technical Feasibility**

**Design Criteria**

The final design of the proposed Crawford St. water main replacement was completed in accordance with the minimum design criteria established by the ADEQ as outlined in the Arizona Administrative Code, which requires that the Project be constructed in accordance with the following regulations:

- *Arizona Revised Statute (A.R.S.), Title 49, Chapter 2*, which establishes water quality standards;
- *A.R.S. 49-104.B.10*, establishing construction requirements according to ADEQ;
- *Arizona Administrative Code, Section R18-4-119*, which establishes required fittings and valves;
- *Arizona Administrative Code, Title 18, Chapter 4 (ACC R18-4)*, relating to primary drinking water regulations; and
- *Arizona Administrative Code, Title 18, Chapter 5, Article 5 (ACC R18-5-502,504)*, which specifies the minimum design criteria and approval to construct.

The final design is also consistent with Engineering Bulletin No. 10, Chapter 1, section D.1. The final design was reviewed and approved by ADEQ, ATC file Number 20120156.

**Selected Technology**

During the final design process, technical alternatives for pipe diameter, material and alignment were evaluated. To identify the most appropriate technology, technical alternatives were evaluated pursuant to the following factors:

- Required connection points for the system components
- Investment cost
- Operation and maintenance cost
- Materials and equipment reliability
Environmental impact

Sustainable technology and practices

Pipe diameter was selected based on the required slope, capacity and pressure to prevent leakage and over-excavation. The analysis also considered using various pipe materials in compliance with applicable standards and regulations. High-density polyethylene and PVC pipes were evaluated, and their characteristics and suitability for the soil type were reviewed. PVC was selected for the proposed waterline. It is the same material used throughout the existing system and has proven to be reliable. This alternative was selected by the Public Works Department as specified in its May 16, 2014 letter. Based on these factors and the required design criteria, the location of the pipeline was selected taking into consideration the shortest distance within available rights-of-way.

2.1.3. Land Acquisition and Right-of-Way Requirements

Construction to replace the waterline will be completed within existing rights-of-way. No additional easements are required to implement the Project.

2.1.4. Management and Operations

Management, construction, and operation of the proposed Project will be the responsibility of the Public Works Department of the City of Nogales. The Public Works Department consists of three departments: Planning & Zoning, Engineering, and Utilities Department (Sanitary Sewer & Water Divisions). The Department serves approximately 5,807 water hookups and 5,068 wastewater connections.

Management and operation of the proposed Project will be the responsibility of the Public Works Department of the City of Nogales (PWCON), which has sufficient resources and staff available for these purposes, including procurement and construction supervision during Project implementation.

The Project Sponsor has an Operation and Maintenance (O&M) manual that includes the primary tasks needed to ensure proper operation of the new infrastructure. The Water Division has established procedures that identify routine operation and maintenance tasks for the waterline.

The Sponsor reports that the proposed Project will eliminate specific annual maintenance tasks, resulting in a cost savings of approximately US$3,000. The 2016 operations budget of $407,365 will be reduced by this amount. O&M expenses for the new infrastructure will be included in the annual budget beginning in 2018, for an initial amount of US$447.43, and are projected to increase 2% annually. An adjustment in user rates is not required as a result of the Project.
2.2. ENVIRONMENTAL CRITERIA

2.2.1. Compliance with Applicable Environmental Laws and Regulations

Applicable Laws and Regulations
The Project will be constructed within the same alignment and the City’s right-of-way. There are no additional environmental clearance laws applicable to the Project.

Environmental Studies and Compliance Actions
The City of Nogales obtained construction approval from the ADEQ (File# 20120156). This certificate gives the City permission to install the 8-inch PVC waterline, as long as notice is given to ADEQ as required in A.R.S. Section 49-104.B.10.

Construction debris disposal and other environmental mitigation considerations have been included in the technical specifications for the Project and will be part of the Engineer’s Joint Contract Documents Committee (EJCDC) Construction Documents. The City will negotiate the recycling of the replaced pipe materials with the selected contractor.

Pending Environmental Tasks and Clearances
There are no pending environmental tasks or authorizations.

Compliance Documents
The only formal authorization required for the Project was ADEQ Approval to Construct (ATC) File No. 20120156, which includes the filing of an Approval of Construction (AOC).

2.2.2. Environmental Effects / Impacts

Existing Conditions and Project Impact – Environmental
The proposed Project will provide access to safe and reliable drinking water services, directly benefiting 330 residential connections, as well as eliminate service interruptions and reduce water losses. The environmental impact resulting from Project implementation will be positive overall, given that this Project will contribute to better distribution of available potable water sources.

Mitigation of Risks
Only minor environmental impacts are anticipated during construction of the Project, provided that the work is carried out in accordance with best management practices. Potential impacts may be present during the construction phase and include the following:

- Fugitive dust emissions;
- Combustion gas emissions from construction machinery; and
- Temporary roadway blockages and presence of workers in the area.
Typical mitigation measures to be practiced:

- Application of water to reduce fugitive dust emissions;
- Vehicle tune-ups to reduce emissions; and
- Placement of warning signs to prevent potentially hazardous situations.

The water distribution line will be replaced along the same alignment, and there is no evidence of anthropological assets that might be affected by the installation of the waterline in the Project area. Should any historical and/or archeological remains be found, construction activities will be stopped and the appropriate department will be contacted for further assistance.

**Natural Resource Conservation**

Replacing the waterline will help prevent water losses resulting from frequent breaks and leaks in the aged infrastructure, thus conserving this vital resource in a drought prone area.

**No Action Alternative**

The no-action alternative was not considered viable. Failing to implement actions to improve the city’s water distribution system would significantly limit the Public Works Department’s ability to provide adequate water services in the Project area.

**Existing Conditions and Project Impact – Human Health**

Waterborne diseases are caused by pathogenic microorganisms that are directly transmitted as a result of inadequate wastewater disposal practices and unsafe water supplies. An individual can become ill after drinking water that has been contaminated with these organisms, eating uncooked foods that have been in contact with contaminated water, or through poor hygiene habits that contribute to the dissemination of diseases by direct or indirect human contact. Table 3 shows waterborne statistics for Santa Cruz County, Arizona.

<table>
<thead>
<tr>
<th>Disease</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amebiasis</td>
<td>0</td>
<td>5</td>
<td>8</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Campylobacteriosis</td>
<td>5</td>
<td>18</td>
<td>19</td>
<td>23</td>
<td>17</td>
</tr>
<tr>
<td>Cryptosporidiosis</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Giardiasis</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Shigellosis</td>
<td>6</td>
<td>12</td>
<td>10</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Vibriosis</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Arizona Department of Health Services, Office of Infectious Disease Services.

Insufficient capacity and low pressure events in the water distribution system the city of Nogales can result in backflows and cross-contamination from wastewater, which may pose a health risk for water users. The Project will help prevent these problems by ensuring the transmission and distribution of safe drinking water throughout the city. According to the World Health
Organization, access to safe water and sanitation facilities, as well as better hygiene practices can reduce ascariasis-related morbidity by 29%.

**Transboundary Effects**

Due to the proximity of Nogales, Arizona, to Nogales, Sonora (Figure 1), there are frequent border crossings between the two communities. Therefore, environmental and health conditions in Nogales, Arizona also affect Nogales, Sonora. The construction of the needed water distribution infrastructure will have a direct positive impact on the health of area residents. No negative transboundary impacts are anticipated.

### 2.3. FINANCIAL CRITERIA

#### 2.3.1. Uses and Sources of Funds

The total estimated cost of the Project is US$645,000. The Project Sponsor requested a US$500,000 grant from NADB through its Community Assistance Program (CAP) to complete the financing of the Project. Table 4 presents a summary of total Project costs and the sources of funds.

<table>
<thead>
<tr>
<th>Uses</th>
<th>Amount</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction*</td>
<td>$645,000</td>
<td>100.0</td>
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<table>
<thead>
<tr>
<th>Sources</th>
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<td>$145,000</td>
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<td><strong>TOTAL</strong></td>
<td><strong>$645,000</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

* Includes costs related to water main construction only.

#### 2.3.2. Program Criteria Compliance

The Project complies with all CAP criteria. It is located within the U.S.-Mexico border region served by BECC and NADB, is being sponsored by a public sector entity and is in an environmental sector eligible for NADB financing. Additionally, as a water project, it is considered a priority under the CAP program. As shown in the above table, the Project Sponsor has agreed to cover more than the 10% minimum required under the program.

All necessary permits and authorizations have been obtained, and the Project Sponsor is ready to initiate bidding for construction once funding has been approved. Upon completion, an estimated 1,178 residents will directly benefit from improved drinking water services.

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2.3.3. Conclusion

For the above reasons, NADB proposes providing a CAP grant of up to US$500,000 to the City of Nogales, Arizona, for construction of the Project.

3. PUBLIC ACCESS TO INFORMATION

3.1. PUBLIC CONSULTATION

BECC released the draft certification and financing proposal for a 14-day public comment period beginning April 23, 2015. The following Project documentation is available, upon request:

- Approval to Construct Water Facilities, ADEQ File No. 20120156, Aug. 31, 2012;
- Final Design for the 8-inch water main, Crawford Street – McNab Drive, prepared by CPE Consultants of Tucson, AZ, in 2012;
- Nogales Capital Improvement Program (CIP); and
- Pipe material selection methodology, Letter from City of Nogales, Arizona, dated May 16, 2014.

The public comment period ended on May 7, 2015, with no comments received.

3.2. OUTREACH ACTIVITIES

As part of the utility’s normal business practices, upcoming projects are announced on the PWCON website. The Sponsor promoted the Project at several City Council meetings. The meetings were open to the general public, and meeting agendas, along with the resulting minutes, are made available for public review.

BECC conducted a media search to identify potential public opinion about the Project. No articles related to the Project were identified, and no opposition to the Project was detected in the media search or reported by the Project Sponsor.