



# **CERTIFICATION AND FINANCING PROPOSAL**

## **WASTEWATER TREATMENT PLANT IMPROVEMENTS IN THE TOWN OF PATAGONIA, ARIZONA**

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## EXECUTIVE SUMMARY

### WASTEWATER TREATMENT PLANT IMPROVEMENTS IN THE TOWN OF PATAGONIA, ARIZONA

<b>Project:</b>	The proposed project consists of improvements to the wastewater treatment plant (WWTP) for the town of Patagonia, AZ (the “Project”). The improvements include upgrades to basin walls, secondary process equipment, chemical dosing, aeration, reuse water system, sludge dewatering, controls, and instrumentation.
<b>Objective:</b>	The purpose of this Project is to reduce the human health risks associated with waterborne diseases caused by exposure to untreated or inadequately treated wastewater and to reliably meet effluent discharge requirements, contributing to the protection of aquatic ecosystems and water quality in the receiving water body.
<b>Expected Outcomes:</b>	<p>The Project is expected to generate environmental and human health benefits related to the following Project outcomes:</p> <ul style="list-style-type: none"><li>• Improve wastewater services to 443 existing residential connections.</li><li>• Eliminate the risk of WWTP failure that could result in approximately 45,000 gallons per day (gpd) of untreated or inadequately treated wastewater discharges to the Sonoita Creek, a tributary of Patagonia Lake.</li><li>• Achieve full compliance with applicable regulations through an improved treatment process.</li><li>• Increase operational efficiency of the wastewater system, which will reduce energy costs and maintenance requirements.</li></ul>
<b>Population to be Benefit:</b>	772 residents in the Town of Patagonia, Arizona. <sup>1</sup>
<b>Project Sponsor:</b>	Town of Patagonia, Arizona.
<b>Project Cost:</b>	US\$600,000

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<sup>1</sup> Source: Based on 2020 Census.

**NADB Grant:** Up to US\$500,000 dollars from the Community Assistance Program (CAP).

**Uses and Sources of Funds:**

Uses	Amount	%
Construction*	\$ 600,000	100.0
<b>TOTAL</b>	<b>\$ 600,000</b>	<b>100.0</b>
Sources	Amount	%
Town of Patagonia	\$ 100,000	20.0
NADB CAP grant	\$ 500,000	80.0
<b>TOTAL</b>	<b>\$ 600,000</b>	<b>100.0</b>

\* Includes construction, contingencies, construction management and bid alternate.

**Project Status:**

Key Milestones	Status
Final design	Completed in June 2021
AZPDES Permit	Completed in April 2020
Aquifer Protection Permit (for operation) - ADEQ*	Amendment completed in August 2021
Procurement	Anticipated in 4th quarter of 2021
Construction period	Estimated period of 5 months

\* Arizona Department of Environmental Quality (ADEQ). No construction permit required.

# CERTIFICATION AND FINANCING PROPOSAL

## WASTEWATER TREATMENT PLANT IMPROVEMENTS IN THE TOWN OF PATAGONIA, ARIZONA

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### 1. PROJECT OBJECTIVE AND EXPECTED OUTCOMES

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The proposed project consists of improvements to essential WWTP components for the town of Patagonia, AZ (the “Project”) including upgrades to basin walls, secondary process equipment, chemical dosing, aeration, reuse water system, sludge dewatering, controls, and instrumentation. The purpose of this Project is to reduce the human health risks associated with waterborne diseases caused by exposure to untreated or inadequately treated wastewater and to reliably meet effluent discharge requirements. The Project is to eliminate the risk of WWTP failure that could result in approximately 45,000 gallons per day (gpd) of untreated or inadequately treated wastewater discharges to the Sonoita Creek, a tributary of Patagonia Lake and provide improved wastewater treatment for 443 existing residential connections.

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### 2. ELIGIBILITY

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#### 2.1. Project Type and Description

The Project falls within the eligible category of wastewater.

#### 2.2. Project Location

The Project will be implemented in the Town of Patagonia, Arizona, which is in the southeastern region of the state of Arizona, approximately 62 miles (100 kilometers) south of Tucson, Arizona and approximately 12 miles (19 kilometers) northeast of Nogales, Arizona, which is located adjacent to the U.S.-Mexico border. Its geographical coordinates are between 31°32'17.68"N and 110°45'36.53"W. Figure 1 shows the approximate location of the Project.

**Figure 1**  
**PROJECT LOCATION MAP**



### 2.3. Project Sponsor and Legal Authority

The public-sector Project sponsor is the Town of Patagonia, Arizona (the “Sponsor” or the “Town”). The Town was incorporated by the Board of Supervisors of Santa Cruz County, AZ, on the 16<sup>th</sup> of February 1948.<sup>2</sup> Pursuant to Arizona Revised Statutes (A.R.S.) 9-511 and 9-514, the Sponsor has the legal authority to operate and maintain water treatment, storage, and distribution systems, as well as wastewater collection and treatment systems. The Town’s Public Works Department is authorized to provide water and sewer services to the community, and it is responsible for developing infrastructure improvement projects.

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## 3. CERTIFICATION CRITERIA

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### 3.1. Technical Criteria

#### 3.1.1. General Community Profile

The Town of Patagonia was developed in the mid-19th century as a trading and supply center for nearby mines and ranches. Currently, it is a tourist destination, retirement community, and arts and crafts center. Patagonia consists of quiet residential areas and limited commercial activities centralized around SR 82.

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<sup>2</sup> The Arizona State Library Archives, Town of Patagonia, AZ.

The Town of Patagonia has a population of 772; the employment rate is approximately 36.5%.<sup>3</sup> The poverty level for the Town of Patagonia is estimated at 17.7%, more than the 14.9% poverty level estimated for the state.<sup>4</sup> The median household income (MHI) is estimated at US\$33,482, which is approximately 35% less than the state MHI of US\$51,340.<sup>5</sup>

Table 1 describes the status of basic public services and infrastructure in the Town of Patagonia, Arizona.

**Table 1  
 PATAGONIA BASIC PUBLIC SERVICES AND INFRASTRUCTURE\***

Water System*			
Coverage	98%		
Supply source	Groundwater (2 active wells – 96’ average depth; static water level 34’)		
Number of hookups	444 (423 residential, 21 commercial)		
Wastewater Collection*			
Coverage	98%		
Number of connections	464 (443 residential; 21 commercial) **		
Wastewater Treatment*			
Coverage	100%		
Treatment facility	Plant	Type	Capacity
	Town of Patagonia Wastewater Treatment Plant	Extended Aeration	110,000 gpd

\*Source: Town of Patagonia

\*\*Some of the homes have private wells and are not connected to the town’s distribution system.

**Local Wastewater Collection System**

The Patagonia utility provides drinking water as well as wastewater collection and treatment services to residential and commercial customers. Both improvements to the wastewater collection system and construction of the existing WWTP were completed in 2004 with funding provided from NADB.

The sewage collection system operates by gravity and consists of approximately four miles of sewer collections lines (6, 8, and 10-inch gravity sanitary sewer pipes), serving 464 connections. Wastewater is conveyed to the Patagonia wastewater treatment plant (WWTP) located on the west side of Patagonia just north of SR 82.

The WWTP is an extended aeration system, which includes head works, an anoxic basin for denitrification, two aeration basins, a clarifier, a three-basin chlorine contact chamber, a de-chlorination and a flow meter chamber, an aerobic sludge digester, and sludge processing

<sup>3</sup> Source: U.S. Census Bureau 2020

<sup>4</sup> Source: Ibid.

<sup>5</sup> Source: Ibid.

equipment. The WWTP has an average daily flow of 45,000 gpd, and a capacity of 110,000 gpd. Figure 2 shows the WWTP site.

**Figure 2**  
**PATAGONIA WWTP SITE**



While the plant capacity is sufficient for the volume of current and future wastewater flows, some of the plant's equipment has fallen into disrepair and structural issues compromise the treatment train process, increasing the risk for inconsistent treatment results or plant failure. To address immediate risks, the Town has recently implemented the following necessary improvements:

- Replacing the influent lift station
- Replacing the headworks auger
- Repairs to the flow meter

Additional conditions requiring improvements at the WWTP facilities include:

- Concrete wall seams are leaking into the secondary treatment chambers and perimeter wall leaks have also been observed (Figure 2).
- Failing equipment must be replaced, including:
  - Controls and instrumentation,
  - Sludge quick coupling and pump piping, and
  - Sludge dewatering conveyor system and Phoenix belt press
- Deteriorated structure conditions at the Chemical Building allows flooding into the facility and the lack of on-site accessibility to electricity as well as other safety issues create risks for basic operation and maintenance activities.



**Figure 3**  
**Leaking Basin Walls**



### **3.1.2. Project Scope**

The Project consists of improvements to the following components:

- basin walls,
- secondary treatment system,
- chemical dosing system,
- coarse bubble aeration,
- sludge quick coupling & pump piping,
- Phoenix belt press (proprietary equipment),
- reuse water system, as well as,
- instrumentation and control components.

If funding is sufficient, improvements to the sludge dewatering conveyor will also be included. Additionally, the construction management services will be contracted by the sponsor to oversee the contractor's performance and construction process.

### **3.1.3. Technical Feasibility**

Technical Assistance was awarded to the Project sponsor to prepare the final design, specifications and bid documents. The final design for the proposed Project was completed in accordance with the minimum design criteria required to meet the operational permits as established by ADEQ and the Project will need to remain in operation and ensure compliance with existing state and federal permits.

The consultant performed an evaluation of the WWTP to determine upgrade recommendations and an implementation plan. The WWTP improvements have been determined based on best management practices, such as, reconstructing the belt press as a more cost-effective option than replacing the unit. In addition, ADEQ determined that since the last major WWTP improvements were completed in 2004, an Other Amendment to the APP was required to document the

proposed improvements, specifically the proposed change from coarse bubble to fine bubble aeration.

### 3.1.4. Land Acquisition and Right-of-Way Requirements

The WWTP Improvements will be completed within existing property and rights-of-way owned by the Town. No additional property or easements are required to implement the Project.

### 3.1.5. Project Milestones

It is estimated that once the Notice to Proceed is issued, construction will take approximately 5 months. The factors that may affect the Project completion date, such as weather conditions, or delivery of materials have been considered. Table 2 summarizes the Project milestones and their specific status.

**Table 2**  
**PROJECT MILESTONES**

Key Milestones	Status
Final design	Completed in June 2021
AZPDES Permit	Completed in April 2020
Aquifer Protection Permit- ADEQ	Amendment completed in September 2021
Procurement	Anticipated in 4th quarter of 2021
Construction period	Estimated period of 5 months

### 3.1.6. Management and Operation

Management and operation of the proposed Project will continue to be the responsibility of the Town of Patagonia, which has sufficient resources and experienced technical staff available for these purposes. The facility is operated by two Level I Wastewater Operators, and one contracted Level III Wastewater Operator. The Level I operators have recently completed training to reach Level II Wastewater Operator status and, if achieved, will meet the appropriate operator level to oversee the facility without contracted support. Procurement for the Project will be conducted by the Town's Procurement Office, which has experience in competitive bidding activities for infrastructure projects.

The Project Sponsor has an Operation and Maintenance (O&M) manual that includes the primary tasks needed to ensure proper operation of the existing infrastructure and planned upgrades. The proposed WWTP improvements will provide more flexibility in its operation. As a result of the increased efficiency, operation costs for this facility should be positively impacted by a reduction in energy costs and maintenance requirements. The Sponsor estimates that the Project will result in cost savings of approximately US\$7,000 per year. An adjustment in user rates is not required to fund the Project or the O&M for the wastewater facilities.

## 3.2. Environmental Criteria

### 3.2.1. Environmental and Health Effects/Impacts

#### A. Existing conditions

Originally built in 1978, several critical components of the Patagonia WWTP have exceeded their useful life and cannot be repaired, including equipment such as process control and instrumentation and sludge management components. Additionally, while hydraulic capacity at the WWTP is sufficient for existing and future wastewater flows, structural issues compromise the treatment train process, increasing the risk for inconsistent treatment results or plant failure. Finally, deteriorated structure conditions at the Chemical Building allow flooding into the facility and the lack of on-site accessibility to electricity as well as other safety issues create risks for basic operation and maintenance activities.

The no-action alternative was not considered viable, since the WWTP is at risk of non-compliance to the discharge permit or, eventually, process failure, which could result in untreated discharges to the Sonoita Creek. The Town is subject to fines for uncontrolled wastewater discharges. Additionally, current operating conditions at the WWTP are inefficient and affect the sustainability of the utility. Therefore, the Project is considered a high priority.

#### B. Project Impacts

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

- Improve wastewater services to 443 existing residential connections.
- Eliminate the risk of WWTP failure that could result in approximately 45,000 gallons per day (gpd) of untreated or inadequately treated wastewater discharges to the Sonoita Creek, a tributary of Patagonia Lake.
- Achieve full compliance with applicable regulations through an improved treatment process.
- Increase operational efficiency of the wastewater system, which will reduce energy costs and maintenance requirements.

The Project will help prevent health problems by ensuring reliable wastewater treatment services, eliminating the potential for untreated discharges to an open creek bed and avoiding potential risks for human contact and surface or groundwater contamination.

As a reference for existing health statistics in the area, Table 3 shows the incidence of waterborne diseases in Santa Cruz County, Arizona.

**Table 3**  
**WATERBORNE STATISTICS FOR SANTA CRUZ COUNTY, ARIZONA**

Disease	Number of Cases per Year				
	2013	2014	2015	2016	2017
Amebiasis	4	0	4	5	5
Campylobacteriosis	53	57	88	75	87
Cryptosporidiosis	1	5	4	9	11
Giardiasis	19	19	17	21	29
Shigellosis	10	9	11	20	11
Vibriosis	0	4	4	2	2

Source: Santa Cruz County, Health Services Agency.

**C. Transboundary Impacts**

Sonoita Creek flows west towards Patagonia Lake, away from the border. Therefore, no negative transboundary impacts are anticipated.

**3.2.2. Compliance with Applicable Environmental Laws and Regulations**

The Project will comply with the following regulations of ADEQ:

- *Aquifer Protection Permit (APP). In compliance with Arizona Revised Statutes (A.R.S.) 49-241, and Arizona Administrative Code (A.A.C.) R18-1-503(1) an Arizona Aquifer Protection Permit (APP) permit Amendment (“Other Amendment”) is required for any facility that discharges pollutants to the groundwater (issued in Sep 2021).*
- *Arizona Pollutant Discharge Elimination System (AZPDES). In compliance with the provisions of Arizona Revised Statutes (A.R.S.) Title 49, Chapter 2, Article 2.1; the AZPDES Permit No. AZ0025011 was re-issued on April 18, 2020 (must be renewed every 5-years).*

Implementation of the Project requires an amendment to the existing APP. An APP amendment application was coordinated with ADEQ during development of design.

**A. Environmental Clearance**

There are no formal environmental clearance laws applicable to the Project.

**B. Mitigation Measures**

The Project, itself, will mitigate the environmental and human health risks associated with exposure to partially or untreated wastewater discharges. The WWTP improvements will allow for operation without interruption.

No other environmental impacts are anticipated during construction of the Project, provided that the tasks are implemented in accordance with best management practices. Typical mitigation measures to be practiced during the implementation phase include:

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

**C. Pending Environmental Tasks and Authorizations**

There are no other pending environmental authorizations.

**3.3. Financial Criteria**

The total estimated cost of the Project is US\$600,000, which includes construction and contingencies. The Sponsor requested a US\$500,000 grant from NADB through its Community Assistance Program (CAP) to support implementation of the Project. Table 4 presents a breakdown of the sources of funding.

**Table 4  
 SOURCES AND USES OF FUNDS**

Uses	Amount	%
<b>Construction*</b>	<b>\$ 600,000</b>	<b>100.0</b>
<b>TOTAL</b>	<b>\$ 600,000</b>	<b>100.0</b>
Sources:	Amount	%
<b>Town of Patagonia</b>	<b>\$ 100,000</b>	<b>20.0</b>
<b>NADB CAP grant</b>	<b>\$ 500,000</b>	<b>80.0</b>
<b>TOTAL</b>	<b>\$ 600,000</b>	<b>100.0</b>

\* Includes construction, contingencies and construction management and bid alternate

The proposed Project complies with all CAP criteria. The Project is located within the US-Mexico border region served by NADB; the Project sponsor is a public entity; and the works comprised in the Project fall within one of the environmental sectors eligible for NADB financing. Furthermore, being a WWTP improvement project, it is considered a priority project in accordance with CAP guidelines. As shown in the previous table, the Sponsor will cover approximately 20% of the cost with their own resources, which is more than the minimum 10% requirement established under the program.

The final design, specifications and the bid documents have been completed through NADB-TA awarded to the Town of Patagonia. The Sponsor is prepared to start the implementation process once CAP funding is approved.

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## 4. PUBLIC ACCESS TO INFORMATION

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### 4.1. Public Consultation

NADB published the draft Certification and Financing Proposal for a 14-day public comment period beginning September 20, 2021. The following Project documents are available upon request for public access:

- Town of Patagonia WWTP Upgrades Pre-Design Recommended Improvements and Phasing Plan dated February 2, 2021.
- Town of Patagonia WWTP Upgrades Construction Drawings dated August 2021.

### 4.2. Outreach Activities

The Town Manager provided Project information to the Mayor and Town Council during regular monthly council meetings, providing updates on Project progress. The meetings were open to the public, and meeting agendas were made available at least 24-hours prior to the meetings. There were no public comments related to the proposed Project documented during these regular public forums.

NADB conducted a media search to identify potential public opinion about the Project; however, no articles were found about it. The activities conducted by the Town Manager show that the public has received updates about the Project. The Sponsor has informed NADB that no opposition to the Project has been identified.