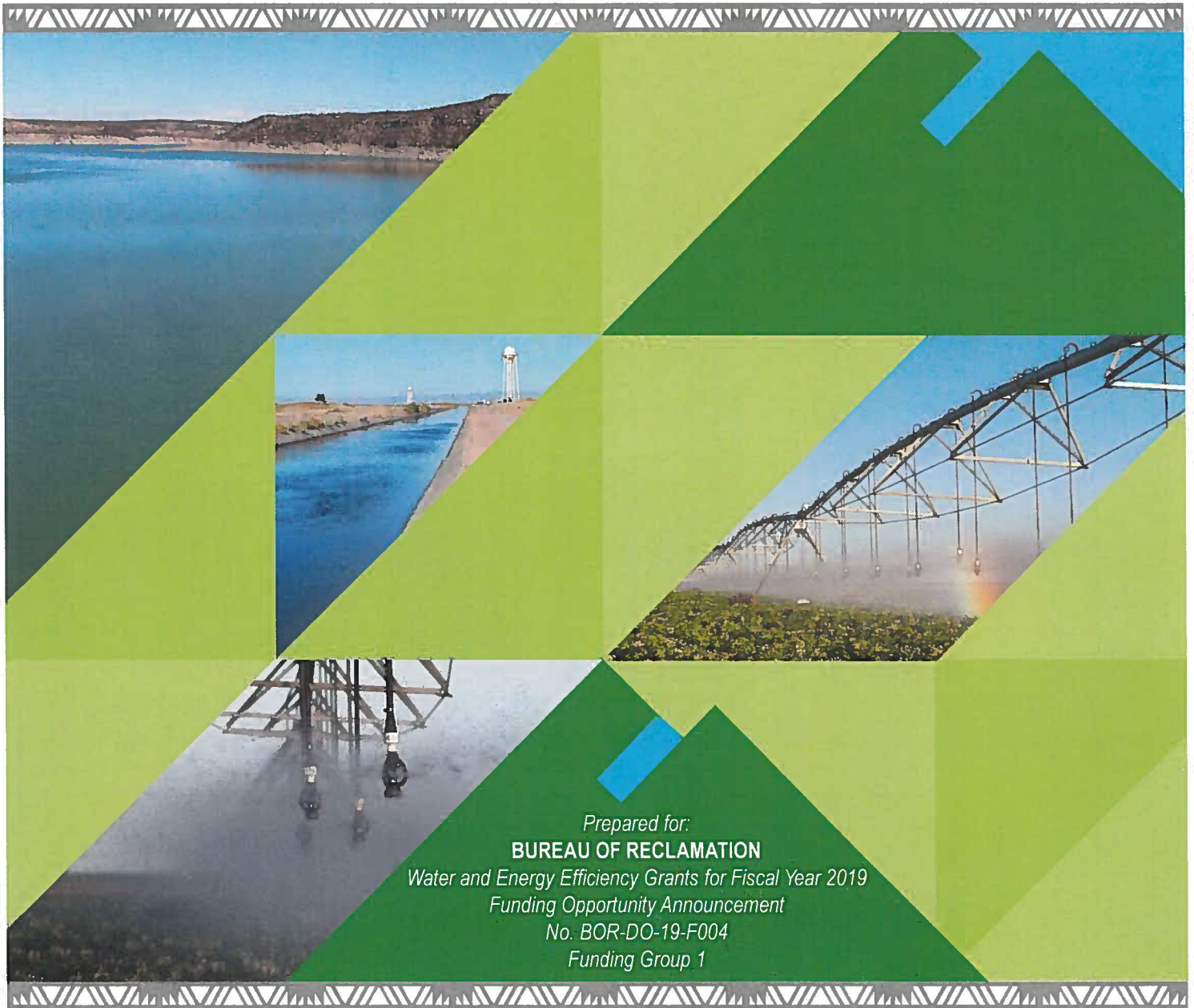


NAVAJO AGRICULTURAL PRODUCTS INDUSTRY

2019 PROPOSAL for WATER and ENERGY EFFICIENCY GRANT



Prepared for:

BUREAU OF RECLAMATION

Water and Energy Efficiency Grants for Fiscal Year 2019

Funding Opportunity Announcement

No. BOR-DO-19-F004

Funding Group 1

LORENZO MARTINEZ, ENGINEER
NAVAJO AGRICULTURAL PRODUCTS INDUSTRY
Tel (505) 609-4239 | Fax (505) 960-9458
P.O. Box Drawer 1318 | Farmington, NM 87499
March 18, 2019

MAR 19 '19 PM 1:59

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Technical Proposal

Navajo Agricultural Products Industry (NAPI) is pleased to submit an application to the Bureau of Reclamation WaterSMART: Water and Energy Efficiency Grants for Fiscal Year 2019 – Funding Opportunity Announcement No. BOR-DO-19-F004 – Funding Group 1.

Executive Summary

Date: **March 19, 2019**

Applicant Information: **Navajo Agricultural Products Industry**
P.O. Drawer 1318
Farmington, NM 87499

Project Manager: **Lorenzo Martinez, Engineer**
Telephone: (505) 609-4239
Fax: (505) 960-9458
lmartinez@navajopride.com

NAPI is proposing to implement better irrigation scheduling by installing Valley Scheduling equipment to 130 center pivots across the NAPI owned farmland. NAPI will invest \$222,000 of their own funds and use approximately \$150,000 of WaterSMART funding to purchase and install the scheduling equipment. Installation of the scheduling equipment will assist NAPI with the following:

- Increase irrigation scheduling
- Lower crop stress
- Decrease deep percolation
- Annually divert less water from Navajo Reservoir

NAPI plans to start the project in November 2019 with full project completion by April 2020. Consequently, this proposal should be able to be funded under WaterSMART Funding Group 1. The proposed project fulfills the WaterSMART funding criteria by having a quantifiable water saving at the end of the irrigation season.

Background Data

NAPI was developed by the Navajo Nation Council as a Navajo-Owned Enterprise to create employment and operate a profitable Agri-business. NAPI has become one of the largest contiguous farmland in the nation and provides 'Navajo Pride' products domestically and internationally. Currently, NAPI farms or leases approximately 72,000 acres. The five major crops grown at NAPI are alfalfa, beans, corn, potatoes, and wheat. The major infrastructure conveying water from Navajo Reservoir to NAPI's center pivot turnouts is known as the Navajo Indian Irrigation Project (NIIP). NIIP is a Federal owned facility by the Bureau of Indian Affairs (BIA) but operated and maintained by NAPI under Public Law 93-638.

BIA and Keller-Bliesner Engineering (KBE) Navajo Indian Irrigation Project – Irrigation and Drainage – 2017 Analysis (KBE, 2017), analyzes NIIP’s drainage and groundwater quality and compares the results to New Mexico’s Water Quality Standards. The analysis concluded the western half of NIIP (Region 2) has risen approximately 10 feet since the 1990’s and as much as 15 feet in NIIP’s Block 7 as shown in Figure 1. Figure 2 illustrates how poor irrigation scheduling has negatively affected production acres in field 7-27A from 2005 to 2015. As a result, NAPI was forced to fallow out the northwest section of field 7-27A due to the field having swamp like conditions, unsuitable for agricultural production.

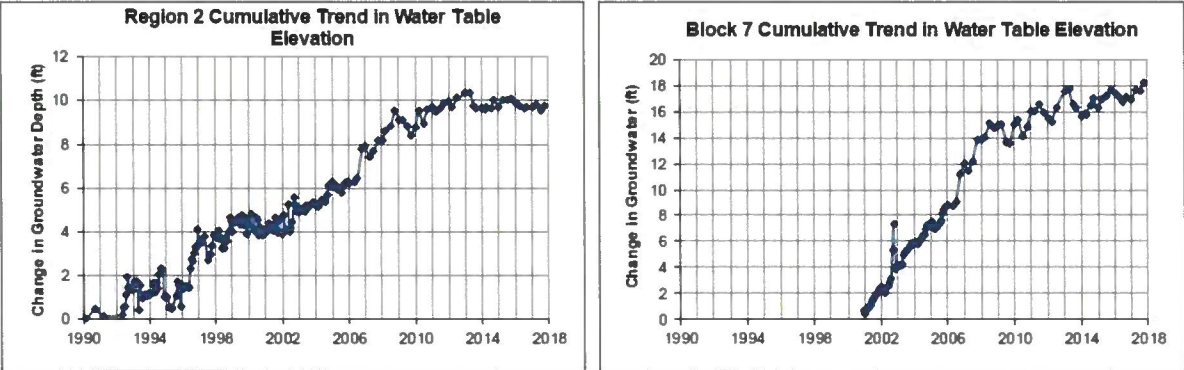


Figure 1: Groundwater Trends (KBE, 2017)



Figure 2: Field 7-27A Satellite Image 2005 vs 2015

NAPI's goal is to improve technology to increase irrigation management and crop growth efficiency. A part of this goal is to implement crop health monitoring, variable rate irrigation, and soil moisture reading.

During the 2018 irrigation season, NAPI installed a trial Valley Scheduling moisture probe within a cornfield to test the annual water saving. The moisture probe communicated with a monitoring software that takes the crop type, development stage, soil, and weather conditions into consideration. The software will then give an optimal moisture content range the crop will need to stay between for that specific area. The cornfield with the moisture probe was compared to a "control" cornfield, similar in size, location, and soil type. At the end of the irrigation season, the field with the Valley Scheduling moisture probe delivered eight percent less water than the field without the probe and keeping product yield the same in both fields.

Project Location

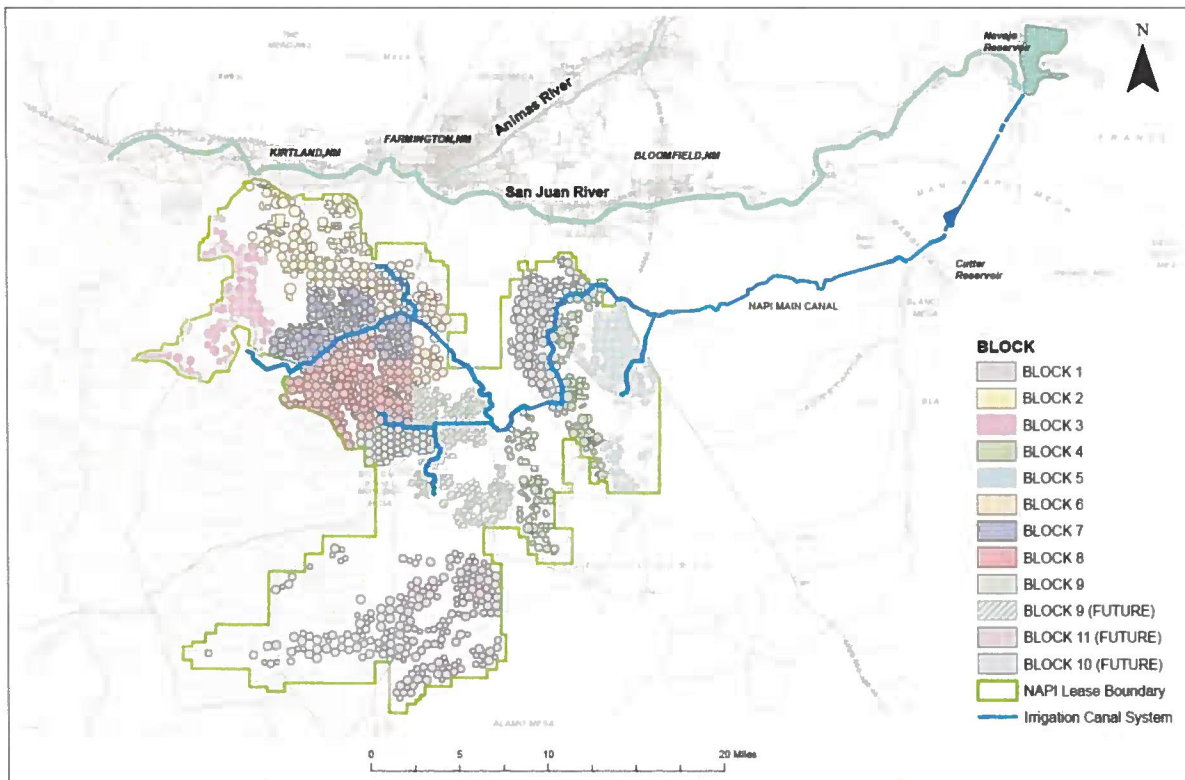


Figure 3: Navajo Indian Irrigation Project

Technical Project Description

NAPI uses approximately 690 center pivots to irrigate fields ranging from 40 acres to 210 acres with an average size of 95 acres. NAPI is proposing to use the WaterSMART funding to install Valley Scheduling equipment to 130 center pivots across the farm for the 2020 irrigation season. Table 1 breaks down the estimated total water saving to be 2,672 acre-feet.

Table 1: Estimated Water Saving

Crop	No. of Sites	Acres	2015-2018 Average Water Delivery, ft.	Estimated Water Saving, ac-ft.
Alfalfa	40	3,800	3.47	1,054
Beans	14	1,330	1.89	201
Corn	40	3,800	2.71	823
Potatoes	12	1,140	2.49	227
Wheat	24	2,280	2.02	368
Total	130	12,350		2,672

Evaluation Criteria

Evaluation Criteria A – Quantifiable Water Saving

A high percentage of NAPI’s irrigable land is receiving an excessive amount of water every irrigation season. The Valley’s Scheduling equipment will lower the annual water delivery by providing NAPI with precise irrigation recommendation each week. Each site will be unique as the crop, soil conditions, and weather conditions differ across the farm. At the end of the 2020 irrigation season, NAPI’s Irrigation department will quantify the total amount of water delivered to each field. NAPI will compare the 2015-2018 average water delivery to the total water delivery to the center pivots with the scheduling equipment.

Equation 1: Actual Water Saving

$$Field\ ABC_{water\ saving} = [Field\ ABC_{acres} \times 4year\ average\ crop\ delivery] - Field\ ABC_{2020\ water\ delivery}$$

The scheduling equipment will be installed in fields that fluctuate in acreage. However, NAPI will ensure the average size of the fields with the scheduling equipment will be greater than or equal to 95 acres. Due to NAPI having little experience on irrigation scheduling with moisture probes, it is estimated an eight percent water saving will be met for all crops. As the farmers gain more experience in the future, the percentage of water saving will increase. The 4-year average water delivery per crop was used as the reference for percent reduction. Please see sample calculation below for estimated water saving.

Sample calculation: Estimate Water Saving

$$Alfalfa_{water\ saving} = number\ of\ sites \times 95\ acres \times 4year\ average\ crop\ delivery \times 8\%$$

$$Alfalfa_{water\ saving} = 40 \times 95\ acres \times 3.47ft \times 8\%$$

$$Alfalfa_{water\ saving} = 1,054\ acre - ft$$

Table 2: Historical Average Water Delivery per Acre by Crop

Crop	2015, ft.	**2016, ft.	2017, ft.	2018, ft.	Average, ft.
Alfalfa	3.26	3.22	3.53	3.86	3.47
Bean	1.51	1.79	1.95	2.31	1.89
Corn	2.53	2.45	2.78	3.06	2.71
Potatoes	2.00	2.42	2.59	2.95	2.49
Wheat	1.69	1.41	2.35	2.62	2.02

***In 2016, NAPI had a catastrophic failure on one of the siphons on the main conveyance system from Navajo Reservoir to NAPI. This failure halted water delivery to the entire farm for 30 days.*

Table 3: Consumptive Irrigation Requirement (KBE, 2017)

Crop	2015, ft.	2016, ft.	2017, ft.
Alfalfa	2.94	3.31	3.34
Bean	1.23	1.38	1.34
Corn	1.99	2.18	2.16
Potatoes	1.83	2.10	2.04
Wheat	1.45	1.81	1.66

NAPI does not have other intended uses for the potential water saved. NIIP is located on the Upper Colorado River Basin and is a tributary to the Colorado River. Water not delivered will remain in the Navajo Reservoir available for other uses.

What types of devices will be installed and what quantity of each? NAPI is proposing to install Valley Scheduling Equipment.

- 130 Sentek Drill and Drop Soil Moisture probes
- 130 AquaTrac Lite telemetry

Will the devices be installed through a rebate or direct-install program? Direct install program.

Will site audits be performed before and after installation? Yes.

Evaluation Criterion B – Water Supply Reliability

As mentioned in *Evaluation Criterion A*, NIIP’s source of water is diverted from Navajo Reservoir. Increasing irrigation scheduling will result in diverting less water during the irrigation season. The water at Navajo Reservoir is also released into San Juan River, which is a tributary to the Colorado River. The Colorado River is the main source of water to Lake Mead and Lake Powell which been having declining water levels in the past few years.

Evaluation Criterion C – Implementing Hydropower

The project will not be implementing hydropower.

Evaluation Criterion D – Complementing On-Farm Irrigation Improvements

Describe how the proposed WaterSMART project would complement any ongoing or planned on-farm improvement. NAPI is devoted to keep increasing irrigation scheduling with crop health monitoring, variable rate irrigation, and soil moisture reading. An issue for NAPI is losing irrigable acres due to the increasing groundwater level across the farm. The main reason of the increasing groundwater is poor irrigation scheduling. The total amount of water going to deep percolation annually from 2007-2017 is shown in Table 4 (KBE, 2017).

Table 4: Annual Diversion vs Deep Percolation

Year	Irrigated Acres	Diversion (ac-ft.)	Deep Percolation (ac-ft.)	Percent of Diversion going to Deep Percolation
2007	60,007	191,343	30,426	15.90%
2008	60,630	206,823	34,868	16.86%
2009	61,534	209,947	31,373	14.94%
2010	63,832	196,369	39,340	20.03%
2011	63,844	217,642	48,871	22.45%
2012	63,942	234,320	41,868	17.87%
2013	64,225	197,685	31,091	15.73%
2014	64,704	206,004	31,697	15.39%
2015	65,380	171,319	17,665	10.31%
**2016	51,871	163,702	14,397	8.79%
2017	65,082	200,598	21,101	10.52%
Average	62,277	199,614	31,154	15.61%

Provide a detailed description of the on-farm efficiency improvements. NAPI receives environmental quality incentives program (EQIP) grants from the United States Department of Agriculture (USDA) – Natural Resources Conservation Service (NRCS). NAPI has center pivots ranging in age from brand new to over 30 years old. The EQIP funds are used for the replacement of the center pivot machines and sprinkler packages to improve water and energy efficiency. Regardless of the EQIP funding, NAPI replaces 10-15 center pivots annually.

Have the farmers requested technical or financial assistance from NRCS for the on-farm efficiency projects, or do they plan to in the future? Yes. Shown in Table 4 below.

Table 5: Pivot Replacement with NRCS EQIP Funds

NRCS EQIP Funds	No. of Center Pivots Replaced	Acres	Status
Phase 1	11	1,350	Completed April 2018
Phase 2	7	502	In Progress. ETA April 2019
Phase 3	5	490	In Progress. ETA April 2020.

Evaluation Criterion E – Department of Interior Priorities

None.

Evaluation Criterion F – Implementation and Results

Subcriterion F.1 – Project Planning

Does the applicant have a Water Conservation Plan and/or System Optimization Review (SOR) in place? Yes, United States Bureau of Reclamation (Reclamation) has brokered a shortage sharing agreement for the San Juan Basin for implementing drought contingency measures. The NIIP storage rights in Navajo Reservoir are key for implementing the agreement. Hence, any water conserved by NAPI is helpful to Reclamation in managing the reservoir and implementing the shortage sharing agreement.

Subcriterion F.2 – Performance Measures.

NAPI's Irrigation department summarizes the water delivery to each individual field monthly and at the end of the irrigation season. NAPI will be able to compare water delivery for fields with scheduling equipment to the 4-year average delivery. Furthermore, KBE will calculate the total volume going to deep percolation. NAPI can compare percent of diversion going to deep percolation to the historical average.

Subcriterion F.3 – Readiness to Proceed

NAPI will be able to proceed with project once awarded. The goal is to have moisture probes installed and ready for operational use for the 2020 irrigation season. There are no engineering designs or new administrative actions required for the project.

Major tasks and schedule:

1. Procurement – Once awarded, NAPI will purchase all equipment required for Valley Scheduling (11/1/2019 to 12/31/2019)
2. Selection of Sites – NAPI engineers and farmers will select 130 center pivots to install the scheduling equipment. Selection will be based on crop type, location, groundwater issues, soil conditions, and pumping cost per acre-ft. (1/1/2020 to 1/31/2020)
3. Installation – Install scheduling equipment to the selected fields (2/1/2020 to 3/15/2020)
4. Troubleshooting – Troubleshoot scheduling equipment wireless communication to scheduling software (3/15/2020 to 4/15/2020)
5. Project Completion – Complete project by 4/30/2020

Evaluation Criterion G – Nexus to Reclamation Project Activities

In 2014, Reclamation and users of the Colorado River began implanting pilot programs to address the lowering water levels in Lake Mead and Lake Powell. The conservation of water delivery to NAPI will allow Reclamation to use water saving downstream of Navajo Reservoir.

Does the applicant receive Reclamation project water? No. All water is Navajo Nation water held in trust by the United States. The Navajo Nation holds Contract 10-WC-40-384 with the United States Department of Interior Bureau of Reclamation which agrees to deliver, or make available for delivery, to the Navajo Nation an average diversion of not more than 508,000 acre-feet per year, or the quantity of water necessary to supply an average depletion of 270,000 acre-feet per year from the San Juan River, whichever is less, during any period of ten consecutive years, and not more than 584,200 acre-feet in any one year for delivery to the NIIP.

Is the project on Reclamation project lands or involving Reclamation facilities? Yes. Navajo Reservoir is a Reclamation facility. In addition, The NIIP construction infrastructure has yet to be transferred to BIA are Reclamation facilities.

Is the project in the same basin as a Reclamation project or activity? Yes. The San Juan Basin in New Mexico includes the West Hammond Conservancy District and the Navajo Gallup Water Supply Project.

Will the proposed work contribute water to a basin where a Reclamation project is located? No additional water.

Will the project benefit any tribe(s)? No.

Evaluation Criterion H – Additional Non-Federal Funding

$$\frac{\text{Non – Federal Funding}}{\text{Total Project Cost}} = \frac{\$222,000.00}{\$372,000.00} = 59.7\%$$

Project Budget

Funding Plan and Letter of Commitment

NAPI is committed and ready to provide \$222,000 of their own funds to this project. Please see letter dated March 19, 2019 from NAPI’s Interim Chief Executive Officer.

Budget Proposal

Table 6 summarizes the project budget.

Table 6: Total Project Cost

Funding Source	Amount
Costs to be reimbursed with the requested Federal funding	\$ 150,000.00
Costs to be paid by applicant	\$ 222,000.00
Value of third party contributions	\$ 0.00
Total Project Cost	\$ 372,000.00

Table 7: Budget Proposal

Budget Item Description	\$/unit	Qty.	Qty. Type	Total Cost
Salary and Wages				
Lorenzo Martinez, Engineer	\$ 28.85	20	hours	\$ 576.92
Lane Pablo, Engineer	\$ 24.04	10	hours	\$ 240.38
Davidson Tsoisie, Engineer	\$ 24.04	10	hours	\$ 240.38
Al Nakai, GIS Coordinator	\$ 21.63	20	hours	\$ 432.69
Fringe Benefits				
Full-Time Employees (8.34%)	\$ -			\$ 124.30
Travel				
None	\$ -			\$ -
Equipment				
None	\$ -			\$ -
Supplies and Material				
90cm Sentel Drill and Drop Soil Moisture Probes	\$ 761.00	130	each	\$ 98,930.00
AquaTrac Lite Telemetry	\$ 646.75	130	each	\$ 84,077.50
Installation Kit – 900mm Tapered Auger and Probe Extraction Tool	\$1,051.00	2	each	\$ 2,102.00
Contractual/Construction				
Valley	\$1,205.50	130	each	\$ 156,715.00
Third-Party Contributions				
None	\$ -			\$ -
Other				
Contingency (8.32%)	\$ -			\$ 28,560.82
Total Estimate Project Cost				\$ 372,000.00

Budget Narrative

The overall budget for the project is \$372,000. Reclamation’s \$150,000 contribution will be used to purchase a majority of the scheduling equipment required for the project. The total cost for the scheduling equipment is \$185,108.50. NAPI’s contributions will cover the remaining equipment, labor, contractual installation, and the annual subscription cost. Since the procurement of the material installation will not occur until November 2019 – March 2020 there was a line item for contingency to prepare for inflation and unforeseen expenses.

Environmental and Cultural Resources Compliance

- *National Environmental Policy Act (NEPA)* – This project will not adversely affect the surrounding environment.
- *Clean Water Act (CWA)* – BIA and KBE ensures all water runoffs throughout the year from NIIP are compliant with New Mexico Water Quality Standards.

- *Endangered Species Act (ESA)* – The San Juan River has been designed as critical habitat for endangered fish. NAPI does not believe this project will adversely impact endangered fish.
- *National Historic Preservation Act (NHPA)* – Project will not affect any Indian sacred sites or impact tribal lands.

Required Permits or Approvals

NAPI does not anticipate any permits are required to complete the project.

Letter of Support

NAPI does not have any other letter of support for the proposed project.

Official Resolutions

NAPI Board of Directors approved Board Resolution: BDS-41-09 (Exhibit 2) to authorize the Chief Executive Officer or sub-delegate to authorize contracts that are less than \$500,000. Please see letter dated March 19, 2019 from NAPI's Interim Chief Executive Officer agreeing to pursue Funding Opportunity Announcement (FOA) No. BOR-DO-19-F004, and to execute any agreements with Reclamation or other documents that may result will an approval for NAPI for this FOA. NAPI received the ok from Mr. Darren Olson, USBR Grant Management Specialist to use a letter from NAPI's CEO rather than getting an Official Resolution (Exhibit 1).

Unique Entity Identifier and System for Award Management

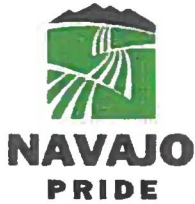
Navajo Agricultural Products Industry

DUNS: 075760850

CAGE Code: 3EX50

Expiration Date: 11/13/19

Purpose of Registration: All Awards



P.O. Drawer 1318, Farmington, NM 87499
Phone: (505) 566-2600 Fax: (505) 960-9458

March 19, 2019

Mr. Darren Olson, Grants Management Specialist
Bureau of Reclamation
Financial Assistance Support Section
Mail Code: 84-27814
PO Box 25007
Denver, CO 80225

Re: Letter of Commitment for Navajo Agricultural Products Industry to Pursue Bureau of Reclamation WaterSMART Grant – Funding Opportunity Announcement No. BOR-DO-19-F004

Dear Mr. Darren Olson,

Navajo Agricultural Products Industry (NAPI), is proud to apply for the *Water and Energy Efficiency Grants for Fiscal Year 2019 (BOR-DO-19-F004)*, 'Funding Group 1.' In conclusion of reviewing the grant criteria, NAPI Interim Chief Executive Officer, Lionel Haskie, and NAPI executive administration are in agreement to execute any agreements with Bureau of Reclamation or other documents that may result will an approval for NAPI for this FOA. NAPI is prepared to comply with all grant criterion and is willing to put forth \$222,000 of its own funding and propose to use \$150,000 of the WaterSMART Grant funding. NAPI is looking forward to working with the Bureau of Reclamation during this process and doing our part in becoming efficient water users.

If you have any questions in regards to this matter, please do not hesitate to contact

Sincerely,

NAVAJO AGRICULTURAL PRODUCTS INDUSTRY
Lionel Haskie, Interim Chief Executive Officer

Cc: Darryl Multine, Chief Financial Officer
Brandy Horner, Controller
Lorenzo Martinez, Engineer

Exhibit 1

Lorenzo Martinez

From: Olson, Darren <dolson@usbr.gov>
Sent: Friday, March 15, 2019 8:13 AM
To: Lorenzo Martinez
Cc: Swickard, Ruth; Irene Hoiby; Joshua German; Maribeth Menendez; Robin Graber
Subject: Re: [EXTERNAL] FW: WaterSMART Grant: BOR-DO-19-F004

Mr. Martinez,

A letter from the NAPI CEO will suffice. If possible, please include a copy of this email string with the letter, in the event that your application packet is reviewed by someone not familiar with your arrangement.

Thanks,

Darren Olson
Grants Management Specialist
Financial Assistance Support Section
Bureau of Reclamation, Department of the Interior
Denver, CO
303-445-3697

On Thu, Mar 14, 2019 at 4:39 PM Lorenzo Martinez <lmartinez@navajopride.com> wrote:

Thank you Darren and Ruth. I appreciate your assistance.

Thanks,



Lorenzo Martinez, Engineer

Navajo Agricultural Products Industry

Main: 505-566-2600 Ext: 1023

Cell: 505-609-4239 Fax: 505-960-9458

PO Drawer 1318, Farmington, NM 87499

www.navajopride.com

Exhibit 1



Stay Connected

with Navajo Pride!

Please consider the environment before printing this e-mail

From: Olson, Darren <dolson@usbr.gov>
Sent: Thursday, March 14, 2019 12:10 PM
To: Swickard, Ruth <rswickard@usbr.gov>
Cc: Lorenzo Martinez <lmartinez@navajopride.com>
Subject: Re: [EXTERNAL] FW: WaterSMART Grant: BOR-DO-19-F004

Hi Lorenzo,

There has been discussion about this between Irene and our Program office. I have not seen a determination yet, but I will pass it along once I see it.

Thanks,

Darren Olson

Grants Management Specialist

Financial Assistance Support Section

Bureau of Reclamation, Department of the Interior

Denver, CO

303-445-3697

On Thu, Mar 14, 2019 at 12:07 PM Swickard, Ruth <rswickard@usbr.gov> wrote:

Exhibit 1

Hi Darren,

Would you please answer Lorenzo Martinez's question.

Thanks,

On Thu, Mar 14, 2019 at 11:38 AM Lorenzo Martinez <lmartinez@navajopride.com> wrote:

Morning Ruth,

I tried to reach out to Irene Hoiby several times this week. I am not sure if she is out of the office. Is there anyone else who can assist with my questions?

Thanks,



Lorenzo Martinez, Engineer

Navajo Agricultural Products Industry

Main: 505-566-2600 *Ext:* 1023

Cell: 505-609-4239 *Fax:* 505-960-9458

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Exhibit 1

 Please consider the environment before printing this e-mail

From: Lorenzo Martinez
Sent: Monday, March 11, 2019 9:06 AM
To: 'IHoiby@usbr.gov' <IHoiby@usbr.gov>
Subject: WaterSMART Grant: BOR-DO-19-F004

Morning Irene,

NAPI is going to apply for USBR WaterSMART Grant: BOR-DO-19-F004. I had a question on the Official Resolution for the submittal packet. NAPI does not have to get a Board Resolution if the funding is less than \$500,000. Is NAPI ok to submit with a letter from NAPI's CEO rather than NAPI's Board of Directors?

Thanks,



Lorenzo Martinez, Engineer

Navajo Agricultural Products Industry

Main: 505-566-2600 Ext: 1023

Cell: 505-609-4239 Fax: 505-960-9458

PO Drawer 1318, Farmington, NM 87499

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Exhibit 1

 Please consider the environment before printing this e-mail

Confidential Disclaimer: The contents of this communication and any files or attachments transmitted contains NAPI and/or Navajo Pride information that is, unless otherwise indicated, confidential; and is intended solely for the individual or entity for which it is addressed. If you are not the intended recipient or the person responsible for delivering the message to the intended recipient, be advised that you have received this message in error and that any reviewing, reading, distributing, copying or other use of this information is strictly prohibited. If you have received this communication in error, please notify the sender immediately and delete this communication and any attachments.

--

Ruth Swickard

Bureau of Reclamation

185 Suttle Street, Suite 2

Durango CO 81303

970-385-6523

rswickard@usbr.gov

Exhibit 2



BDS-41-09

RESOLUTION OF THE NAVAJO AGRICULTURAL PRODUCTS INDUSTRY BOARD OF DIRECTORS

Increasing the Signature Authority of the Chief Executive Officer to \$500,000 for Contracts, Checks, and Other Instruments Related to Ordinary Budgeted Operating Costs and Confirming Such Signature Authority for All Items on NAPI's Board-Approved Capital Budget and the CEO's authority to Delegate Such Authority to the Chief Operating Officer, Subject to Such Policies and Procedures as May Be Required for Prudent Financial Management and/or as Adopted by this Board or by Management not Inconsistent with either such Prudent Financial Management Practices or Board-Approved Policies

WHEREAS:

1. The Navajo Agricultural Products Industry ("NAPI") is a wholly owned enterprise of the Navajo Nation charged with operating and managing a commercial farm on land held in trust by the United States for the Navajo Nation under legislation authorizing the Navajo Indian Irrigation Project; and
2. The NAPI Board of Directors is authorized to manage and give general direction to NAPI management regarding the conduct of NAPI's business affairs; to review and approve fundamental operating, financial, and other corporate, plans, strategies and objectives; and to delegate as it deems appropriate its authority over contracting and similar matters to top management; and
3. Under and consistent with such authority, this Board has established contracting and other guidelines and limitations for top management and may adjust such guidelines and limitations as circumstances warrant; and
4. NAPI has established budgeting procedures for capital outlays and for operations, NAPI's business has become more complex and successful in recent years, and NAPI has attracted, retained and developed a top management team capable of preparing, carrying out and complying with the budgets approved by this Board; and
5. Management's authority regarding its contracting and signature authority should be updated and clarified to reflect such circumstances; and
6. This Board has heard the report and recommendation of management and has determined that it should increase the signature authority of the Chief Executive Officer to \$500,000 for contracts, checks, and other instruments related to ordinary budgeted operating costs and confirm such signature authority in the CEO for all items (including those over \$500,000) on NAPI's Board-approved capital budget, and should confirm the CEO's authority to

Exhibit 2

BDS-41-09

sub-delegate such signature authority to the Chief Operating Officer, subject to such policies and procedures as may be required for prudent financial management (as determined by the Chief Financial Officer after consultation with the CEO) and/or as adopted by this Board or by management not inconsistent with either such prudent financial management practices or Board-approved policies.

NOW THEREFORE BE IT RESOLVED THAT:

1. The signature authority of the Chief Executive Officer ("CEO") is hereby increased to \$500,000.00 for ordinary budgeted operating costs and the CEO's signature authority is further confirmed for all items (including those over \$500,000.00) included in NAPI's Board-approved capital budget; provided, however, that the CEO shall provide contemporaneous notice of such expenditures to the Chairman of the Board.

2. The CEO is authorized to sub-delegate such authority to the Chief Operating Officer; provided, however, that the CEO shall retain ultimate accountability for the actions of the Chief Operating Officer taken under such sub-delegation.

3. All such authority shall be taken in conformity with such policies and procedures as may be required for prudent financial management (as determined by the Chief Financial Officer after consultation with the CEO) and/or as adopted by this Board or by management not inconsistent with either such prudent financial management practices or Board-approved policies, and shall continue in effect until this Board adopts more generally applicable financial management policies addressing the CEO's signature authority.

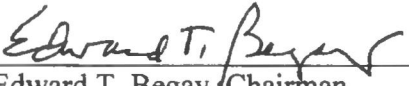
4. Any prior resolution of this Board inconsistent with this resolution is hereby superseded to the extent of such inconsistency.

5. Nothing in this Resolution is intended, nor shall it be construed, as preventing or discouraging the CEO from seeking Board input or approval for any expenditure, regardless of amount or purpose.

CERTIFICATION

I hereby certify that the foregoing resolution was considered by the Navajo Agricultural Products Industry Board of Directors at a regularly called meeting at which a quorum was present at NAPI headquarters near Farmington, New Mexico, and that the same was passed by vote of 4 in favor, 0 opposed, and 0 abstained, this 25th day of September, 2009.

Motion: Lyndon Chee
Second: Jeannie Y. Benally


Edward T. Begay, Chairman
Board of Directors

NAVAJO INDIAN IRRIGATION PROJECT IRRIGATION AND DRAINAGE 2017 ANALYSIS

FINAL

Prepared by

**Bureau of Indian Affairs
Navajo Region
304 North Auburn, Suite B
Farmington, NM 87401**

and

**Keller-Bliesner Engineering, LLC
78 East Center
Logan, UT 84321**

July 20, 2018



**Keller-Bliesner Engineering, LLC
78 East Center
Logan, Utah 84321
435-753-5651 (435-753-6139 Fax)**

Exhibit 4

Full summary available by request

2015 Water Delivery Summary

Field	Acres	Crop	Total AcFt	Feet
01-01-A	72.92	BEANS	82.83	1.14
01-02-A	94.5	CORN	279.27	2.96
01-03-A	73.17	CORN	281.08	3.84
01-04-A	124.01	BEANS	36.24	0.29
01-05-A	120.23	ALFALFA	347.35	2.89
01-07-A	79.87	POTATOES	164.26	2.06
01-08-A	88.32	BEANS	78.64	0.89
01-08-B	62.55	CORN	178.41	2.85
01-09-A	75.13	BEANS	70.90	0.94
01-11-A	65.15	BEANS	83.36	1.28
01-11-B	52.27	BEANS	63.48	1.21
01-11-C	74.81	ALFALFA	214.81	2.87
01-12-A	53.62	ALFALFA	201.47	3.76
01-12-B	66.67	CORN	181.49	2.72
01-13-A	60.02	ALFALFA	224.42	3.74
01-13-B	55.49	BEANS	67.64	1.22
01-15-A	96.08	BEANS	105.47	1.10
01-15-B	49.6	ALFALFA	198.88	4.01
01-16-A	119.38	ALFALFA	506.41	4.24
01-17-A	115.83	ALFALFA	407.14	3.51
01-17-B	49.01	BEANS	56.83	1.16
01-18-A	145.92	CORN	362.44	2.48
01-18-B	90.23	BEANS	90.25	1.00
01-18-C	48.02	BEANS	41.34	0.86
01-19-A	124.75	BEANS	150.81	1.21
01-20-A	60.02	BEANS	76.66	1.28
01-20-B	76.56	BEANS	103.77	1.36
01-21-A	125.71	ALFALFA	415.23	3.30
01-21-B	93.71	BEANS	161.86	1.73
01-23-A	126.67	BEANS	195.38	1.54
01-23-B	91.18	CORN	258.25	2.83
01-24-A	79.87	ALFALFA	269.91	3.38
01-25-A	103.56	WHEAT	234.95	2.27
01-25-B	49.97	ALFALFA	183.49	3.67
01-26-A	68.2	BEANS	62.79	0.92
01-27-A	144.06	POTATOES	351.10	2.44
01-28-A	149.2	ALFALFA	479.74	3.22
01-28-B	88.32	ALFALFA	245.71	2.78
01-29-A	124.76	ALFALFA	420.74	3.37
01-30-A	148.56	ALFALFA	487.63	3.28
01-30-B	75.31	ALFALFA	257.56	3.42

2016 Water Delivery Summary

Field	Acres	Crop	Total AcFt	Feet
01-01-A	72.92	CORN	161.89	2.22
01-02-A	94.5	CORN	309.77	3.28
01-03-A	73.17	CORN	283.06	3.87
01-04-A	124.01	CORN	72.35	0.58
01-05-A	120.23	HAYGRAZER	235.68	1.96
01-07-A	79.87	CORN	232.61	2.91
01-08-A	88.32	CORN	256.24	2.90
01-08-B	62.55	BEANS	124.35	1.99
01-09-A	75.13	CORN	208.12	2.77
01-11-A	65.15	CORN	185.33	2.84
01-11-B	52.27	AVAILABLE	55.41	1.06
01-11-C	74.81	HAYGRAZER	118.82	1.59
01-12-A	53.62	ALFALFA	181.10	3.38
01-12-B	66.67	BEANS	117.80	1.77
01-13-A	60.02	ALFALFA	202.10	3.37
01-13-B	55.49	CORN	157.21	2.83
01-15-A	96.08	CORN	273.72	2.85
01-15-B	49.6	ALFALFA	177.73	3.58
01-16-A	119.38	ALFALFA	398.97	3.34
01-17-A	115.83	ALFALFA	348.69	3.01
01-17-B	49.01	AVAILABLE	64.81	1.32
01-18-A	145.92	BEANS	305.31	2.09
01-18-B	90.23	CORN	269.99	2.99
01-18-C	48.02	CORN	138.88	2.89
01-19-A	124.75	CORN	354.49	2.84
01-20-A	60.02	CORN	148.25	2.47
01-20-B	76.56	CORN	196.02	2.56
01-21-A	125.71	HAYGRAZER	245.90	1.96
01-21-B	93.71	AVAILABLE	120.10	1.28
01-23-A	126.67	CORN	344.09	2.72
01-23-B	91.18	BEANS	166.60	1.83
01-24-A	79.87	ALFALFA	280.89	3.52
01-25-A	103.56	AVAILABLE	153.90	1.49
01-25-B	49.97	ALFALFA	169.42	3.39
01-26-A	68.2	AVAILABLE	74.12	1.09
01-27-A	144.06	CORN	419.53	2.91
01-28-A	149.2	ALFALFA	533.29	3.57
01-28-B	88.32	CORN	214.51	2.43
01-29-A	124.76	CORN	410.84	3.29
01-30-A	148.56	HAYGRAZER	259.05	1.74
01-30-B	75.31	AVAILABLE	18.73	0.25